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OPERABLE UNIT 3 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT VOLUME 2 OF 4 - APPENDIX A - ****DRAFT**** - SEPTEMBER 1995

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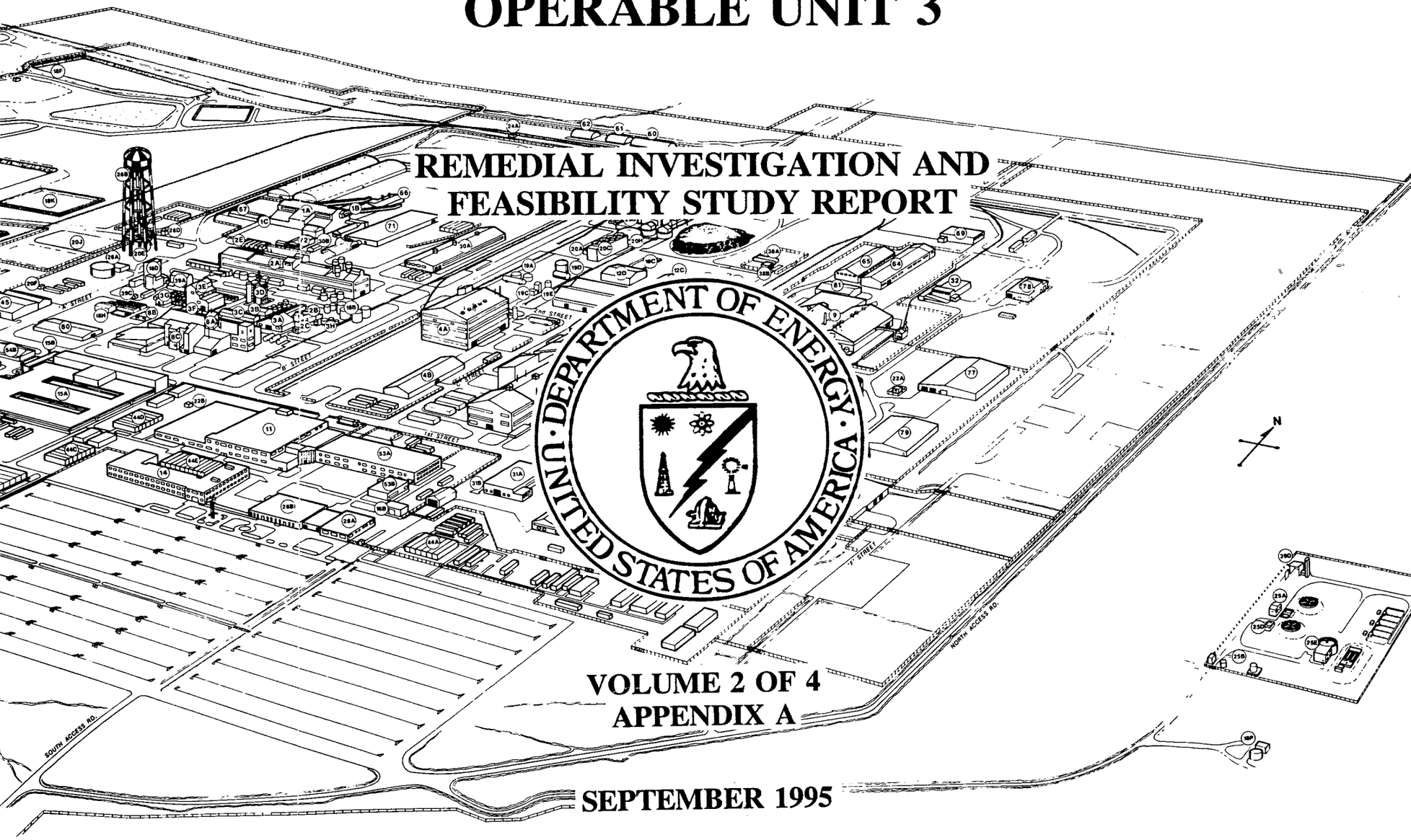

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT

VOLUME 2 OF 4
APPENDIX A

SEPTEMBER 1995

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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OPERABLE UNIT 3 RI/FS REPORT

VOLUME II

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LIST OF ACRONYMS AND ABBREVIATIONS

AHF	anhydrous hydrogen fluoride
AIP	abandoned in place
ALARA	as low as reasonably achievable
Al_2O_3	aluminum oxide
BDN	biodenitrification
BOD	biological oxygen demand
CaO	calcium oxide
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CDD	chlorinated dibenzo p-dioxin
CDF	chlorinated dibenzofurans
cm^2	square centimeter
CO_2	carbon dioxide
CO_3	carbonate
COC	constituent of concern
CPC	constituent of potential concern
DAPP	diamyl-amyl phosphate
D&D	decontamination and dismantlement
DHF	dilute hydrogen fluoride
DOE	United States Department of Energy
dpm	disintegrations per minute
DOE	Department of Energy
EOC	Emergency Operations Center
EPA	United States Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FS	feasibility study
g	gram
g/L	grams per liter
HEPA	high-efficiency particulate air
HF	hydrogen fluoride
HI	hazard index
HQ	hazard quotient
HVAC	heating, ventilating and air conditioning
HWMU	hazardous waste management unit
ILCR	incremental lifetime cancer risk
KCl	potassium chloride
kg	kilogram

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LIST OF ACRONYMS
(Continued)

KPA	kinetic phosphorescence analysis
L	liter
LLW	low-level (radioactive) waste
LMB	long metal box
m	meter
m^2	square meter
MEI	maximally exposed individual
MgF_2	magnesium fluoride
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MgO	magnesium oxide
μg/g	micrograms per gram
μg/L	micrograms per liter
N_2	nitrogen
NaCl	sodium chloride
NaOH	sodium hydroxide
NFS	Nuclear Fuel Services
NORM	naturally occurring radioactive material
NPDES	National Pollutant Discharge Elimination System
OU	operable unit
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi	picocurie
PO_4	phosphate
P_2O_5	phosphorous pentoxide
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROB	roll-off box
SiO_2	silicon dioxide
SO_4	sulfate
SPIT	South Plume Interim Treatment (facility)
STP	Site Treatment Plan
SWIFTS	Sitewide Waste Inventory Forecasting and Tracking System
TAL	target analyte list

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LIST OF ACRONYMS
(Continued)

TBP	tributyl phosphate
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
ThF_4	thorium tetrafluoride
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UF_4	uranium tetrafluoride (green salt)
UF_6	uranium hexafluoride
UNH	uranyl nitrate hexahydrate
UO_2	uranium dioxide (brown oxide)
UO_3	uranium trioxide (orange oxide)
UO_2F_2	uranyl fluoride (black oxide)
U_3O_8	uranium oxide
V_2O_5	vanadium pentoxide
VOC	volatile organic compound
WAC	waste acceptance criteria
WMB	white metal box
WPA	Operable Unit 3 RI/FS Work Plan Addendum

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A.0 DATA EVALUATION

Appendix A presents a detailed characterization of Operable Unit 3 (OU3) of the Fernald Environmental Management Project (FEMP) based on the results of the remedial investigation/feasibility study (RI/FS) field sampling program. This characterization is accomplished by first summarizing the physical characteristics of OU3 (Section A.1.1) and the historical evidence of contamination at the site (Section A.1.4), both of which are detailed in the Operable Unit 3 Work Plan Addendum (WPA) (DOE 1993). From this knowledge of the site, the OU3 target analyte list was developed. Based on the results of the OU3 RI/FS field sampling program, a list of constituents of concern (COCs) is developed in Section A.2 and a series of reference criteria used to characterize contamination within OU3 is presented in Section A.3. Contamination within OU3 is then described in Sections A.4, A.5 and A.6.

During the OU3 RI/FS field sampling program, a total of 1127 samples of twelve media types (acid brick, heating, ventilating, and air conditioning [HVAC] filters, asphalt, concrete, liquids, loose media, masonry, sediment, sludge, soil, transite, and wood) from 137 components were analyzed for one or more analytical fractions (i.e., radiological, inorganic, semivolatile, volatile, and pesticide/PCB - note that all but pesticides/PCBs include TCLP and total fractions), which include a total of 175 analytes. The result is a database of 53,293 separate results (such as elemental uranium for a given sample). The description of such a large number of results suggests multiple levels of detail to aid in the overall understanding of the type and level of contamination within OU3. Five levels of detail have been included in this RI/FS report:

- Appendix L contains the actual analytical results and appropriate validation qualifiers of the sampling program, organized by component category (see A.1.1 for descriptions of component categories).
- The attachments to Appendix A present detailed discussions of the type and level of contamination within OU3 compared to reference criteria (see Appendix A.3 for details regarding reference criteria).
- Appendix A presents a mid-level summary of the type and level of contamination within OU3, based on the details provided in the attachments.
- Section 3 summarizes the key characteristics and issues regarding contamination within OU3 that may affect the decision-making process.
- The Executive Summary highlights the major types and levels of contamination within OU3.

This organization allows the reader to examine the type and level of contamination within OU3 at whatever level of detail is desired.

To further aid in understanding the level and type of contamination within OU3, the discussions in Appendix A (including attachments) and Section 3 are presented from three different viewpoints: by contaminant (Attachment A.II, Appendix A.5, and Section 3.5), by sampled medium (Attachment A.III, Appendix A.6, and Section 3.6), and by component category/component (Attachment A.IV, Appendix A.7, and Section 3.7). This presentation anticipates that different readers will require not only different levels of detail regarding contamination within OU3, but also a description from different viewpoints:

- The discussions by contaminant are useful in identifying the occurrence of specific constituents within OU3; such as what potentially hazardous/mixed wastes occur and at what levels, how widespread they are, and whether or not enriched materials are an issue.
- The media presentations are useful in identifying which media are of most concern as well as the type and level of contamination within each medium.
- The descriptions of the contamination by component category/component presentation are useful in identifying which components are of most concern as well as the type and level of contamination within a particular component/component category.

A.1 DESCRIPTION OF OPERABLE UNIT 3

The Amended Consent Agreement states that OU3 includes all structures, equipment, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, K-65 transfer line, wastewater treatment facilities, fire training facilities, scrap metal piles, feedstocks, and coal pile at the FEMP. This section describes the physical characteristics of this extensive array of production, support, and related facilities.

A.1.1 Components/Component Categories

The former Production Area covers approximately 136 acres and was used essentially as a uranium refinery and foundry. As listed in Table 2-5 (Volume I), OU3 consists of 233 components (e.g., buildings, structures, and appurtenances). As indicated on the table, several of these components (25) contain multiple process areas (125 total), which, by reason of location or production operation, are somewhat different from other areas within the component.

As indicated on the table, the 233 components comprising OU3 have been grouped into 11 categories. This categorization is primarily used for sampling purposes but is also useful for discussion and presentation purposes. The following provides a brief overview of each of these component categories.

Administrative and Support Buildings (Component Category 1)

The administrative and support buildings are shown on Figure A-1. This component category consists of 15 components that have been used primarily for office space and analytical laboratories (excluding radiological laboratories). These components were not part of the production process or waste storage area. As a result, these buildings have low levels of contamination. Although one component in this group (Building 45A) was previously used for machining and rolling uranium products, all process equipment has been removed and the area decontaminated.

Warehouse and Storage Buildings (Component Category 2)

The warehouse and storage buildings are shown on Figure A-2. This component category includes 39 structures used to store containerized waste materials (see Containers and Containerized Materials component categories below). These structures act as secondary containment for the waste, and any contamination results from leakage from the waste containers.

Process Buildings (Component Category 3)

The process buildings are shown on Figure A-3. This component category consists of 31 buildings and areas where potential contaminants have been used as part of production operations. These components currently contain significant quantities of waste material (radiological and chemical) in equipment, pipes, and ducts, as well as contamination associated with the building construction materials. These buildings are expected to be the most significant sources of contaminants for OU3.

Process Support Buildings (Component Category 4)

The process support buildings are shown on Figure A-4. This component category includes 52 structures that house operations currently used to treat contaminated media or to support activities necessary to maintain the site. These structures support daily activities and ongoing and proposed removal actions at the FEMP. The physical distribution of contaminants is varied, consistent with the diversity of activities that took place in these buildings.

Containers and Containerized Materials (Component Categories 5 and 6)

Containers and containerized materials are separated into two groups — above-ground (Component Category 5) and below-ground (Component Category 6). The above-ground containers are shown on Figure A-5. This component category consists of 23 components that now contain (or previously contained) potential contaminants and/or waste materials (including all waste, holdup and product inventories). Note that two of these components include both above-and below-ground facilities. Drummed materials may be exposed on concrete pads or protected in structures. The pads (see Storage Pads, Parking Lot, Roads, and Railroads component category below) and buildings (see Warehouse and Storage Buildings component category above) on/in which the containers are stored are likely to be contaminated by past spills.

The below-ground containers are listed on Figure A-6. This component category includes two buried components that contain (or previously contained) wastes, product, or chemicals. These containers hold residual quantities of material. Most of the underground storage tanks included in this category have been removed. Leakage from these below-ground containers is a potential source for contamination of soil and groundwater. The soil surrounding these containers is likely contaminated by past spills and/or leakage and will be addressed by OU5.

Bulk Material (Component Category 7)

Bulk material storage areas are shown on Figure A-7. This component category includes eight areas with large volumes of exposed material containing low levels of contaminants, all stored without containment.

Storage Pads, Parking Lot, Roads, and Railroads (Component Category 8)

The storage pads, parking lot, roads, and railroads are shown and listed on Figure A-8. This component category consists of 27 components, most of which provided support for the transport or storage of raw materials, products, and wastes. These areas are, or have the potential to be, contaminated by leakage. The soil surrounding these areas may also be contaminated and will be addressed by OU5.

Piping, Utilities, and Equipment (Component Categories 9 and 10)

Piping, utilities, and equipment are divided into two groups — above-ground (Component Category 9) and below-ground (Component Category 10). The above-ground component category is shown on Figure A-9 and includes 26 structures, some of which contained or transported potentially hazardous

substances. Note that three of these components include both above-ground and below-ground facilities. The interiors of such structures are contaminated. Exterior surfaces may have been contaminated by leakage or deposition during production activities.

The below-ground component category is shown and listed on Figure A-10 and contains seven structures. Some of these components contained or transported potentially hazardous substances. The interiors of such structures are contaminated; exteriors may be contaminated by the leakage of contents. That leakage is also a potential source of contamination of soil and groundwater.

Ponds and Basins (Component Category 11)

The ponds and basins are shown on Figure A-11. This component category consists of eight structures or areas where liquids containing potentially hazardous substances are, were, or can be stored without secondary containment. Some of these components contain large volumes of water with relatively small amounts of contamination. They also contain sediments with more concentrated quantities of contamination.

A.1.2 Material Types/Categories

Seventy-four different types of material (such as concrete beams, pipe, and electrical equipment) have been identified within OU3. These materials are composed of only a few media types (i.e., concrete, steel, soil, etc.). As described in Section 2, it is these media types that were sampled during the OU3 RI/FS characterization study and the sampling results applied to materials of the same general media type. As indicated on Table A-1, the material types have been grouped into ten categories according to, in most cases, similar physical characteristics. Because of these similar characteristics, materials within each category will have similar potential disposition options and potential treatment process alternatives.

A.1.3 Material Mass/Volume Estimates

A partial inventory of material quantities for above-grade facilities associated with OU3 was prepared in 1994 from a detailed review of existing drawings and equipment databases. This report has been supplemented by an inventory of material quantities for above-grade facilities for OU3 components omitted in the first study and by an inventory of belowgrade facilities. All of this inventory information has been placed into a single, comprehensive report (DOE 1995a) and compiled into a database, referred to as the Sitewide Waste Information Forecasting and Tracking System (SWIFTS). This extensive database provides the quantity of process and utility piping; HVAC filters, including

process ductwork; electrical conduit; lighting fixtures; transformers; and building and architectural members (including concrete, masonry, transite, acid brick, and structural steel) associated with each component of OU3. Also, equipment types (process, HVAC, electrical, or material handling) are detailed.

The weights and volumes of material comprising OU3 are summarized from the database in Appendix B and are found in Table B-7. In total, OU3 is estimated to contain approximately 9.3 million cubic feet of material weighing approximately 454,000 tons. Over 72 percent of the weight (over 52 percent of the volume) of this material is concrete, masonry, and transite associated with walls, beams, columns, slabs, pads, and foundations. As indicated in Appendix B, the largest amount of concrete (over 50 percent) is associated with at-grade floors and pads and over 40 percent of the concrete is belowgrade (foundations, electrical duct banks, drainage structures, etc.). The next most prevalent material is steel (structural, piping, and equipment), which accounts for approximately 10 percent of the total weight and over 21 percent of the total volume. A significant amount of the material associated with OU3 is in bulk piles (coal, copper metal scrap, gravel, rock salt, sand, and soil). In addition, various drummed inventories, such as hazardous/mixed waste, low-level waste, marketable nuclear material, and thorium inventory (see Appendix B.2), account for a significant percentage of the total OU3 material quantities (five percent of the weight and eight percent of the volume).

Tables A-2 and A-3 summarize these volumes and weights, respectively, according to component and material categories. Approximately 21 percent of the total volume and weight is associated with Component Category 3 - Process Buildings; over 16 percent of the total volume (six percent of the weight) with Component Category 1 - Administrative and Support Buildings; and over 15 percent of the volume (22 percent of the weight) with Component Category 8 - Storage Pads, Parking Lot, Roads, and Railroads. Again, the predominant material within most of the component categories is concrete, comprising over 43 percent of the volume and 79 percent of the weight of buildings (Component Categories 1 through 4) and all of the Storage Pads, Parking Lot, Roads, and Railroads (Component Category 8).

A.1.4 Historical Evidence of Contamination Within OU3

Contamination within OU3 originated during production and waste management operations at the FEMP. These operations resulted in releases of contaminants to the environment through routine discharges, such as permitted air emissions, wastewater discharges, and storm water discharges, as

well as nonroutine events, such as spills and leaks. These discharges resulted in the contamination of the various materials associated with OU3.

The FEMP uranium refining process has been well documented in various reports and publications. These records provide an indication of the type and distribution of radiological and chemical contaminants expected. Table A-4 summarizes the potential contaminants expected within OU3 (DOE 1993) and the following sections describe the sources of these expected contaminants.

A.1.4.1 Expected Radiological Contaminants

During its 37 years of operation, the FEMP produced more than 180,000,000 kilograms (200,000 tons) of uranium metal. The feed materials for this production primarily came from the following three sources:

- High tonnages of purified uranium in solid (uranium metal, black oxide -uranium oxide [U_3O_8], brown oxide - uranium dioxide [UO_2], orange oxide - uranium trioxide [UO_3], and green salt - uranium tetrafluoride [UF_4]); semisolid (uranium hexafluoride [UF_6]); and liquid (uranyl nitrate [$UO_2(NO_3)_2$] solution) forms.
- Intermediate tonnages of uranium ores and ore concentrates containing primarily the isotopes of uranium and its progeny (thorium-230 and radium-226), as well as a wide variety of impurities (see discussion of thorium series and inorganic contaminants below).
- Relatively low volumes of recycled uranium residues and scraps containing fission products (strontium-90, technetium-99, ruthenium-106, and cesium-137) and transformation products (americium-241, neptunium-237, plutonium-238, plutonium-239/240, uranium-236, and plutonium-241).

The FEMP also produced 369,000 kilograms (400 tons) of thorium-232 in the late 1960s and early 1970s. The feed materials for this production were thorium compounds and metal-containing progeny of thorium (radium-228 and thorium-228, as well as thorium-230).

Consistent with the production history at the FEMP, the predominant radiological contaminants in OU3 are expected to be uranium isotopes and their more stable progeny (radium-226, thorium-230, and protactinium-231). Since thorium-232 was also refined at the FEMP, this radionuclide and its more stable progeny (radium-228 and thorium-228) are expected. In addition, shorter-lived radionuclides in the uranium, thorium, and actinium series would be expected. Finally, since the FEMP processed recycled materials, several fission and transformation products are also expected.

A.1.4.2 Expected Inorganic Contaminants

Inorganic chemicals were integral to the manufacturing process at the FEMP. The predominant inorganic chemicals used in the uranium refining process at the FEMP were nitric acid, hydrochloric acid, hydrofluoric acid, magnesium metal, calcium hydroxide (lime), and calcium-magnesium carbonate (dolomite). Magnesium fluoride was also a major waste from the refining process. In addition, the ore concentrates processed at the FEMP contained elevated concentrations (greater than one percent) of impurities such as calcium, iron, magnesium, phosphorus (as phosphorus pentoxide - P_2O_5), sodium, silicon (as silicon dioxide - SiO_2), and sulfur (as sulfate - SO_4), as well as minor concentrations of several other impurities, including arsenic, carbon (as carbonate - CO_3), molybdenum, phosphorus (as phosphate - PO_4), and vanadium (as vanadium pentoxide - V_2O_5). These impurities were concentrated up to five times through the removal of the uranium in the refining process (DOE 1995b).

A.1.4.3 Expected Organic Contaminants

Several uses of organic chemicals have been identified in the history of processing operations at the FEMP. A mixture of kerosene and tributyl phosphate was used as a solvent for the extraction of uranyl nitrate following nitration of uranium ores and recoverable wastes. Other organic materials include oils (lubricating, cutting, cooling, and water-soluble), polychlorinated biphenyls (PCBs), from lubricants and electrical equipment, pesticides and herbicides, and various solvents and cleaning fluids. In general, volatile organic compounds (VOCs) were used in support functions, such as maintenance activities, or were progeny of parent chemicals used at the site. Because many of the oils and oily materials were burned at the FEMP, chlorinated dibenzo p-dioxins/dibenzofurans (CDDs/CDFs), polynuclear aromatic hydrocarbons (PAHs), and phenols could have been produced.

A.2 CONSTITUENTS OF CONCERN

Constituents of concern (COCs) are those contaminants that may make a substantial contribution to site human health and environmental risk. COCs are normally determined in the baseline risk assessment in consideration of constituent concentrations, plausible land uses, and exposure pathways. COCs normally pose a 10^{-7} or greater Incremental Lifetime Cancer Risk (ILCR) or a Hazard Quotient (HQ) greater than 0.1 to the maximally exposed individual (MEI).

As discussed in Section 1, a stand-alone baseline risk assessment was not performed for OU3. A list of COCs, however, is required for the FS portion of this combined document, therefore, an alternative method of determining COCs was used. This method, similar to the method used for

determining constituents of potential concern (CPCs) in standard baseline risk assessments, removed analytes not contributing to risk while providing adequate human health and environmental protection. This section describes the selection process, delineates selection criteria, and presents the results of the screening process. Since the soil piles, sampled as part of the RI/FS Characterization Study, were previously accounted for in the OU5 FS, a comparison between COCs found in excavated soil piles and COCs used in the OU5 FS (DOE 1995c) is also presented.

A.2.1 Overview of Selection Process

The four-step COC selection process used in OU3 is described below, graphically portrayed in Figure A-12.

STEP 1: Separation by media. COC determination was performed on nine media types. Seven of these media constitute the majority of the materials forming the infrastructure of OU3: concrete, acid brick, masonry, steel coatings, transite, asphalt, and wood. These seven media types represent the bulk of OU3 construction debris relevant to this RI/FS. Two other media types not directly related to the RI/FS were also assessed: loose media and excavated soil. Loose media, or miscellaneous debris, is not evaluated as part of this RI/FS because its media will be removed during the interim remedial action and dispositioned in accordance with on-going programs. The excavated soil piles are not directly applicable to the OU3 RI/FS as they are considered in the OU5 FS (DOE 1995c) and will be dispositioned in the OU5 Record of Decision. These soil piles are included in the COC determination that was performed in this report because the analytical results for these soil piles were not available when the OU5 RI/FS was performed. This analysis was performed to ensure that no COCs were overlooked in the analysis performed by OU5 (See Section A.2.4).

Analytical information for each of the previously mentioned media types was drawn for all chemical-specific analytical information (chemical and radiological constituents) specified in the WPA (DOE 1993). In all, 170 constituents were included in the analysis, consisting of 19 radiological constituents, 24 metals, 35 volatile organic chemicals, 66 semivolatile organic chemicals, and 26 pesticides and PCBs. As explained in the WPA sampling and analysis plan (DOE 1993a), not all media were analyzed for all compound classes.

STEP 2: Determination of Representative Concentration. Because of the variety of expected contaminant levels in the production facility and the small number of samples for some media, the maximum detected value for each analyte was used as the representative concentration for COC

screening purposes. This extremely conservative assumption was made to increase the sensitivity of the COC selection process, making certain that all significant contributors were included in the COC selection process.

STEP 3: Compare to Part B Screening Criteria. The representative (maximum) concentration for each analyte within a media was compared to the Part B Screening Criteria for safe levels in residential surface soil (EPA 1991). If the representative concentration exceeded the Part B Screening Criteria, the constituent was considered a COC for that media. Part B Screening Criteria were calculated at an Incremental Lifetime Cancer Risk (ILCR) level of one in ten million (10^{-7}) and a Hazard Quotient of 0.1. Calculation of the Part B screening criteria is presented in Section A.V.

STEP 4: Combine COCs for all media. The final step of the COC selection process was to combine COCs for all media. If a constituent was a COC for any of the 9 media considered, it was considered a COC for all media. This was done to eliminate omission of possibly significant contributions from low concentration sources during contaminant mass calculations. Note that even COCs found exclusively in loose media and soil (media not directly related to this RI/FS) were marked for further consideration in Sections 4, 5, and 6.

A.2.2 COC Selection Criteria

Part B screening criteria for residential surface soil was the sole selection criteria employed for COC screening. Although surface soil is not a perfect model for the construction media screening within OU3, it was felt this was an adequately conservative assumption as construction material are generally less soluble and bioavailable than soil.

All screening levels were calculated from exposure parameters presented in Risk Assessment Guidance for Superfund, Part 1B (EPA 1991). These screening levels are presented in Appendix A.V.

A.2.3 Constituents of Concern in OU3

Media-specific screening is summarized in Table A-5, which displays the Part B screening criteria followed by the maximum concentrations for each of the nine media considered for each constituent. For instance, the Part B screening criteria for the metal antimony is 11 parts per million (ppm). This screening concentration was exceeded in two media, concrete and steel coating, so antimony was retained as a COC.

Screening by the procedure described previously yielded the 60 COCs listed in Table A-6. Of these 60 COCs, thirteen were found only in extraneous media (soil and loose media) and were displayed in brackets. As previously mentioned, these media are not directly applicable to this RI/FS (i.e., loose media will be removed during the interim remedial action and dispositioned according to on-going programs and soil will be dispositioned by OU5) and will not be subject to further evaluation in the FS section of this document. Also note that, by previous agreement with EPA, all detected radionuclides are retained as COCs.

A.2.4 Completeness Check for Soil Media

As mentioned previously, COC determination for OU3 soil piles was performed in this report because the analytical results for these soil piles was not available when the OU5 FS (DOE 1995c) was performed. A comparison between COCs found in this effort and the OU5 FS is a partial completeness test of the previous OU5 modeling effort.

A completeness check for soil media within OU3 is presented in Table A-7. This table compares COCs determined for OU3 soil piles and those used for the OU5 FS. This comparison shows that all COCs found in this analysis were accounted for in the OU5 FS.

A.3 REFERENCE CRITERIA USED DURING CHARACTERIZATION

Characterization of the radiological and chemical contamination in OU3 involves comparison of constituent concentrations to known constituent-specific reference criteria. These reference criteria provide some perspective on the level of contamination within the sampled media. This is important to the characterization process because the comparison assists in the identification of dominant constituents and the media/locations in which they predominate. This determination is needed to help guide the remedial alternative selection process, which is partially dependent on the type, level, and location of contamination in OU3.

A.3.1 Types of Reference Criteria Investigated

The reference criteria used for comparison to sample constituent concentrations include:

- Media-specific baseline constituent concentrations,
- Derived constituent screening level concentrations in soil based on RAGS Part B guidance (EPA 1991),

- Constituent-specific waste acceptance criteria (WAC) at off-site disposal facilities, and
- Constituent-specific Toxicity Characteristic Leaching Procedure (TCLP) concentrations.

A summary of these criteria is provided in Table A-8.

A.3.1.1 Baseline Media Concentrations

A key reference criterion used for comparison is constituent baseline concentration. Baseline concentration is the concentration of a constituent in a medium of interest that is considered not contaminated. Baseline concentrations were determined for concrete and for coatings on structural steel (i.e., paint baseline) and were used for comparison with sample constituent concentrations. Constituent baseline concentrations are addressed in Attachment A.I (Determination of Baseline Conditions) and are summarized in Table A-8.

A.3.1.2 Part B Screening Levels

Another reference criterion used for comparison is constituent soil concentration derived based on EPA guidance (EPA 1991). Part B screening levels are described in Appendix A.V and summarized in Table A-8.

A.3.1.3 Off-Site WAC

Another reference criterion used for comparison is the constituent-specific Waste Acceptance Criteria (WAC) at a representative off-site commercial disposal facility. Disposal facility WAC are constituent concentrations specified by a waste disposal facility to limit the concentration and or total quantity of a constituent in waste that may be accepted for disposal. The disposal facilities' WAC are established to ensure that the long-term impact of the disposal facility is protective of human health and meets appropriate regulatory stipulations. Numerical values for constituent WAC are discussed further in Appendix H and summarized in Table A-8. These numerical values are consistent with those WAC presented in the OU5 FS report.

A.3.1.4 Constituent-Specific TCLP Concentrations

Another reference criterion used for comparison is the constituent-specific 20 times the TCLP regulatory limit (40 CFR 261.24). The EPA has promulgated standards for classification of solid waste as hazardous. One method for determining whether solid waste is hazardous is to determine the quantity of hazardous materials that could potentially leach from a sample into the environment. This

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determination is made using the TCLP specified in the appendix of 40 CFR 261, in which a sample is exposed to acid environment to allow constituent leaching. The leachate is then analyzed for contaminants, and the results are compared to regulatory limits (40 CFR 261.24). Since the TCLP process yields contaminant concentrations in leachate that are 20 times more dilute than contaminant concentrations in the solid sample (see Attachment A.II for a complete description), a solid sample with a contaminant concentration exactly 20 times the TCLP limit from which all of the contaminant leaches should yield a leachate concentration equal to the regulatory limit. Furthermore, a solid sample with a contaminant concentration less than 20 times the TCLP limit cannot yield a leachate concentration greater than the regulatory limit. Therefore, exceedance of 20 times the TCLP limit provides an indication that a sample material may be hazardous. Numerical values for 20 times the TCLP limit for each applicable constituent are summarized in Table A-8.

A.3.1.5 TSCA Limit

The Toxic Substance Control Act (40 CFR 761) requires that wastes containing in excess of 50 mg/L (ppm) of PCBs to be handled and dispositioned in accordance with specified procedures. This definition of liquid TSCA waste has been used in this RI/FS report as a reference level for evaluating the level of contamination in solids [i.e., PCB contamination exceeding 50 mg/kg (ppm)].

A.4 CHARACTERIZATION BY CONSTITUENT OF CONCERN WITHIN OU3

This section provides a level of data summary and evaluation that is intermediate between the detail in Attachment A.II and the summary in Section 3.5. As such, only data for COCs are addressed. A summary of OU3 characterization data by COC is needed for two primary reasons:

1. The complete set of analytes for OU3 is so large (175 separate analytes) that it can be overwhelming, and beyond the interest of many readers; and

2. A summary provides an intermediate level of detail that allows significant issues to be better highlighted.

The summary presented in this section addresses the characterization results for those analytes from Attachment A.II that have been selected as COCs for the OU3 RI/FS. The presentation is organized by COC and consolidates information across media and components, thus providing data for each COC that applies to OU3 as a whole. This information is useful for identifying those constituents that may affect FS treatment or disposal options, without the distraction of often insignificant details.

Attachment A.II presents a summary of the constituent concentration sample results for all constituents analyzed and reported as validated data. The presentation in Attachment A.II is organized by sampled fraction (i.e., radiological, inorganic, semivolatile, volatile and pesticides/PCBs) and consolidates the information across media and components. The reader is referred to Attachment A.II for statistical summaries and evaluations of the complete validated data set for each constituent for OU3.

A.4.1 Constituents of Concern Selected for Summary-Level Discussion

The extensive OU3 characterization data reveal that there are a limited number of constituents detected in a few media that may affect treatment/disposal options. Summary-level discussions in Section 3.5 are appropriately focused on these most significant constituents. It is not implied that other constituents should be ignored; however, the available data indicate that other constituents will not influence remedial decisions in most circumstances, and successful remediation of other constituents will be accomplished by the remediation focused on more significant COCs. The reasons each of these are considered more significant are described in the following sections.

A.4.2 Radioactive Constituents of Concern Summaries

To characterize radiological contamination in OU3, 795 samples were collected and analyzed for elemental uranium and 19 radionuclides. Almost 89 percent of these samples were from solid media (brick, concrete chips, concrete cores, loose media, masonry chips, sediment, sludge, soil, and wood), while the remaining 85 samples were from liquid media and air filters. Detailed results of this sampling and analysis for the 20 radioactive constituents are presented in Attachment A.II.

As discussed in Section A.2.3, all radionuclides and uranium detected in OU3 are included as COCs. Therefore, all radionuclides and uranium are discussed below. For reasons described below, technetium, thorium-230, and uranium and its three isotopes are considered contaminants of major concern within OU3. They are regarded as having a more significant impact on the RI/FS than other radionuclides studied. (This does not imply that other constituents are insignificant.) These more significant contaminants are selected for summary level presentations in Section 3.5.

Groups of related radioactive contaminants were introduced to the OU3 by specific processes. In this presentation, discussions on radioactive constituents have been grouped by the type of process that introduced them to the facility.

A.4.2.1 Summary Discussion of Uranium in OU3

The FEMP processed large quantities of uranium throughout its history. Thus, uranium is expected to be one of the major contaminants at the site. Uranium is a heavy metal. It is both chemically toxic and radioactive. Its target organ for chemical effects is the kidney. Its radioactivity makes it a Class A carcinogen. Thus, its characterization was a major goal of this study.

Three naturally occurring radioactive isotopes make up the uranium found at the FEMP: uranium-234, uranium-235, and uranium-238. One additional anthropogenic (man-made) isotope of uranium, uranium-236, associated with reprocessed fuel handling, is occasionally found in trace amounts in some places on the site.

The next four sections summarize the data on uranium and its three naturally occurring isotopes found at the FEMP. A fifth section uses the interrelated nature of these four uranium parameters to determine the enrichment of uranium found at the site.

A.4.2.1.1 Elemental Uranium

Uranium results were reported for 771 samples from solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, uranium was detected in 689 solid media samples, and over 70 percent of the uranium concentrations detected in solid media exceed baseline levels. This indicates widespread uranium contamination of structural components and other solid materials within OU3.

Statistical analysis of the data suggests a lognormal distribution is the single statistical distribution that best describes the OU3 population of uranium results. The arithmetic and geometric means for this data set are 4,530 microgram per gram (μg/g) and 152 μg/g, respectively.

The highest concentrations of uranium were detected in loose media, but concentrations exceeding baseline were detected in every medium. The maximum detected concentration of 520,000 μg/g was found in loose media. To put the reported uranium concentrations in perspective, about 38 percent of these samples exceed 500 μg/g and thus would qualify as source material under 10 CFR 20. Eighteen samples do not meet the representative off-site disposal facility's WAC for uranium.

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Elemental uranium was detected in 135 of 135 components in which samples were collected for analysis of radionuclides and uranium. Uranium was detected in concrete in 126 of these components.

Uranium is regarded as a contaminant of major concern in OU3 because it is a Class A carcinogen and it is present in high concentrations throughout large areas of the site.

A.4.2.1.2 Uranium-234

Uranium-234 results were reported for 758 samples from solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, uranium-234 was detected in 601 solid media samples, and over 80 percent of the uranium-234 concentrations detected in all solid media exceed baseline levels. This indicates widespread uranium contamination of structural components and other solid materials within OU3.

Statistical analysis of the data suggests a lognormal distribution is the single statistical distribution that best describes the OU3 population of uranium-234 results. The arithmetic and geometric means for this data set are 1,900 picocuries per gram (pCi/g) and 66.5 pCi/g, respectively.

The highest concentrations of uranium-234 were detected in loose media, but concentrations exceeding baseline were detected in every medium. The maximum detected concentration of 210,000 pCi/g was found in loose media from the Rolling Mill area of the Metals Fabrication Plant (6A). Seven samples do not meet the representative off-site disposal facility's waste acceptance concentration for uranium-234.

Uranium-234 was detected in 130 of 135 components in which samples were collected for analysis of radionuclides and uranium. Uranium-234 was detected in concrete in 120 of these components.

Uranium-234 is a contaminant of major concern in OU3 because it is a Class A carcinogen and it is present in high concentrations throughout large areas of the site.

A.4.2.1.3 Uranium-235/236

Uranium-235/236 results were reported for 740 samples from solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, uranium-235/236 was detected in 555 solid media samples, and over 85 percent of the uranium-235/236 concentrations detected in

solid media exceed baseline levels. This indicates widespread uranium-235/236 contamination of structural components and other solid materials within OU3.

Statistical analysis of the data suggests a lognormal distribution is the single statistical distribution that best describes the OU3 population of uranium-235/236 results. The arithmetic and geometric means for this data set are 219 pCi/g and 6.2 pCi/g, respectively.

The highest levels of uranium-235/236 were detected in loose media, but concentrations exceeding baseline were detected in every medium. The maximum detected concentration of 27,000 pCi/g was found in loose media from the Rolling Mill area of the Metal Fabrication Plant (6A). Twenty-three samples do not meet the representative off-site disposal facility's waste acceptance concentration for uranium-235/236.

Uranium-235/236 was detected in 101 of 135 components in which samples were collected for analysis of radionuclides and uranium. Uranium-235/236 was detected in concrete in 85 of these components.

Uranium-235/236 is a contaminant of major concern in OU3 because it is a Class A carcinogen and it is present in high concentrations throughout large areas of the site.

A.4.2.1.4 Uranium-238

Uranium-238 results were reported for 736 samples from solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1, uranium-238 was detected in 599 solid media samples, and over 80 percent of the uranium-238 concentrations detected in solid media exceed baseline levels. This indicates widespread uranium-238 contamination of structural components and other solid materials within OU3.

Statistical analysis of the data suggests a lognormal distribution is the single statistical distribution that best describes the OU3 population of uranium-238 results. The arithmetic and geometric means for this data set are 2,110 pCi/g and 87.1 pCi/g, respectively.

The highest concentrations of uranium-238 were detected in loose media, but concentrations exceeding baseline were detected every medium. The maximum detected concentration of 180,000 pCi/g was found in two samples of loose media from the Rolling Mill area of the Metals Fabrication Plant (6A)

and the Enriched Uranium Casting area of the Special Products Plant (9A). Ten samples do not meet the representative off-site disposal facility's WAC for uranium-238.

Uranium-238 was detected in 130 of 135 components in which samples were collected for analysis of radionuclides and uranium. Uranium-238 was detected in concrete in 120 of these components.

Uranium-238 is a contaminant of major concern in OU3 because it is a Class A carcinogen and it is present in high concentrations throughout large areas of the site.

A.4.2.1.5 Enrichment of Uranium

In general, uranium can be grouped into one of three categories, depending on the relative atomic abundance of the three naturally occurring isotopes (uranium-234, uranium-235, and uranium-238). The three categories are natural uranium, enriched uranium, or depleted uranium. The Health Physics Manual of Good Practices for Uranium Facilities (EG&G 1988) lists the typical isotopic percent abundance of uranium-238, uranium-235, and uranium-234 in natural uranium as 99.2739 ± 0.0007, 0.7204 ± 0.0007, and 0.0057 ± 0.0002, respectively. Mixtures that are lower in these two isotopes are identified as depleted uranium. Mixtures of uranium isotopes containing significantly higher percentages of uranium-234 and uranium-235 are called enriched uranium.

The vast majority of uranium handled at the FEMP was either natural or depleted uranium. A very small fraction of the total uranium that passed through processes at the FEMP was enriched in uranium-234 and uranium-235. It is important to identify media contaminated with enriched uranium because this material may have different or additional handling and disposal requirements during remediation. These handling requirements are partially based on the increased radiotoxicity of enriched uranium in occupational settings. Uranium is a heavy metal. In normal occupational settings, allowable exposures to soluble forms of natural and depleted uranium tend to be limited by its chemotoxicity, rather than its radiotoxicity. However, the radiotoxicity of uranium increases as its degree of enrichment increases. The level of enrichment at which radiotoxicity concerns supersede chemical toxicity concerns for soluble uranium is 1.3 percent uranium-235 enrichment. This level of enrichment has been selected as a convenient dividing line for focusing attention on samples containing significantly enriched uranium.

The enrichment status of uranium in environmental samples collected in OU3 was determined by calculating the percent atomic abundances of both uranium-235/6 and uranium-234. This dual

approach takes advantage of the knowledge that historical separation techniques enriched both uranium-234 and uranium-235 simultaneously. For example, it is known that when uranium was enriched in uranium-235 from 0.72 percent to 2.96 percent, the uranium-234 content of the same uranium went from 0.006 percent to 0.03 percent (EG&G 1988). Thus if the relative isotopic abundance of one nuclide suggests the presence of enriched uranium, the relative isotopic abundance of the other should too.

Presently, complete sets of isotopic uranium data are available for 498 sample locations. Based on the uranium-235/236 data available, 42 of these locations were suspected of containing uranium with a 1.3 percent or greater enrichment of uranium-235. This distribution is not matched by the enrichment results indicated by examining uranium-234 abundances in the same samples. The uranium-234 abundances indicate that just two samples contain the elevated uranium-234 ratios indicative of two percent uranium-235 enriched uranium (Figure A-13). This discrepancy required additional evaluation of the uranium-234 and uranium-235 abundance data.

Figure A.2.1-2 plots both uranium-234 and uranium-235/236 activity against the attendant uranium-238 activity, and linear regressions were performed on the isotopic data. The uranium-234 verses uranium-238 activity line has a slope of 1.07 and a regression coefficient of 0.92. This ratio agrees reasonably well with the ratio of uranium-234 activity to uranium-238 activity in natural uranium (about 1.0). In contrast, the uranium-235/236 to uranium-238 activity line of the measured data has a slope of 0.12, ($r^2 = 0.78$), whereas the ratio of uranium-235 activity to uranium-238 activity in natural uranium is 0.046 (Figure A-14). This is indicative of a systematic positive bias in the uranium-235/236 analytical results.

The uranium-235/236 isotopic data depicted in Figure A-14 also appear more scattered than the uranium-324 data, indicating the uranium-235 data set has a greater variance than the uranium-234 data. Since the uranium-235 enrichment calculation is very sensitive to changes in the uranium-235/236 data, a greater variance in the uranium-235/236 data may explain why the uranium-235 enrichment assessment indicates a higher number of enriched samples than does the uranium-234 enrichment assessment.

For these two reasons, uranium-234 enrichment was used to identify the presence of enriched uranium. One of the two individual samples identified as containing enriched uranium came from masonry chips taken from the Nuclear Fuels Services Storage and Pump House (2E). This

component was used to store enriched material received from the Nuclear Fuels Services facility in Erwin, Tennessee, before processing or transhipment. The other sample containing enriched uranium was composed of concrete chips taken from the floor of the General In-Isotopic Verification area of the Process Warehouse (71).

A.4.2.2 Fission Products within OU3

During nuclear fission, larger atoms break apart into smaller ones and energy is released. These smaller atoms, called fission products, are some of the typical wastes produced by nuclear weapons and reactors. Windborne fallout from nuclear weapons testing scattered trace amounts of fission products over the earth's surface.

Process-related fission products found at the FEMP were produced by nuclear fission of uranium in reactors operating off-site. The uranium in these reactors was removed and sent for reprocessing. Reprocessing removes most, but not all, of the fission products from the uranium metal, and some fission products remained in the uranium sent to the FEMP. For this reason, process-related fission products are expected at the FEMP.

A.4.2.2.1 Summary Discussion of Cesium-137

One fission product, cesium-137, was a known contaminant in reprocessed uranium metal handled at the FEMP. Even though the amount of cesium-137 introduced to the site was very small, its prompt daughter product, barium-137m, emits a relatively high-energy gamma radiation. Potential sort-term impacts to workers during remediation make cesium-137 a constituent of concern in OU3.

Cesium-137 results were reported for 767 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, cesium-137 was detected in 194 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of cesium-137 results from within OU3. The arithmetic and geometric means of this sample population are 1.4 pCi/g and 0.83 pCi/g, respectively.

Some cesium-137 concentrations in all solid media except asphalt exceed their respective baseline concentrations. The maximum detected concentration of 21 pCi/g was found in acid brick from the Pilot Plant Wet Side (13A).

Cesium-137 was detected in 65 of 135 components in which samples were collected for analysis of radionuclides and uranium. Cesium-137 was detected in concrete in 48 of these components.

Results include a high number of samples that did not contain detectable levels of cesium-137. This implies that areas of the operable unit do not contain measurable quantities of cesium-137. Because cesium-137 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. Its localized nature suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.2.2 Summary Discussion of Strontium-90

Strontium-90 was a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of strontium-90 introduced to the site was very small compared to other radiological contaminants. Strontium-90, and its daughter, yttrium-90 are beta emitters. Potential short-term impacts to workers during remediation of some facilities make strontium-90 a constituent of concern in OU3.

Strontium-90 results were reported for 758 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, strontium-90 was detected in 172 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of strontium-90 results from within OU3. The arithmetic and geometric means of this sample population are 1.6 pCi/g and 0.46 pCi/g, respectively.

Some strontium-90 concentrations in all solid media exceed their respective baseline concentrations. The maximum detected concentration of 140 pCi/g was found in loose media from the Pilot Plant Thorium Tank Farm (13D).

Strontium-90 was detected in 82 of 135 components in which samples were collected for analysis of radionuclides and uranium. Strontium-90 was detected in concrete in 53 of these components.

Results include a high number of samples that did not contain detectable levels of strontium-90. This implies that areas of the operable unit do not contain measurable quantities of strontium-90. Because strontium-90 is a Class A carcinogen, it is considered a contaminant of concern during remediation.

Its localized nature suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.2.3 Summary Discussion of Technetium-99

The fission product technetium-99 was a known contaminant in reprocessed uranium metal handled at the FEMP. The major source of technetium is recycled uranium from the Hanford site. The best estimate of the amount of technetium-99 introduced to the site is 97 kilogram (kg) (1650 Curies).

Technetium-99 results were reported for 765 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, technetium-99 was detected in 506 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of technetium-99 results from within OU3. The arithmetic and geometric means of this sample population are 139 pCi/g and 5.2 pCi/g, respectively.

The maximum detected concentration of 13,000 pCi/g was found in loose media from the Rolling Mill area of the Metals Fabrication Plant (6A), but concentrations exceeding baseline were detected in every medium. Technetium-99 was detected in about 75 percent of the solid media sampled. This implies that many areas of the operable unit contain measurable quantities of technetium-99.

Technetium-99 was detected in 111 of 135 components in which samples were collected for analysis of radionuclides and uranium. Technetium-99 was detected in concrete in 93 of these components.

Technetium-99 is considered a contaminant of major concern because 1) it is a Class A carcinogen, 2) it was detected in high concentrations throughout large areas of the site, and 3) it is extremely mobile in the environment.

A.4.2.3 Transformation Products Within OU3

Neutrons are produced during nuclear fission. These neutrons are sometimes absorbed by atoms in the surrounding metal fuel. This absorption transforms these atoms into different isotopes of the same element or into isotopes of different elements. These new isotopes, called transformation products, are some of the typical radionuclides produced by nuclear weapons and reactors. Windborne fallout from nuclear weapons testing scattered trace amounts of transformation products over the surface of the earth.

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Process-related transformation products found at the FEMP were produced by nuclear fission of uranium in reactors operating off-site. The uranium in these reactors was removed and sent for reprocessing. Reprocessing removes most, but not all, of the transformation products from the uranium metal, and some transformation products remained in the metal sent to the FEMP for machining. This is the source of process-related transformation products at the FEMP.

A.4.2.3.1 Summary Discussion of Americium-241

Americium-241 is a suspected contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of americium-241 introduced to the site was small compared to other radiological contaminants. Thus, the extent of americium contamination is expected to be small and probably localized.

Americium-241 results were reported for 723 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, americium-241 was detected in 235 solid media samples. The arithmetic and geometric means of this sample population are 0.89 pCi/g and 0.17 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of americium-241 results from within OU3.

Some americium-241 concentrations in all solid media exceed their respective baseline concentrations. The maximum detected concentration of 83 pCi/g was found in loose media from the Pilot Plant Thorium Tank Farm (13D).

Americium-241 was detected in 76 of 135 components in which samples were collected for analysis of radionuclides and uranium. Americium-241 was detected in concrete in 57 of these components.

Results include a high number of samples that did not contain detectable levels of americium-241. This implies that areas of the operable unit do not contain measurable quantities of americium-241. Because americium-241 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. The low frequency of its occurrence suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.3.2 Summary Discussion of Neptunium-237

Neptunium-237 is a suspected contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of neptunium-237 introduced to the site was quite small, compared to other radiological contaminants.

Neptunium-237 results were reported for 744 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, neptunium-237 was detected in 231 solid media samples. The arithmetic and geometric means of this sample population are 0.70 pCi/g and 0.16 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of neptunium-237 results from within OU3.

Some neptunium-237 concentrations in all solid media sampled exceed their respective baseline concentrations. The maximum detected concentration of 68 pCi/g was found in loose media collected from the Enriched Uranium Casting area of the Special Products Plant (9A).

Neptunium-237 was detected in 76 of 135 components in which samples were collected for analysis of radionuclides and uranium. Neptunium-237 was detected in concrete in 59 of these components.

Results include a high number of samples that did not contain detectable levels of neptunium-237. This implies that areas of the operable unit do not contain measurable quantities of neptunium-237. Because neptunium-237 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. The low frequency of its occurrence suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.3.3 Summary Discussion of Plutonium-238

Plutonium-238 was a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-238 introduced to the site was quite small compared to other radiological contaminants.

Plutonium-238 results were reported for 749 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, plutonium-238 was detected in 291 solid media samples. The arithmetic and geometric means of this sample population are 6.1 pCi/g and 0.14 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is

the single statistical distribution that best describes the population of plutonium-238 results from within OU3.

Some plutonium-238 concentrations in all solid media exceed their respective baseline concentrations. The maximum detected concentration of 1,300 pCi/g was found in acid brick from the Southern Extraction area of the Pilot Plant Wet Side (13A).

Plutonium-238 was detected in 80 of 135 components in which samples were collected for analysis of radionuclides and uranium. Plutonium-238 was detected in concrete in 57 of these components.

A majority of the samples did not contain detectable levels of plutonium-238. This implies that areas of the operable unit do not contain measurable quantities of plutonium-238. Because plutonium-238 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. The infrequent nature of its occurrence suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.3.4 Summary Discussion of Plutonium-239/240

Plutonium-239/240 was a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-239/240 introduced to the site was quite small compared to other radiological contaminants.

Plutonium-239/240 results were reported for 751 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, plutonium-239/240 was detected in 319 solid media samples. The arithmetic and geometric means of this sample population are 1.8 pCi/g and 0.16 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of plutonium-239/240 results from within OU3.

Some plutonium-239/240 concentrations in all solid media, except asphalt chips, exceed their respective baseline concentrations. The maximum detected concentration of 92 pCi/g was found in steel coatings from the Oil Centrifuge area of the Recovery Plant (8A).

Plutonium-239/240 was detected in 94 of 135 components in which samples were collected for analysis of radionuclides and uranium. Plutonium-239/240 was detected in concrete in 60 of these components.

Results include a majority of solid media did not contain detectable levels of plutonium-239/240. This implies that areas of the operable unit do not contain measurable quantities of plutonium-239/240. Because plutonium-239/240 is a Class A carcinogen, it must be considered a contaminant of concern. Its infrequent occurrence and relatively low concentrations suggest other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.3.5 Summary Discussion of Plutonium-241

Plutonium-241 was a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-241 introduced to the site was quite small compared to other radiological contaminants.

Plutonium-241 results were reported for 488 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, plutonium-241 was detected in 137 solid media samples. The arithmetic and geometric means of this sample population are 11.7 pCi/g and 1.22 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of plutonium-241 results from within OU3. The maximum detected concentration of 923 pCi/g was found in acid brick from the Southern Extraction area of the Pilot Plant Wet Side (13A).

Plutonium-241 was detected in 61 of 135 components in which samples were collected for analysis of radionuclides and uranium. Plutonium-239/240 was detected in concrete in 47 of these components.

Some plutonium-241 concentrations in all solid media exceed their respective baseline concentrations, but almost 60 percent of the solid media sampled did not contain detectable levels of plutonium-241. This implies that large areas of the operable unit do not contain measurable quantities of plutonium-241. Because plutonium-241 is a Class A carcinogen, it must be considered a constituent of concern. Its infrequent occurrence and relatively low concentrations suggest other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.4 Radionuclides Associated with Ore Handling

The FEMP handled uranium ore for a brief period of its early history. Uranium was extracted from this ore, and the residues left over from this extraction were stored in the Waste Storage Area, now known as Operable Units 1 and 2. Some of the buildings and surrounding grounds have been contaminated by ore residues. These materials contain the long-lived, naturally occurring radionuclides thorium-230, radium-226, lead-210, polonium-210, actinium-227 and their short-lived daughter products. These radionuclides have been grouped for discussion in the following five sections.

Ore residues can contain members of the thorium decay chain (thorium-232, radium-228, thorium-228, and their daughter products). These radionuclides are also associated with thorium fuel processing. A discussion of the radionuclides belonging to the thorium decay chain is deferred to the section on thorium fuel processing (Section A.4.2.5).

A.4.2.4.1 Summary Discussion of Thorium-230

Thorium-230 was a known contaminant in ore residues handled at the FEMP. Thorium-230 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations. The geographic distribution of thorium-230 throughout the site may also be augmented by another potential thorium-230 source, the processing of thorium fuel, but the largest sources of thorium-230 at the FEMP were the ore processing operations.

Thorium-230 results were reported for 743 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, thorium-230 was detected in 590 of the solid media samples. The arithmetic and geometric means of this sample population are 64.1 pCi/g and 3.9 pCi/g, respectively. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of thorium-230 results from within OU3.

The maximum detected concentration of 5,600 pCi/g was found in steel coatings from the Oil Centrifuge area of the Recovery Plant (8A), but concentrations exceeding baseline were detected in every medium except asphalt and concrete deeper than one inch. Thorium-230 levels exceeded baseline concentrations in about 75 percent of the solid media sampled. This implies that most areas

of the operable unit contain elevated quantities of thorium-230. Many of the samples that had thorium-230 levels below the baseline concentration were outside of the production area.

Thorium-230 was detected in 132 of 135 components in which samples were collected for analysis of radionuclides and uranium. Thorium-230 was detected in concrete in 122 of these components.

Thorium-230 is considered a contaminant of major concern because it is a Class A carcinogen, and it was detected in high concentrations throughout large areas of the site.

A.4.2.4.2 Summary Discussion of Radium-226

Radium-226 was a known contaminant in ore residues handled at the FEMP. Radium-226 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Radium-226 results were reported for 747 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, radium-226 was detected in 603 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of radium-226 results from within OU3. The arithmetic and geometric means of this sample population are 36 pCi/g and 1.4 pCi/g, respectively. The maximum detected concentration of 6,710 pCi/g was found in steel coatings from the Central area of the Pilot Plant Wet Side (13A).

About 30 percent of the radium-226 concentrations exceed their respective baseline concentrations in solid media. This implies that large areas of the operable unit do not contain elevated quantities of radium-226.

Radium-226 was detected in 135 of 135 components in which samples were collected for analysis of radionuclides and uranium. Radium-226 was detected in concrete in 124 of these components.

Because radium-226 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. This radionuclide is relatively easy to detect in-situ, and can be expected to impact remedial concerns in areas with a history of ore processing, like the Ore Refinery Plant (2A), the Conveyer Tunnel (2H), and the Drum Dryer in the Incinerator Building (39A).

A.4.2.4.3 Summary Discussion of Lead-210

Lead-210 is a daughter product of radium-226, a contaminant in ore residues handled at the FEMP. Lead-210 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Lead-210 results were reported for 758 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, lead-210 was detected in 412 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of lead-210 results from within OU3. The arithmetic and geometric means of this sample population are 15 pCi/g and 2.0 pCi/g, respectively. The maximum detected concentration of 1,750 pCi/g was found in acid brick from the Extraction area of the Ore Refinery Plant (2A).

Over 50 percent of the lead-210 concentrations in all solid media exceed their respective baseline concentrations. This implies that some areas of the operable unit do not contain elevated quantities of lead-210.

Lead-210 was detected in 119 of 135 components in which samples were collected for analysis of radionuclides and uranium. Lead-210 was detected in concrete in 102 of these components.

Because lead-210 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. This radionuclide can be expected to affect remedial concerns in areas with a history of ore processing, like the Ore Refinery Plant (2A), the Conveyer Tunnel (2H), and the Drum Dryer in the Incinerator Building (39A).

A.4.2.4.4 Summary Discussion of Polonium-210

Polonium-210 is daughter product of lead-210 and a contaminant in ore residues handled at the FEMP. Polonium-210 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Polonium-210 results were reported for 746 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, polonium-210 was detected in 589 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of polonium-210 results from within OU3.

The arithmetic and geometric means of this sample population are 15.1 pCi/g and 1.22 pCi/g, respectively. The maximum detected concentration of 2970 pCi/g was found in acid brick from the Extraction area of the Ore Refinery Plant (2A).

Under 30 percent of the polonium-210 concentrations in all solid media exceed their respective baseline concentrations. This implies that areas of the operable unit may not contain measurable quantities of polonium-210.

Polonium-210 was detected in 132 of 135 components in which samples were collected for analysis of radionuclides and uranium. Polonium-210 was detected in concrete in 132 of these components.

Because polonium-210 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. The infrequent nature of its occurrence suggests other contaminants will dominate remediation decisions throughout most of the site.

A.4.2.4.5 Summary Discussion of Thorium-227/Actinium-227

Thorium-227 is a daughter product of actinium-227 and has a half-life of 18 days. Since the samples collected within OU3 were essentially undisturbed prior to their extraction, the thorium-227 results can be used to infer the presence and activity of actinium-227 in OU3. Actinium-227 was separated from the uranium product and remained in the ore residues handled by the FEMP. Actinium-227 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Limited analyses were performed for Thorium-227. Only 97 results were reported for all solid media, and no results are available for liquids within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, thorium-227 was detected in 55 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of thorium-227 results from within OU3. The arithmetic and geometric means of this sample population are 7.1 pCi/g and 1.4 pCi/g, respectively. The maximum detected concentration of 80 pCi/g was found in steel coatings taken from the Drum Dryer in the Incinerator Building (39A).

Almost 50 percent of the concentrations exceed their respective baseline concentrations. This implies that areas of the operable unit do not contain elevated quantities of thorium-227, or its parent actinium-227.

Thorium-227 was detected in 17 of 135 components in which samples were collected for analysis of radionuclides and uranium. Thorium-227 was detected in concrete in nine of these components.

Because thorium-227 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. The infrequent nature of its occurrence suggests other contaminants will dominate remedial decisions throughout most of the site.

A.4.2.5 Radionuclides Associated with Thorium Fuel Processing

The FEMP processed thorium fuel pellets for a brief period in the 1970s. The FEMP also serves as the DOE repository for thorium. A few buildings and surrounding grounds have been contaminated by material containing the long-lived, naturally occurring radionuclides thorium-232, thorium-230, radium-228, thorium-228, and their the short-lived daughter products.

These four nuclides were also introduced to the FEMP during ore processing operations. Because the bulk of the thorium-230 handled by the site was associated with ore processing operations, thorium-230 is discussed in Section A.5.3.3. Thorium-232, radium-228, thorium-228, and their daughter products are discussed in this section because their major source is expected to be thorium fuel processing operations.

A.4.2.5.1 Summary Discussion of Thorium-232

Thorium-232 is a major component of thorium compounds handled at the FEMP. Thorium-232 contamination attributable to fuel pellet processing operations is expected in older areas of the site which housed the fuel handling operations. The geographic distribution of thorium-232 throughout the site may also be augmented by another potential thorium-232 source, the processing of uranium ore.

Thorium-232 results were reported for 743 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, thorium-232 was detected in 542 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of thorium-232 results from within OU3. The arithmetic and geometric means of this sample population are 16 pCi/g and 1.1 pCi/g, respectively.

High concentrations of this radionuclide tend to be localized in areas with a history of thorium processing. For example, twelve out of the 23 samples with thorium concentrations exceeding

100 pCi/g were collected from 13A. The two highest detected concentrations of 1270 pCi/g and 976 pCi/g were found in two depths of a concrete core from the Southern Extraction area of the Pilot Plant Wet Side (13A).

Thorium-232 was detected in 132 of 135 components in which samples were collected for analysis of radionuclides and uranium. Thorium-232 was detected in concrete in 118 of these components.

Because thorium-232 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. This radionuclide can be expected to impact remedial concerns in areas with a history of thorium processing, but other radionuclides are expected to be of more concern throughout the rest of the site.

A.4.2.5.2 Summary Discussion of Radium-228

Radium-228 is produced by the radioactive decay of thorium-232, a major component of thorium compounds handled at the FEMP. Radium-228 contamination attributable to historical fuel pellet processing operations is expected in older areas of the site which housed the fuel handling operations. The geographic distribution of radium-228 throughout the site may also be augmented by another potential thorium-232 source, the processing of uranium ore.

Radium-228 results were reported for 759 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, radium-228 was detected in 488 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of radium-228 results from within OU3. The arithmetic and geometric means of this sample population are 58.6 pCi/g and 1.35 pCi/g, respectively.

This nuclide tends to be found in the same areas of OU3 as its parent thorium-232. Twenty of the 27 samples with concentrations exceeding 100 pCi/g were collected from the Pilot Plant Wet Side (13A). The maximum detected concentration of 15,000 pCi/g was found in concrete chips taken from the Plant 1 Thorium Warehouse (67).

Radium-228 was detected in 119 of 135 components in which samples were collected for analysis of radionuclides and uranium. Radium-228 was detected in concrete in 99 of these components.

Because radium-228 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. This radionuclide can be expected to affect remedial concerns in areas with a history of thorium processing, but other radionuclides are expected to be of more concern throughout the rest of the site.

A.4.2.5.3 Summary Discussion of Thorium-228

Thorium-228 is produced by the radioactive decay of radium, a daughter product of thorium-232. Thorium-228 contamination attributable to historical fuel pellet processing operations is expected in older areas of the site that housed the fuel handling operations. The geographic distribution of radium-228 throughout the site may also be augmented by another potential thorium-232 source, the processing of uranium ore.

Thorium-228 results were reported for 744 samples from all solid and liquid media sampled within the confines of OU3. As shown on Table A.II-1 in Attachment A.II, thorium-228 was detected in 535 solid media samples. As discussed in Attachment A.II, a lognormal distribution is the single statistical distribution that best describes the population of thorium-228 results from within OU3. The arithmetic and geometric means of this sample population are 38 pCi/g and 1.6 pCi/g, respectively.

This radionuclide tends to be found in the same areas of OU3 as its progenitor thorium-232. Fourteen of the 27 samples with concentrations exceeding 100 pCi/g were collected from Pilot Plant Wet Side (13A). The maximum detected concentration of 8,950 pCi/g was found in concrete chips taken from the Plant 1 Thorium Warehouse (67).

Thorium-228 was detected in 129 of 135 components in which samples were collected for analysis of radionuclides and uranium. Thorium-228 was detected in concrete in 117 of these components.

Because thorium-228 is a Class A carcinogen, it must be considered a contaminant of concern during remediation. This radionuclide can be expected to affect remedial concerns in areas with a history of thorium processing, but other radionuclides are expected to be of more concern throughout the rest of the site.

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A.4.3 Inorganic Constituent of Concern Summaries

As described in Appendix A.1.4, several inorganic chemicals were used at the FEMP and are therefore expected contaminants in OU3. Based on this knowledge, 643 major media samples and 85 supplemental media samples were analyzed for 23 inorganic contaminants. Based on these results, 16 inorganics have been identified as COCs in OU3 (see Appendix A.2). The following sections describe the expected source of each COC at the FEMP and summarize its occurrence. A detailed description of the expected and actual occurrence of all 23 inorganics for which analyses were performed is provided in Attachment A.II.

As described below, four inorganics (barium, cadmium, lead, and mercury) are considered *more significant* in comparison to the others and, therefore, a summary of the occurrence of these contaminants within OU3 is presented in Section 3.5.

A.4.3.1 Summary Discussion of Antimony in OU3

Antimony is expected within OU3 because it is a trace constituent of concrete (up to a baseline level of 11 milligrams per kilogram [mg/kg] at the FEMP) and was a minor impurity in the uranium ores and ore concentrates received at the FEMP. Antimony ranged in concentration from 0.001 to 0.002 percent (DOE 1994a), but was concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of antimony is expected to be:

- Widespread in concrete, tending toward baseline concentrations; and
- At slightly elevated levels (up to 100 mg/kg) in most media in uranium processing facilities.

As shown on Table A.II-1, antimony was detected in only 26 percent (151 of 589) of the samples of solid media, with concentrations ranging from 0.83 to 393 mg/kg (median of 9.3 mg/kg). Antimony was detected in all sampled media, except asphalt and lower depths of concrete.

Antimony was detected most often and at the highest concentrations in steel coatings and loose media. As described below, part of the reason for not being detected more often in concrete was the relatively high detection limits. Antimony was detected most often and at the highest concentrations in the Metals Production Plant (5A) and the Recovery Plant (8A), both processing facilities.

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Antimony was detected in 51 of 135 components in which samples were taken for analysis of inorganics. Antimony was detected in concrete in only 18 of these components. This appears to indicate that antimony is not as widespread in concrete in OU3 as expected. However, the detection limit for concrete in samples from 61 components ranged from 1 to 70 mg/kg, compared to a minimum detected concentration in concrete of 0.83 mg/kg. Had the detection limits been lower, it is likely that antimony would have been detected in more samples. Therefore, the actual extent of antimony in OU3 at lower concentrations is not known.

Antimony is a COC because 18 percent of the results were above the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 74 percent of the solid media samples, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its off-site disposal (see Appendix F). Therefore, it is considered *not as significant* compared to other inorganic COCs and is not discussed further in Section 3.5.

A.4.3.2 Summary Discussion of Arsenic in OU3

Arsenic is expected within OU3 primarily because it has been used in agricultural insecticides and poisons, it is a trace constituent of concrete (up to a baseline level of 3.96 mg/kg at the FEMP), and it was a minor impurity in uranium ores and ore concentrates received at the FEMP. Arsenic in concentration ranged from 0.003 to 0.80 percent (DOE 1994a), but was concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of arsenic is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- At elevated levels (up to 40,000 mg/kg) in most media in uranium processing facilities; and
- At elevated levels in media where insecticides may have been used routinely (i.e., around pads and in the corners of building slabs).

As shown on Table A.II-1, arsenic was detected in 87 percent (635 of 726) of the samples of solid media, with concentrations ranging from 0.23 to 2690 mg/kg (geometric mean of 5.0 mg/kg). Arsenic was detected in all sampled media, at the highest concentration in a wood sample.

Arsenic was detected most often in concrete, but it was detected at the consistently highest levels in loose media and steel coatings. It was detected in 133 of 135 components in which samples were taken for analysis of inorganics. It was detected most often in processing plants (Recovery Plant [8A], Pilot Plant Wet Side [13A], and Metals Production Plant [5A]), but at the consistently highest levels in Electrical Panels and Transformers (16C) and Pilot Plant Warehouse (68).

Concentrations of arsenic in 11 samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous. These 11 samples include five steel coatings samples, four loose media samples, one sediment sample, and the wood sample. No concrete, masonry, or acid brick samples exceeded 20 times the TCLP limit for arsenic.

Arsenic is a COC because all of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because 11 of the results exceeded 20 times the TCLP limit. However, none of the steel coating samples would be hazardous if a representative sample were taken (i.e., including the underlying steel - see Appendix A.III.2.6.2); the loose media and sediment samples are not part of the decision-making process of this RI/FS (see Section 1.0), and there is no WAC for its on-property or off-site disposal. Therefore, arsenic is considered *not as significant* compared to other inorganic COCs and is not discussed further in Section 3.5.

A.4.3.3 Summary Discussion of Barium in OU3

Barium is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 50.4 mg/kg at the FEMP); because barium carbonate was used in thorium extractions in the Pilot Plant Wet Side (13A); and because barium compounds also were involved in operations at the Preparation Plant (1A), the Graphite Furnace and Oil Burner (10D), the Coal Pile (P-005), and the Laboratory (15A). Barium sulfate ($BaSO_4$) is a constituent in white paint as well as a "covering agent" used to make the paint flow easier. Therefore, the occurrence of barium is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- Widespread in painted surfaces; and
- At elevated levels in the components where it was used in the process.

As shown on Table A.II-1, barium was detected in 98 percent (720 of 733) of the samples of solid media, with concentrations ranging from 3.3 to 23,700 mg/kg (geometric mean of 109 mg/kg). Barium was detected in all sampled media and at the highest, and most consistently high,

concentrations in a steel coatings. It was detected in all 135 components in which samples were taken for analysis of inorganics. It was detected most often in process buildings (Recovery Plant [8A], Special Products Plant [9A], Pilot Plant Wet Side [13A], and Six to Four Reduction Facility #1 [54A]), but at consistently high concentrations in many components.

Concentrations of barium in 33 samples exceeded 20 times the TCLP limit (2000 mg/kg) and are therefore potentially hazardous. These 33 samples include 24 steel coating samples, five concrete samples, two loose media samples, one masonry sample, and one sediment sample.

Of these 33 samples, 23 were collected from the process buildings component category; three were collected from the process support buildings category, all from the Heavy Equipment Building (46); two samples each were collected from the warehouse/storage buildings and the above-ground containers categories; and one sample each was collected from the administrative buildings, above-ground piping, utilities and equipment, and below-ground piping, utilities, and equipment categories. All of the concrete samples exceeding 20 times the TCLP limit for barium were taken from the top half inch of concrete. Three of the five concrete samples exceeding 20 times the TCLP limit were collected from the Recovery Plant (8A); the remaining concrete samples were collected from the Special Products Plant (9A) and the Sump Pump House (13C). The single masonry sample exceeding 20 times the TCLP limit was collected from the Engine House/Garage (31A).

Barium is a COC because five percent of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because of the 33 samples exceeding 20 times the TCLP limit (including five concrete and one masonry sample). Even though there is no WAC for its on-property or off-site disposal, barium is considered *more significant* compared to other inorganic COCs and is further discussed in Section 3.5.

A.4.3.4 Summary Discussion of Beryllium in OU3

Beryllium is expected within OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 1.40 mg/kg at the FEMP). Therefore, the occurrence of beryllium is expected to be widespread in concrete, tending toward baseline concentrations.

As shown on Table A.II-1, beryllium was detected in only 29 percent (199 of 698) of the samples of solid media, with concentrations ranging from 0.03 to 56.3 mg/kg (median of 0.41 mg/kg).

Beryllium was detected in all sampled media, except asphalt, and at the highest concentrations in supplemental media (loose media and sediment).

Beryllium is a COC because 100 percent of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was only detected in 29 percent of the solid samples collected from OU3, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganic COCs and is not further discussed in Section 3.5.

A.4.3.5 Summary Discussion of Cadmium in OU3

Cadmium is expected within OU3 primarily because it is used as a yellow pigment in paint, it is a trace constituent in concrete (up to a baseline level of 2.40 mg/kg at the FEMP), and it was a minor impurity in uranium ores and ore concentrates used at the FEMP. Cadmium concentrations ranged from 0.006 to 0.007 percent (DOE 1994a) but were concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of cadmium is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- At slightly elevated levels (up to 350 mg/kg) in most media is uranium processing facilities; and
- At elevated levels associated with paint.

As shown on Table A.II-1, cadmium was detected in 42 percent (305 of 732) of the solid media samples, with concentrations ranging from 0.11 to 558 mg/kg (median of 1.2 mg/kg). Cadmium was detected in all sampled madia, except asphalt, and at the highest, and most consistently high, concentrations in steel coatings (paint). It was detected in 86 of the 135 components from which samples were taken for analysis of inorganics. It was detected most often in process buildings (Metals Production Plant [5A], Recovery Plant [8A], Pilot Plant Wet Side [13A], and Incinerator Building [39A]), and at consistently high levels in the Incinerator Building.

Concentrations of 44 samples exceeded 20 times the TCLP limit (20 mg/kg) and are therefore potentially hazardous. These 44 samples include 37 steel coatings samples, four loose media samples, one concrete chip sample, one masonry sample and one sediment sample.

Of these 44 samples, 27 were collected from the process buildings, six samples were collected from the process support buildings, four samples were collected from the warehouse/storage buildings, two samples each were collected from the above-ground containers and the below-ground piping, utilities and equipment, and one sample each was collected from the administrative buildings; the storage pads; and the above-ground piping, utilities and equipment component categories. The five components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Incinerator Building (39A), the Pilot Plant Wet Side (13A), and the Main Maintenance Building (12A) with four each; and the Ore Refinery Plant (2A) and the Green Salt Plant (4A) with three each. The single concrete chip sample exceeding 20 times the TCLP limit was collected from the Recovery Plant (8A), and the single masonry sample was collected from the Service Building (11).

Cadmium is a COC because 20 percent of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because 44 samples exceeded 20 times the TCLP limit (including one concrete and one masonry sample). Even though there is no WAC for its on-property or off-site disposal, cadmium is considered *more significant* compared to other inorganic contaminants and is further discussed in Section 3.5.

A.4.3.6 Summary Discussion of Chromium in OU3

Chromium is expected within OU3 because it is used as a pigment in paints, it is a trace constituent in concrete (up to a baseline level of 8.15 mg/kg at the FEMP), and it was used as a biocide in the treatment of cooling tower water at the FEMP. Furthermore, it is a major constituent in stainless steel, and it was also a minor impurity in uranium ores and ore concentrates used at the FEMP. Chromium ranged in concentration from 0.003 to 0.045 percent (DOE 1994a) but was concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of cadmium is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- At slightly elevated levels (up to 2250 mg/kg) in most media in uranium processing facilities; and
- At elevated levels associated with paint.

As shown on Table A.II-1, chromium was detected in 89 percent (653 of 733) of solid media samples collected from OU3, with concentrations ranging from 1 to 17,300 (geometric mean of 35 mg/kg). Chromium was detected in all sampled media, with the highest levels in steel coatings.

Concentrations of chromium in 175 samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous. These 175 samples included 123 steel coatings samples, 21 loose media samples, ten sediment samples, eight concrete core samples, five concrete chip samples, four acid brick samples, one masonry sample, one air filter sample, one transite sample, and one wood sample. Of these 175, 107 were collected from the process buildings; 26 from process support buildings; 13 from warehouse buildings; seven from above-ground containers; six from below-ground piping, utilities, and equipment; six each from above-ground piping and ponds/basins; three from administrative buildings; and one from storage pads.

The six components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Recovery Plant (8A) with 15; the Metals Production Plant (5A) with nine; and the Preparation Plant (1A), the Metals Fabrication Plant (6A), the Special Products Plant (9A), and the Six to Four Reduction Plant #1 (54A) with seven each.

Chromium is a COC because 24 percent of all results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because 175 samples exceeded 20 times the TCLP limit. Even though there is no WAC for its on-property or off-site disposal, chromium is considered *more significant* compared to other inorganic contaminants and is discussed further in Section 3.5.

A.4.3.7 Summary Discussion of Copper in OU3

Copper is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 11.1 mg/kg at the FEMP). Furthermore, it was present in Zircalloy-2 cladding from reactor fuel rods received from Hanford for recycling (Plant 9), and it (as copper sulfate) also was used in the WINLO process in Plant 8. In addition, it was a minor impurity in uranium ores and ore concentrates used at the FEMP. Copper ranged in concentration from 0.003 to 0.20 percent (DOE 1994a), but was concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of copper is expected to be:

- Widespread in concrete, tending toward baseline concentrations;

- At slightly elevated levels (up to 10,000 mg/kg) in most media in uranium processing facilities; and
- At elevated levels in most media in Plants 8 and 9.

As shown on Table A.II.1, copper was detected in 86 percent (612 of 714) of solid media samples collected from OU3, with concentrations ranging from 2 to 26,300 mg/kg (geometric mean of 32.9 mg/kg). Copper was detected in all sampled media, with the highest concentrations detected in loose media.

Copper is a COC because three percent of all results were above the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, it is considered to be *not as significant* compared to other inorganic compounds and is not further discussed in Appendix A or Section 3.5.

A.4.3.8 Summary Discussion of Lead in OU3

Lead is expected in OU3 because it is a trace constituent in concrete (up to a baseline level of 3.42 mg/kg at the FEMP), and it (as lead dioxide) is used in storage batteries. Furthermore, it has been used extensively in paints, and it was an impurity in uranium ores and ore concentrates used at the FEMP. Lead concentrations ranged from 0.09 to 4.78 percent (DOE 1994a), but were concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of lead is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- At elevated levels (up to 239,000 mg/kg) in most media in uranium processing facilities; and
- At elevated levels associated with paint.

As shown on Table A.II.1, lead was detected in 90 percent (658 of 731) of solid media samples collected from OU3, with concentrations ranging from 0.54 to 375,000 mg/kg (geometric mean of 77.3 mg/kg). Lead was detected in all sampled media, except masonry chips. It was detected most often, at the highest levels, and at the most consistently high levels in steel coatings. It was detected in all 135 components in which samples were collected for analysis of inorganics. It was detected most often in process buildings (Metals Production Plant [5A], Recovery Plant [8A], Main

Maintenance Building [12A], Pilot Plant Wet Side [13A], and Six to Four Reduction Facility #1 [54A]), but at consistently high levels in many components.

Concentrations of lead in 247 samples exceeded 20 times the TCLP limit and are therefore potentially hazardous. These 247 samples were comprised of 131 steel coatings samples, 34 loose media samples, 23 masonry samples, 21 concrete core samples, 20 sediment samples, 13 concrete chip samples, and five acid brick samples. Of these 247 samples, 156 were collected from process buildings; 36 from process support buildings; 12 each from above-ground containers and ponds/basins; eleven each from warehouse buildings and ponds/basins; six of the samples were collected from above-ground piping, utilities and equipment; five each from storage pads and below-ground piping, utilities and equipment; three from administrative buildings; and one from bulk materials.

Two components, the Metals Fabrication Plant (6A) and the Pilot Plant Wet Side (13A), have lead concentrations exceeding 20 times the TCLP limit in depths to 1.0 inch in the concrete core samples collected. A third concrete core sample collected from the Pilot Plant Wet Side at a depth of 0.5 to 1.0 inch also exceeded 20 times the TCLP limit; however, the top half inch of the core sample did not. Two other components, the Preparation Plant (1A) and the Old Cooling Water Tower (3K), had lead concentrations exceeding 20 times the TCLP limit in the concrete core samples collected at depths of 0.5 to 1.0 inch; however the top half inch of the core sample did not. The Ore Refinery Plant (2A) had three samples from the top half inch of concrete which exceeded 20 times the TCLP limit. The Main Maintenance Building (12A), the Metals Production Plant (5A), and the Old North Tank Farm (19D) had two samples from the top half inch of concrete which exceeded 20 times the TCLP limit. Five other components also had one sample from the top half inch of concrete core samples collected which exceeded 20 times the TCLP limit.

Lead exceeded 20 times the TCLP limit in concrete chip samples collected in the top half inch in one component (the Pilot Plant Annex - 37) in three different samples. Concrete chip samples from three other components; the Green Salt Plant (4A), the Metals Fabrication Plant (6A), and the Recovery Plant (8A); exceeded 20 times the TCLP limit in two different samples. Four other components also had one concrete chip sample which exceeded 20 times the TCLP limit.

The Six to Four Reduction Facility #1 (54A) had seven masonry samples which exceeded 20 times the TCLP limit for lead. The Pilot Plant Annex (37) had four masonry samples which exceeded 20 times

the TCLP limit. Two masonry samples from three other components; the Incinerator Building (39A), the Main Maintenance Building (12A), and the Plant 8 Maintenance Building (8B); exceeded 20 times the TCLP limit. Six other components also had one masonry sample which exceeded 20 times the TCLP limit.

The five acid brick samples, which exceeded 20 times the TCLP limit for lead, were collected from the Ore Refinery Plant (2A - four samples) and the Metal Dissolver Building (2D - one sample).

Lead is a COC because 247 samples exceeded 20 times the TCLP limit (including acid brick, concrete and masonry samples). Even though there is no WAC for its on-property or off-site disposal, lead is considered *more significant* compared to other inorganic contaminants and is further discussed in Section 3.5.

A.4.3.9 Summary Discussion of Manganese in OU3

Manganese is expected in OU3 because it is a trace constituent in concrete (up to a baseline level of 343 mg/kg at the FEMP) and it was a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.001 to 0.091 percent (DOE 1994a), but concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of manganese is expected to be:

- Widespread in concrete, tending toward baseline concentrations; and,
- At slightly elevated levels (up to 4550 mg/kg) in most media uranium processing facilities.

As shown on Table A.II.1, manganese was detected in 99 percent (717 of 722) of solid media samples collected from OU3, with concentrations ranging from 1.8 to 5560 mg/kg (geometric mean of 320 mg/kg). Manganese was detected in all sampled media, at the highest levels in steel coatings.

Manganese is a COC because 92 percent of all results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganic compounds and is not discussed further in Section 3.5.

A.4.3.10 Summary Discussion of Mercury in OU3

Mercury is expected in OU3 primarily because it (mercuric sulfide) is used as a pigment in paints, it is a trace constituent in concrete (up to a baseline level of 0.03 mg/kg at the FEMP), and it was used in the dissolution of alloys in Plant 2/3, as well as in the Laboratory. Therefore, the occurrence of mercury is expected to be:

- Widespread in concrete, tending toward baseline concentrations;
- At elevated levels in most media in uranium processing facilities where it was used; and
- At elevated levels associated with paints.

As shown on Table A.II-1, mercury was detected in 42 percent (299 of 712) of solid media samples collected from OU3, with concentrations ranging from 0.024 to 223 mg/kg (median of 0.1 mg/kg). Mercury was detected in all sampled media, except asphalt and soil, and at the highest level in sediment, but at the most consistently high levels in steel coatings. It was detected in 74 of the 135 components in which samples were collected for analysis of inorganics. It was detected most often in process and support buildings (Recovery Plant [8A], Main Maintenance Building [12A] and Pilot Plant Wet Side [13A]), but at consistently high levels in several components.

Concentrations of mercury in 50 samples exceeded 20 times the TCLP limit and are therefore potentially hazardous. These 50 samples include 32 steel coatings samples, five loose media samples, six sediment samples, two masonry samples, two acid brick samples, one concrete core sample, and two concrete chip samples.

Of the 50 samples exceeding 20 times the TCLP limit, 24 of the samples were collected from process buildings, 15 from process support buildings, five from the ponds and basins, and two each from warehouse buildings, above-ground containers, and above-ground piping, utilities, and equipment category. The Main Electrical Strainer House (26C) had a mercury concentration exceeding 20 times the TCLP limit in the top half inch in the concrete core sample collected. Both concrete chip samples were collected from the Electrical Power Center Building (3L). The masonry samples collected were from the Main Electrical Strainer House (26C) and the Digester and Control Building (25E). Two acid brick samples both collected from the Main Maintenance Building (12A) exceeded 20 times the TCLP limit for mercury.

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Mercury is a COC because 10 percent of all samples exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because 50 samples exceeded 20 times the TCLP limit (including masonry, concrete and acid brick samples). Even though there is no WAC for its on-property or off-site disposal, mercury is considered *more significant* compared to other inorganic contaminants and is discussed further in Section 3.5.

A.4.3.11 Summary Discussion of Nickel in OU3

Nickel is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 9.37 mg/kg at the FEMP), nickel cladding was dissolved in the Zirnlo process (Plant 9), and nickel was a minor impurity in uranium ores and ore concentrates used at the FEMP. Nickel ranged in concentration from 0.001 to 0.003 percent (DOE 1994a), but was concentrated up to five times through the removal of the uranium in the refining process. Therefore, the occurrence of nickel is expected to be:

- Widespread in concrete, tending toward baseline concentrations; and
- At slightly elevated levels (up to 150 mg/kg) in most media processing facilities where it was used.

As shown on Table A.II-1, nickel was detected in 78 percent (562 of 722) of solid media samples collected from OU3, with concentrations ranging from 0.48 to 53,500 mg/kg (geometric mean of 18.7 mg/kg). Nickel was detected in all sampled media, with the highest concentrations detected in loose media.

Nickel is a COC because one percent of all results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganics and is not discussed further in Section 3.5.

A.4.3.12 Summary Discussion of Selenium in OU3

Selenium is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 0.47 mg/kg at the FEMP). Therefore, its occurrence is expected to be widespread in concrete, tending toward baseline concentrations.

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As shown on Table A.II-1, selenium was detected in only 16 percent (96 of 601) of solid media samples collected from OU3, with concentrations ranging from 0.29 to 157 mg/kg (geometric mean of 1.1 mg/kg). Selenium was detected in all sampled media, except asphalt, with the highest concentrations detected in loose media.

Concentrations of selenium in seven samples exceeded 20 times the TCLP limit (20 mg/kg) and are therefore potentially hazardous. These seven samples included four loose media samples and three steel coatings samples. Six of these seven samples were collected from the process buildings and the remaining sample was collected from above-ground containers.

Selenium is a COC because one percent of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because seven samples exceed 20 times the TCLP limit. However, there is no WAC for its on-property or off-site disposal, none of the steel coating samples would be hazardous if a representative sample were taken (i.e., including the underlying steel - see Appendix A.III.2), and the loose media is not part of the decision-making process of this RI/FS (see Volume 1, Section 1). Therefore, selenium is considered *not as significant* compared to other inorganic contaminants and is not discussed further in Section 3.5.

A.4.3.13 Summary Discussion of Silver in OU3

Silver is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 5.42 mg/kg at the FEMP), and silver compounds were used as an algicide in the Plant 4. Silver was also associated with the photo lab and the analytical laboratory. Therefore, the occurrence of silver is expected to be:

- Widespread in concrete, tending toward baseline concentrations; and
- At elevated levels in the media in the Plant 4 heat exchanger area.

As shown on Table A.II-1, silver was detected in 36 percent (257 of 722) of solid media samples collected from OU3, with concentrations ranging from 0.17 to 1360 mg/kg (geometric mean of 1.4 mg/kg). Silver was detected in all sampled media, except asphalt and soil, at the highest levels in loose media.

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Concentrations of silver in five samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous. These five samples include four loose media samples and one sediment sample. All of these samples were collected from process buildings.

Silver is a COC because one percent of the samples exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and its concentration in five exceeded 20 times the TCLP limit. However, there is no WAC for on-property or off-site disposal, and loose media and sediments are not part of the decision-making process in this RI/FS (see Volume 1, Section 1). Therefore, silver is considered *not as significant* compared to other inorganic contaminants, and it is not discussed further in Section 3.5.

A.4.3.14 Summary Discussion of Thallium in OU3

Thallium is expected in OU3 primarily because it is a trace constituent in concrete (up to a baseline level of 0.32 mg/kg at the FEMP). Therefore, the occurrence of thallium is expected to be widespread in concrete, tending toward baseline concentrations.

As shown on Table A.II-1, thallium was detected in only five percent (36 of 668) of solid media samples collected from OU3, with concentrations ranging from 0.04 to 16 mg/kg (geometric mean of 0.45 mg/kg). Thallium was detected in steel coatings, concrete, masonry, loose media, and sediment, with the highest concentrations detected in concrete chips and steel coatings.

Thallium is a COC because five percent of the results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, thallium is considered *not as significant* compared to other inorganic contaminants, and it is not discussed further in Section 3.5.

A.4.3.15 Summary Discussion of Vanadium in OU3

Vanadium is expected in OU3 because it is a trace constituent in concrete (up to a baseline level of 13.2 mg/kg at the FEMP), and it was a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 2.59 percent (DOE 1994a), but concentrated up to five times through the removal of the uranium in the refining process.

As shown on Table A.II-1, vanadium was detected in 73 percent (517 of 713) of solid media samples collected from OU3, with concentrations ranging from 0.23 to 494 mg/kg (geometric mean of 10.3 mg/kg). Vanadium was detected in several samples of all sampled media, with the highest concentrations being detected in concrete cores and loose media.

Vanadium is a COC because one percent of the results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, selenium is considered *not as significant* compared to other inorganic contaminants and it is not discussed further in Section 3.5.

A.4.3.16 Summary Discussion of Zinc in OU3

Zinc is expected in OU3 because it is a trace constituent in concrete (up to a baseline level of 27.5 mg/kg at the FEMP), zinc fluoride and zinc chloride were used in the production of thorium metal in the Pilot Plant and Plant 9, it was a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.006 to 0.145 percent (DOE 1994a), but concentrated up to five times through the removal of the uranium in the refining process.

As shown on Table A.II-1, zinc was detected in 92 percent (665 of 722) of solid media samples collected from OU3, with concentrations ranging from 2.7 to 215,000 mg/kg (geometric mean of 136 mg/kg). Zinc was detected in several samples of all sampled media, with the highest concentrations detected in steel coatings.

Zinc is a COC because six percent of the results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24) and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganic compounds and it is not discussed further in Section 3.5.

A.4.4 Semivolatile Organic Compound Constituent of Concern Summaries

As described in Appendix A.2.4, semivolatile organic compounds were used at the FEMP and are therefore expected contaminants in OU3. Based on this knowledge, 20 major media samples and 159 supplemental media samples were analyzed for a total of 66 semivolatile organics. Based on these results, 15 semivolatiles have been identified as COCs in OU3 (see Appendix A.3). The following

sections describe the expected source of each COC at the FEMP, if known, and summarize its occurrence. A detailed description of the expected and actual occurrence of all 66 semivolatiles for which analyses were performed is provided in Attachment A.II.

As described below, three semivolatiles (1,4-dichlorobenzene, hexachlorobutadiene, and nitrobenzene) are considered *more significant* in comparison to the others and, therefore, a summary of the occurrence of these contaminants within OU3 is presented in Section 3.5. Note that most of the semivolatile compounds were used in various materials throughout the FEMP. Therefore, in most cases, their exact source and use are not known and, are thus not included in the discussions below.

A.4.4.1 Summary Discussion of 1,4-Dichlorobenzene in OU3

As shown on Table A.II-1, 1,4-dichlorobenzene was detected in only two percent (2 of 112) of solid media samples, with concentrations of 39,000 and 344,000 μg/kg. These samples were of loose media and transite. The transite result, which was obtained by multiplying the actual TCLP result by 20 (to account for the dilution effect of the TCLP test) was above 20 times the TCLP limit (150,000 μg/kg) and therefore considered characteristically hazardous.

1,4-Dichlorobenzene is a COC because both detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because the one result (in transite - major media) exceeded 20 times the TCLP limit. Although there is no WAC for its on-property or off-site disposal, it is considered *more significant* compared to other organic COCs and is discussed further in Section 3.5.

A.4.4.2 Summary Discussion of 2,4-Dinitrotoluene in OU3

As shown on Table A.II-1, 2,4-dinitrotoluene was detected in only one percent (1 of 112) of solid media samples, with a concentration of 50,000 μg/kg. This sample was of loose media and exceeded 20 times the TCLP limit for 2,4-dinitrotoluene (2600 μg/kg).

2,4-Dinitrotoluene is a COC because the detected result exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because the one result exceeded 20 times the TCLP limit. However, it was not detected in 99 percent of all solid media samples or in any major media samples, 99 percent of the results are below the Part B Soil Screening Level, 99 percent of the results are below 20 times the TCLP limit, and there are no WAC for on-property or off-site

disposal. Therefore it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.3 Summary Discussion of Benzo(a)anthracene in OU3

As shown on Table A.II-1, benzo(a)anthracene was detected in 59 percent (60 of 101) of solid media samples, with concentrations ranging from 18 to 73,000 μg/kg (median of 740 μg/kg). Of the 60 detected results, 56 were in loose media samples, two in asphalt, one in concrete, and one in wood.

Benzo(a)anthracene is a COC because 56 of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, only one of the detected results was in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.4 Summary Discussion of Benzo(a)pyrene in OU3

As shown on Table A.II-1, benzo(a)pyrene was detected in 50 percent (51 of 101) of solid media samples, with concentrations ranging from 23 to 74,000 μg/kg (geometric mean of 1660 μg/kg). Of the 51 detected results, 49 were loose media, one acid brick, and one wood.

Benzo(a)pyrene is a COC because all the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, only one of the detected results was in major media, all samples were below 20 times the TCLP limit, and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.5 Summary Discussion of Benzo(b)fluoranthene in OU3

As shown on Table A.II-1, benzo(b)fluoranthene was detected in 61 percent (62 of 101) solid media samples, with concentrations ranging from 19 to 81,000 μg/kg (geometric mean of 1659 μg/kg). Of the 62 detected results, 59 were in loose media samples, two in acid brick, and one in wood.

Benzo(b)fluoranthene is a COC because 59 of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, only two of the detected results were in major media, there are no hazardous criteria governing its disposal in a landfill

(40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.6 Summary Discussion of Benzo(k)fluoranthene in OU3

As shown on Table A.II-1, benzo(k)fluoranthene was detected in 46 percent (46 of 101) of solid media samples, with concentrations ranging from 18 to 69,000 μg/kg (median of 920 μg/kg). Of the 46 detected results, 45 were in loose media samples and one in wood.

Benzo(k)fluoranthene is a COC because 40 of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, none of the detected results were in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.7 Summary Discussion of Bis(2-Ethylhexyl)phthalate in OU3

As shown on Table A.II-1, bis(2-ethylhexyl)phthalate was detected in 34 percent (34 of 101) of solid media samples, with concentrations ranging from 44 to 560,000 μg/kg (median of 3700 μg/kg). Of the 34 detected results, 32 were in loose media samples, one in concrete, and one in acid brick.

Bis(2-ethylhexyl)phthalate is a COC because 17 of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, only one of the detected results was in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.8 Summary Discussion of Carbazole in OU3

As shown on Table A.II-1, carbazole was detected in 33 percent (33 of 100) of solid media samples, with concentrations ranging from 21 to 24,000 μg/kg (median of 900 μg/kg). Of the 33 detected results, 32 were in loose media samples and one in wood.

Carbazole is a COC because 18 detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 67 percent of the solid media

samples and in no major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.9 Summary Discussion of Chrysene in OU3

As shown on Table A.II-1, chrysene was detected in 70 percent (71 of 101) solid media samples, with concentrations ranging from 18 to 81,000 μg/kg (geometric mean of 1370 μg/kg). Of the 71 detected results, 65 were in loose media samples, two in concrete, two in acid brick, two in asphalt, and one in wood.

Chrysene is a COC because 23 detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, only six of the detected results were in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.10 Summary Discussion of Dibenzo(a,h)anthracene in OU3

As shown on Table A.II-1, dibenzo(a,h)anthracene was detected in 14 percent (14 of 101) of solid media samples, with concentrations ranging from 55 to 15,000 μg/kg (geometric mean of 1850 μg/kg). All detected results were in loose media.

Dibenzo(a,h)anthracene is a COC because all of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, the concentration in 86 percent of the samples was undetected, none of the detected results are in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.11 Summary Discussion of Hexachlorobutadiene in OU3

As shown on Table A.II-1, hexachlorobutadiene was detected in only one percent (1 of 102) of solid media samples, with a concentration of 298,000 μg/kg. The sample was of transite and exceeded 20 times the TCLP limit (10,000 μg/kg). Note the result was obtained by multiplying the actual TCLP result by 20 (to account for the dilution effect of the TCLP test).

Hexachlorobutadiene is a COC because the one detected result exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because it exceeded 20 times the TCLP limit, indicating that the transite is characteristically hazardous. Although there is no WAC for its on-property off-site disposal, it is considered *more significant* compared to other organic COCs and is discussed further in Section 3.5.

A.4.4.12 Summary Discussion of Indeno(1,2,3-cd)pyrene in OU3

As shown on Table A.II-1, indeno(1,2,3-cd)pyrene was detected in 50 percent (51 of 101) of solid media samples, with concentrations ranging from 20 to 49,000 μg/kg (geometric mean of 1370 μg/kg). All detected results were in loose media samples.

Indeno(1,2,3-cd)pyrene is a COC because 50 of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, none of the detected results were in major media, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.13 Summary Discussion of n-Nitroso-di-n-propylamine in OU3

As shown on Table A.II-1, n-nitroso-di-n-propylamine was detected in only one percent (1 of 101) of solid media samples. This sample was of loose media, with a concentration of 48,000 μg/kg.

n-Nitroso-di-n-propylamine is a COC because the one detected result exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, the organic was not detected in 99 percent of all solid media samples or in any major media, 99 percent of the results are below the Part B Soil Screening Level, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.4.14 Summary Discussion of Nitrobenzene in OU3

As shown on Table A.II-1, nitrobenzene was detected in only two percent (2 of 113) of solid media samples, with concentrations of 140 and 566,000 μg/kg. The detected results were found in loose media and transite, respectively. The concentration in the transite, which was obtained by multiplying

the actual TCLP result by 20 (to account for the dilution effect of the TCLP test) exceeded 20 times the TCLP limit.

Nitrobenzene is a COC because one detected result exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact, and because its concentration in major media exceeded 20 times the TCLP limit and is characteristically hazardous. Although there is no WAC for its on-property or off-site disposal, it is considered *more significant* compared to other organic COCs and is discussed further in Section 3.5.

A.4.4.15 Summary Discussion of Pentachlorophenol in OU3

As shown on Table A.II-1, pentachlorophenol was detected in only two percent (2 of 100) of solid media samples, with concentrations of 730 and 14,000 μg/kg. Both of the detected results were found in loose media.

Pentachlorophenol is a COC because both of the detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, the organic was not detected in 98 percent of all solid media samples or in any major media; 98 percent of the results are below the Part B Soil Screening Level; and none were above 20 times the TCLP limit, which is the hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.5 Volatile Organic Compound Constituent of Concern Summaries

As described in Appendix A.2.2, volatile organic compounds were used at the FEMP and are therefore expected contaminants in OU3. Based on this knowledge, 35 major media samples and 160 supplemental media samples were analyzed for a total of 33 volatile organics. Based on these results, three volatiles have been identified as COCs in OU3 (see Appendix A.3). The following sections describe the expected source of each COC at the FEMP, if known, and summarize its occurrence. A detailed description of the expected and actual occurrence of all 33 volatiles for which analyses were performed is provided in Attachment A.II.

As described below, one volatile (tetrachloroethene) is considered *more significant* in comparison to the others and, therefore, a summary of its occurrence within OU3 is presented in Section 3.5. Note that most of the volatile compounds were used in various materials throughout the FEMP. Therefore,

in most cases, their exact source and use are not known, and therefore, are not included in the discussion below.

A.4.5.1 Summary Discussion of Benzene in OU3

Benzene is expected in OU3 because it was used in the laboratory and in degreasing operations at the FEMP. Furthermore, it is a major constituent in gasoline, which was used and stored at the FEMP.

As shown on Table A.II-1, benzene was detected in only two percent (3 of 127 samples) of solid media samples, with concentrations ranging from 18 to 2800 μg/kg. All three of the detected results were in loose media.

Benzene is COC because one detected result exceeded the Part B Screening Level, indicating a potential concern with direct contact. However, it was not detected in 98 percent of the solid media samples and in no major media, the maximum detected concentration is well below 20 times the TCLP regulatory limit (i.e., its disposal on landfills is not regulated), and there is no WAC for its on-property or off-site disposal. Therefore it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.5.

A.4.5.2 Summary Discussion of Styrene in OU3

As shown on Table A.II-1, styrene was detected in eight percent (9 of 113 samples) of solid media samples, with concentrations ranging from 25 to 3100 μg/kg (geometric mean of 66 μg/kg). Seven of the detected results were in loose media and one was in acid brick.

Styrene is a COC because one detected result exceeded the Part B Screening Level, indicating a potential concern with direct contact. However, it was not detected in 92 percent of the solid media samples and was detected in only one major media sample. Furthermore, 99 percent of the detected concentrations are below the Part B Soil Screening Level, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.5.

A.4.5.3 Summary Discussion of Tetrachloroethene in OU3

Tetrachloroethene is expected in OU3 because it was used in degreasing operations at the FEMP as well as a coolant in the Pilot Plant Remelt Furnace.

As shown on Table A.II-1, tetrachloroethene was detected in 12 percent (15 of 125 samples) of solid media samples, with concentrations ranging from 1.0 to 1,180,000 μg/kg (geometric mean of 82 μg/kg). Six of the detected results were in loose media, seven in concrete, one in acid brick, and one in transite. The transite, with analytical result of 59 mg/L, exceeded the TCLP limit (i.e., greater than 0.7 mg/L) in the Ore Refinery Plant (2A).

Tetrachloroethene is a COC because one detected result exceeded the Part B Screening Level, indicating a potential concern with direct contact, and because the same result exceeded 20 times the TCLP limit. Although there is no WAC for its on-property or off-site disposal, it is considered *more significant* compared to other organic COCs and is discussed further in Section 3.5.

A.4.6 Pesticide/PCB Constituent of Concern Summaries

As described in Appendix A.2.2, pesticides and PCBs were used at the FEMP and are therefore expected contaminants in OU3. However, they are expected to be limited in both level and abundance. Based on this knowledge, 22 major media samples and 16 supplemental media samples were analyzed for pesticides/PCBs. Based on these results, three pesticides and two PCBs have been identified as COCs in OU3.

Of the 28 PCB/pesticide contaminants for which analyses were performed, 16 were detected during analyses of the OU3 remedial investigation samples. Twenty-seven of the samples analyzed for pesticides/PCBs exceeded the Part B Soil Screening Levels. However, none of the samples exceeded 20 times the TCLP limit. Also, none of the samples analyzed exceeded the 50 ppm limit for PCBs established by the Toxic Substances Control Act (TSCA) (40 CFR 761). The following sections discuss the frequency of detections and relative levels of detections for each pesticide/PCB COC in OU3 materials.

A.4.6.1 Summary Discussion of alpha-Chlordane in OU3

As shown on Table A.II-1, alpha-chlordane was detected in six percent (two of 35) of solid media samples, with concentrations of 5.4 and 71 μg/kg. Both of the detected results were in concrete chip samples. The maximum concentration of gamma-chlordane was also detected in one of these samples.

alpha-Chlordane is a COC because its concentration in one sample exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 94 percent

of the solid media samples, and 97 percent of the results were below Part B Soil Screening Criteria. Furthermore, the detected results were well below 20 times the TCLP limit (6000 μg/kg) (i.e., its disposal in a landfill is not regulated), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed further in Section 3.5.

A.4.6.2 Summary Discussion of Dieldrin in OU3

As shown on Table A.II-1, dieldrin was detected in 15 percent (5 of 34) of solid media samples, with concentrations ranging from 1.6 to 6.9 μg/kg (geometric mean of 3.9 μg/kg). Four of the detected results were in concrete chips and one in soil.

Dieldrin is a COC because two of the detected results were above the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 85 percent of the solid media samples and was detected in only four major media samples. Furthermore, 94 percent of the results were below the Part B Soil Screening Level, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed in Section 3.5.

A.4.6.3 Summary Discussion of gamma-Chlordane in OU3

As shown on Table A.II-1, gamma-chlordane was detected in nine percent (three of 35) of the solid media samples, with concentrations ranging from 0.42 to 76 μg/kg. Two of the detected results were in concrete chips and one in soil. The maximum concentration of gamma-chlordane was also detected in one of the concrete chip samples.

gamma-Chlordane is a COC because its concentration in one sample exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 91 percent of the solid media samples and was detected in only two major media samples. Furthermore, 97 percent of the results were below the Part B Soil Screening Level, and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed in Section 3.5.

A.4.6.4 Summary Discussion of Aroclor-1248 in OU3

As shown on Table A.II-1, aroclor-1248 was detected in five percent (two of 37) of solid media samples, at concentrations of 53 and 1700 μg/kg. These detections were in samples of soil and concrete chips, respectively.

Aroclor-1248 is a COC because both detected results exceeded the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was only detected in six percent of all solid media samples, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site disposal (50,000 μg/kg), and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed in Section 3.5.

A.4.6.5 Summary Discussion of Aroclor-1254 in OU3

As shown on Table A.II-1, aroclor-1254 was detected in 38 percent (14 of 37) of solid media samples, with concentrations ranging from 41 to 5100 μg/kg (media of 35 μg/kg). Five of the detected results were in soil, eight in concrete, and one in a loose media.

Aroclor-1254 is a COC because all of the detected results were above the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 62 percent of the solid media samples and was detected in only eight major media samples. Furthermore, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site disposal (50,000 μg/kg), and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed in Section 3.5.

A.4.6.6 Summary Discussion of Aroclor-1260 in OU3

As shown on Table A.II-1, aroclor-1260 was detected in 22 percent (eight of 37) of solid media samples, with concentrations ranging from 24 to 3400 μg/kg (geometric mean of 62 μg/kg). Five of the detected results were in concrete, two in soil, and one in loose media.

Aroclor-1260 is a COC because all of the detected results were above the Part B Soil Screening Level, indicating a potential concern with direct contact. However, it was not detected in 78 percent of the solid media samples and was detected in only five major media samples. Furthermore, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site

disposal (50,000 μg/kg), and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is not discussed in Section 3.5.

A.5 CHARACTERIZATION BY SAMPLED MEDIA TYPE WITHIN OU3

This section provides a level of data summary and evaluation that is intermediate between the detail in Attachment A.III and the summary in Section 3.6. As such, only COC contamination in major media (i.e., acid brick, asphalt, concrete chips and cores, masonry, steel coatings, and transite) is addressed. A summary of the OU3 characterization data by COC within major media is needed for two primary reasons:

1. The complete set of analytes within all sampled media is so large (175 separate analytes in 12 media types) that it can be overwhelming and beyond the interest of many readers; and

2. The summary provides an intermediate level of detail that allows significant issues to be better highlighted.

The summary in this section addresses the characterization results for sampled media within OU3 that comprise a significant portion of OU3 material. This information is useful for identifying the material types that may drive FS treatment or disposal options, without the distraction of often insignificant details.

Attachment A.III presents a summary of the constituent concentration sample results for all sampled media. The presentation in Attachment A.III is organized by major media (i.e., acid brick, asphalt, concrete chips and cores, masonry, steel coatings, and transite) and supplemental media (i.e., HVAC filters, loose media, sediment and sludge, wood, and unknown liquids) and consolidates the information across components. The reader is referred to Attachment III for statistical summaries and evaluations of the complete data set for each sampled media type.

A.5.1 Acid Brick

Acid brick was used in several wet process areas as a protective layer for the underlying concrete. It is a heat-treated material that is non-porous and resistant to chemical attack. Since acid brick is nonporous, significant penetration of contaminants is not expected.

A total of 33 acid brick samples were taken for analysis of radiological and chemical contamination. Note that one of the samples was analyzed only for volatile organics and not inorganics. The following describes the results of the analyses of acid brick samples. In summary, acid brick contains elevated levels of isotopic and elemental uranium, isotopic thorium, technetium-99, and radium-228, and samples from five components contain potentially hazardous levels of chromium, lead, and mercury.

A.5.1.1 Radiological Contamination:

The results of radiological sample analyses for acid brick are statistically summarized in Table A.III-1. As Table A.III-1 indicates, the number of analytical results available from acid brick for each radionuclide varies:

- 21 analytical results are reported for cesium-137, lead-210, radium-226, radium-228, strontium-90, technetium-99, uranium-234, and uranium,
- 20 analytical results are reported for americium-241, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, uranium-235/236, and uranium-238,
- 18 analytical results are reported for plutonium-241, thorium-228, thorium-230, and thorium-232,
- 6 analytical results are reported for thorium-227.

All radioactive constituents were detected in at least one sample, with the exception of thorium-227.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration (sample-to-baseline/screen ratios are included in parentheses for each radionuclide). The geometric mean of sample analytical results is used to compare lognormally distributed radionuclide sample results to baseline concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for technetium-99 (35.6), uranium (59.4), uranium-234 (80.3), uranium-235/236 (63.8), and uranium-238 (34.4).

The minimum sample result detected exceeds the corresponding concrete baseline concentration for the following radionuclides: americium-241; cesium-137; radium-228; thorium-228, thorium-230; and thorium-232.

This suggests that these analyte's baseline concentrations exceed the analyte's detection limits. None of the maximum sample results detected are less than the corresponding baseline or concentration. This indicates that acid brick in OU3 contains elevated levels of every radionuclide sampled.

A.5.1.2 Inorganic Contamination:

Twenty-four acid brick samples were taken from eleven components for analysis of Target Analyte List (TAL) inorganics. As shown on Table A.III-1, all of the 16 inorganic COCs for which analyses were performed were detected, except thallium. All but six (antimony, beryllium, cadmium, selenium, silver and thallium) were detected in at least 12 samples. Two inorganics (barium and manganese) were each detected in all 24 samples.

Table A.III-3 summarizes the inorganic contamination in acid brick that exceeds 20 times the TCLP limit. Ten samples exceeded one or more of the limits for chromium, lead, or mercury. Lead was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in five samples, with concentrations up to 518 mg/kg. Chromium was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in four samples, with concentrations up to 407 mg/kg, and mercury was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 4.0 mg/kg) in two samples, with concentrations up to 5.2 mg/kg.

The most extensive inorganic contamination is associated with the Denitration Area of the Ore Refinery Plant (2A), where results exceeded 20 times the TCLP limit for both chromium and lead. The Digestion Area and the Extraction Area of the Ore Refinery Plant (2A) also have results for lead that exceed 20 times the TCLP limit. The other components with results that exceed these limits include the Special Products Plant (9A), Pilot Plant Wet Side (13A), Metal Dissolver Building (2D), and Main Maintenance Building (12A).

TCLP Results - Inorganics

Three acid brick samples were analyzed using the TCLP. Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for total inorganics. Note that only analyses for which the leachate concentration was below the theoretical maximum concentration, based on all of the metal in the solid sample leaching, are considered reasonable.

Only two TCLP metals, chromium (at 127 mg/kg) and lead (at 169 mg/kg), were detected at greater than 20 times the TCLP limit in the solid sample corresponding to the sample analyzed using the

TCLP. Chromium was detected in the TCLP leachate of the respective sample at 0.116 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only two percent of available chromium leached from the solid sample. Lead was detected in the TCLP leachate of the respective sample at 0.0727 mg/L, well below the TCLP limit of 5.0 mg/L, and indicating that only one percent of the available lead leached from the solid sample.

From 0.8 percent (arsenic) to 77 percent (silver) of the TAL inorganics leached out in the TCLP test. Based on this, a concentration of 20 times the TCLP limit in the solid sample will be used to conservatively estimate the amount of acid brick that is potentially hazardous.

A.5.1.3 Semivolatile Organic Contamination:

Three acid brick samples from two components were analyzed for semivolatile organic constituents. Only four of the 15 semivolatile COCs [benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, and chrysene] for which analyses were performed were detected. Benzo(b)fluoranthene and chrysene were each detected in two samples. All other detected semivolatiles were found in only one sample.

All semivolatile COCs detected in acid brick were collected from the Northern area of the Pilot Plant Wet Side (13A) or the Digestion area of the Ore Refinery Plant (2A).

No semivolatile COC for which a TCLP limit exists was detected.

A.5.1.4 Volatile Organic Contamination:

Four acid brick samples from two components were analyzed for volatile organic constituents. Only two of the three volatile COCs (tetrachloroethane and styrene) for which analyses were performed were detected, each in one sample collected from the Northern or Central areas of the Pilot Plant Wet Side (13A).

No volatile COC for which a TCLP limit exists was detected.

A.5.1.5 Pesticide/PCB Contamination:

None of the acid brick samples were analyzed for pesticides or PCBs.

A.5.2 Asphalt

Asphalt is a common material used in the construction of roads and pads at the FEMP. Samples of asphalt were collected by chipping away the surface using a jackhammer, hammer drill, or chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of four asphalt samples were taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, asphalt contains elevated levels of elemental uranium but no samples are potentially hazardous.

A.5.2.1 Radiological Contamination:

The results of radiological sample analyses for asphalt are statistically summarized in Table A.III-1. Four analytical results are available from asphalt. With the exceptions of americium-241 and neptunium-237, all radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration (sample-to-baseline/screen ratios are included in parentheses for each radionuclide). The arithmetic mean is used for comparing results that can not be assigned a statistical distribution to baseline radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for technetium-99 (8.3) and uranium (11.0).

The minimum detected sample result exceeds the corresponding concrete baseline concentration for technetium-99, uranium, and plutonium-238. This suggests that an analyte's baseline concentrations exceed the analyte's detection limit.

Plutonium-239/240 was not detected above the corresponding baseline concentrations. This indicates that this radionuclide was not found in elevated concentrations in the asphalt sampled.

A.5.2.2 Inorganic Contamination

Four asphalt samples were taken from three components and analyzed for TAL inorganics. As shown on Table A.III-1, nine of the 16 inorganic COCs for which analyses were performed, except antimony, beryllium, cadmium, mercury, selenium, silver, and thallium, were detected. Six COCs (arsenic, barium, lead, manganese, vanadium, and zinc) were detected in all four samples.

The most extensive inorganic contamination is associated with the Decontamination Pad (74P), which had the maximum results for four inorganic COCs, arsenic, chromium, copper, and lead. Sampling of the Roads (G-002) indicated maximum values for barium, vanadium, and zinc.

None of the asphalt samples exceeded 20 times the TCLP limit for any inorganic contaminant.

A.5.2.3 Semivolatile Organic Contamination

Two asphalt samples, both from roads, were analyzed for semivolatile organic constituents. Only two [benzo(a)anthracene and chrysene] of the 15 semivolatile COCs for which analyses were performed were detected, and both of these semivolatiles were detected in both samples.

There are no TCLP limits for the detected semivolatiles.

A.5.2.4 Volatile Organic Contamination

The same two asphalt samples that were analyzed for semivolatile contaminants were also analyzed for volatiles. None of the volatile COCs were detected in the asphalt samples.

A.5.2.5 Pesticide/PCB Contamination

Both samples analyzed for semivolatile/volatile organics were also analyzed for pesticides and PCBs. None of the six pesticides/PCBs for which analyses were performed were detected in either sample.

A.5.3 Concrete Chips

Concrete constitutes nearly 59 percent of the total weight of OU3 materials. Neither acids nor caustics were used in process operations in these areas; therefore, significant penetration of contaminants is not likely.

A total of 193 concrete chip samples were taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, concrete chips contain elevated levels of isotopic and elemental uranium, technetium-99, and samples from nine components contain potentially hazardous levels of barium, chromium, lead, and mercury.

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A.5.3.1 Radiological Contamination

The results of radiological sample analyses for concrete chips are statistically summarized in Table A.III-1. This table indicates that the number of analytical results from concrete chips for each radioactive constituent varied:

- 158 analytical results are reported for uranium-234;
- 156 analytical results are reported for uranium-235/236 and uranium-238;
- 152 analytical results are reported for cesium-137, technetium-99, and uranium,
- 151 analytical results are reported for radium-228;
- 150 analytical results are reported for plutonium-238, plutonium-239/240, and strontium-90;
- 149 analytical results are reported for lead-210;
- 148 analytical results are reported for neptunium-237, polonium-210, radium-226, thorium-228, thorium-230, thorium-232;
- 142 analytical results are reported for americium-241;
- 85 analytical results are reported for plutonium-241; and
- 10 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration (sample-to-baseline/screen ratios are included in parentheses for each radionuclide). The geometric mean of sample analytical results is used for comparing lognormally distributed radionuclide sample results to concrete baseline radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for technetium-99 (11.8), uranium (17.3), uranium-234 (10.7), uranium-235/236 (10.4), and uranium-238 (15.5).

None of the maximum sample results detected are less than the corresponding baseline concentration. This indicates that elevated levels of every radionuclide and uranium were detected in surface concrete from at least one location within OU3.

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A.5.3.2 Inorganic Contamination

A total of 154 concrete chip samples were taken from 90 components for analysis of TAL inorganics. As shown on Table A.III-1, all of the inorganic COCs for which analyses were performed were detected, and all but seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected in at least 111 samples. Barium and manganese were detected in all samples.

Table A.III-3 summarizes the inorganic contamination in concrete chips that exceeds 20 times the TCLP limit. Five (barium, cadmium, chromium, lead and mercury) of the eight RCRA metals were detected at greater than 20 times the TCLP limit. Most significant of these is lead, which was detected at greater than 20 times the TCLP limit in 13 samples, with concentrations ranging up to 2730 mg/kg. This is followed by chromium (detected at greater than 20 times the TCLP limit in five samples, with concentrations ranging up to 640 mg/kg) and barium, cadmium, and mercury (each detected at greater than 20 times the TCLP limit in one sample, with concentrations of 5890, 29.4 and 4.8, respectively).

The most extensive inorganic contamination in concrete chips is associated with the Ball Mall Area of the Recovery Plant (8A), where results exceeded 20 times the TCLP limit for barium, chromium, and lead. The Muffle Furnace Area and the UAP Furnace Area of the Recovery Plant (8A) exceeded 20 times the TCLP limits for cadmium and lead. Other components which had results exceeding these limits include the Boiler Plant (10A), Pilot Plant Thorium Tank Farm (13D), Cooling Towers (20C), Electrical Power Center Building (3L), Green Salt Plant (4A), Metals Production Plant (5A), Metals Fabrication Plant (6A), Special Products Plant (9A), Service Building (11), Pilot Plant Annex (37), and the Incinerator Building (39A).

TCLP Results - Inorganics

Nine concrete chip samples were analyzed for TCLP inorganics. Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for TAL (total) inorganics. The TCLP samples were taken in the same general area as the listed samples collected for analysis of TAL inorganics. Note that only analyses where the leachate concentration was below the theoretical maximum concentration, based on all of the metal in the solid sample leaching, are considered.

Only one TCLP metal, lead, in the Sump Processing System Area of the Pilot Plant Wet Side (13A), was detected at greater than 20 times the TCLP limit in the solid sample (105 mg/kg). Lead was

detected in the corresponding TCLP leachate at 0.0075 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only 0.14 percent of the available lead leached from the solid sample.

From 0.1 percent (iron) to 57.9 percent (sodium) of the TAL inorganics, and a maximum of 46 percent (silver) of TCLP metals, leached out in the TCLP test. Conservatively assuming that up to 50 percent of any single metal could leach out in a TCLP test indicates a hazardous screening level of 40 times the TCLP limit. This would indicate that the concentration of barium, cadmium, chromium, lead, and mercury (the only inorganics with results greater than 20 times the TCLP limit) would have to exceed 4000, 40, 200, 200, and 8 mg/kg to be potentially hazardous. Based on this, concrete chip samples from several process areas/components could be potentially hazardous, but only with regard to levels of barium, chromium, and lead.

As noted in Section 2.3, the concrete chip samples are not truly representative. In most cases, the samples were taken from the top half-inch of an assumed 8-inch thickness. Assuming the concrete below the concrete chip is at the OU3 baseline concentration for all inorganics would indicate that not even the sample with the highest lead concentration would be hazardous. This assumption is reasonable, since the concrete chip samples were taken in dry process areas where contamination is not expected to penetrate to any significant depth. Based on this, no concrete in the areas where concrete chip samples were taken is expected to be characteristically hazardous due to TCLP metals. However, to be conservative, samples exceeding 40 times the TCLP limit will be considered potentially hazardous.

A.5.3.3 Semivolatile Organic Contamination

Eight samples from four components were analyzed for semivolatile organic constituents. Only three of the 15 semivolatile COCs for which analyses were performed were detected. Chrysene was detected in two samples, with benzo(a)anthracene and bis(2-ethylhexyl)phthalate detected in one sample.

The most extensive semivolatile COC contamination was found in concrete chip samples collected from the Uranium Machining area of the Special Products Plant (9A) and the New Drum Storage area of the Plant 1 Storage Pad (74T).

No semivolatile COCs that were detected have TCLP limits.

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A.5.3.4 Volatile Organic Contamination

The same eight samples that were analyzed for semivolatile organics were also analyzed for volatile organics. Only one of the three volatile COCs for which analyses were performed was detected. Tetrachloroethene was detected in one sample collected from the Northern area of the Pilot Plant Wet Side (13A).

Tetrachloroethene was detected at a concentration 3 μg/kg, well below 20 times the TCLP limit of 14,000 μg/kg required to even be potentially hazardous.

A.5.3.5 Pesticide/PCB Contamination:

A total of 14 samples were taken from 12 components for analysis of pesticides and PCBs. All three pesticide COCs and all three PCB COCs were detected. Of the pesticides, dieldrin was detected in four samples, alpha-chlordane and gamma-chlordane were each detected in two samples. Of the PCBs, Aroclor-1254 and Aroclor 1260 were each detected in two samples, and Aroclor-1248 was detected in only one sample. All three Aroclors were found in concrete chips collected from the Sewage Treatment Plant Incinerator (39D).

The only detected pesticide with a TCLP limit is chlordane. It was detected at a maximum concentration of 4 μg/kg (sum of alpha-chlordane and gamma-chlordane) in a concrete chips collected from the Quonset Hut #3 (62), well below 20 times the TCLP limit of 6000 μg/kg required to even be potentially hazardous.

None of the pesticide concentrations exceeded the 50 ppm TSCA limit.

TCLP Results - Organics

Nine concrete chip samples were analyzed for the leachability of organics using the TCLP test. These results, compared to the organic concentration in the core itself, are summarized on Tables A.II-3 through A.II-6. Although nearly all of the results for both the total and TCLP analyses were below detection limits (designated as less than [<]), the reported detected value was used for this comparison. The results from only one sample were above detection limits. This sample (for phenanthrene) indicated an amount leached of 9.5 percent. Many of the other analyses are unreliable, since the apparent percent leached is grater than 100 percent (designated as a dash [-]). The remaining results, although not definitive, indicate, based on the detection limits, a wide range of contaminant in the sample leaches during the TCLP test. Since none of these results definitively

indicate leachable percentage, a conservative estimate of 100 percent (i.e., 20 times the TCLP limit) will be used to assess the potential for being a hazardous waste.

A.5.4 Concrete Cores

Concrete core samples were collected from wet process areas to determine the vertical distribution of contaminants within OU3 media.

The majority of the components in OU3 have concrete floors or pads associated with them. Materials spilled onto this concrete may penetrate its surface and migrate downward. Samples designed to determine the vertical extent of constituent distribution in concrete floors and pads were collected by extracting concrete grab samples from three depths. These sequential grab samples are called "cores" in this report for convenience. Section 2.0 of this report contains additional details on this aspect of the sampling and analysis plan.

A total of 375 concrete core samples were taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, concrete cores contain elevated levels of isotopic and elemental uranium, technetium-99, radium-228, thorium-230, and lead-210, and samples from 19 components contain potentially hazardous levels of barium, chromium, lead, and mercury.

Data from concrete cores collected within a component yield a contamination profile over depth at specific locations in OU3. Concentration profiles were evaluated to identify trends that could be used to assess the vertical distribution of contaminants at the FEMP. This section summarizes the results of the evaluation and its conclusions. Attachment A.III.4 presents summary statistics for concrete core samples used in this study and provides a discussion of vertical distributions constructed for each contaminant from available data.

A.5.4.1 Radiological Contamination

All radionuclides were detected in at least one concrete core sample from each depth, but no radionuclide was detected in 100 percent of the samples collected. Surface and subsurface concentrations of technetium-99 and uranium exceed their respective baseline concentrations in most of the locations sampled. Summary level discussions of the distributions of these constituents are provided below. Concentrations of thorium-230, radium-228, and thorium-230 measured in the first half-inch of concrete exceed their baseline concentrations in the majority of cases.

Table A.III-1 presents summary statistics for radionuclide concentrations in concrete cores. Synopses of results from the concrete core sampling efforts are offered below:

- Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90 were detected in fewer than 50 percent of the samples collected from all core sampling intervals.

- Plutonium-239/240 was detected in fewer than 50 percent of the samples collected from the 0.5 to 1.0 inch and greater than 1 inch core sampling intervals.

- No nuclide exceeds their respective concrete baseline concentrations in all three concrete core sampling intervals over 50 percent of the time.

- Lead-210, radium-228, technetium-99, thorium-230, uranium, uranium-234, uranium-235/236, and uranium-238 exceed their respective concrete baseline concentrations in the top ½-inch of concrete core over 50 percent of the time.

- Technetium-99, uranium, uranium-234, uranium-235/236, and uranium-238 exceed their respective concrete baseline concentrations in the second ½-inch of concrete core in over 50 percent of the samples.

A.5.4.1.1 Vertical Extent of Radiological Contamination

Data indicates the highest radionuclide concentrations are generally found in the top ½-inch of concrete, but the vertical distribution of radionuclides in concrete is unpredictable (Attachment A.III.2.4). This can be illustrated by examining elemental uranium concentrations. Data on isotopic uranium (uranium-234, uranium-235/236, and uranium-238) parallel the elemental uranium analyses; therefore, only the elemental uranium results are presented below. Isotopic uranium is discussed in Attachment A.III.2.4. The elemental uranium concentrations evaluated came from three depths at 83 locations:

- Cores containing uranium concentrations at or below concrete baseline concentrations. Uranium concentrations in 8 cores fall below the baseline concentrations for uranium in concrete. These cores were excluded from the trend analysis.

- Uranium concentration profiles that decrease with depth. Uranium concentrations in 56 cores decrease with increasing depth from the surface. Thirty-two of these cores exhibit surface uranium concentrations exceeding 500 ppm. Figure A-15 depicts the depth profile of these cores. The figure plots normalized uranium concentrations against the sample's depth from the surface. The concentration data was normalized by dividing the concentration at each depth by the concentration in the first ½-inch interval. Surface concentrations of each core, in ug/g, are also plotted along the X-axis of this figure. This presentation illustrates the rate at which uranium decreases as depth increases is not solely a function of either depth or of surface uranium concentrations.

- Uranium concentration profiles that in the first decrease and then increase with depth. Uranium concentrations in 12 cores first decrease and then increase as depth from the surface increases. Concentrations in the lower reaches of 80 percent of these cores remain below 50 ppm. Uranium concentrations in a core taken from the Water Treatment area of the Recovery Plant (8A) drop from almost 5000 ppm at the surface to less than 100 ppm in the first inch before increasing to almost 6000 ppm in the 1.0 to 4.0 inch interval.

- Uranium concentration profiles that increase in the first inch and then decrease. Uranium concentrations in seven cores are higher in the middle sections than in the top or bottom of the core. Midsection concentrations in these seven cores range from 19 ppm to 5000 ppm.

Figure A-16 presents a plot of uranium profiles from the 19 cores in the last two groups. As in the previous figure, concentrations data were normalized by dividing the concentration at each depth by the concentration in the first ½-inch interval. This plot further illustrates the unpredictable nature of subsurface uranium concentrations. A likely explanation for this involves the history of the concrete being sampled. Concrete slabs, such as floors and pads, are subject to cracking and construction modifications over time. Examples of construction modifications that occurred to OU3 flooring include installation of equipment anchor bolts, and removal of concrete for trenches, sumps, and new pads. These imperfections in the structural integrity of the concrete create avenues for infiltration of radionuclides, resulting in nonuniform patterns of contamination. In addition, concrete can be sealed with paint; existing contamination may be covered by pouring a new layer of concrete over older sections of concrete flooring.

The data, combined with historical knowledge of the concrete floors and pads in OU3, suggest that most of the concrete within OU3 production areas will exhibit a uranium profile that decreases with depth. However, some of the concrete from near cracks and construction modifications can be expected to show unpredictable patterns of uranium contamination. Data presented in Attachment A.III.2.4 indicate that other analytes show similar distributions.

A.5.4.1.2 Impact of Solubility on the Penetration of Radionuclides into Concrete

In theory, more soluble radionuclides penetrate a porous material like concrete more quickly than do less soluble radionuclides. Concentration profiles of technetium-99 and thorium-230 were compared to each other to investigate the impact of a radionuclide's solubility on its ability to penetrate concrete. These two radionuclides were compared because the prevalent form of technetium found in the environment tends to be quite mobile in the environment, while thorium tends to be much less

mobile. Available data confirms this in the majority of cases, but a subset of the data highlights the unpredictable nature of subsurface contamination in OU3 concrete.

Technetium-99 data is available from 87 cores. Three of these cores do not have concentration data reported for all three depths. Fifty-eight of the remaining 84 cores contain concentrations exceeding the technetium-99 concrete baseline concentration. Within this group, 44 cores exhibit technetium-99 concentrations that decrease as depth increases. Figure A-17 plots of technetium-99 concentrations against the sample depth in these 44 concrete cores. The average ratio of technetium-99 in the second and the first depth intervals in this set of cores, after subtracting the technetium-99 baseline concentration of 0.86 pCi/g, is 0.23. The average ratio between the third and second intervals is 0.25. These ratios have limited predictive power because the concentration ratios vary from core to core and range over two orders of magnitude. This is further illustrated by Figure A-18, which plots the 14 cores with concentrations that do not always decrease with depth.

Thorium-230 data is available from 84 cores. Eighty-three of these cores contain concentrations exceeding its concrete baseline concentration. Within this group, 31 cores exhibit thorium-230 concentrations that decrease as depth increases. Figure A-19 plots thorium-230 concentrations against depth in these 31 concrete cores. The average ratio of thorium-230 in the second and the first depth intervals in this set of cores, after subtracting the thorium-230 baseline concentration of 0.86 pCi/g, is 0.15. The average ratio between the third and second intervals is 0.06. These ratios have limited predictive power because the concentration ratios vary from core to core, ranging over three orders of magnitude.

To compare the relative degree of penetration exhibited by technetium-99 and thorium-230, the average ratios of technetium-99 and thorium-230 in the second and the first depth intervals were compared. The ratio was higher for technetium-99 than for thorium-230 (0.23 versus 0.15), implying that concrete tends to be more permeable to technetium-99 than thorium-230. A similar comparison of the third and second intervals' average ratios for technetium-99 and thorium-232 (0.25 to 0.06) suggests a similar conclusion.

A second evaluation used data from twenty-two cores containing both technetium-99 and thorium-230, and exhibiting a decreasing concentration profile over depth. The intent of this assessment was to remove possible interferences from cores containing only one of the two radionuclides being compared. The average ratios of technetium and thorium-230 in the second and the first depth

intervals of this group of cores were 0.20 for technetium-99 and 0.16 for thorium. The average ratios of technetium and thorium-230 in the third and the first depth intervals of this group of cores were 0.047 for technetium-99 and 0.03 for thorium.

The results of these evaluations must be qualified by pointing out the large variability of the ratios for individual cores used in the comparisons, but it appears the more soluble technetium penetrates concrete with greater ease than the less soluble thorium in most cases.

A.5.4.2 Inorganic Contamination:

A total of 256 concrete core samples were taken from 48 components for analysis of TAL inorganics. Of these, 93 samples from 48 components were cores from the top ½-inch, 86 samples from 48 components from the second ½-inch, and 55 samples from 36 components from greater than 1-inch depth. Based on the results of the trend analysis discussed in the modification to the WPA (DOE 1994b), the deeper samples of several cores were not analyzed. The trend analysis showed that these samples generally approached background concentrations.

As shown on Table A.III-1, all of the 16 inorganic COCs for which analyses were performed, except thallium in the top ½-inch, were detected at all depths, and all except six (antimony, beryllium, cadmium, mercury, selenium and silver) were detected in the majority of all samples at all three depths. Barium and manganese were detected in all samples at all three depths.

Table A.III-3 summarizes the inorganic contamination in concrete cores that exceeds 20 times TCLP. Only four (barium, chromium, lead, and mercury) were detected at greater than 20 times the TCLP limit. Lead was detected at greater than 20 times the TCLP limit in 16 samples from the top ½-inch, with concentrations ranging up to 1210 mg/kg; and five times in the second ½-inch, with concentrations ranging up to 275 mg/kg). In two of the samples where lead was detected at greater than 20 times the TCLP limit in the top ½-inch, the lead contamination was greater than 20 times the TCLP limit in the second ½-inch. However, in the other three samples where chromium was detected at greater than 20 times the TCLP limit in the second ½-inch, it was not detected at elevated levels in the top ½-inch.

Chromium was detected at greater than 20 times the TCLP limit in five samples from the top ½-inch, with concentrations up to 424 mg/kg; in two samples from the second ½-inch, with concentrations up to 280 mg/kg); and in one sample from below 1-inch, at a concentration of 105 mg/kg. In two of the

samples where chromium was detected at greater than 20 times the TCLP limit in the top ½-inch, it was also detected at greater than 20 times the TCLP limit in the second ½-inch. However, in the sample where chromium was detected at greater than 20 times the TCLP limit at a depth greater than 1-inch, the sample taken from the top ½-inch in the same area does not indicate an elevated chromium level.

Barium was detected at greater than 20 times the TCLP limit in four samples from the top ½-inch, with concentrations up to 4800 mg/kg. The barium concentrations in lower depths at the same locations were all well within 20 times the TCLP limit.

Mercury was detected at greater than 20 times the TCLP limit in the top ½-inch of one sample, with a concentration of 12.6 mg/kg. The mercury concentration in lower depths at the same location was well within 20 times the TCLP limit.

The most extensive inorganic contamination in concrete core samples is associated with the Ore Refinery Plant (2A), the Ozone Building (3B), and the Old Cooling Water Tower (3K), where results exceeded 20 times the TCLP limit for both lead and chromium. The Special Products Plant (9A) exceeded 20 times the TCLP limit for both barium and lead. Other components with results exceeding 20 times the TCLP limit include the Recovery Plant (8A), Sump Pump House (13C), NFS Storage & Pump House (2E), Refrigeration Building (3G), Metals Production Plant (5A), Metals Fabrication Plant (6A), Main Maintenance Building (12A), Pilot Plant Wet Side (13A), Old North Tank Farm (19D), Incinerator Building (39A), Six to Four Reduction Facility #1 (54A), Decontamination Building (69), the Main Electrical Strainer House (26C), and the Preparation Plant (1A).

<u>TCLP Results - Inorganics</u>

One additional sample, from the Special Products Plant (9A), was taken for analysis of TCLP inorganics. Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for TAL inorganics. The TCLP sample was taken in the same general area as the listed sample collected for analysis of TAL inorganics. None of the TCLP metals in the TAL inorganic sample were detected at greater than 20 times the TCLP limit. Based on these results, no concrete in the areas where concrete core samples were taken is expected to be characteristically hazardous due to TCLP inorganic compounds (metals).

A.5.4.2.1 Vertical Extent of Inorganic Contamination

Data indicate the highest inorganic contamination is typically found in the top ½-inch of concrete, but the vertical distribution of inorganics is unpredictable (Attachment A.III.4). Only in nine of the 23 inorganics for which analyses were performed, can the decrease of concentrations between depths be considered significant. These inorganics include barium, cobalt, copper, iron, lead, mercury, nickel, sodium, and zinc. For these inorganics, the amount of decrease increases with increasing concentration in the preceding depth. The most significant of the inorganics is lead, which demonstrated a decrease that ranged from 30 percent to 90 percent in more than half of the samples.

A.5.4.3 Semivolatile Organic Contamination:

Three samples, all from the same location but at three different depths, were analyzed for semivolatile organics. None of the 15 semivolatile COCs for which analyses were performed were detected at any of the depths.

A.5.4.4 Volatile Organic Contamination

Eighteen samples, from six locations (three components) and three depths, were analyzed for volatile organics. Only one of three volatile COCs was detected. Tetrachloroethene was detected in all three depths of concrete cores.

Tetrachloroethene was detected in concrete cores collected from the Central area of the Pilot Plant Wet Side (13A) and the Plant 9 Sump Treatment Facility (9B).

The only detected volatile compound for which a TCLP limit exists is tetrachloroethene, which was detected at a maximum concentration of 23 μg/kg from component 13A, well below the 700 μg/kg (i.e., 20 times the TCLP limit) required to even be potentially hazardous.

A.5.4.5 Pesticide/PCB Contamination

Six samples, from two components and three depths, were collected for analysis of pesticides and PCBs. None of the three pesticide COCs, and only two of the three PCB COCs, for which analyses were performed were detected. Aroclor-1254 was detected at all three depths in two locations, and Aroclor-1260 was detected at all three depths in one location. The Aroclor contamination was found in concrete chips collected from the Liquid Waste Incinerator area of the Incinerator Building (39A) and the Contaminated Oil/Graphite Burn Pad (10D).

None of the results exceeded the 50 ppm TSCA limit (40 CFR 761).

TCLP Results - Organics

Eleven concrete core samples, (three from the top ½-inch, four from the second ½-inch, and four below 1 inch) were analyzed for the leachability of organics using the TCLP test. These results, compared to the organic concentration in the core itself, are summarized on Table A.II-3 through A.II-6. Nearly all of the results for both the total and TCLP analyses were below detection limits (designated as less than [<]). None of the analyses where both the total and TCLP results were above detection limits are considered reliable, since the apparent percent leached is greater than 100 percent. Many of the other analyses are also unreliable, since the apparent percent leached is also greater than 100 percent (designated as a dash [-]). The remaining results, although not definitive, indicate, based on the detection limits, a very low percentage of contaminant in the core sample leaches during the TCLP test. Since none of these results definitively indicate a leachable percentage, a conservative estimate of 100 percent (i.e., 20 times the TCLP limit) will be used to assess the potential for being a hazardous waste.

A.5.5 Masonry Chips

Masonry or concrete block was a common construction material used in the construction of building walls at the FEMP. Since the masonry was used for walls, significant penetration of contaminants is not likely.

A total of 77 masonry samples were collected from 28 components for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, masonry contains elevated levels of no radionuclides, but samples from 18 components contain potentially hazardous levels of barium, cadmium, chromium, lead, and mercury.

A.5.5.1 Radiological Contamination

The results of radiological sample analyses for masonry chips are statistically summarized in Table A.III-1. Table A.III-1 indicates that the number of analytical results available from masonry chips for each radionuclide is as follows:

- 59 analytical results are reported for plutonium-239/240, and uranium-234;
- 58 analytical results are reported for cesium-137, plutonium-238, radium-226, technetium-99, thorium-228, thorium-230, and thorium-232;

- 57 analytical results are reported for polonium-210, and radium-228;
- 56 analytical results are reported for neptunium-237, strontium-90, uranium-235/236, and uranium-238;
- 55 analytical results are reported for americium-241, and lead-210;
- 30 analytical results are reported for plutonium-241; and
- 4 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration. The mean of sample results exceeds the baseline concentration by the greatest ratios for thorium-227 (7.0) and uranium (4.9).

The minimum sample result detected exceeds the corresponding concrete baseline concentration for thorium-227. This indicates an analyte's baseline concentrations exceed the radionuclide detection limit.

All maximum sample results exceed the corresponding baseline concentration. This indicates elevated levels of every radionuclide and uranium were detected in surface masonry samples from at least one location.

A.5.5.2 Inorganic Contamination

A total of 60 masonry samples from 28 components were collected for analysis of TAL inorganic contaminants. As shown on Table A.III-1, all of the 16 inorganic COCs for which analyses were performed were detected, and all but four (antimony, silver, selenium, and thallium) were detected in at least 12 samples. Barium and manganese were detected in all 60 samples.

Table A.III.-3 summarizes the inorganic contamination in masonry that exceeds 20 times the TCLP limit. One sample exceeded one or more of the limits for barium, cadmium, chromium, lead, or mercury. Lead was detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in 23 of 59 samples, with concentrations ranging up to 16,300 mg/kg. This is followed by mercury, which was detected at greater than 20 times the TCLP limit (i.e., greater than 4 mg/kg) in two of 60

samples, with concentrations up to 5.2 mg/kg; and barium, cadmium, and chromium, which were detected at greater than 20 times the TCLP limit (i.e., greater than 2000 mg/kg, 20 mg/kg, and 100 mg/kg, respectively) each in one of 60 samples, with concentrations of 3820 mg/kg, 21 mg/kg, and 306 mg/kg, respectively.

The most extensive inorganic contamination is associated with the Hydrometallurgical System WINLO, and Water Treatment Area of the Recovery Plant (8A), where results exceeded 20 times the TCLP limit for chromium and lead; the Engine House/Garage (31A), where results exceeded 20 times the TCLP limit for barium and lead; and the Digester and Control Building (25E), where results exceeded 20 times the TCLP limit for lead and mercury. Other components that have at least one result that exceeds 20 times the TCLP limits include the Six to Four Reduction Facility #1 (54A), Service Building (11), Main Maintenance Building (12A), Pilot Plant Annex (37), Incinerator Building (39A), Maintenance Building (3A), Decontamination Building (69), Recovery Plant (8A), Plant 8 Maintenance Building (8B), and Plant 9 Sump Treatment Facility (9B).

TCLP Results - Inorganics

Two of the samples, both from the Six to Four Reduction Facility #1 (54A), were also analyzed for TCLP inorganics. Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for total inorganics. Only one TCLP metal, lead, in the Autoclave Area, was detected at greater than 20 times the TCLP limit. Lead, which was the only metal with a TCLP regulatory limit detected in the TCLP analysis, was detected in the leachate at 11 mg/L, well above the TCLP limit of 5.0 mg/L. Based on these results, masonry in the Six to Four Reduction Facility (54A) is considered characteristically hazardous due to lead.

A.5.5.3 Semivolatile Organic Contamination

Two masonry samples from were taken from two components were analyzed for semivolatile organic constituents. None of the 15 semivolatile COCs for which analyses were performed were detected.

A.5.5.4 Volatile Organic Contamination

Two masonry samples from were taken from two components were analyzed for volatile organic constituents. None of the three volatile COCs for which analyses were performed were detected.

A.5.5.5 Pesticide/PCB Contamination

None of the masonry samples were analyzed for pesticides or PCBs.

A.5.6 Steel Coatings

Steel coatings or "scraping" samples were obtained from the base of structural steel I-beams located throughout the OU3 components.

A total of 200 steel coating samples were taken for analysis of radiological and chemical contamination. The following describes the results of the analyses of steel coating samples. In summary, steel coatings (paint and oxides) contain elevated levels of isotopic uranium and technetium-99, and there are no inorganics present at potentially hazardous levels.

A.5.6.1 Radiological Contamination

The results of radiological sample analyses for steel coatings are statistically summarized in Table A.III-1. Table A.III-1 indicates the number of analytical results available for each radioactive analyte in steel coatings varies:

- 83 analytical results are reported for americium-241, cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, and uranium;
- 82 analytical results are reported for strontium-90;
- 81 analytical results are reported for neptunium-237;
- 78 analytical results are reported for plutonium-241;
- 75 analytical results are reported for uranium-234;
- 73 analytical results are reported for uranium-235/236, and uranium-238; and
- 28 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding paint baseline concentration. The mean of sample results exceeds the baseline concentration by the greatest ratios for technetium-99 (16.4), uranium (9.3), uranium-234 (14.4), uranium-235/236 (11.3), uranium-238 (15.9).

The minimum sample result detected exceeds the corresponding paint baseline concentration for lead-210 and indicates its baseline concentration exceeds its detection limit.

All maximum sample results exceeded the corresponding baseline concentration. This indicates elevated concentrations of all radioactive analytes were detected in steel coatings from at least one location.

A.5.6.2 Inorganic Contamination

A total of 139 steel coating samples were taken from 60 components for analysis of TAL inorganics. As shown on Table A.III-1, all of the 16 inorganic COCs for which analyses were performed were detected. Seven inorganic COCs (barium, chromium, copper, lead, manganese, nickel, and zinc) were detected in over 90 percent of the samples analyzed.

Although several inorganics exceed 20 times the TCLP limit, it has been determined that metal coated with lead-based paint does not exhibit the toxicity characteristic (TC) for lead, and is therefore, not a hazardous waste (DOE 1995d). In summary, the FEMP conducted TCLP analysis of light-gauge metal debris (16 to 18-gauge) coated with lead-based paint with a paint thickness varying from 1 mil to 23 mil. The paint contained lead ranging from 9500 mg/kg to 170,000 mg/kg. The TCLP extraction of the metal resulted in a maximum TCLP leachate result of 1.1 mg/L, well below the TCLP limit of 5 mg/L. The percent of lead that leached from the light-gauge metal ranged from less than 0.1 percent to a maximum of 1.1 percent.

The maximum lead value determined in the OU3 RI/FS characterization study for lead-based paint was 375,000 mg/kg. To determine if this result would result in a potentially hazardous waste, the anticipated TCLP leachate result was calculated. The following variables were used in the calculation:

- The minimum metal thickness (18-gauge or 0.0478 in.) determined in the light-gauge metal study,
- the maximum paint thickness (23 mil) determined in the light-gauge metal study,
- the maximum percent of lead leached (1.1 percent) determined in the light-gauge metal study, and
- the maximum lead result (375,000 mg/kg) determined in the OU3 RI/FS characterization study.

The resulting TCLP leachate concentration was calculated to be 4.3 mg/L, below the 5 mg/L TCLP limit for lead. Therefore, no painted material in OU3 is considered characteristically hazardous as a

result of being painted with lead-based paint. However, any paint that is removed from any surface will be considered characteristically hazardous waste unless actual TCLP results show otherwise. This conclusion is extended to the other TC metals. This is possible because the maximum concentration for lead was so much higher than the maximum concentration of the other eight TC metals (375,000 mg/kg in lead versus 17,500 mg/kg in chromium, or 558 mg/kg for cadmium).

A.5.6.3 Organic Contamination

None of the steel coatings samples were analyzed for organic contamination.

A.5.7 Transite

Transite, a mixture of cement and asbestos, is a common construction material used for walls and roofs for many components in OU3. All transite is assumed to be radiologically contaminated. Samples of transite were collected by chipping away the surface using a jackhammer, hammer drill, or chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of ten transite samples collected from nine components were analyzed for chemical contamination. The following describes the results of the analyses of transite. In summary, samples from three components contain hazardous levels of chromium, 1,4-dichlorobenzene, hexachlorobutadiene, nitrobenzene, or tetrachloroethene.

A.5.7.1 Radiological Contamination

Samples of transite collected were assumed to be radiologically contaminated and were not subjected to radiological analyses at the analytical laboratory.

A.5.7.2 Inorganic Contamination

Eleven samples of transite were collected from nine components and analyzed for the leachability of metals using the TCLP test. Table A.III-1 summarizes the inorganic chemical contamination associated with transite. Six of the eight TC metals (except cadmium and selenium) were detected in at least one transite sample, whereas only one metal (chromium) exceeded the TCLP limit. Chromium was detected in 8 of the 11 samples, one of which exceeded the TCLP limit (5.0 mg/L). This sample was collected from the Hot Raffinate Building (3E). The chromium concentration in the

leachate was 5.96 mg/L; the TCLP limit for chromium is 5.0 mg/L, indicating that the transite in this component is characteristically hazardous.

A.5.7.3 Semivolatile Organic Contamination

Twelve samples were analyzed for the leachability of semivolatiles using the TCLP test. Only five semivolatile constituents were detected, three of which were in excess of the TCLP limits: 1,4-dichlorobenzene (17.2 mg/L detected compared to a TCLP limit of 7.5 mg/L), hexachlorobutadiene (14.9 mg/L detected compared to a TCLP limit of 0.5 mg/L), and nitrobenzene (28.3 mg/L detected compared to a TCLP limit of 2.0 mg/L). All three results were found in the same sample of transite in the Special Products Plant (9A).

A.5.7.4 Volatile Organic Contamination

Only two volatile constituents were detected, tetrachloroethene and 2-butanone. Tetrachloroethene was the only detected result that exceeds the TCLP limit at 59 mg/L (compared to a TCLP limit of 0.7 mg/L). This sample was collected from the Ore Refinery Plant (2A).

A.5.7.5 Pesticide/PCB Contamination

None of the transite samples were analyzed for pesticides or PCBs.

A.6 COMPONENT CATEGORY LEVEL CHARACTERIZATION

The purpose of this section of the appendix is to present the characterization of OU3 on a component category basis, as opposed to an analyte basis or media basis.

The data collection strategy of the WPA was based, in part, on the grouping of the 233 OU3 components into 11 component categories based on similarity of structure and/or function. The categories are listed below with the section numbers where the characterization within each is summarized listed in parenthesis:

- Category 1: Administrative and Support Buildings (A.6.1),
- Category 2: Warehouse/Storage Buildings (A.6.2),
- Category 3: Process Buildings (A.6.3),
- Category 4: Process Support Buildings (A.6.4),
- Category 5: Containers/Containerized Material - Aboveground (A.6.5),
- Category 6: Containers/Containerized Material - Belowground (A.6.6),
- Category 7: Bulk Material (A.6.7),
- Category 8: Storage Pads/Parking Lot/Roads/Railroads (A.6.8),
- Category 9: Piping, Utilities, Equipment - Aboveground (A.6.9),

- Category 10: Piping, Utilities, Equipment - Belowground (A.6.10),
- Category 11: Ponds and Basins (A.6.11).

The data from all samples collected within a particular component category (e.g., all samples collected from the components in Category 1) were combined and are presented below as summaries of radiological, inorganic, semivolatile, volatile, and pesticide/PCB contamination. The COC contamination within major media, discussed in A.5, are emphasized, with the supplemental media used as supporting information.

A.6.1 Summary Characterization of Administrative and Support Buildings (Component Category 1)

Thirteen components were classified during the development of the OU3 RI/FS WPA as administrative and support buildings. These buildings were not expected to contain significant levels of contamination because of their primary function as administrative offices, conference rooms, security posts, and other non-process-related activities. However, detectable quantities of several radiological, inorganic, and organic contaminants were anticipated. These include:

Radionuclides	Inorganics	Organics
uranium	lead	perchloroethylene
	magnesium	trichloroethylene
	mercury	vinyl chloride
	silver	ammonium sulfate
	germanium	miscellaneous oils

Two additional components have been constructed since the final approval of the WPA, for a total of 15 components. Six of the 15 components in this component category were sampled. A total of 37 intrusive samples were collected from major and supplemental media, including eight concrete chips, 13 concrete cores (comprised of three different depth ranges), six masonry samples, four steel coating samples, and four supplemental samples taken from HVAC filters.

A.6.1.1 Summary of Radiological Contamination

These components were not part of the production process or waste storage area, the Rust Engineering Building (45A) was previously used for machining and rolling uranium products. Subsequently, all process equipment has been removed from this building and the area has been decontaminated. As a result, the component buildings in this category have low levels of contamination. The radiological contamination that could potentially be present in this component category should be very limited and might include uranium and isotopes of uranium.

The radiological characterization of the Administrative and Support Buildings is based on 29 samples collected from five media: concrete chips (seven samples), concrete cores (ten), masonry chips (six), steel coatings (two), and air filters (four). Results for each media are presented below.

Concrete Chips

Seven concrete chip samples from components in this category were analyzed for uranium and 19 radionuclides. All but two (neptunium-237 and plutonium-241) of the radiological constituents were detected in at least one sample. The most notable constituents detected were uranium and its isotopes, which exceeded their baseline levels in concrete from the Rust Engineering Building (45A) by factors ranging from 13 to 41. The mean concentrations for uranium and its isotopes exceeded baseline by factors ranging from 0.33 to 7.8. Only one fission product, technetium-99, was detected at high levels in this category. Its mean and maximum concentrations exceed the baseline by factors of 3.3 and 12. Eight other radionuclides were detected above baseline in concrete chips from this category: americium-241, lead-210, polonium-210, radium-226, radium-228, thorium-228, thorium-230, and thorium-232.

Concrete Cores

Nine samples and one duplicate sample were taken from components in this category. In the top ½-inch of concrete, three samples and the duplicate were analyzed for uranium and 19 radionuclides. All but six of the radiological constituents (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected in at least one sample. Only two radioactive constituents were detected above baseline levels. Technetium-99 and uranium in exceeded baseline levels by factors of 1.2 and 1.1, respectively.

Three samples were collected from the second ½-inch of concrete in this category. All but six of the radiological constituents (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected in at least one sample. Uranium was the only radionuclide detected above baseline levels. The maximum uranium concentration exceeds its baseline level by factor of 1.5.

Three samples were collected below the first inch in this category. All but nine of the radiological constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, and technetium-99) were detected in at least one sample. No radionuclide was detected above baseline levels.

Masonry Chips

Six masonry chip samples from components in this category were analyzed for uranium and 19 radionuclides. All but four (cesium-137, neptunium-237, plutonium-238, and technetium-99) of the radiological constituents were detected in at least one sample. No radioactive constituent exceeded its baseline level by more than a factor of 1.5. Uranium and lead-210 exceeded their baseline levels by factors of 1.3 and 1.4, respectively.

Steel Coatings

Two steel coating samples from components in this category were analyzed for uranium and 19 radionuclides. All but five (americium-241, lead-210, plutonium-238, plutonium-241, and strontium-90) of the radiological constituents were detected in at least one sample. The most notable constituent detected was technetium-99. Its mean and maximum concentrations exceed its baseline level in paint by factors of 7.6 and 31, respectively. Three other radioactive constituents were detected above baseline in concrete chips from this category: thorium-227, thorium-230, and uranium and its isotopes.

Air Filters

Four samples were collected from HVAC filters in this category. All radionuclides were detected except americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, strontium-90, thorium-228, and uranium-235/236. The results confirm the presence of radionuclide contamination in this component category. No radioactive constituent was detected in these filters that was not already identified in at least one of the component's other media.

A.6.1.2 Summary of Inorganic Contamination

Concrete Chips

Seven concrete chips collected from six components within this category were analyzed for inorganic constituents. All but four (i.e., antimony, cadmium, selenium, and thallium) of the 16 inorganic COCs were detected. With the exception of beryllium, the maximum results from the 12 detected inorganic COCs were greater than the concrete baseline. The most significant of these was lead (collected from the Pistol Range area of the Service Building [11]) , which was approximately 200 times the concrete baseline for lead. The lead concentration of that concrete chip was the only one greater than 20 times the TCLP limit. The average results from ten of these COCs (i.e., arsenic, barium, chromium, copper, lead, manganese, mercury, nickel, vanadium, and zinc) were greater than

their respective baseline concentrations. The most significant of these remained lead, which exceeded the concrete baseline by a factor of 6.6.

Concrete Cores

The top half inch of four concrete cores collected from one component within Component Category 1 buildings was analyzed for inorganic constituents. All but three (i.e., beryllium, mercury, and thallium) of the 16 inorganic COCs were detected. Analyses showed that maximum concentrations of six (i.e., arsenic, copper, lead, selenium, vanadium, and zinc) of the 13 detected COCs exceeded the concrete baseline. The most significant of these was selenium (collected from the Laundry area of the Service Building [11]), which was over 16 times the baseline concentration for concrete. Selenium and lead were the only two inorganic COCs whose average concentrations exceeded concrete baseline levels; these concentrations were 6.4 and 1.5 times the baseline levels, respectively. None of these samples were greater than 20 times the TCLP limits.

The second half inch of three concrete cores was analyzed for inorganic constituents. Just like the top inch of concrete, all but three (i.e., beryllium, mercury, and thallium) of the 16 inorganic COCs were detected. Analyses showed that maximum concentrations of five (i.e., chromium, lead, selenium, silver, and zinc) of the 13 detected COCs exceeded the concrete baseline. The most significant of these was selenium (collected from the Laundry area of the Service Building [11]), which was almost ten times the baseline concentration for concrete. Selenium and lead were the only two inorganic COCs whose average concentrations exceeded concrete baseline levels; these concentrations were 5.2 and 1.5 times the baseline levels, respectively. None of these samples were greater than 20 times the TCLP limits.

The last portion of three concrete cores (depths of 1 to 4 inches) was analyzed for inorganic constituents, although antimony results are not available. All but four of the 15 remaining inorganic COCs were detected (i.e., beryllium, lead, mercury, and selenium). Analyses showed that maximum concentrations of four (i.e., arsenic, cadmium, chromium, and silver) of the 11 detected COCs exceeded the concrete baseline. The most significant of these was silver (collected from the Locker Room area of the Service Building [11]), which was approximately 1.7 times the baseline concentration for concrete. Arsenic was the only inorganic COCs whose average concentration exceeded concrete baseline levels although the average concentration was only 1.02 times the baseline level. None of these samples were greater than 20 times the TCLP limits.

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Masonry Chips

Six masonry chips collected from three components within this category were analyzed for inorganic constituents. All but four (i.e., antimony, selenium, silver, and thallium) of the 16 inorganic COCs were detected. Maximum concentrations from seven (i.e., barium, cadmium, chromium, lead, mercury, vanadium, and zinc) of the 12 detected inorganic COCs were greater than the concrete baseline. The most significant of these was mercury (collected from the Laundry area of the Service Building [11]), which was approximately 77 times the concrete baseline. The average results from five of these COCs (i.e., barium, chromium, lead, mercury, and zinc) were greater than their respective baseline concentrations. The most significant of these was lead, which exceeded the concrete baseline by a factor of 7.1. The cadmium concentration of one masonry chip was the only one greater than 20 times the TCLP limit.

Steel Coatings

Two steel coating samples collected from two components within this category were analyzed for inorganic constituents. All but five (i.e., antimony, beryllium, selenium, thallium, and vanadium) of the 16 inorganic COCs were detected. Barium (collected from the Rust Engineering Building [45A]), and lead (from the NAR Control Room [3C]) were the only inorganic COCs that showed maximum concentrations exceeding the baseline levels for paint. They exhibited levels that were 1.4 percent and 1 percent over the paint baseline, respectively. The average results from of all of the inorganic COCs for these steel coatings were less than their respective baseline concentrations. Both steel coating samples were found to contain more than 20 times the TCLP limits of chromium and lead. One of these samples also contained more than 20 times the TCLP limit for barium.

Supplemental Media

Four samples of HVAC filters were taken from administrative and support buildings. Of these, one was analyzed for inorganic constituents. Eight of the 16 inorganic COCs were detected (i.e., arsenic, cadmium, chromium, lead, manganese, nickel, selenium, and zinc). The chromium concentration of the HVAC filter (collected from the Rust Engineering Building[45A]) was the only one greater than 20 times the TCLP limit.

A.6.1.3 Summary of Organic Contamination

None of the 37 intrusive samples taken from administrative or support buildings were analyzed for organic constituents.

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A.6.2 Summary Characterization of Warehouse and Storage Buildings (Component Category 2)

The components which comprise the Warehouse and Storage Buildings component category are listed on Table 1.1 (Volume I). This component category includes 39 structures used to store containerized waste materials (see Containers and Containerized Material component category, Sect A.6.5). These structures act as secondary containment for the waste, and any contamination results from leakage from the waste containers.

Various contaminants are expected in this component category, including radionuclides, inorganics, and organics as follows:

Radionuclides	Inorganics	Organics
uranium tetrafluoride	ore concentrates	1,1,1-trichloroethane
uranium trioxide	copper	trichloroethylene
ores	asbestos	perchloroethylene
low-level radioactive waste	lead	mixed waste
uranium metal	mixed waste	hazardous waste
thorium compounds	hazardous waste	other drummed waste
thorium metal	other drummed waste	
mixed waste		

Nineteen of the 39 components were sampled. A total of 49 intrusive samples were collected from major and supplemental media. These include 27 concrete chip samples, three masonry samples, 18 steel coatings samples, and one unknown liquid sample.

A.6.2.1 Summary of Radiological Contamination

The 39 structures in this component category serve as secondary containment for containerized waste. Any contamination would result from leakage from the waste containers during storage or handling. Thus, potential expected contaminants include those contaminants in the stored materials. The radiological contamination that could potentially be present in this component category includes all radionuclide COCs.

The radiological characterization of the Warehouse and Storage Buildings is based on 33 samples collected from five media: concrete chips (24 samples), masonry chips (four), steel coatings (four), and unknown liquids (one). Results for each media are presented below.

Concrete Chips

Twenty-four concrete chip samples from components in this category were analyzed for uranium and 19 radionuclides. All radiological constituents were detected in at least one sample. Plutonium-238, plutonium-239/240, radium-226, radium-228, technetium-99, thorium-228, thorium-232 and uranium exceed their baseline levels by orders of magnitude. The highest concentrations of these radioactive constituents appear together in four components: the Thorium Warehouse (64), the Plant 1 Thorium Warehouse (67), the Pilot Plant Warehouse (68), and the General In-Process Warehouse (71). In addition, elevated uranium concentrations were detected in the Plant 5 Ingot Storage Shelter (05G), and the Plant 6 Covered Storage Area (06b). All other radionuclides were detected above baseline in concrete chips from Warehouse and Storage Buildings.

The mean for elemental uranium was 4.9 times baseline and the maximum detect was 860 times baseline. The mean concentrations for uranium isotopes ranged from 3.2 to 4.9 times baseline and the maximum detected concentrations for uranium isotopes range from 28 to 36 times baseline. The mean maximum values of technetium-99 exceed the baseline by factors of 3.3 and 1400, respectively. Among transformation products, the maximum values for plutonium-238, plutonium-239/240, americium-241, and neptunium exceed the baseline by factors of 750, 300, 29, and 1.1 times baseline. For radionuclides associated with ore handling, the mean concentrations for thorium-230, lead-210, radium-226 and polonium-210 exceed the baseline by factors of 2.0, 2.4, 1.2, and 0.61, respectively. The maximum detected concentrations for thorium-230, lead-210, radium-226 and polonium-210 exceed the baseline by factors of 780, 69, 870, and 9.9. For radionuclides associated with thorium processing the mean concentrations for radium-228, and thorium-228 exceeded baseline levels by factors of 3.6, and 1.8. The maximum detected concentrations for radium-228, thorium-228 and thorium-232 exceeded baseline levels by factors of 50,000, 15,000 times and 270, respectively.

Masonry Chips

Four masonry chip samples from components in this category were analyzed for uranium and 19 radionuclides. All but six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241) of the radiological constituents were detected in at least one sample. Cesium-137, strontium-90, and uranium exceeded their baseline levels by factors of 1.5, 2.6 and 2.4, respectively. One of the samples taken from the General In-Process Warehouse (71) contains enriched uranium. No radionuclide exceeded its baseline level by more than 2.5.

Steel Coatings

Four steel coating samples from components in this category were analyzed for uranium and 19 radionuclides. All but two (cesium-137 and lead-210) of the radiological constituents were detected in at least one sample. No radionuclide was detected above baseline levels.

Supplemental Media

One sample of unknown liquid was collected from HVAC filters in this category. The only radionuclides detected were uranium and uranium isotopes, and technetium-99. The results confirm the presence of uranium and technetium-99 contamination in this component category. No radioactive constituent was detected in this sample that was not already identified in at least one of the category's other media.

A.6.2.2 Summary of Inorganic Contamination

Concrete Chips

From this component category, 27 samples of concrete chips were collected from nine components. Mercury was the only one of 16 inorganic COCs not detected. Beryllium was the only one of these detected COCs not greater than the concrete baseline, yet its concentration was equal to the baseline. The most significant COC was zinc (collected from the Lumber Storage Building [12C]), with a maximum result which exceeded the concrete baseline by a factor of 31. The mean concentrations from nine of these COCs were greater than the respective concrete baselines. The most significant of these was antimony, which exceeded the concrete baseline by a factor of 8.1. None of the detected results exceeded 20 times the TCLP limit, where applicable.

Masonry

Three masonry samples were collected from two components in the Warehouse and Storage Buildings component category. Of 16 inorganic COCs, 10 were detected. Arsenic, cadmium, nickel, selenium, silver, and thallium are those that were not detected. The maximum results of seven of the ten detected concentrations were above the respective concrete baselines, with zinc [collected from the Isotopic Verification area of the General In-Process Warehouse (71)], which is the most significant, exceeding the baseline by a factor of 18. The mean results from five of these COCs were greater than the respective concrete baselines. The most significant of these was mercury, which exceeded the concrete baseline by a factor of 3.4. None of the detected results exceeded 20 times the TCLP limit, where applicable.

Steel Coatings

From 13 components in this component category, 18 samples of steel coatings were collected. Thallium was the only inorganic COC not detected. Nine maximum concentrations of the 15 COCs that were detected exceeded the respective paint baselines. Arsenic (collected from the Pilot Plant Warehouse [68]) was the most significant, exceeding the paint baseline by a factor of 7.7. Selenium was the only COC that had an average concentration greater than the paint baseline, and this was by a factor of 2.0. Chromium exceeded 20 times the TCLP limit in 13 samples collected from all of the components within this category. Lead exceeded 20 times the TCLP limit in 11 samples. Cadmium, barium, arsenic, and mercury were detected at concentrations exceeding 20 times the TCLP limit in four, two, two, and one samples, respectively.

Supplemental Media

One unknown liquid sample was the only supplemental sample collected from this component category. No inorganic COCs were detected in this sample.

The absence of any inorganics in the unknown liquid sample does not support the findings of several inorganics detected in the major media, discussed previously.

A.6.2.3 Summary of Semivolatile Organic Contamination

The unknown liquid sample was the only sample from this component category analyzed for semivolatile organics; yet none were detected.

A.6.2.4 Summary of Volatile Organic Contamination

The unknown liquid sample was the only sample from this component category analyzed for volatile organics; yet none were detected.

A.6.2.5 Summary of Pesticide/PCB Contamination

One concrete chip sample was analyzed for PCB/pesticides. alpha-Chlordane was the only PCB detected, but it did not exceed TSCA limits of 50 ppm.

A.6.3 Summary Characterization of Process Buildings (Component Category 3)

The Process Buildings are listed on Table 1.1. This component category consists of 31 buildings and areas where potential contaminants have been used as part of plant operations. The components that comprise this category currently contain significant quantities of waste material (radiological and

chemical) in equipment, pipes, and ducts, as well as contamination associated with the building construction materials. These buildings are expected to be the most significant sources of contaminants for OU3.

Various contaminants are expected in this component category. These include radionuclides, inorganics, and organics, listed as follows:

Radionuclides
uranium metal (up to 20 percent enrichment)
uranium compounds
uranium ores and concentrates and associated impurities
thorium compounds
uranium and thorium decay products
plutonium

Inorganics
impurities in ores and ore concentrates
aluminum oxide
magnesium fluoride
urea
copper
magnesium
calcium fluoride
ammonium hydroxide
sulfur dioxide
barium
lithium
arsenic
silver
cadmium
hydrogen fluoride
calcium
zinc
mercury
chromium
magnesium oxide
zirconium
yttria
zirconium oxide
Halon 1301
nitric acid

Inorganics (Cont'd)
sodium hydroxide
sulfuric acid
nickel
potassium hydroxide
potassium fluoride
lithium carbonate
potassium carbonate
sodium chloride
potassium chloride
lithium chloride
sodium sulfite
calcium fluoride
hydrochloric acid
phosphoric acid
ammonium hydroxide
copper sulfate
sulfur dioxide
zinc fluoride
aluminum
barium chloride
barium sulfate
asbestos
ammonia
platinum
acetic acid
chromic acid
percloric acid
soda ash
argon
nitrogen
sodium silicate
Freon-11™
aluminum oxide
graphite
diatomacious earth
dolomite
misc. laboratory chemicals

Organics
various oils
1,1,1-trichloroethane
ethylene glycol
trichloroethylene
diesel fuel
methylene chloride
acetone
tributyl phosphate
kerosene
diamyl amyl phosphonate
gasoline
creosote
perchloroethylene
carbon tetrachloride
chlordane
chloroform
1,2-dichloroethane
1,1-dichloroethylene
vinyl chloride
sump cakes
tributyl phosphate
tetrachloroethane
tetrachloroethylene
benzene
chlorobenzene
toluene
trichloroethylene
perchloroethylene
acetone
ethylbenzene
methyl ethyl ketone
xylene
oxalic acid
methanol
ethylene glycol
methyl ethyl ketone
naphtha mineral spirits
oily sludges
misc. laboratory chemicals

Of the 31 components, 28 were sampled. A total of 598 intrusive samples were collected from major and supplemental media. These include 26 acid brick samples, 93 concrete chip samples, 222

concrete core samples, 30 loose media samples, 41 masonry samples, 134 steel coatings samples, 10 transite samples, and 42 unknown liquid samples.

A.6.3.1 Summary of Radiological Contamination

This component category consists of 31 buildings and areas where the bulk of the historical industrial processes were located. These components currently contain significant quantities of waste material in equipment, pipes, and ducts as well as contamination associated with the building construction materials. This group of structures is expected to be the most significant source of contaminants for OU3. Given the accumulation of information on radiological surface contamination levels and knowledge of process operations history, the potential extent of contamination is widespread within OU3. Expected contaminants include uranium, thorium, ore process residues, transformation products and fission products.

The radiological characterization of the Process Buildings is based on 337 samples collected from five media: acid brick (14 samples), concrete chips (71), concrete cores (156), masonry chips (29), and steel coatings (67). This effort was supported by collecting 90 samples from five supplemental media: Air filters (26 samples), loose media (23), sediment (two), sludge (one), and unknown liquids (38).

Acid Brick

Fourteen acid brick samples from components in this category were analyzed for uranium and 19 radionuclides. All of the radiological constituents have at least one sample that exceeds its baseline concentration by a factor of 15 or greater. Acid brick samples from the Ore Refinery (2A) and the Pilot Plant Wet Side (13A) contain very high levels (over 100 times baseline) of all contaminants except cesium-137, strontium-90, neptunium-237, thorium-228, thorium-232, and actinium-227 (thorium-227). The maximum concentration for plutonium-238 exceeds its baseline by a factor of 10,000. The mean concentrations for uranium and its isotopes exceeded baseline by factors ranging from 0.33 to 7.8. Only one fission product, technetium-99, was detected at high levels in this category. Its mean and maximum concentrations exceed the baseline by factors of 3.3 and 12. Eight other radionuclides were detected above baseline in concrete chips from this category: americium-241, lead-210, polonium-210, radium-226, radium-228, thorium-228, thorium-230, and thorium-232.

The mean for elemental uranium was 230 times baseline, and the maximum detect was 750 times baseline. The mean concentrations for uranium isotopes ranged from 89 to 150 times baseline, and

the maximum detected concentrations for uranium isotopes range from 240 to 580 times baseline. Mean concentrations for the fission products technetium-99 and cesium-137 exceed the baseline by factors of 74 and four, respectively. The maximum concentrations technetium-99 and cesium-137 exceed the baseline by factors of 740 and 140, respectively. The strontium-90 mean concentration was 0.65 pCi/g and the maximum detect was 1.5 pCi/g. The transformation product, found in the highest abundance was plutonium-238. Its mean and maximum concentrations exceeded the baseline value by factors of ten and 14,000. Among the other transformation products, the mean concentrations reported for americium-241, neptunium-237, and plutonium-239/240 exceed baseline by factors of 7.3, 3.2, and 6.3 respectively. The maximum detected concentrations for americium-241, neptunium-237, and plutonium-239/240 were 330, 17, and 750 times their baseline level, respectively. For radionuclides associated with ore handling, the mean and maximum concentrations of polonium-210 exceeded the baseline by factors of 3.1 and 2100. The mean concentrations of thorium-230, radium-226, and lead-210 exceed baseline by 74, 3.7, and 11, respectively. The maximum concentrations for thorium-230, radium-226, and lead-210 were 340, 300, and 2000 times baseline. For radionuclides associated with thorium processing, the mean and maximum concentrations of radium-228 exceed baseline by factors of 29 and 5700, respectively. The mean concentrations for thorium-228 and thorium-232 exceed baseline by factors of 20 and 6.8 times baseline, respectively. The maximum detected concentrations for thorium-228 and thorium-232 exceed baseline by factors of and 16 times baseline, respectively.

Concrete Chips

Seventy-one (71) concrete chip samples from components in this category were analyzed for uranium and 19 radionuclides. All radiological constituents were detected in at least one sample. Technetium-99, thorium-230, and uranium, plus its isotopes, exceed their baseline levels by three or more orders of magnitude. The highest concentrations of these radioactive constituents appear in six components: The Ore Refinery (2A), the Metals Production Plant (5A), the Recovery Plant (8A) the Special Products Plant (9A), the Pilot Plant Wet Side (13A), and the Six to Four Reduction Facility #1 (54A). All other radionuclides were detected in concentrations above their baseline concentrations in concrete chips from this category.

The mean and maximum concentrations for elemental uranium exceed the baseline level by factors of 100 and 5,200, respectively. The mean concentrations for uranium isotopes ranged from 64 to 99 times baseline, and the maximum detected values for uranium isotopes ranged from 5,700 to 8,200 times their baseline levels. Among fission products, the mean and maximum concentrations for

technetium-99 exceeded baseline concentrations by 54 times and 20,000, respectively. The mean and maximum concentrations for cesium-137 exceeded baseline by factors of 1.1 and 32, respectively. The transformation product neptunium-237 was detected at 180 times its baseline concentration, and its mean concentration is 2.0 times baseline. The mean concentrations for americium-241, plutonium-238, and plutonium-239/240 were 1.6, 1.4, and 1.5 times baseline, respectively. The maximum detected concentrations for americium-241, plutonium-238, and plutonium-239/240 exceeded baseline levels by factors of 8.7, 97, and 140, respectively. Among radionuclides associated with ore handling, the mean and maximum concentrations for thorium-230 exceeded baseline by factors of 9.3 and 1,100, respectively. The mean concentrations of radium-226, lead-210, polonium-210, and thorium-227 exceeded baseline levels by factors of 0.66, 3.3, 0.41, and 3.6, respectively. The maximum detected concentrations for radium-226, lead-210, polonium-210, and thorium-227 exceeded baseline levels by factors of 18, 78, 25, and 18, respectively. For radionuclides associated with thorium processing the mean concentrations for radium-228, thorium-228 and thorium-232 exceeded baseline by factors of 4.2, 2.3 and 4.7, respectively. The maximum detected values for radium-228, thorium-228 and thorium-232 exceeded baseline by factors of 200, 60 and 86, respectively.

Concrete Cores

In support of characterization, 156 samples and six duplicates were taken from concrete at three depths in this component category and analyzed for uranium and 19 radionuclides. These samples provide information on the vertical extent of contamination in OU3 concrete.

As expected, levels of radioactive constituents in this category tend to be highest in the top inch of concrete sampled. In areas of undisturbed concrete, constituent concentrations tended to decrease as the depth of the concrete sample increased. Moderate to high levels of contamination were detected in all components, with the exceptions of the Preparation Building (1A), the Plant 6 Electrostatic Precipitator (South) (6C), the Plant 6 Salt Oil Heat Treatment Building (6F), and the Engine House/Garage (31A).

In the top half-inch of concrete, eight radioactive constituents were detected in concentrations exceeding their baseline levels by three orders of magnitude: plutonium-238, radium-228, technetium-99, thorium-232, and uranium, plus its three isotopes. Four radioactive constituents were detected in concentrations exceeding their baseline levels by two orders of magnitude: neptunium-237, plutonium-

239/240, radium-226, and thorium-230. All remaining radionuclides were detected in concentrations exceeding their baseline levels by at least a factor of five.

The mean and maximum concentration for elemental uranium exceed the baseline level by factors of 84 and 1100, respectively. The mean concentrations for uranium isotopes ranged from 49 to 74 times baseline and the maximum detected concentrations for uranium isotopes range from 1900 to 3000 times baseline. Among the fission products, the mean and maximum concentrations for technetium-99 exceed baseline by 41 times and 2100 times baseline. The mean concentration for cesium-137 was 1.4 times and the maximum detected value was 24 times baseline. The transformation products americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were detected at concentrations that exceeded their baseline values by factors of 70, 110, 1200, 340 and 39. The mean concentrations of americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 exceeded baseline levels by factors of 2.4, 2.3, 2.8, 3.6 and 1.6. Among radionuclides associated with ore handling and thorium processing, the most prevalent radionuclides were radium-228, thorium-228, thorium-230, and thorium-232, with maximum concentrations exceeding baseline by factors of 6800, 1700, 770, and 1200, respectively. The mean concentrations for radium-228, thorium-228, thorium-230, and thorium-232, exceeded baseline levels by factors of 7.5, 7.2, 12, and 2.9, respectively. The remaining radionuclides were detected at lower levels. The mean concentrations for radium-226, lead-210, and polonium-210 were 0.94, 2.7, and 0.57 times their respective baseline levels. The maximum detected concentrations for radium-226, lead-210, and polonium-210 were 180, 33, and 13 times baseline, respectively. Ac-227's daughter, thorium-227, had mean and maximum concentrations that were 5.3 and 23 times baseline.

In the second half-inch, five radionuclides were detected in concentrations exceeding their baseline levels by three orders of magnitude: plutonium-238, radium-228, thorium-228, thorium-230 and, thorium-232. Six radioactive constituents were detected in concentrations exceeding their baseline levels by two orders of magnitude: plutonium-239/240, technetium-99, and uranium and its three isotopes. Five of the remaining radionuclides were detected in concentrations exceeding their baseline levels by at least a factor of five: americium-241, cesium-137, lead-210, neptunium-237, and radium-226.

The mean and maximum concentration for elemental uranium exceed the baseline level by factors of 10 and 390, respectively. The mean concentrations for uranium isotopes ranged from 4.7 to 8.3 times baseline and the maximum detected concentrations for uranium isotopes range from 190 to 290

times baseline. Among the fission products, the mean and maximum concentrations for technetium-99 exceed baseline by 10 times and 350 times baseline. The maximum detected concentration for cesium-137 was 31 times baseline. The transformation products americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were detected at concentrations that exceeded their baseline values by factors of 68, 38, 2700, 140 and 39. The mean concentrations of americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were all below baseline levels.

Among radionuclides associated with ore handling and thorium processing, the most prevalent were radium-228, thorium-228, thorium-230, and thorium-232, with maximum concentrations exceeding baseline by factors of 3300, 2000, 1000, and 1500, respectively. The mean concentrations for radium-228, thorium-228, and thorium-232, exceeded baseline levels by factors of 3.6, 2.1, and 2.8, respectively. The remaining radionuclides were detected at lower levels. The maximum detected concentrations for radium-226, lead-210, and polonium-210 were 6.8, 6.3, and 3.3 times baseline, respectively. The maximum concentration for Ac-227's daughter, thorium-227, exceeded baseline by a factor of 2.8. The mean concentrations for radium-226, lead-210, polonium-210, and thorium-227 were all less than their respective baseline levels.

Below the first inch of concrete, eight radionuclides were detected in concentrations exceeding their baseline levels by two orders of magnitude: plutonium-238, radium-228, technetium-99, thorium-230 and, uranium and its isotopes. Four of the remaining radionuclides were detected in concentrations exceeding their baseline levels by at least a factor of five: americium-241, lead-210, thorium-228, and thorium-232.

The mean and maximum concentrations for elemental uranium exceed the baseline level by factors of 2.0 and 450, respectively. The mean concentrations for uranium isotopes ranged from 4.7 to 8.3 times baseline, and the maximum detected concentrations for uranium isotopes range from 360 to 490 times baseline. Among the fission products, the mean and maximum concentrations for technetium-99 exceed baseline by 3.7 times and 220 times baseline. The maximum detected concentration for cesium-137 was 2.2 times baseline. The transformation products americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were detected at concentrations that exceeded their baseline values by factors of 6.0, 2.9, 110, 4.6 , and 12.6. The mean concentrations of americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were all below baseline levels. Among radionuclides associated with ore handling and thorium processing, the

most prevalent were radium-228, thorium-228, thorium-230, and thorium-232, with maximum concentrations exceeding baseline by factors of 290, 76, 53, and 51, respectively. The mean concentrations from radium-228 and thorium-230 exceeded baseline by factors of 2.1 and 1.1, respectively. The maximum detected concentrations for radium-226, lead-210, polonium-210, and thorium-227 were 1.8, 5.7, 1.6, and 3.0 times baseline, respectively. The mean concentrations for the remaining radionuclides were all less than their respective baseline levels.

Masonry Chips

Twenty-nine masonry chip samples from components in this category were analyzed for uranium and 19 radionuclides. All of the radiological constituents were detected in at least one sample. Ten radioactive constituents were detected in concentrations exceeding their baseline levels by two orders of magnitude: cesium-137, lead-210, polonium-210, radium-228, technetium-99, thorium-230, and uranium, plus its three isotopes. Six radionuclides were detected in concentrations exceeding their baseline levels by at least a factor of five: neptunium-237, plutonium-238, plutonium-239/240, thorium-227, thorium-228, and thorium-232. The highest concentrations of these radioactive constituents appear in three components: The Incinerator Building (39A), the Pilot Plant Wet Side (13A), the Recovery Plant (8A).

The mean and maximum concentration for elemental uranium exceed the baseline level by factors of 19 and 620, respectively. The mean concentrations for uranium isotopes range from 8.4 to 13 times baseline, and the maximum detected concentrations for uranium isotopes range from 170 to 240 times baseline. Among the fission products, the mean and maximum concentrations for technetium-99 exceed baseline by 5.3 times and 160 times baseline. The maximum detected concentration for cesium-137 was 110 times baseline. The transformation products americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were detected at concentrations that exceeded their baseline values by factors of 120, 42, 67, 35, and 6.1. The mean concentrations of americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 were less than twice baseline levels. Among radionuclides associated with ore handling and thorium processing, the most prevalent were lead-210, polonium-210, radium-226, radium-228, and thorium-230, with maximum concentrations exceeding baseline by factors of 910, 150, 1400, 210, and 860, respectively. The maximum detected concentrations for thorium-227, thorium-228, and thorium-232 were 16, 38, and 24 times baseline, respectively. The mean concentrations for lead-210, radium-226, radium-228, and thorium-230, exceeded baseline by factors of 3.0, 1.1, 5.1, and 3.3, respectively. The mean concentrations for the remaining radionuclides were all less than their respective baseline levels.

Steel Coatings

Sixty seven steel coating samples from components in this category were analyzed for uranium and 19 radionuclides. All of the radiological constituents were detected in concentrations exceeding baseline in at least one sample. Maximum concentrations of two constituents, lead-210 and radium-228, exceed their baseline levels in paint by three orders of magnitude. All other radioactive constituents, with the exception of the fission products cesium-137 and strontium-90, were detected in concentrations that were over two orders of magnitude higher than their baseline levels. High levels of contamination are widespread and involve virtually every component in the category.

The mean concentration for elemental uranium exceeded its baseline by a factor of 12, and the maximum detect was 260 times baseline. The mean concentrations for uranium isotopes range from 19 to 26 times baseline, and the maximum detected concentrations for uranium isotopes range from 520 to 580 times baseline. Among the fission products, the mean for technetium-99 exceeded its baseline by a factor of 25 times baseline, and the maximum detected value was 690 times baseline, both of which were the highest factors greater than baseline. The strontium-90 mean was less than baseline and the maximum detect exceeded its baseline by a factor of 26 times baseline. The mean for cesium-137 was less than twice baseline, and the maximum detect exceeded its baseline by a factor of 12. Elevated levels of transformation products were detected in steel coatings from components in this category. The mean for plutonium-238 was less than twice baseline, but the maximum detected concentration exceeded its baseline by a factor of 1300. The mean concentrations for americium-241, neptunium-237, and plutonium-239/240 were 4.0, 1.7, and 5.5 times their baseline levels. The maximum detected concentrations for americium-241, neptunium-237, and plutonium-239/240 exceeded their baselines by a factor of 270, 210, and 510, respectively. Similarly high levels of other radionuclides associated with ore handling and thorium processing were also detected. The mean concentration for lead-210 exceeded its baseline level by a factor of 7.3, and the maximum detected value exceeded baseline by a factor of 1700 times baseline. The mean concentrations for thorium-230, radium-226, polonium-210, and thorium-227 exceeded their baselines by a factors of 2.0, 0.72, 0.36, and 3.5, respectively. The maximum detected concentrations for thorium-230, radium-226, polonium-210, and thorium-227 exceeded their baselines by a factor s of 370, 1500, 100, and 190, respectively. The mean and maximum concentrations for radium-228 exceeded their baselines by factors of 3.3 and 840, respectively. The mean concentrations for thorium-228 and thorium-232 were less than twice baseline. The maximum detected concentrations for thorium-228 and thorium-232 exceeded their baselines by a factor of 110 and 62, respectively.

Supplemental Media

Ninety samples were collected from five supplemental media: air filters (26 samples), loose media (23), sediment (two), sludge (one), and unknown liquids (38). All radioactive constituents were detected in air filters except americium-241, plutonium-239/240, strontium-90, and technetium-99. All radioactive constituents were detected in loose media, sediment, and unknown liquids. All radioactive constituents were detected in sludge except neptunium-237. Elemental uranium and uranium isotopes exhibit the highest concentrations in these media. Other radionuclides found in high concentrations in at least one media include lead-210, polonium-210, plutonium-238, radium-228, technetium-99, thorium-228, thorium-230, and thorium-232. All radioactive constituents detected in supplemental media were also detected at least once in another media from the category.

A.6.3.2 Summary of Inorganic Contamination

Acid Brick

From the Process Buildings component category, 17 samples of acid brick were collected for inorganic analyses from six components. Thallium was the only inorganic COC not detected. The maximum concentrations of all but three (beryllium, manganese, and vanadium) were above the respective concrete baseline. The most significant of these were copper (collected from the Zirno Decladding area of the Special Products Plant [9A]) and lead (collected from the Denitration area of the Ore Refinery Plant [2A]), which exceeded the baseline by factors of 150 and 160, respectively. The mean concentration of nine of the 15 detected COCs was greater than the concrete baseline. The most significant of these was lead, which exceeded the concrete baseline by a factor of 35. The following samples exceeded 20 times the TCLP limit:

Exceeds 20 times TCLP:	Building:	Process Area:
Chromium	Special Products Plant (9A)	Zirno Decladding
	Special Products Plant (9A)	Triple Beta Heat Treating
	Ore Refinery Plant (2A)	Denitration
	Pilot Plant Wet Side (13A)	Northern
Lead	Metal Dissolver Building (2D)	West Metal Dissolution
	Ore Refinery Plant (2A)	Dinitration
	Ore Refinery Plant (2A)	Extraction
	Ore Refinery Plant (2A)	Digestion

Concrete Chips

From 18 components in this component category, 67 samples of concrete chips were collected and analyzed for inorganic constituents. All 16 inorganic COCs were detected. The maximum results

from all of these COCs were greater than the respective concrete baselines. The most significant of these was zinc (collected from P-2 Furnace area of the Pilot Plant Annex [37]), which exceeded the concrete baseline by a factor of 4900. The average results from 11 of these COCs were greater than the respective concrete baselines. The most significant of these was lead, which exceeded the concrete baseline by a factor of 9.4. The following exceeded 20 times the TCLP limit:

Exceeds 20 times TCLP:	Building:	Process Area:
Barium	Recovery Plant (8A)	Ball Mill
Cadmium	Recovery Plant (8A)	Muffle Furnace
Chromium	Recovery Plant (8A)	Ball Mill
Lead	Pilot Plant Annex (37)	P-2 Furnace
	Pilot Plant Annex (37)	West Wall Processes
	Pilot Plant Annex (37)	Outside Areas
	Green Salt Plant (4A)	Hydrofluorination
	Metals Fabrication Plant (6A)	Ammonia Dissociation and Nitrogen
	Metals Fabrication Plant (6A)	Rolling Mill
	Metals Production Plant (5A)	Vacuum Outgas Furnace
	Recovery Plant (8A)	Graphite Machining
	Recovery Plant (8A)	Ball Mill
	Special Products Plant (9A)	UAP Furnace
	Incinerator Building (39A)	Uranium Machining
		Solid Waste Incinerator
Silver	Metals Fabrication Plant (6A)	Rolling Mill
	Six to Four Reduction Facility #1 (54A)	AHF Recovery

Concrete Cores

The top ½-inch of 55 concrete cores samples collected from 22 components in this category were analyzed for inorganic constituents. All 16 inorganic COCs except thallium were detected. The maximum detected results of all of those detected were greater than the respective concrete baselines. The most significant of these was lead (collected from the Hilco Oil Reclaimer area of the Metal Production Plant [5A]), which exceeded the concrete baseline by a factor of 350. The average concentrations from 10 of these COCs were greater than the respective concrete baselines. The most significant of these again was lead, which exceeded the concrete baseline by a factor of 9.6. The list of samples that exceed 20 times the TCLP limit is below.

In the second ½-inch of 51 concrete core samples collected from this component category for inorganic analyses, all 16 inorganic COCs were detected. The maximum detected results from all of

these COCs except thallium were greater than the respective concrete baselines. The most significant of these was lead (collected from the Pickling area of the Metals Fabrication Plant [6A]), which exceeded the baseline by a factor of 80. The average concentrations from 11 of these COCs were greater than the respective concrete baselines. The most significant of these was antimony, which exceeded the baseline by a factor of 5.2. The list of samples that exceed 20 times the TCLP limit is below.

In the bottom depth (greater than 1.0 inch) of 44 concrete core samples collected from this component category for inorganic analyses, all 16 inorganic COCs were detected. The maximum detected results from all of these COCs except thallium were greater than the respective concrete baselines. The most significant of these was vanadium (collected from the Drum Digestion area of the Ore Refinery Plant [2A]), which exceeded the concrete baseline by a factor of 37. The average concentrations from eight of these COCs were greater than the respective concrete baselines. The most significant of these were antimony and selenium, which exceeded their concrete baselines by factors of 4.8 and 4.0, respectively. The list of samples that exceed 20 times the TCLP limit follows.

Exceeds 20 times TCLP:	Depth:	Building:	Process Area:
Barium	Top ½-inch	Special Products Plant (9A)	Triple Beta Heat Treating
	Top ½-inch	Sump Pump House (13C)	Sump Pump
	Top ½-inch (2)	Recovery Plant (8A)	Oil Centrifuge
Chromium	one to four inch	Six to Four Reduction Facility #1 (54A)	DHF Recovery
	Top ½-inch	Ore Refinery Plant (2A)	Drum Digestion
	Top ½-inch	Metals Fabrication Plant (6A)	Old Water Treatment
Lead	Top ½-inch	Metals Production Plant (5A)	Hilco Oil Reclaimer
	Top ½-inch (2)	Ore Refinery Plant (2A)	Drum Digestion
	Top ½-inch	Six to Four Reduction Facility #1 (54A)	DHF Recovery
	Second ½-inch	Metals Fabrication Plant (6A)	Pickling
	Top ½-inch	Metals Fabrication Plant (6A)	Pickling
	Top ½-inch	Decontamination Building (69)	Decontamination
	Second ½-inch	Preparation Plant (1A)	Solvent Reclamation
	Top ½-inch	Ore Refinery Plant (2A)	Extraction
	Second ½-inch	Pilot Plant Wet Side (13A)	Central
	Top ½-inch	Metals Production Plant (5A)	Water Treatment
	Second ½-inch	Pilot Plant Wet Side (13A)	Northern
	Top ½-inch	Pilot Plant Wet Side (13A)	Central
	Top ½-inch	Incinerator Building (39A)	Liquid Waste Incinerator
Silver	Top ½-inch	Ore Refinery Plant (2A)	Drum Digestion

Masonry Chips

From 11 components in this component category, 31 samples of masonry chips were collected and analyzed for inorganic constituents. All 16 inorganic COCs except selenium were detected. The maximum results from 12 of these COCs were greater than the respective concrete baselines. Those detected COCs that did not exceed baseline include beryllium, cadmium, and thallium. The most significant of these was lead (collected from the Autoclave Area of the Six to Four Reduction Facility #1 [54A]), which exceeded the concrete baseline by a factor of 4800. The average results from nine of these COCs were greater than the respective concrete baselines. The most significant of these again was lead, which exceeded the concrete baseline by a factor of 35.96. Lead concentration also was greater than 20 times the TCLP limits in 17 of the 31 original concrete chip samples. Chromium concentration exceeded 20 times the TCLP limit in one sample.

Exceeds 20 times TCLP:	Building:	Process Area:
Barium	Engine House/Garage (31A)	Garage
Chromium	Recovery Plant (8A)	Water Treatment
Lead	Six to Four Reduction Facility (54A)	Autoclave Area
	Recovery Plant (8A)	Water Treatment
	Pilot Plant Annex (37)	West Wall Processes
	Pilot Plant Annex (37)	P-2 Furnace
	Decontamination Building (69)	Decontamination
	Engine House/Garage (31A)	Garage
	Incinerator Building (39A)	Drum Dryer
	Six to Four Reduction Facility (54A)	UF6 Reduction Reactors
	Pilot Plant Annex (37)	Plasma Furnace
	Six to Four Reduction Facility (54A)	DHF Recovery
	Pilot Plant Annex (37)	East Wall Processes
	Six to Four Reduction Facility (54A)	Derby/Saw Sampling
	Plant 9 Sump Treatment Facility (9B)	Sump Treatment
	Incinerator Building (39A)	Drum Dryer
	Six to Four Reduction Facility (54A)	PLT Furnace
	Six to Four Reduction Facility (54A)	P-1 Furnace Room
	Six to Four Reduction Facility (54A)	Autoclave Area
Silver	Decontamination Building (69)	Decontamination

Steel Coatings

From 18 components in this component category, 134 samples of steel coatings were collected and analyzed for inorganic constituents. All 16 inorganic COCs were detected. The maximum results from 14 of these COCs were greater than the respective concrete baselines. Those detected COCs that did not exceed baseline include thallium and zinc. The most significant of those detected was selenium (collected from the Hydrofluoric Acid Recovery area of the Green Salt Plant [4A]), which

exceeded the concrete baseline by a factor of 93. The average results from only one of these COCs, selenium, was greater than the concrete baseline by a factor of 1.8. Lead and chromium exceeded 20 times the TCLP limit by factors of 83 and 79, respectively. Cadmium, mercury, barium, arsenic, and selenium exceeded 20 times the TCLP limit in 23, 19, 16, four, and two samples, respectively. The samples that exceed 20 times the TCLP for steel coatings were collected from the majority of the components within this category.

Supplemental Media

From 24 loose media samples collected from 15 components from this category for inorganic analyses, all 16 inorganic COCs were detected. Lead exceeded 20 times the TCLP limits in 22 of the 24 samples. Chromium exceeded this criteria in 16 of the samples. Arsenic, mercury, selenium, and silver exceed 20 times the TCLP limit in four samples each. Cadmium and barium exceed this criteria in two and one sample, respectively.

Two sediment samples were collected for inorganic analyses. Only three inorganic COCs (selenium, thallium, and vanadium) were not detected. Concentrations of cadmium, chromium, mercury, and silver exceeded 20 times the respective TCLP limits in one sample each, whereas the lead concentration exceeded 20 times the TCLP limit in both samples.

One sludge sample was collected for inorganic analyses. Only four inorganic COCs (mercury, selenium, thallium, and vanadium) were not detected. Concentrations of chromium and lead exceeded 20 times the respective TCLP limits in the sample.

From the Process Buildings category, 37 unknown liquid samples were collected for inorganic analyses. All 16 inorganic COCs were detected, and chromium (collected from the Special Products Plant [9A]) exceeded the TCLP limit.

Supplemental media results support findings in major media of inorganic constituents.

A.6.3.3 Summary of Semivolatile Organic Contamination

Acid Brick

Three samples of acid brick were collected and analyzed for semivolatiles. Four of 15 semivolatile COCs were detected (benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, and chrysene), but these did not exceed 20 times the TCLP limit.

Concrete Chips

One sample of concrete chips was collected and analyzed for semivolatile constituents. Of 15 semivolatile COCs, bis(2-ethylhexlyl)phthalate and chrysene were the only ones detected, but these did not exceed 20 times the TCLP limit.

Concrete Cores

One concrete core was collected for analyses of semivolatile constituents at all three depths. No semivolatile COCs were detected in any of the three depths.

Masonry Chips

Two samples of masonry chips were collected and analyzed for semivolatile constituents, yet no semivolatile COCs were detected.

Supplemental Media

A total of 24 loose media samples were collected for analyses of semivolatile constituents. Of 15 semivolatile COCs, 13 were detected. The two that were not detected are hexachlorobutadiene and nitrobenzene. 2,4-Dinitrotoluene exceeded 20 times the TCLP limit in one sample.

Two sediment samples were collected from this component category for analyses of semivolatile constituents. Of 15 semivolatile COCs, nine were detected. The six that were not are 1,4-dichlorobenzene, 2,4-dinitrotoluene, hexachlorobutadiene, n-nitroso-di-n-propylamine, nitrobenzene, and pentachlorophenol. None of the COCs exceeded 20 times the TCLP limit.

One sludge sample was collected from this component category for analyses of semivolatile constituents. Of 15 semivolatile COCs, seven were detected: (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, and indeno(1,2,3-cd)pyrene). None of the COCs exceeded 20 times the TCLP limit.

From this component category, 37 unknown liquid samples were collected for analyses of semivolatile constituents. Of 15 semivolatile COCs, seven were detected (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, and chrysene). None of the COCs exceeded 20 times the TCLP limit.

A.6.3.4 Summary of Volatile Organic Contamination

Acid Brick

Four samples of acid brick were collected and analyzed for volatiles. Two of three volatile COCs were detected (styrene and tetrachloroethene), but these did not exceed 20 times the TCLP limit.

Concrete Chips

One sample of concrete chips was collected and analyzed for volatile constituents. One of three volatile COCs was detected (tetrachloroethene), but this did not exceed 20 times the TCLP limit.

Concrete Cores

Six concrete cores were collected for analyses of volatile constituents at all three depths. One of three volatile COCs was detected (tetrachloroethene). This volatile COC was detected in all three depths but did not exceed 20 times the TCLP limit.

Masonry Chips

Two samples of masonry chips were collected and analyzed for volatile constituents; yet no volatile COCs were detected.

Supplemental Media

A total of 24 loose media samples were collected for analyses of volatile constituents. All three volatile COCs were detected, but none exceeded 20 times the TCLP limit.

One oil sample was collected from this component category for analyses of volatile constituents; yet none were detected.

Two sediment samples were collected and analyzed for volatile constituents; yet no volatile COCs were detected.

One sludge sample was collected from this component category for analyses of volatile constituents; yet none were detected.

A total of 37 unknown liquid samples were collected for analyses of volatile constituents. All three volatile COCs were detected. The tetrachloroethene concentration exceeded the TCLP limit.

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A.6.3.5 Summary of Pesticide/PCB Contamination

Asphalt

Two asphalt samples were analyzed for PCBs/pesticides. None of the pesticides were detected, and none exceeded TSCA limits of 50 ppm.

Concrete Chips

One sample of concrete chips was analyzed for PCBs/pesticides. Dieldrin was detected but did not exceed TSCA limits of 50 ppm.

Concrete Cores

One concrete core was analyzed for PCBs/pesticides at all three depths. Of six PCBs/pesticides, Aroclor-1254 was the only one detected, but this did not exceed 20 times the TCLP limit. This PCB was detected in all three depths. None of the PCBs exceeded the TSCA limits of 50 ppm in any depth.

Supplemental Media

One unknown liquid sample was analyzed for PCBs/pesticides. None of the pesticides were detected, and none exceeded TSCA limits of 50 ppm.

Supplemental media results support findings in major media of semivolatile and volatile constituents, but the lack of PCB/pesticide detected results in supplemental media does not support the concrete core results.

A.6.4 Summary Characterization of Process Support Buildings (Component Category 4)

The 49 components that were classified during the development of the OU3 RI/FS WPA as process support buildings were generally expected to contain significant levels of a wide variety of contaminants. An additional four components were added after the approval of the WPA, for a total of 53 components for this category. Detectable quantities of many radiological, inorganic, and organic contaminants were anticipated. These include:

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Radionuclides	Inorganics	Organics
uranium (up to 5% enriched)	barium oxides	1,1,1-trichloroethane
UF_4	magnesium oxides	trichloroethylene
U_3O_8	magnesium fluoride	perchloroethylene
thorium	calcium oxides	PCB oils
	sulfur	hydraulic oils
	mercury	degreasing solvents
	lead	refrigerants
	silver	nitric acid
	nickel	sulfuric acid
		chlorine
		hypochlorite
		ethylene glycol
		hydrogen sulfide
		halon
		ammonia

Of the 53 components in this component category, 21 were sampled. A total of 162 intrusive samples were collected from major and supplemental media, including two acid brick samples, 18 concrete chips, 69 concrete cores (comprised of three different depth ranges), 26 masonry samples, 29 steel coating samples, and 18 supplemental samples.

A.6.4.1 Summary of Radiological Contamination

This component category consists of 52 structures that house operations currently used to treat contaminated media or to support activities necessary to maintain the site. These structures support daily activities and ongoing and proposed removal actions at the FEMP. Expected contaminants include uranium and thorium in the Main Maintenance Building (12A), uranium in the Maintenance Building (3A), and localized areas of miscellaneous contaminants from the various activities in this category.

The radiological characterization of the Process Support Buildings is based on samples collected from five media: acid brick (two samples), concrete chips (18), concrete cores (48 and 1 duplicate), masonry chips (21), and steel coatings (eight). This effort was supported by collecting 90 samples from five supplemental media: Air filters (eight samples), loose media (two), sediment (two), unknown liquids (five), and wood (one).

Acid brick

Two acid brick samples from components in this category were analyzed for uranium and 19 radionuclides. All of the radiological constituents were detected at least once in the two samples

except for americium-241, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and thorium-227. The mean and maximum concentrations of uranium exceed its baseline by 69 and 91 times its baseline concentration, making it the most prevalent constituent detected. The mean concentrations for uranium isotopes ranged from 8.8 to 31 times baseline, and the maximum detected values range from 10 to 35 times baseline. The mean and maximum concentrations of cesium-137 exceed baseline by factors of 5.6 and 6.1, respectively. Radium-228 is the predominate radionuclides associated with ore handling and thorium processing, with mean and maximum concentrations exceeding baseline by a factor of 12 and 14, respectively. The maximum concentrations for thorium-228, thorium-230, and thorium-232 exceed the baseline by factors of 9, 4.6, and 5.7. The mean concentrations for these three radionuclides exceed the baseline by factors of 7.5, 4.3, and 4.6. The means for lead-210 and polonium-210 were 2.2 and 1.1 times baseline, respectively. The maximum detects for lead-210 and polonium-210 were 3.0 and 1.1 times baseline. All other radionuclides were detected at levels below their baseline concentrations.

Concrete Chips

Eighteen (18) concrete chip samples from components in this category were analyzed for uranium and 19 radionuclides. All radiological constituents were detected in at least one sample except americium-241 and plutonium-241. The six most prominent constituents, lead-210, technetium-99, and uranium and it isotopes, exceed their baseline levels by an order of magnitude. The highest concentrations of these radioactive constituents appear together in three components: The General/Refinery Sump Control Building (2B), the Plant 4 Maintenance Building (4C), and the Railroad Engine House (24B).

The maximum concentration for elemental uranium exceeds baseline by a factor of 30 times baseline. The maximum detects for uranium isotopes range from 17 to 20 times baseline. The maximum concentration of technetium-99 was 20 times its baseline. The mean concentrations for lead-210 and radium-228 were 1.2 and 1.1 their respective baseline levels. The maximum concentrations for lead-210 and radium-228 exceeded their baseline values by factors of 15 and 3, respectively. All the mean and maximum concentrations of all remaining radionuclides did not exceed baseline by more than a factor of two.

Concrete Cores

In support of characterization, 48 samples and one duplicate were taken from concrete at three depths in this component category and analyzed for uranium and 19 radionuclides. These samples provide information on the vertical extent of contamination in OU3 concrete.

As expected, levels of radioactive constituents in this category tend to be highest in the top inch of concrete sampled. In areas of undisturbed concrete, constituent concentrations tended to decrease as the depth of the concrete sample increased. The highest uranium levels were detected in the Refrigeration Building (3G). The samples from the Main Maintenance Building (12A), the Maintenance Building (3A), Ozone Building (3B), and the Pilot Maintenance Building (13B) also produced samples containing uranium at levels that exceed it baseline by an order of magnitude.

All radionuclides were detected in the first ½-inch of concrete except americium-241 and thorium-227. The mean and maximum concentrations of the predominant constituent, uranium, exceeded its baseline value by factors of 5.8 and 97, respectively. The mean concentrations for uranium isotopes ranged from 3.1 to 6.8 times baseline, while their maximum concentrations ranged from 8.4 to 13 times baseline. The mean and maximum concentrations of technetium-99 exceed the baseline level for technetium-99 in concrete by 5.2 and 19, respectively. Among the transformation products, the maximum detected values for neptunium-237, plutonium-239, and plutonium-239/240, were 4.2, 7.4, and 45 times baseline respectively. The mean concentration for plutonium-241 (calculated using nondetected results at face value) exceeded baseline by a factor of 4.6. Among radionuclides associated with ore handling and thorium processing, the maximum detected concentrations for radium-226, lead-210, polonium-210, and thorium-203 were 2.9, 4.6, 2.8, and 10 times baseline, respectively. The mean and maximum concentrations for radium-228 exceed the baseline concentration by 3.5 and 180, respectively. The maximum detects for thorium-228 and thorium-232 were 3.7 and 1.7 times baseline, respectively. The mean and maximum concentrations of all other radionuclides were at concentrations less than twice their baseline values.

All radionuclides were detected in the second ½-inch of concrete except americium-241, neptunium-237, and thorium-227. The maximum concentration of uranium exceeded baseline by a factor of 4.2. The maximum detected concentrations for uranium isotopes range from 1.7 to 2.8 times their baseline concentrations. The maximum concentration of the fission product technetium-99 exceeded the technetium-99 baseline value by a factor of 3. Among the transformation products, the maximum concentrations of plutonium-238 and plutonium-239/240 exceed their baseline levels by factors of 21 and 28, respectively. The mean concentration for plutonium-241 was 8.6 times baseline. The maximum concentrations of four radionuclides associated with ore handling and thorium processing, radium-228, thorium-228, thorium-230, and thorium-232 exceed their baseline concentrations by factors of 16, 5.4, 16, and 3.1, respectively. The mean and maximum concentrations of all other radionuclides were at concentrations less than twice their baseline values.

All radionuclides were detected below the first inch of concrete except cesium-137 and neptunium-237. The maximum concentrations of elemental uranium, thorium-230, and radium-228 exceed baseline concentrations by factors of 8.8, 2.2, and 3.0. The maximum concentrations of the transformation product plutonium-239/240, americium-241, and plutonium-238 exceed their baseline levels by factors of 4, 2.3, and 7.1. The mean and maximum concentrations of all other radionuclides were at concentrations less than twice their baseline values.

Masonry Chips

Twenty-one masonry chips were analyzed for uranium and 19 radionuclides. All of these radioactive constituents were detected except americium-241 and plutonium-241. The majority of the contaminated masonry chip samples were collected from the Plant 8 Maintenance Building (8B), and the Main Maintenance Building (12A). Uranium was the predominant radioactive constituent. It was detected at 99 times its baseline concentration. The maximum concentrations for uranium's isotopes range from 22 to 80 times baseline. The maximum concentrations for the fission products technetium-99 and cesium-137 exceed the baseline concentrations by 4.3 and 2.8, respectively. The maximum concentrations for the transformation products plutonium-238 and plutonium-239/240 exceed baseline their baseline concentrations by factors of 15 and 18. Among radionuclides associated with ore handling, the predominant radionuclide was thorium-230. The maximum concentrations for thorium-230, radium-226, lead-210, and polonium-210 exceeded their respective baseline concentrations by factors of 45, 34, 14, and 13. The mean and maximum concentrations for radium-228 exceeded their baseline levels by factors of 2.2 and 5.9. The maximum detected concentrations of thorium-228 and thorium-232 exceeded baseline levels by factors of 3.3 and 2.3, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Steel Coatings

Eight steel coatings were analyzed for uranium and 19 radionuclides. All radionuclides were detected except cesium-137. Uranium was the predominant radioactive constituent. The mean and maximum concentrations for elemental uranium exceed the baseline concentration by factors of 30 and 83. The mean concentrations for uranium isotopes range from 12 to 16 times baseline and the maximum concentrations for uranium isotopes range from 49 to 52 times baseline. The mean and maximum concentrations for technetium-99 exceed baseline levels by factors of 11 and 29. The mean and maximum concentrations for plutonium-238 exceed baseline levels by factors of 2.2 and 9.8, respectively. The mean and maximum concentrations for plutonium-239/240 exceed baseline levels

by factors of 2.6, and 4.7, respectively. Among radionuclides associated with ore handling, the mean concentrations for lead-210, thorium-230, and thorium-227 exceed their respective baseline levels by factors of 4.4, 4.0, and 3.6. The maximum concentrations for lead-210, thorium-230, radium-226, polonium-210 and thorium-227 exceed their respective baseline levels by factors of 250, 16, 34, 64, and 3.6. The mean concentrations for radium-228, thorium-228, thorium-232 exceed their respective baseline levels by factors of 3.4, 3.3, and 2.8. The maximum concentrations for radium-228, thorium-228 and thorium-232 exceed baseline concentrations by factors of 11, 9 and 6.3. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Supplemental Media

Ninety samples were collected from five supplemental media analyzed for uranium and 19 radionuclides: Air filters (eight samples), loose media (two), sediment (two), unknown liquids (five), and wood (one). Americium-241, plutonium-239/240, radium-226, radium-228, and technetium-99 were not detected in air filters. All radionuclides were detected in loose media except neptunium-237. All radionuclides were detected in sediment except neptunium-237 and strontium-90. Lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, thorium-228, thorium-232 were not detected in unknown liquids. Americium-241 cesium-137, and plutonium-241 were not detected in wood. Elemental uranium and uranium isotopes were detected in higher concentrations than any other radioactive constituent. No radionuclide was detected in supplemental media that was not also detected in at least one of the other media sampled.

A.6.4.2 Summary of Inorganic Contamination

Acid Brick

Of the 49 buildings in Component Category 4, two acid brick samples were analyzed for inorganic constituents. All but four (i.e., antimony, beryllium, selenium, and thallium) of the 16 inorganic COCs were detected. All detects were from samples collected from the Generator Rooms of the Main Maintenance Building (12A). Analyses showed that maximum concentrations of six (i.e., barium, copper, lead, mercury, nickel, and zinc) of the 12 detected COCs exceeded the concrete baseline. The most significant of these was mercury, which was more than 230 times the concrete baseline. The average results from five of these COCs (i.e., copper, lead, mercury, nickel, and zinc) were greater than their respective baseline concentrations. The most significant of these remained mercury, which exceeded the concrete baseline by a factor of 200. Both samples showed mercury levels greater than 20 times the respective TCLP limits.

Concrete Chips

Of the 49 buildings in Component Category 4, 18 concrete chips were analyzed for inorganic constituents. All of the 16 inorganic COCs were detected. With the exception of beryllium and cadmium, the maximum results from the inorganic COCs were greater than the concrete baseline. The most significant of these was chromium (collected from the Steam Production area of the Boiler Plant [10A]), which was approximately 79 times the concrete baseline for chromium. The average results from all but four (i.e., beryllium, cadmium, manganese, silver) of these COCs were greater than their respective baseline concentrations. The most significant of these remained lead, which exceeded the concrete baseline by a factor of 8.2. The concentration of chromium in two of the concrete chip samples (also from the Boiler Plant [10A]) and the concentration of mercury in one of the samples (collected from the Electrical Distribution area of the Electrical Power Center Building [3L]) were greater than 20 times the respective TCLP limits.

Concrete Cores

The top ½-inch of four concrete cores collected from process support buildings was analyzed for inorganic constituents. All but two (i.e., selenium and thallium) of the 16 inorganic COCs were detected. Analyses showed that maximum concentrations of all of the 14 detected COCs exceeded the concrete baseline. The most significant of these was lead (collected from the Refrigeration Building [3G]), which was over 73 times the baseline concentration for concrete. All but three (i.e., beryllium, cadmium, and silver) of the 14 detected inorganic COCs had average concentrations that exceeded concrete baseline levels. The most significant of these was mercury, which exceeded the concrete level by a factor of 8.8. Four of these samples showed lead levels, one showed a chromium level, and one showed a mercury level greater than 20 times the respective TCLP limits. The location of the samples which exceed 20 times the TLCP limit are:

Exceeds 20 times TCLP:	Building:	Process Area:
Chromium	Ozone Building (3B)	Acid Bleaching
Lead	Refrigeration Building (3G)	Refrigeration
	Ozone Building (3B)	Acid Bleaching
	Main Maintenance Building (12A)	Generator Rooms
	Main Maintenance Building (12A)	Instrument Shops
Mercury	Main Electrical Strainer House (26C)	Electrical Deluge System

The second ½-inch of three concrete cores was analyzed for inorganic constituents. Just like the top inch of concrete, all but two (i.e., selenium and thallium) of the 16 inorganic COCs were detected.

All but three (i.e., beryllium, cadmium, and silver) of the 14 detected inorganic COCs had maximum concentrations that exceeded concrete baseline levels. The most significant of these was mercury (collected from the Main Electrical Strainer House [26C]), which exceeded the concrete level by a factor of 53. Analyses showed that five (i.e., antimony, chromium, lead, mercury, and nickel) of the 14 detected COCs had averages that exceeded the concrete baseline levels. The most significant of these was antimony, which was almost eight times the baseline concentration for concrete. None of these samples showed levels greater than 20 times the TCLP limit.

The last portion of three concrete cores (depths of one to four inches) was analyzed for inorganic constituents. Of the 16 inorganic COCs, all but thallium were detected. Analyses showed that maximum concentrations of all but two (i.e., cadmium and selenium) of the 15 detected COCs exceeded the concrete baseline. The most significant of these was lead (collected from the Bulk Lime Handling Building [2C]), which was approximately 14.6 times the baseline concentration for concrete. The average results from 7 (i.e., antimony, chromium, lead, mercury, nickel, selenium, and vanadium) of the 15 detected COCs exceeded baseline levels for concrete. The most significant of these was antimony, which was almost 8.8 times the baseline concentration for concrete. None of these samples were greater than 20 times the TCLP limit.

Masonry Chips

Of the 49 buildings in Component Category 4, 26 masonry chips were analyzed for inorganic constituents. Antimony was the only constituent of the 16 inorganic COCs that was not detected. Maximum concentrations from all but three (i.e., beryllium, silver, and thallium) of the 15 detected inorganic COCs were greater than the concrete baseline. The most significant of these was lead (collected from the Plant 8 Maintenance Building [8B]), which was more than 300 times the concrete baseline. The average results from nine of these COCs (i.e., barium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) were greater than their respective baseline concentrations. The most significant of these were lead and mercury, which exceeded the concrete baseline by factors of 12.0 and 9.8, respectively. Six of these samples showed lead levels and two showed mercury levels greater than 20 times the respective TCLP limits. The location of the samples which exceed 20 times the TLCP limit are:

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Exceeds 20 times TCLP:	Building:	Process Area:
Lead	Plant 8 Maintenance Building (8B)	Maintenance (2 samples)
	Main Maintenance Building (12A)	Generator Rooms
	Maintenance Building (3A)	Maintenance
	Digestor and Control Building (25E)	Digestor
	Main Maintenance Building (12A)	Electrical and Scale Shops
Mercury	Main Electrical Strainer House (26C)	Electrical Deluge System
	Digestor and Control Building (25E)	Digestor

Steel Coatings

Twenty-three of the 29 steel coating samples taken from process support buildings were analyzed for inorganic constituents. Thallium was the only constituent of the 16 inorganic COCs that was not detected. Beryllium was the only inorganic COC that did not show maximum concentrations exceeding the baseline levels for paint. The maximum concentration of nickel (collected from the Generator Rooms area of the Main Maintenance Building [12A]) was over 19 times the paint baseline. Selenium was the only inorganic COC that displayed an average concentration above the baseline; this concentration was 170 percent over the paint baseline for selenium. Three of the steel coating samples showed barium levels, 19 showed chromium levels, 21 showed lead levels, seven showed mercury levels greater than 20 times the respective TCLP limits. As discussed in Appendix A.III.2.6.2, no painted material is considered characteristically hazardous. Therefore, the list of samples that exceed 20 times the TCLP limit is not applicable.

Supplemental Media

Of the 49 buildings in Component Category 4, ten samples of supplemental media were analyzed for inorganic constituents. These supplemental media samples include three loose media samples; two sediment samples; four samples of unknown liquids; and one wood sample.

For the three loose media samples, beryllium and thallium were the only inorganic COCs that were not detected. The loose media were collected from the General/Refinery Sump Control Bldg. (2B), the Pilot Plant Dissociator Shelter (54C), and the Main Maintenance Building (12A). The concentrations of chromium and lead for all three samples were above 20 times their respective TCLP limits. Also, one of the samples (from component 2B) showed a mercury concentration that exceeded 20 times the TCLP mercury limit.

For the two sediment samples, all but four (i.e., antimony, cadmium, silver, and thallium) of the 16 inorganic COCs were detected. The sediment samples were collected from the Bulk Lime Handling Building (2C) and the Heavy Equipment Building (46). The concentrations of lead for both sediment samples were above 20 times the TCLP lead limit. Also, one of the samples (from component 2C) showed a chromium concentration that exceeded 20 times the TCLP chromium limit.

The four samples of unknown liquids exhibited detectable concentrations of nine of the 16 inorganic COCs; the detectable COCs include arsenic, barium, chromium, copper, lead, manganese, mercury, vanadium, and zinc. None of these liquid samples showed inorganic concentrations greater than 20 times the TCLP limit.

The single wood sample showed detectable concentrations of barium, copper, lead, manganese, and zinc, but did not exceed 20 times the TCLP limits.

A.6.4.3 Summary of Semivolatile Contamination

None of the 144 intrusive samples taken from major media contained within the process support buildings were analyzed for semivolatile constituents.

Of the 18 supplemental samples taken within the process support buildings, eight were analyzed for semivolatile organic constituents. These supplemental media samples include: two loose media samples; two sediment samples; and four samples of unknown liquids. For the two loose media samples, seven of the 15 semivolatile organic COCs were detected; they are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, and indeno(1,2,3-cd)pyrene. For the two sediment samples, seven of the 15 semivolatile organic COCs were detected; they are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, and indeno(1,2,3-cd)pyrene. For the four samples of unknown liquids, only bis(2-ethylhexyl)phthalate had detectable concentrations of the 15 semivolatile organic COCs. However, none of the supplemental media samples showed semivolatile concentrations greater than 20 times the TCLP limit.

A.6.4.4 Summary of Volatile Contamination

None of the 144 intrusive samples taken from major media contained within the process support buildings were analyzed for volatile constituents.

Of the 18 supplemental samples taken within the process support buildings, eight were analyzed for volatile organic constituents. These supplemental media samples include: two loose media samples; two sediment samples; and four samples of unknown liquids. Tetrachloroethene was detected in one of the loose media samples. None of the other supplemental media samples exhibited detectable levels of any of the three volatile organic COCs. None of the supplemental media samples showed volatile concentrations greater than 20 times the TCLP limit.

A.6.4.5 Summary of Pesticide/PCB Contamination

Of the 21 sampled buildings in Component Category 4, three concrete chips were collected and analyzed for PCBs/pesticides. One pesticide (dieldrin) and one PCB (Aroclor-1260) were detected. The concentration of Aroclor-1260 was well below the TSCA limit of 50 ppm.

A.6.5 Summary Characterization of Containers and Containerized Materials - Aboveground (Component Category 5)

This category consists of all above-ground containers (with or without contents) and containerized material; all waste and product inventories, including holdup material; and all uranium and thorium inventories. This category does not include tanking/piping/distribution systems or bulk stored materials. The 23 components that are included in this category currently contain, or previously contained, potential contaminants and/or waste materials. Drummed materials may be exposed on concrete pads or protected in structures. The pads on which the containers are stored are likely to be contaminated by past spills. Contaminants expected among the components in this category are listed below.

Radiological	Inorganic	Organic
plutonium/neptunium	aluminum	1,1,1-trichloroethylene
radium-228	anhydrous ammonia	1,1,1-trichloroethane
thorium-232	arsenic	diamyl amyl-phosphorate
thorium-234	barium	kerosene
thorium nitrate	barium carbonate	lubricating/cutting oils
uranium	cadmium	methanol
uranium-234	chromium	mineral spirits
uranium-235	hydrochloric acid	paint thinners
uranium-238	hydrochloric acid	perchloroethylene
uranyl nitrate	hydrogen fluoride	tributyl phosphate
	lead	waste paint solvents
	mercury	
	metal oxide	
	nitric acid,	
	ore raffinates	
	potassium fluoride	
	selenium	
	sodium hydroxide	
	urea	

During the OU3 RI, a total of 66 samples were collected from components in this category for chemical analysis: four from acid brick, four from concrete chips, 38 from concrete cores, two from loose media, one from masonry, nine from steel coatings, and eight from unknown liquids. A summary of sample analyses for the three types of contaminants (identified above) is described below.

A.6.5.1 Summary of Radiological Contamination

Containers and containerized materials are divided into two groups, above-ground and below-ground. The above-ground component category consists of 23 components that now contain, or previously contained, potential contaminants and/or waste materials. This includes all waste, holdup, and product inventories. Two of these components include both above-ground and below-ground facilities. Drummed materials are either outdoors on concrete pads or protected inside structures. The pads and buildings on or in which the containers are stored are likely to be contaminated by past spills. Storage pads are discussed in component category 8 and storage buildings are discussed in component category 2.

Expected contaminants include uranium and its isotopes, thorium, and radionuclides associated with ore processing. Samples collected for radiological analysis include four from acid brick, four from concrete chips, 32 from concrete cores, one from masonry chips, two from steel coatings, three from loose media, and eight from unknown liquids.

Acid Brick

Four acid brick samples were analyzed for uranium and 19 radionuclides. All radioactive constituents were detected except americium-241, cesium-137, and neptunium-237. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 4.5 and 69, respectively. The means for uranium isotopes ranged from 1.9 to 2.5 times baseline and the maximum detects for uranium isotopes range from 43 to 84 times baseline. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 20 and 420, respectively. The maximum detects for the transformation products plutonium-238, plutonium-239/240, and plutonium-241 were 5.4, 58, and 6.1 times baseline. Radionuclides associated with ore handling are expected to be elevated in this category. The mean concentrations for radium-226, lead-210, polonium-210 and thorium-230 exceed their respective baseline concentrations by factors of 23, 3.7, 6.1, and 5.1. The maximum concentrations for radium-226, lead-210, polonium-210 and thorium-230 exceed their respective baseline concentrations by factors of 74, 59, 61, and 32 times baseline. The mean and maximum

concentrations for radium-228 were 4.0 and 18 times baseline levels, respectively. The mean concentrations for thorium-228 and thorium-232 exceed their baseline concentrations by factors of 12 and 3.0, respectively. The maximum concentrations for thorium-228 and thorium-232 exceed their baseline concentrations by factors of 16 and 4.0, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Concrete Chips

Four concrete chip samples were collected and analyzed for uranium and 19 radionuclides. All radionuclides were detected except cesium-137. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 1.2 and 92, respectively. The maximum concentrations for uranium isotopes for uranium isotopes range from 61 to 110 times baseline. The mean and maximum concentrations of the fission product technetium-99 exceed baseline levels by factors of 3.3 and 82, respectively. The mean for plutonium-238 was 0.69 times and the maximum detect was 44 times baseline, which was the highest factor greater than baseline. The mean and maximum concentrations of neptunium-237 exceed baseline levels by factors of 2.4 and 11. The maximum concentrations for americium-241, and plutonium-239/240 were 4.2, and 15 times baseline, respectively. Among the radionuclides associated with ore handling the maximum concentrations for thorium-230 and lead-210 exceed baseline levels by factors of 16 and 2.3, respectively. The mean and maximum concentrations of radium-228 exceed baseline levels by factors of 3.4 and 240, respectively. The maximum concentrations for thorium-228 and thorium-232 exceed baseline levels by factors of 98 and 29 times baseline, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Concrete Cores

In support of characterization, 32 samples were taken from concrete at three depths in this component category and analyzed for uranium and 19 radionuclides. These samples provide information on the vertical extent of contamination in OU3 concrete.

As expected, levels of radioactive constituents in this category tend to be highest in the top inch of concrete sampled. In areas of undisturbed concrete, constituent concentrations tended to decrease as the depth of the concrete sample increased. The highest levels of uranium and technetium were detected in the Refinery Sump (3H) and the Raffinate Tanks (3J).

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All radionuclides were detected in the first ½-inch of concrete. Uranium was the predominate radioactive constituent found. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 7.0 and 510, respectively. The means for uranium isotopes range from 2.7 to 3.1 times baseline, and the maximum detects for uranium isotopes range from 460 to 670 times baseline. Mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 8.8 and 460, respectively. The maximum concentration for cesium-137 was 8.5 times baseline. The maximum concentrations of the transformation products americium-241, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241 exceed baseline by factors of 20, 19, 7.2, 3.5, and 7.4 times baseline, respectively. The mean and maximum concentrations of thorium-230 exceed baseline levels by factors of 3.3 times and 280, respectively. The maximum concentrations of radium-226, lead-210, polonium-210, thorium-227 were 5.4, 7.3, 3.6 and 0.83 times baseline, respectively. The mean and maximum concentrations of radium-228 exceed baseline levels by factors of 2.5 and 510 respectively. The maximum concentrations for thorium-228 and thorium-232 were 410 and 9.0 times baseline, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

All radioactive constituents were detected in the second inch of concrete. The maximum concentration for elemental uranium exceeded baseline by a factor of 150. The maximum concentrations for uranium isotopes range up to 28 times their baseline value. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 16 and 82 respectively. The maximum concentrations for thorium-230, lead-210, radium-228, and thorium-228 exceed their respective baseline levels by factors of 8.0, 2.6, 98, and 16. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

All radioactive constituents were detected below the first inch of concrete except plutonium-241. The maximum concentration for elemental uranium exceeded baseline by a factor of 2.4. The maximum concentrations for uranium isotopes range up to 2.7 times their baseline value. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 2.9 and 160 respectively. The maximum concentrations for the transformation products plutonium-239/240 and plutonium-238 exceed baseline levels by factors of 86 and 6.1, respectively. The maximum concentrations for thorium-230, lead-210, polonium-210, radium-226, radium-228, thorium-232 exceed their respective baseline levels by factors of 180, 30, 5.3, 5.3. 4.1, and 6.1. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

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Masonry Chips

One masonry chip was collected and analyzed for radioactive constituents. All radionuclides were detected except plutonium-241 and strontium-90. The maximum concentration of elemental uranium exceeded baseline by a factor of 270, while the maximum values for uranium's isotopes range up to 360 times baseline. The maximum concentration of technetium-99 exceeds background by a factor of 3.5. Maximum concentrations of the transformation products americium-241, neptunium-237, plutonium-238, and plutonium-239/240 were 5.1, 5.2, 6.4, and 17 times baseline, respectively. The maximum concentrations of thorium-230 and thorium-228 exceeded baseline by factors of 9.1 and 4.8, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Steel Coatings

Two steel coatings were collected and analyzed for uranium and 19 radionuclides. All radionuclides were detected in these samples except cesium-137, plutonium-241, strontium-90, and technetium-99. The maximum concentration of elemental uranium exceeded baseline by a factor of 4.3, while the maximum values for uranium's isotopes range up to 3.6 times baseline. Mean and maximum concentrations of the transformation products plutonium-239/240 exceed baseline levels by factors of 2.1 times and 4.3 times baseline. The maximum concentration for americium-241 exceeds baseline by a factor of 4.3. The mean and maximum concentrations of lead-210 exceed baseline levels by factors of 7.8 and 15, respectively. The maximum concentration for thorium-227 exceeded baseline by a factor of 8.6. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Supplemental Media

Eleven supplemental media samples were collected and analyzed for uranium and 19 radionuclides -three from loose media and eight from unknown liquids. All radioactive constituents were detected in loose media, and all but one, cesium-137, were detected in unknown liquids. Elemental uranium and uranium isotopes exhibit the highest concentrations in both supplemental media. No radionuclides were detected in supplemental media that were not also detected in one of the other media.

A.6.5.2 Summary of Inorganic Contamination

Acid Brick

In the four acid brick samples taken for inorganic contamination, detections were reported for all but six (antimony, beryllium, cadmium, selenium, and silver) of the 16 inorganic COCs. Analyses

showed that maximum concentrations for four inorganic COCs (barium, copper, lead, and mercury) exceeded their respective OU3 baseline concentrations for concrete. The most significant of these was mercury (collected from the Combined Raffinate area in the Combined Raffinate Tanks [3J]), which exceeded the concrete baseline by a factor of 93. Three average concentrations (barium, lead, and mercury) exceeded their respective OU3 baseline concentrations. The most significant of these was also mercury, which exceeded the concrete baseline by a factor of 29. None of the acid brick samples showed concentrations of inorganic COCs in excess of 20 times their respective TCLP limits.

Concrete Chips

In the four concrete chip samples taken for inorganic contamination, detections were reported for all but four (antimony, cadmium, mercury, and thallium) of the 16 inorganic COCs. Analyses showed that maximum concentrations for eight inorganic COCs (arsenic, chromium, copper, lead, nickel, selenium, vanadium, and zinc) exceeded their respective OU3 baseline concentrations for concrete. The most significant of these was chromium collected from the Tank Storage area in the Pilot Plant Tank Farm [13D], which exceeded the concrete baseline by a factor of 40. The average concentrations of five (chromium, copper, lead, nickel, and selenium) inorganic COCs exceeded their respective OU3 baseline concentrations. The most significant of these was also chromium, which exceeded the concrete baseline by a factor of 4. The concentration of chromium (322 mg/kg), (collected from the Tank Storage area in the Pilot Plant Tank Farm [13D]) exceeded 20 times the TCLP limit (100 mg/kg).

Concrete Cores

The 38 concrete core samples were taken from three depths (0 - ½-inch, ½ -1.0 inch, and 1.0 -4.0 inch) in eight of the 23 components in this category. In the sampling interval between 0.0 - 0.5 inches, detections were reported for all but two (selenium and thallium) of the 16 inorganic COCs. Most prevalent of those detected were arsenic, barium, chromium, copper, lead, manganese, vanadium, and zinc, which were detected in either 90 percent or 100 percent of samples. The maximum concentrations of all but five (beryllium, cadmium, selenium, silver, and thallium) inorganic COCs exceed their respective OU3 baseline concentrations. Most significant of those was lead, (collected from the Bulk Storage area in the Old North Tank Farm [19D]), which exceeded the concrete baseline by a factor of 37. The average concentrations of all but six (beryllium, cadmium, manganese, selenium, silver, and thallium) inorganic COCs exceeded their respective OU3 baseline concentrations. Most significant of those was antimony, which exceeded the baseline by a factor of approximately 23. In the 0.0 - 0.5 inch interval, the concentrations of chromium (121 mg/kg)

(collected from the NFS Storage area in the NFS Storage & Pump House [2E]) and lead (127 mg/kg) (collected from the Bulk Storage area in the Old North Tank Farm [19D]) exceeded 20 times their TCLP limits (100 mg/kg for both).

In the sampling interval between ½ - 1.0 inches, detections were reported for all but two (selenium and thallium) out of the 16 inorganic COCs. Most prevalent of those detected were arsenic, barium, chromium, lead, manganese, and zinc, which were detected in over 80 percent of samples. The maximum concentrations of all but three (beryllium, selenium, and thallium) inorganic COCs exceed their respective OU3 baseline concentrations. Most significant of those that exceeded the baseline was lead, (collected from the Nitric Acid Recovery area in the NAR Towers), which exceeded the baseline by a factor of approximately 18. The average concentrations of all but five (beryllium, manganese, selenium, silver, and thallium) inorganic COCs exceeded their respective OU3 baseline concentrations. Most significant of those that exceeded the baseline was antimony, which exceeded the baseline by a factor of approximately 22. In the 0.5 - 1.0 inch interval, the concentration of chromium (115 mg/kg) (collected from the NFS Storage area in the NFS Storage & Pump House [2E]) exceeded 20 times the TCLP limit (100 mg/kg).

In the sampling interval between 1.0 - 4.0 inches, detections were reported for all but three (antimony, selenium, and thallium) out of the 16 inorganic COCs. Most prevalent of those detected were arsenic, barium, chromium, lead, manganese, and zinc, which were detected in over 88 percent of samples. The maximum concentrations of nine (arsenic, barium, chromium, copper, lead, manganese, mercury, vanadium, and zinc) inorganic COCs exceed their respective OU3 baseline concentrations. Most significant of these was mercury, (collected from the Combined Raffinate area in the Combined Raffinate Tanks [3J]), which exceeded the baseline by a factor of approximately 43. The average concentrations of six (arsenic, copper, lead, nickel, vanadium, and zinc) inorganic COCs exceeded their respective OU3 baseline concentrations. Most significant of these was lead, which exceeded the baseline by a factor of approximately 3. None of the inorganic COCs exceeded 20 times the TCLP limit in the 1.0 - 4.0 inch sample interval.

Masonry

In the only masonry chip sample taken for inorganic contamination, detections were reported for all but six (antimony, cadmium, mercury, selenium, thallium, and vanadium) of the 16 inorganic COCs. Analyses showed that both the maximum and average concentrations for four inorganic COCs (copper, lead, nickel, and zinc) exceeded their respective OU3 baseline concentrations. The most

significant of these was copper (collected from the NFS Storage area in the NFS Storage & Pump House [2E]), which exceeded the baseline by a factor of approximately 10. The masonry chip sample did not have any inorganic COCs that exceeded 20 times the TCLP limit.

Steel Coatings

In steel coatings, detections were reported in all but two (beryllium ad thallium) of the sixteen inorganic COCs. Most prevalent of those detected were barium, chromium, copper, lead, manganese, nickel, and zinc, which showed detections in approximately 88 percent of samples. The maximum concentration for five inorganic COCs exceed their respective OU3 baseline concentrations. The most significant of these was selenium, which exceeded the baseline by a factor of approximately 51. The average concentration for two (barium and selenium) inorganic COCs exceeded OU3 baseline concentrations. The most significant of these was barium which exceeded the baseline by a factor of slightly greater than two. In steel coatings, the following samples exceeded 20 times the TCLP limit:

Exceeds 20 times TCLP:	Component:	Process Area:
Barium	High Nitrate Storage Tank (18M)	High Nitrate Storage
Cadmium	Combined Raffinate Tanks (3J)	Combined Raffinate
	Refinery Sump (3H)	Wastewater Treatment
Chromium	General Sump (18B)	Wastewater Treatment
	Combined Raffinate Tanks (3J)	Combined Raffinate
	Refinery Sump (3H)	Wastewater Treatment
	NAR Towers (3D)	Nitric Acid Recovery
Lead	General Sump (18B)	Wastewater Treatment
	Combined Raffinate Tanks (3J)	Combined Raffinate
	Refinery Sump (3H)	Wastewater Treatment
	NAR Towers (3D)	Nitric Acid Recovery
	Harshaw Digestion Fume Recovery (3F)	Harshaw Fume Recovery
	Old North Tank Farm (19D)	Sump
	High Nitrate Storage Tank (18M)	High Nitrate Storage
Mercury	General Sump (18B)	Wastewater Treatment
	Harshaw Digestion Fume Recovery (3F)	Harshaw Fume Recovery
Selenium	Combined Raffinate Tanks (3J)	Combined Raffinate

Supplemental Media

In two samples of loose media, detections were reported in all but three (beryllium, selenium, and thallium) of the 16 inorganic COCs. The concentrations of both barium (4,080 mg/kg) (collected from the Wastewater area of the General Sump [18B]) and lead (436 mg/kg) (two collected from the Wastewater Treatment area of the General Sump [18B] and one from the Wastewater Treatment area

of the Refinery Sump [3H]) were above 20 times their TCLP limits, 2,000 mg/kg and 100 mg/kg, respectively.

In eight samples of unknown liquids, detections were reported in all but two (antimony, and thallium) of the 16 inorganic COCs. Lead, manganese, and zinc were most prevalent, showing up in greater than 87 percent of samples. None of the inorganic COCs exceeded their TCLP limits.

A.6.5.3 Summary of Semivolatile Organic Contamination

Acid brick, concrete chips, concrete cores, masonry, and steel coatings were not analyzed for semivolatile organic compounds.

In the two samples of loose media, detections were reported for all but six (1,4-dichlorobenzene, 2,4-dinitrotoluene, hexachlorobutadiene, n-nitroso-di-n-propylamine, nitrobenzene, and pentachlorophenol) of the 15 semivolatile organic compound COCs. None of the semivolatile organic compound COCs exceeded 20 times the TCLP limits.

In the eight samples of unknown liquids, detections were reported for five (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, and chrysene) of the 15 semivolatile organic compound COCs. None of the semivolatile organic compound COCs exceeded their TCLP limits.

A.6.5.4 Summary of Volatile Organic Contamination

Acid brick, concrete chips, concrete cores, masonry, and steel coatings were not analyzed for volatile organic compounds.

In the two samples of loose media, there were no detections reported for the three volatile organic compound COCs. Accordingly, none of the volatile organic compounds COCs exceeded 20 times the TCLP limit in loose media.

In the eight samples of unknown liquids, there were no detections reported for the three volatile organic compound COCs. Accordingly, none of the volatile organic compounds COCs exceeded the TCLP limits in unknown liquids.

A.6.5.5 Summary of Pesticide/PCB Contamination

None of the media samples were analyzed for PCBs/pesticides.

A.6.6 Summary Characterization of Containers and Containerized Materials - Belowground (Component Category 6)

This component category includes two buried components that contain, or previously contained, waste, product, or chemicals. These containers hold residual quantities of material. The underground storage tanks included in this category, most or which have been removed, are described in Section 1.0. Leakage from these below-ground containers is a potential source for contamination of soil and groundwater. The soil surrounding these containers is likely contaminated by past spills and/or leakage and will be addressed by OU5.

Anticipated contaminants are uranium, 1,1,1-trichloroethane, copper, petroleum compounds, waste oils, and solvents.

Summary of Contamination

Neither component was sampled from this component category as part of the OU3 RI/FS characterization study.

A.6.7 Summary Characterization of Bulk Materials (Component Category 7)

This component category includes eight areas with large volumes of exposed material containing low levels of contaminants, all stored without containment.

Anticipated contaminants for this component category include uranium, sulfuric acid, ethylene glycol, lead, motor oil, asbestos, copper, and motor fuels. Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA (DOE 1993), no intrusive samples were planned for this component.

One of the eight components in this category was sampled. A total of 59 soil samples were collected from the Soil Piles (G13).

A.6.7.1 Summary of Radiological Contamination

This component category consists of eight areas with large volumes of exposed material containing low levels of contaminants, all stored without containment. Expected contaminants include uranium

(and its isotopes) and miscellaneous radionuclide. Thirteen samples were collected from soil in this category and analyzed for uranium and 19 radionuclides.

Americium-241, plutonium-241, and thorium-227 were not detected in soil. Elemental uranium was detected in concentrations up to 70 ppm. Concentrations of uranium isotopes range up to 38 pCi/g. With one exception, all other radionculides in all samples are below 5 pCi/g. Thorium-232 is present in one sample at 10 pCi/g.

A.6.7.2 Summary of Inorganic Contamination

Major Media

No major media samples were collected for inorganic analysis.

Soil

Of the 59 soil samples collected, 11 were analyzed for inorganics. Detections were reported in all but four of the 16 inorganic COCs (antimony, mercury, silver, and thallium). Nine of the COCs (all except beryllium, cadmium, and selenium) were detections in all samples submitted. Only one sample (collected from the soil pile East of Building 2A) exceeded 20 times the TCLP limit for lead (greater than 100 mg/kg).

A.6.7.3 Summary of Semivolatile Organic Contamination

Major Media

No major media samples were collected for semivolatile organic contamination analysis.

Soil

A total of 12 soil samples were analyzed for semivolatile analysis. Of these samples, detections were reported in all but six (1,4-dichlorobenzene, 2,4-dinitrotoluene, hexachlorobutadiene, n-nitroso-di-n-propylamine, nitrobenzene, and pentachlorophenol) of the semivolatile COCs. The most prevalent were benzo(a)anthracene and bis(2-ehtylhexyl)phthalate, having detects in 66 percent of samples analyzed. There were no detections greater than 20 times the TCLP limit.

A.6.7.4 Summary of Volatile Organic Contamination

Major Media

No major media samples were collected for volatile organic analysis.

Soil

In 12 soil samples analyzed for volatile organics, there were no detections for any of the three volatile organic COCs.

A.6.7.5 Summary of Pesticide/PCB Contamination

Major Media

No major media samples were collected for PCB/pesticide contamination analysis.

Soil

A total of 12 soil samples were analyzed for pesticides and PCBs. Of these samples, detections were reported in all but one of the PCB/pesticide COCs (alpha-chlordane). The most prevalent COC was Aroclor-1254, having detections in 33 percent of the samples analyzed. None of the samples exceeded either 20 times the TCLP limit or the TSCA limit (50 ppm).

A.6.8 Summary Characterization of Storage Pads, Parking Lot, Roads, and Railroads (Component Category 8)

This component category consists of 27 components, most of which provided support for the transport or storage of raw materials, products, and wastes. These areas are, or have the potential to become, contaminated by leakage. The soil surrounding these areas also may be contaminated and will be addressed by OU5.

Various contaminants are expected in this component category, primarily because of their storage on pads. These include radionuclides, inorganics, and organics, listed as follows:

Radionuclides	Inorganics	Organics
uranium metal (up to 2.1 percent E)	lead	oil
uranium (up to 5 percent E)	ore concentrates	lubricating and hydraulic oils
uranium oxide (U_3O_8)	aluminum oxide	1,1,1-trichloroethane
UF_4	ammonium diuranate	ethylene glycol
UO_3 (up to 3 percent E)	magnesium fluoride (MgF_2)	trichloroethylene
uranium hexafluoride (UF_6)	urea	diesel fuel
uranyl fluoride (UO_2F_2)	copper	hydraulic acid
uranyl ammonium phosphate cakes	magnesium	methylene chloride
ore	calcium fluoride (CaF_2)	acetone
thorium	ammonium hydroxide	tributyl phosphate
ThF_4	sulfite (SO_2)	kerosene
thorium metal	barium	diamyl amyl phosphate
radium	lithium carbonate	PCB oils

Radionuclides	Inorganics	Organics
strontium-90	arsenic	motor oils
prill	silver	gasoline
technetium-99 residues	cadmium	creosote
	hydrofluoric acid (HF)	hydraulic fluids
	ammonia	drummed waste
	drummed waste	

Twenty-three of the 27 components were sampled. A total of 74 intrusive samples were collected, including one acid brick sample, four asphalt samples, 26 concrete chip samples, 21 concrete core samples, 10 loose media samples, and 12 unknown liquid samples.

A.6.8.1 Summary of Radiological Contamination

This component category consists of a large number of waste storage or handling pads, the FEMP parking lot, and all rail lines and roads associated with the FEMP. Most of these 27 components provided support for the transport or storage of raw materials, products, and wastes. These areas are, or have the potential to be, contaminated by leakage. The radiological contamination that could potentially be present in this component category includes all radionuclide COCs because of the widely distributed nature of these component pads and transportation throughways.

The radiological characterization of the category is based on 40 samples collected from acid brick (one sample), asphalt (four), concrete chips (22), and concrete core (13). In addition to these samples, samples were collected from supplemental media including eight loose media, one sediment, and 11 unknown liquid samples. Results for each media are presented below.

Acid Brick

One acid brick sample was collected and analyzed for uranium and 19 radionuclides. Lead-210, radium-226, radium-228, technetium-99, and uranium were the only radioactive constituents detected in the acid brick sample. The most prominent radionuclide was technetium-99. Its concentration exceeded its baseline level by a factor of 16. Radium-226 and radium-228 factors were less than twice baseline, and lead-210 was 3.9 times baseline. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Asphalt

Four asphalt samples were collected and analyzed for uranium and 19 radionuclides. Americium-241 and neptunium-237 were not detected in asphalt. The mean and maximum concentrations of

elemental uranium exceed baseline levels by factors of 9.4 and 19, respectively. The maximum concentrations for uranium isotopes range up to 5.7 times baseline. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 3.2 and 19. The maximum concentrations for lead-210 and polonium-210 and radium-228 exceed their respective baselines by factors of 2.7, 4.6 and 5.3. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Concrete Chips

Twenty-22 concrete chip samples were collected and analyzed for uranium and 19 radionuclides. All radioactive constituents were detected in concrete chips from this category. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 20 and 410, respectively. The mean and maximum concentrations for uranium isotopes ranged up to 14 and 410 times baseline respectively. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 12 and 300, respectively. The maximum concentration of cesium-137 was 17 times baseline. Maximum concentrations for the transformation products americium-241 neptunium-237, plutonium-238, and plutonium-239/240 exceeded baseline concentrations by factors of 130, 2.5, 18, and 14, respectively. Maximum concentrations for lead-210, polonium-210, radium-226, and thorium-230 exceed their respective baseline concentrations by factors of 19, 4.7, 2.5, and 47, respectively. The mean concentration for radium-226 was 2.2 times baseline. The single result for thorium-227 was 21 times baseline. Maximum concentrations for radium-228, thorium-228, and thorium-232 exceed their respective baseline concentrations by factors of 670, 240, and 140, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Concrete Cores

In support of characterization, 12 samples and one duplicate were taken from concrete at three depths in this component category and analyzed for uranium and 19 radionuclides. These samples provide information on the vertical extent of contamination in OU3 concrete.

As expected, levels of radioactive constituents in this category tend to be highest in the top inch of concrete sampled. In areas of undisturbed concrete, constituent concentrations tended to decrease as the depth of the concrete sample increased. Moderate levels of uranium and technetium were detected in the four components of this category that were sampled: the Oil Burner/Graphite Burner (10D) and the Decontamination Pad (74P) Plant 8 North Pad (74R), and Building 39A Pad (74W).

All radionuclides were detected in the first ½-inch of concrete except americium-241, plutonium-239/240, and plutonium-241. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 28 and 400, respectively. The mean concentrations for uranium isotopes ranged from 8.5 to 18 times baseline and the maximum concentrations for uranium isotopes range from 7.1 to 18. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 4.8 and 180, respectively. The maximum concentration of cesium-137 was 3.3 times baseline. The mean concentrations of lead-210 and thorium-230 exceed baseline levels by factors of 5.5, 2.5. The maximum concentrations of lead-210, polonium-210, and radium-226 exceed baseline levels by factors of 35, 2.5, and 3.5, respectively. Mean and maximum concentrations of radium-228 exceed baseline levels by factors of 2.9 and 4.7, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

All radionuclides were detected in the second ½-inch of concrete except americium-241, plutonium-238, plutonium-241, and uranium-235/236. The mean and maximum concentrations of elemental uranium exceed baseline levels by factors of 13 and 99, respectively. The means for uranium-234 and uranium-238 ranged up to 12 times baseline and their maximum concentrations ranged up to 65 time baseline. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 11 and 85, respectively. The mean concentration for plutonium-239/240 was 3.0 times baseline. The mean and maximum concentrations of thorium-230 exceed baseline levels by factors of 2.5 and 50. The mean concentrations for lead-210, polonium-210, and radium-226 were 2.4, 0.86, and 1.0 times baseline and the maximum concentrations were 15, 3.4, and 2.5 times baseline, respectively. The maximum concentrations for thorium-232 and radium-228 exceeded baseline levels by factors of 6.6 and 2.7, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

All radionuclides were detected below the first inch of concrete except americium-241, cesium-137, plutonium-239/240, plutonium-241, and uranium-235/236. The maximum concentration of elemental uranium exceeds baseline levels by a factor of 59. The mean and maximum concentrations of technetium-99 exceed baseline levels by factors of 3.6 and 32 times, respectively. Maximum concentrations of lead-210 and thorium-230 exceed baseline by factors of 3.8 times baseline and 2.2, respectively. The mean and maximum concentrations of all other radionuclides detected did not exceed their baselines by more than a factor of two.

Supplemental Media

Twenty samples were collected from supplemental media and analyzed for uranium and 19 radionuclides, including eight loose media samples, one sediment sample, and 11 unknown liquid samples.

All radionuclides were detected in loose media and unknown liquids. All radionuclides were detected in sediment except neptunium-237, plutonium-238, and strontium-90. Elemental uranium and uranium isotopes exhibit the highest concentrations in these supplemental media. No radionuclides were detected in supplemental media that were not also detected in one of the other media.

A.6.8.2 Summary of Inorganic Contamination

Acid Brick

One sample of acid brick was collected. Seven of 16 inorganic COCs were detected (arsenic, barium, chromium, copper, lead, manganese, and silver). The only detected result above the concrete baseline value was lead, (collected from the Plant 8 Old Metal Dissolver Pad [74Q]), which exceeded by a factor of 2.0. No results exceeded 20 times the TCLP limit.

Asphalt

Four samples of asphalt were collected from three components. Nine inorganic COCs were detected (arsenic, barium, chromium, copper, lead, manganese, nickel, vanadium, and zinc). The maximum detected results from five (arsenic, lead, manganese, vanadium, and zinc) of these COCs were greater than the respective concrete baselines. The most significant of these was zinc, (collected from the roads [G-002]), which exceeded the baseline by a factor of 7.8. The average concentrations from two of these COCs (lead and zinc) were greater than the respective concrete baselines. Again, the most significant of these was zinc, which exceeded the concrete baseline by a factor of 1.56. None of the detected results exceeded 20 times the TCLP limit, where applicable.

Concrete Chips

From 18 components in this component category 21 samples of concrete chips were collected and analyzed for inorganic constituents. All except two of 16 inorganic COCs (antimony and selenium) were detected. The maximum results from 13 (all those above except silver) of these COCs were greater than the respective concrete baselines. The most significant of these was zinc, (collected from the Plant 2 West Pad [74B]), which exceeded the baseline by a factor of 32. Also significant were copper, (collected from the Plant 8 West Pad [74D]) and lead, (collected from the Plant 6 Pad [74J]),

which exceeded their baselines by factors of 24 and 23, respectively. The average results from nine (same as the maximum inorganics except beryllium, cadmium, manganese, and vanadium) of these COCs were greater than the respective concrete baselines. The most significant of these was lead, which exceeded the concrete baseline by a factor of 2.6. None of the detected results exceeded 20 times the TCLP limit, where applicable.

Concrete Cores

The top ½-inch of five concrete cores samples collected from this component category were analyzed for inorganic constituents. All except three of 16 inorganic COCs (antimony, selenium, and thallium) were detected. The maximum detected results of nine (arsenic, barium, chromium, copper, lead, manganese, mercury, nickel, and zinc) of these COCs were greater than the respective concrete baselines. The most significant of these was nickel, (collected from the Building 39A Pad [74W]), which exceeded the baseline by a factor of 11. Also significant was lead, (also collected from 74W) which exceeded the baseline by a factor of 8.0. The average concentrations from seven (the nine above minus arsenic and chromium) of these COCs were greater than the respective concrete baselines. The most significant of these were mercury and lead, which exceeded their concrete baselines by factors of 3.7 and 3.1, respectively. None of the detected results exceeded 20 times the TCLP limit, where applicable.

In the second half inch of four concrete cores collected from this component category, all except three of 16 inorganic COCs (antimony, selenium, and thallium) were detected. The maximum detected results from ten of these detected COCs (all except beryllium, cadmium, and silver) were greater than the respective concrete baselines. The most significant of these was nickel, (collected from the Building 39A Pad [74W]), which exceeded the concrete baseline by a factor of 11. Also significant was lead, (also from 74W), which exceeded the baseline by a factor of 6.3. The average concentrations from seven of these COCs (same list as maximums minus arsenic, chromium, and vanadium) were greater than the respective concrete baselines. The most significant of these was mercury, which exceeded the concrete baseline by factor of 3.5. None of the detected results exceeded 20 times the TCLP limit, where applicable.

In the bottom depth (greater than 1.0 inch) of three concrete cores collected from this component category, all except 5 of 16 inorganic COCs (antimony, cadmium, mercury, selenium, and thallium) were detected. The maximum detected results from six (barium, chromium, lead, manganese, nickel, and vanadium) of these detected COCs were greater than the respective concrete baselines. The most

significant of these was lead, (collected from the Plant 8 North Pad [74R]), which exceeded the concrete baseline by a factor of 5.1. The average concentrations from four (above except nickel and vanadium) of these COCs were greater than the respective concrete baselines. The most significant of these was lead also, which exceeded the concrete baseline by factor of 1.4. None of the detected results exceeded 20 times the TCLP limit, where applicable.

Supplemental Media

From eight loose media samples collected from seven components in this category, all inorganic COCs were detected except thallium. Cadmium and chromium were detected at concentrations exceeding 20 times the TCLP limit in one sample each; and lead was detected at a concentration exceeding 20 times the TCLP limit in four samples.

From one sediment sample, ten inorganic COCs were detected. Those not detected include arsenic, beryllium, mercury, silver, thallium, and zinc. Lead concentration was greater than 20 times the TCLP limit in this sample.

From 11 unknown liquid samples collected and analyzed for inorganic constituents, only two (antimony and thallium) were not detected. None of those that were detected exceeded 20 times their respective TCLP limits.

The fact that lead concentration exceeded 20 times the TCLP level in four supplemental samples supports the fact that it was the most common significant inorganic COC in the major media samples.

A.6.8.3 Summary of Semivolatile Organic Contamination

Asphalt

Two asphalt samples were collected and analyzed for semivolatile constituents. Of 15 semivolatile COCs, benzo(a)anthracene and chrysene were the only ones detected.

Concrete Chips

One sample of concrete chips was collected and analyzed for semivolatile constituents. Of 15 semivolatile COCs, benzo(a)anthracene and chrysene were the only ones detected.

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Supplemental Media

Eight loose media samples, one sediment sample, and 11 unknown liquid samples were collected and analyzed for semivolatile constituents. Of 15 semivolatile COCs, eight were detected in the loose media, yet none of these exceeded 20 times the TCLP limit. These eight were benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, and indeno(1,2,3-cd)pyrene.

Five semivolatile COCs were detected in the single sediment sample collected from this component category. These five are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, and chrysene.

No semivolatile COCs were detected in the 11 unknown liquid samples.

A.6.8.4 Summary of Volatile Organic Contamination

Asphalt

Two asphalt samples were analyzed for volatile constituents, yet none were detected.

Concrete Chips

One sample of concrete chips was collected and analyzed for volatile constituents, yet none were detected.

Supplemental Media

Eight loose media samples, one sediment sample, and 11 unknown liquid samples were collected and analyzed for volatile constituents. Of three volatile COCs, one (tetrachloroethene) was detected in one liquid sample.

A.6.8.5 Summary of Pesticides/PCB Contamination

Asphalt

Two asphalt samples were analyzed for PCBs/pesticides. None of the pesticides were detected, and none exceeded TSCA limits of 50 ppm.

Concrete Chips

One sample of concrete chips was analyzed for PCBs/pesticides. None of the pesticides were detected, and none exceeded TSCA limits of 50 ppm.

Concrete Cores

One concrete core was analyzed for PCBs/pesticides at all three depths. Of six PCBs/pesticides, Aroclor-1254 and Aroclor 1260 were the only two detected, but these did not exceed 20 times the TCLP limit. These PCBs were detected in all three depths. None of the PCBs exceeded the TSCA limits of 50 ppm in any depth.

Supplemental Media

One unknown liquid sample was analyzed for PCBs/pesticides. None of the pesticides were detected, and none exceeded TSCA limits of 50 ppm.

In summary, the supplemental media analyses confirm the presence of the semivolatiles benzo(a)antracene and chrysene and the absence of the volatile COCs in major media. Since two Aroclors were detected in all three depths of the concrete core but none were detected in the supplemental media, the supplemental media does not support the PCB/pesticide results found in major media.

A.6.9 Summary Characterization of Piping, Utilities, and Equipment - Aboveground (Component Category 9)

This category consists of all above-ground piping and utility systems, including outside tank and distribution systems. 20 structures are included in this category, some of which contained or transported potentially hazardous substances. The interiors of such structures are contaminated. Exterior surfaces may have been contaminated by leaking or deposition during production activities. These components are also exposed to natural forces. Contaminants expected among the components in this category included those listed below.

Radiological	Inorganic	Organic
uranium (up to 1.25%)	MgF_2	cooling oils
uranium metal	ore	CB oils
thorium	ore concentrates	hydraulic oils
U_3O_8	high/low grade residues	lubricating oils
UF_6	NaOH	PCBs
UF_4	dolomite	pentachlorophenol
UO_3	chromium	diesel fuel
UO_2F_2	asbestos	
	lead	

During the OU3 RI, a total of 24 samples were collected from components in this category for chemical analysis: 16 from concrete chips, five from steel surfaces, and three from supplemental

media including loose media and wood. A summary of sample analysis for the three types of contaminants is described below according to major and supplemental media.

A.6.9.1 Summary of Radiological Contamination

The above-ground piping, utilities, and equipment category consists of 26 structures including all above-ground piping and utility systems, including outside tank and distribution systems. Some of these components contained or transported potentially hazardous substances.

The bulk of the radiological contamination is expected in the ore processing facilities included in this component category. Expected contaminant include uranium and radionuclides associated with ore processing.

The radiological characterization of the category is based on 12 samples collected from concrete chips. In addition to these samples, three samples were collected from supplemental media including two loose media, and one wood sample. Results for each media are presented below.

Concrete Chips

All radionuclides were detected except plutonium-239/240 and plutonium-241. The most prominent radionuclide detected was uranium, with a maximum concentration 460 times that of baseline. Radium-228 was detected at 70 times its baseline concentration.

The mean and maximum concentrations for elemental uranium exceed the uranium baseline level by factors of 5 and 460, respectively. The mean concentrations for uranium isotopes ranged from 1.4 to 2.3 times baseline and the maximum detected concentrations for uranium isotopes range from 35 to 110. Among the radionuclides associated with ore handling operations, the most prevalent was radium-228, which had mean and maximum concentrations exceeding baseline by factors of 1.6 and 70, respectively.

The means for lead-210, thorium-230, polonium-210, and radium-226 exceed baseline by factors of 3.8, 1.1, 0.70, and 0.71, respectively, while their maximum detected values were 16, 3.6, 1.5, and 11 times baseline, respectively. The mean and maximum concentrations for thorium-228 and thorium-232 were all less than twice baseline. For the fission products, the mean and maximum concentrations for technetium-99 were 1.3 and 8 times the baseline. The strontium-90 mean was 2.0

pCi/g and the maximum detect was 8.4 pCi/g. The maximum concentration of cesium-137 was 2.0 times its baseline. All transformation products were detected at less than twice baseline.

Supplemental media

All radionuclides were detected in loose media except cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90. Cesium-137 neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, thorium-230, thorium-232, and uranium-235/236 were not detected in wood. The results confirm the presence of radionuclide contamination in this component category.

A.6.9.2 Summary of Inorganic Contamination

For concrete chips, detections were reported in either 11 or 12 out of 12 samples for seven out of the sixteen inorganic COCs. The maximum concentration for all but two inorganic COCs (beryllium and thallium) exceed the OU3 baseline concentrations. The maximum concentration of zinc, (collected from the Electrical Distribution area of the Main Electrical Station [16A]) was the most significant, exceeding the baseline concentration by a factor of 65. The average concentration for all but three inorganic COCs (beryllium, manganese, and thallium) exceeded baseline concentrations. The average concentration of antimony is the most significant, exceeding the baseline level by a factor of 38. In concrete chips, the only inorganic COC that exceeded 20 times the TCLP limit (i.e., 100 mg/kg) was chromium, (collected from the Cooling Towers [20C]), with concentrations up to 261 mg/kg.

For steel coatings, detections were reported in all but three of the sixteen inorganic COCs (beryllium, selenium, and thallium); most of those detections occurred in greater than half of the samples for each of those COCs. The maximum concentration for seven inorganic COCs exceed the OU3 baseline concentrations. The maximum concentration of vanadium, (collected from the Hot Side Ore Conveyor [2G]) is the most significant, exceeding the baseline concentration by a factor of between three and four. The average concentration for inorganic COCs did not exceed baseline concentrations. Chromium and lead exceeded 20 times the TCLP limit in four and five samples, respectively. Mercury and barium exceeded 20 times the TCLP limit in only two and one samples, respectively. The list of samples that exceed 20 times the TCLP limit is not listed because, as discussed in A.III.2.6.2, no painted surfaces are characteristically hazardous because of the paint.

In the three samples of supplemental media, COCs exceeding 20 times the TCLP limit included cadmium and lead (both collected from loose media in the Central area of the Plant 6 Electrostatic

Precipitator [6D], and arsenic and chromium (both collected from wood media in the Electrical Distribution area of the Electrical Panels & Transformer [16C]). These results support the 20 times the TCLP results found in major media noted above.

A.6.9.3 Summary of Semivolatile Organic Contamination

Concrete media and steel coating samples were not analyzed for semivolatile organic compounds. Samples of supplemental media were analyzed for semivolatile organic compounds but none of them exceeded 20 times the TCLP limit.

A.6.9.4 Summary of Volatile Organic Contamination

Concrete and steel coating samples were not analyzed for volatile organic compounds. Samples of supplemental media were analyzed for volatile organic compounds but none of them exceeded 20 times the TCLP limit.

A.6.9.5 Summary of Pesticide/PCB Contamination

In concrete chips, detections were reported for each of the six PCBs/pesticides on the COC list. Most PCB/pesticide samples were detected in less than 25 percent of samples for each COC. Those found in greatest frequency were Aroclor-1254 and dieldrin, which were detected in two out of seven samples. Aroclor-1254 had the highest concentration of the six PCBs/pesticides which was 3.2 ppm. None of the pesticides exceed 20 times the TCLP limit. None of the PCBs exceed TSCA limits of 50 ppm. Steel coating samples were not analyzed for PCB/pesticide contamination. Samples of supplemental media were analyzed for PCBs/pesticides but none of them exceeded 20 times the TCLP limit or TSCA limits.

A.6.10 Summary Characterization of Piping, Utilities, and Equipment - Belowground (Component Category 10)

Several of the components from this category contained or transported potentially hazardous substances. The interiors of such structures are contaminated; exteriors may be contaminated by the leakage of contents. That leakage is also a potential source of contamination of soil and groundwater.

Anticipated contaminants for this component include uranium (up to 0.71 percent E), uranium compounds and complexes, ores, ore raffinates, asbestos, lead, barium, and solvent wastes. Many of the individual components did not have any anticipated contaminants listed in the WPA.

Five of the seven components were sampled. A total of 16 samples were collected including: one concrete chip, two concrete cores, one steel sample, three loose media samples, and five unknown liquid samples.

A.6.10.1 Summary of Radiological Contamination

Piping, utilities, and equipment are divided into two groups, above-ground and below-ground. The below-ground component category consists of seven structures including all below-ground piping and utility systems. Some of these components contained or transported potentially hazardous substances. The interiors of such structures are contaminated and exterior surfaces may be contaminated by the leakage of contents.

Expected contaminants include uranium, radionuclides associated with ore processing, and radionuclides collected by storm water runoff or the Clearwell Line.

The radiological characterization of the below-ground Piping, Utilities, and Equipment is based on seven samples collected from two media: concrete chips (one sample), and concrete cores (three). In addition to these samples, nine samples were collected from supplemental media including one loose media, two sediment and six unknown liquid samples. Results for each media are presented below.

Concrete Chips

All radionuclides were detected except plutonium-239/240. Uranium was detected at 310 times its baseline level. The uranium isotopes, uranium-234, uranium-235/236, and uranium-238 concentrations exceeded their baselines by factors of 360, 140, and 430, respectively. The concentrations for lead-210, technetium-99, and polonium-210 exceed baseline by factors of 34, 30, and 19, respectively. Remaining radionuclide concentrations ranged from 0.30 to 5.7 times their baseline.

Concrete Core

Americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, and technetium-99 were not detected in the first ½-inch of the concrete core sample. None of the other radionuclides exceed baseline by a more than 2.2 times the baseline.

Americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, and technetium-99 were not detected in the second half-inch of concrete. None of the other radionuclides exceed their baseline concentrations.

Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, and technetium-99 were not detected in the first half-inch of concrete. None of the other radionuclides exceed their baseline concentrations.

Supplemental Media

All radionuclides were detected in loose media except cesium-137, thorium-228, thorium-232. The results confirm the presence of radionuclide contamination in this component category. All radionuclides were detected in sediment. The results confirm the presence of radionuclide contamination in this component category. All radionuclides were detected in unknown liquids except cesium-137. These results include radionuclides not encountered in the other media.

A.6.10.2 Summary of Inorganic Contamination

Concrete Chips

One concrete chip sample was collected from one component (Conveyer Tunnel [from Plant 1] [2H]) for analyses of inorganics. For this sample, seven of the 16 COCs (arsenic, barium, chromium, copper, nickel, selenium, and zinc) exceed the concrete baseline values. Most significant were selenium and zinc, which exceeded the baseline by a factor of 22 and 4.9, respectively. No inorganics exceed 20 times the TCLP limits.

Concrete Cores

Two concrete core samples were collected from this category for inorganic analysis. One from Old Cooling Tower (3K) and one from the Utility Trench to Pit Area (22E).

Of these samples, at the 0 - ½ inch level of the cores, nine of the 16 inorganics were detected. They are antimony, arsenic, barium, chromium, copper, lead, manganese, vanadium, and zinc. The maximum concentration of eight (the above, except copper) inorganics exceeded the OU3 concrete baseline. Most significant of these are chromium and lead (collected from the Old Cooling Tower [3K]), which exceeded the baseline by a factors of 52 and 16, respectively. The average of the validated results for this level exceeded the baseline for the same eight inorganics. The most significant were antimony, which exceeded the baseline by a factor of 7.8, and chromium, which

exceeded the baseline by a factor of 6.2. Also at this level for one core sample, chromium (collected from the Old Cooling Tower [3K]) was detected at concentrations greater than 20 times TCLP (greater than 100 mg/kg).

At the ½ - 1.0 inch level of the cores, eight of the 16 inorganics were detected. They are antimony, arsenic, barium, chromium, lead, manganese, vanadium, and zinc. The maximum concentration of all eight exceeded the concrete baseline values. The most significant COCs exceeded were lead, which exceeded the baseline by a factor of 78, and chromium (both collected from the Old Cooling Water Tower [3K]), which exceeded the baseline by a factor of 34. The average of the validated results at this level exceeded the baseline for the same eight inorganics. The most significant were antimony, which exceeded the baseline by a factor of 9.4, and lead, exceeding the baseline by a factor of 6.4. At this level for one core sample, chromium and lead (both collected from the Old Cooling Tower [3K]) were both detected at concentrations greater than 20 times TCLP (both greater than 100 mg/kg).

At the 1.0 - 4.0 inch level of the cores, the maximum concentration of nine inorganics exceeded the concrete baseline values. They are antimony, arsenic, barium, chromium, copper, lead, manganese, silver, and vanadium. The most significant was silver (collected from the Utility Trench to Pit Area [22E]), which exceeded the baseline by a factor of 7.2. The average concentration of the same nine inorganics exceeded the baseline. The most significant was antimony, which exceeded the baseline by a factor of 7.4. There were no detects at concentrations of 20 times TCLP limit.

Steel Coatings

One steel coating sample was collected from the Conveyer Tunnel (from Plant 1) (2H) for inorganic analysis. All but selenium was detected of the 16 COC inorganics. The maximum concentrations of only two (arsenic and beryllium) exceeded the OU3 paint baseline. The most significant was beryllium, which exceeded the paint baseline by a factor of 3.8. The average of the validated results exceeded this baseline for the same two COCs. The most significant was beryllium again, which exceeded the baseline by a factor of 3.7. The following inorganics were detected at concentrations greater than 20 times the TCLP limit: cadmium (greater than 29 mg/kg), chromium (greater than 100 mg/kg), and lead (greater than 100 mg/kg).

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A.6.10.3 Summary of Semivolatile Organic Contamination

No major media samples collected from this component category were analyzed for semivolatile organic contaminants. Of the eight supplemental media samples which were analyzed for semivolatiles, there were no detects exceeding 20 times TCLP for the COC analytes.

A.6.10.4 Summary of Volatile Organic Contamination

No major media samples collected from this component category were analyzed for volatile organic contaminants. Of the eight supplemental media samples, there were no detects for the volatile organic COCs.

A.6.10.5 Summary of Pesticide/PCB Contamination

No major media samples or supplemental media samples collected from this component category were analyzed for PCB/pesticide contamination.

A.6.11 Summary Characterization of Ponds and Basins (Component Category 11)

This category consists of all surface impoundments, ponds, and basins where liquids containing potentially hazardous substances are, or can be, stored without secondary containment. In OU3, there are eight components in this category. Some of these components contain large volumes of water with relatively small amounts of contamination. They also contain sediments with more concentrated quantities of contamination. Contaminants expected among the components in this category are listed below.

Radiological	Inorganic	Organic
uranium	nitrates	1,1,1-trichloroethylene
		1,1,1-trichloroethane
		perchloroethylene
		toluene
		used oils (hydraulic, lubricating)
		waste paint solvents
		paint thinners

Six of the eight components were sampled. A total of 56 samples were collected from components in this category for chemical analysis: one from concrete chips, six from concrete cores, 23 from sediment (loose media) and 26 from unknown liquids. A summary of sample analysis for the three types of contaminants is described below.

A.6.11.1 Summary of Radiological Contamination

This component category consists of eight structures or areas where liquids containing potentially hazardous substances are, were, or can be, stored without secondary containment. Some of these components contain large volumes of water with relatively small amounts of contamination. They also contain sediments with more concentrated quantities of contamination.

Uranium is an expected contaminant in these ponds and basins. The presence of radionuclides is very possible since water for other contaminated areas in OU3 drain into these lagoons.

The radiological characterization of the Ponds and Basins is based on twenty-nine samples collected from two media: concrete chips (one sample), and concrete cores (three). In addition to these samples, 44 samples were collected from supplemental media including 22 sediment and 22 unknown liquid samples. Results for each media are presented below.

Concrete Chips

Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and uranium-235/236 were not detected in the chip sample. All other radionuclides were detected at concentrations below their baseline concentrations.

Concrete Core

Americium-241, neptunium-237, plutonium-239/240, strontium-90, and technetium-99 were not detected in the first half inch of concrete. Lead-210 was detected at 6.8 times its baseline concentration. All other radionuclides were detected at concentrations below their baseline concentrations.

Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-226, strontium-90, and technetium-99 were not detected in the second ½-inch of concrete. Lead-210 was detected at 2.0 times its baseline concentration. All other radionuclides were detected at concentrations below their baseline concentrations.

Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99 were not detected below the first inch of concrete. Lead-210 was detected at 5.2 times its baseline concentration. All other radionuclides were detected at concentrations below their baseline concentrations.

Supplemental Media

All radionuclides were detected in sediment except for thorium-227, and all radionuclides were detected in unknown liquids. The results confirm the presence of radionuclide contamination in this component category and indicate the presence of radionuclides in the category that were not detected in concrete.

A.6.11.2 Summary of Inorganic Contamination

Concrete Chips

In the only concrete chip sample taken for inorganic contamination, detections were reported for three of the sixteen inorganic COCs (arsenic, barium, and manganese). Since only one sample was taken from concrete chips, the maximum and average concentrations are equivalent; both having concentration for only one inorganic COC (barium) (collected from the Sludge Drying Beds [25F]) that exceeded the OU3 baseline concentration. The maximum and average concentrations of barium exceeded the baseline concentration by a factor of 1.1. In the concrete chip sample, there were no inorganic COCs that exceeded 20 times the TCLP limit.

Concrete Cores

The six concrete core samples were taken from one component in this category: Primary Settling Basin (25G). The six samples were split between radiological and chemical locations. In the sampling interval between 0.0 - 0.5 inches, detections were reported in half of the 16 inorganic COCs (barium, chromium, copper, lead, manganese, nickel, vanadium, and zinc). The maximum and average concentrations of six inorganic COCs (barium, chromium, lead, manganese, vanadium, and zinc) exceed their respective OU3 baseline concentrations. The maximum and average concentrations of zinc (collected from the Primary Settling Basins [25G]) are the most significant, both exceeding the baseline concentration by a factor of 1.3. In the 0.0 - 0.5 inch interval, there were no inorganic COCs that exceeded 20 times the TCLP limit.

In the sampling interval between 0.5 - 1.0 inches, detections were reported for nine out of the 16 inorganic COCs (barium, chromium, copper, lead, manganese, nickel, silver, vanadium, and zinc). The maximum and average concentrations of six inorganic COCs (barium, chromium, lead, manganese, nickel, and vanadium) exceed their respective OU3 baseline concentrations. The maximum and average concentrations of vanadium (collected from the Primary Settling Basins [25G]) are the most significant, both exceeding the baseline concentration by a factor of 1.3. In the 0.5 - 1.0 inch interval, there were no inorganic COCs that exceeded 20 times the TCLP limit.

In the sampling interval between 1.0 - 4.0 inches, detections were reported for nine out of the 16 inorganic COCs (arsenic, barium, chromium, copper, manganese, nickel, selenium, silver, and vanadium). The maximum and average concentrations of five inorganic COCs exceed their respective OU3 baseline concentrations. The maximum and average concentrations of arsenic (collected from the Primary Settling Basins [25G]) are the most significant, both exceeding the baseline concentration by a factor of 1.7. In the 1.0 - 4.0 inch interval, there were no inorganic COCs that exceeded 20 times the TCLP limit.

Supplemental Media

In the 23 sediment samples, detections were reported for all of the 16 inorganic COCs. For eight of the COCs, detections were reported in more than half of the samples; more than 20 detections were found in five of the COCs. The inorganic COCs that exceeded 20 times their TCLP limits are listed below:

Exceeds 20 times TCLP	Component	Process Area
Arsenic	Coal Pile Runoff Basin (18C)	Runoff Collection
Chromium	BDN Surge Lagoon (18A)(4 Samples)	Wastewater Treatment
	Low Nitrate Tank (18K)	Wastewater Storage
	Sludge Drying Beds (25F)	Sludge Drying
Lead	BDN Surge Lagoon (18A) (8 Samples)	Wastewater Treatment
	Low Nitrate Tank (18K)	Wastewater Storage
	Storm Water Retention Basin (18E)(2 Samples)	Wastewater Storage
	Coal Pile Runoff Basin (18C)	Runoff Collection
Mercury	BDN Surge Lagoon (18A)	Wastewater Treatment
	Low Nitrate Tank (18K) (5 Samples)	Stormwater Storage

In the 26 samples of unknown liquids, detections were reported for all of the 16 inorganic COCs; barium was most prevalent, having detections in 88 percent of samples. The other inorganic COCs were detected in less than half of samples. None of the inorganic COCs exceeded their TCLP limits.

A.6.11.3 Summary of Semivolatile Organic Contamination

Major Media

No concrete media was analyzed for semivolatile organic compounds.

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Supplemental Media

In the 23 sediment samples, detections were reported for 11 out of the 15 semivolatile organic compound COCs. For six of the COCs, detections were reported in more than half of the samples; three COCs (benzo(a)anthracene, benzo(b)fluoranthene, and chrysene) each had 18 detections. None of the semivolatile organic compound COCs exceeded 20 times the TCLP limit in sediment samples.

In the 26 samples of unknown liquids, detections were reported for six of the semivolatile organic compound COCs; chrysene was most prevalent, having detections in three samples. The other semivolatile compound COCs were detected in either one or two samples. None of the semivolatile organic compound COCs exceeded their TCLP limits.

A.6.11.4 Summary of Volatile Organic Contamination

Major Media

No concrete media was analyzed for volatile organic compounds.

Supplemental Media

In the 23 sediment samples, detections were reported for two out of the three volatile organic compound COCs (styrene and tetrachloroethene). Styrene was most prevalent, having detections in six samples. None of the volatile organic compounds exceeded 20 times the TCLP limit in sediment samples.

In the 26 samples of unknown liquids, detections were reported for two out of the three volatile organic compound COCs (styrene and tetrachloroethene). Tetrachloroethene was most prevalent, having detections in three samples. The TCLP limit was not exceeded for tetrachloroethene, the only volatile organic compound COC detected that has a TCLP limit.

A.6.11.5 Summary of Pesticide/PCB Contamination

Only unknown liquids were sampled for PCBs/pesticides. Of the one sample taken for PCB/pesticide analysis, there were no detections of any COCs.

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REFERENCES

EG&G, 1988, "Health Physics Manual of Good Practices for Uranium Facilities," prepared for US Department of Energy, Fernald Field Office, Fernald, OH.

US Department of Energy (DOE), 1993, "Operable Unit 3 RI/FS Work Plan Addendum," DOE, Fernald Field Office, Fernald, OH.

US Department of Energy (DOE), 1994a, "Operable Unit 3 Record of Decision for Interim Remedial Action and Responsiveness Summary," Final, DOE, Fernald Field Office, Fernald, OH.

US Department of Energy (DOE), 1994b, "Modification of the Operable Unit 3 RI/FS Work Plan Addendum," DOE, Fernald Field Office, Fernald, OH.

US Department of Energy (DOE), 1995a, "Operable Unit 3 Estimated Material Quantities Report," Draft, DOE, Fernald Area Office, Fernald, OH.

US Department of Energy (DOE), 1995b, "Feasibility Study Report/Proposed Plan for Environmental Actions at Operable Unit 2," Final, DOE, Fernald Area Office, Fernald, OH.

US Department of Energy (DOE), 1995c, "Feasibility Study Report/Proposed Plan for Remedial Actions at Operable Unit 5," Draft Final, DOE, Fernald Area Office, Fernald, OH.

US Department of Energy (DOE), 1995d, Letter DOE-1451-95, dated September 8, 1995, from DOE to US EPA and OEPA. Subject: Characterization of Light-Gauge Metal Coated with Lead-Based Paint.

US Environmental Protection Agency (EPA), 1991, "Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)," 9285.7-01B, EPA, Office of Emergency and Remedial Response, Washington, DC.

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TABLE A-1

OU3 RI/FS MATERIAL CATEGORIES/DESCRIPTIONS

A ACCESSIBLE METALS	B INACCESSIBLE METALS	C PROCESS-RELATED METALS	D PAINTED LIGHT-GAUGE METALS	E CONCRETE	F BRICK	G NON-REGULATED ACM	H REGULATED ACM	I MISCELLANEOUS MATERIALS	J PRODUCT, RESIDUES AND SPECIAL MATERIALS
STRUCTURAL AND MISC. STEEL	DOORS	ELECTRICAL EQUIPMENT	DUCTWORK	ASPHALT	ACID BRICK	CEILING DEMO.	DUCTWORK INSULATION	PVC CONDUIT	COAL PILE
	CONDUIT/WIRE (2" AND LESS)	EQUIPMENT AND MISCELLANEOUS	LEAD FLASHING	CONCRETE		FEEDER CABLE	PIPING INSULATION	BASIN LINERS	COPPER SCRAP METAL PILE
	CONDUIT/WIRE (2-1/2" TO 4")	HVAC EQUIPMENT	LOUVERS	CONCRETE BEAMS		FIRE BRICK	PPE	FABRIC	GRAVEL PILE
	CONDUIT/WIRE/CABLE TRAY (OVER 4")	MATERIAL HANDLING EQUIPMENT	EXTERIOR METAL WALL PANELS	CONCRETE COLUMNS		FLOOR TILE		FABRIC ROOF	HAZARDOUS/MIXED WASTE
	ELECTRICAL FIXTURES	PROCESS EQUIPMENT	INTERIOR METAL WALL PANELS	CONCRETE FOUNDATION		EXTERIOR TRANSITE PANELS		FABRIC WALLS	LOW LEVEL WASTE
	ELECTRICAL WIRING	PIPING (2" AND LESS)	METAL PANEL ROOF	CONCRETE SLABS		INTERIOR TRANSITE PANELS		DRYWALL	MARKETABLE NUCLEAR MATERIAL
	MISCELLANEOUS ELECTRICAL ITEMS	PIPING (2-1/2" TO 4")		CONCRETE WALLS		TRANSITE ROOF		BUILDING INSULATION	OUTSIDE EQUIPMENT STORAGE AREA
	ELECTRICAL EQUIPMENT	PIPING (OVER 4")		MASONRY				MISCELLANEOUS DEBRIS	ROCK SALT PILE
	EQUIPMENT AND MISCELLANEOUS			MASONRY WALLS				PPE	SAND PILES
	HVAC EQUIPMENT			CLAY PIPING				PVC PIPING	SOIL PILES
	MATERIAL HANDLING EQUIPMENT							ROOFING, BUILT-UP	THORIUM INVENTORY
	PROCESS EQUIPMENT							PROCESS TRAILERS	SCRAP METAL PILE
	ELECTRICAL TRANSFORMERS							NON-PROCESS TRAILERS	
	PIPING (2" AND LESS)							WINDOWS	
	PIPING (2-1/2" TO 4")							WOOD	
	PIPING (OVER 4")								

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TABLE A-2
SUMMARY OF MATERIAL QUANTITY VOLUME[a] BY COMPONENT/MATERIAL CATEGORIES
OPERABLE UNIT 3 -FEMP

	Material Type Category										
	A	B	C	D	E	F	G	H	I	J	
Component Category	Accessible Metals	Inaccessible Metals	Process-Related Metals	Painted, Light-Gauge Metals	Concrete	Brick	Non-Regulated ACM	Regulated ACM	Misc-Materials	Product, Residues and Special Materials	Totals [b]
1 - Administrative Support	1,120	56,500	5,110	795	454,000	0	3,460	2,040	413,000	77.6	936,000
2 - Warehouse/Storage	6,100	12,400	415	1,130	660,000	0	2,640	1,790	19,300	1.55	704,000
3 - Process	35,100	974,000	113,000	4,130	1,020,000	14,700	40,600	13,600	70,700	75,700	2,360,000
4 - Process Support	8,740	293,000	32,600	799	406,000	301	11,700	2,700	21,900	11,900	790,000
5 - Aboveground Containers/Containerized Material	3,420	120,000	12,900	5.29	126,000	5,220	29.4	49,400	4,680	725,000	1,050,000
6 - Belowground Containers/Containerized Material	0	0	0	0	0	0	0	0	0	0	0
7 - Bulk Material	0	0	0	0	0	0	0	0	0	985,000	985,000
8 - Pads, Roads, Railroads, Parking Lot	0	0	0	0	1,810,000	437	0	0	0	0	1,810,000
9 - Aboveground Piping, Utilities, Equipment	2,640	191,000	20,100	297	25,200	0	776	390	6,700	2.22	247,000
10 - Belowground Piping, Utilities, Equipment	6,260	63,500	6,960	0	280,000	0	1,120	10,300	25,200	0	393,000
11 - Ponds/Basins	48.1	1,410	47.9	0	16,400	0	0	24.4	2,190	0	20,100
Totals [b]	63,400	1,710,000	191,000	7,160	4,800,000	20,700	60,300	80,200	564,000	1,800,000	9,293,706

[a] All volumes are in cubic feet (unbulked).
[b] Totals are rounded.

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TABLE A-3
SUMMARY OF MATERIAL QUANTITY WEIGHT[a] BY COMPONENT/MATERIAL CATEGORIES
OPERABLE UNIT 3 -FEMP

	Material Type Category										
	A	B	C	D	E	F	G	H	I	J	
Component Category	Accessible Metals	Inaccessible Metals	Process-Related Metals	Painted, Light-Gauge Metals	Concrete	Brick	Non-Regulated ACM	Regulated ACM	Misc-Materials	Product, Residues and Special Materials	Totals [b]
1 - Administrative Support	267	987	73.1	176	26,700	0	147	4.48	2,000	3.63	30,400
2 - Warehouse/Storage	1,470	412	19.7	188	48,000	0	153	3.07	310	.07	50,600
3 - Process	8,400	13,600	2,070	867	71,500	1,030	2,270	28.5	1,120	6,600	107,000
4 - Process Support	2,100	5,640	709	116	26,800	21.1	691	5.03	267	1,040	37,400
5 - Aboveground Containers/Containerized Material	818	1,200	107	1.21	9,460	365	1.54	1,370	9.23	19,800	33,100
6 - Belowground Containers/Containerized Material	0	0	0	0	0	0	0	0	0	0	0
7 - Bulk Material	0	0	0	0	0	0	0	0	0	47,300	47,300
8 - Pads, Roads, Railroads, Parking Lot	0	0	0	0	117,000	30.6	0	0	0	0	117,000
9 - Aboveground Piping, Utilities, Equipment	632	640	43	11.7	1,890	0	45.7	.67	81.4	.1	3,340
10 - Belowground Piping, Utilities, Equipment	1,530	3,210	343	0	21,000	0	321	23.2	375	0	26,800
11 - Ponds/Basins	11.6	33.6	.91	0	1,230	0	0	.05	69.2	0	1,350
Totals [b]	15,200	25,700	3,370	1,360	324,000	1,450	3,630	1,430	4,230	74,700	455,000

[a] All weights are in tons.
[b] Totals are rounded.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																												Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Radionuclides																													
Uranium-238	●	●	●	●	●	●	●	●	●	●	●	●			●	●		●	●	●	●		●	●	●	●	●	●	Ores, ore concentrates, and recycled material.
Uranium-234	●	●	●	●	●		●	●	●	●	●	●			●	●		●	●	●			●	●	●	●	●	●	Ores, ore concentrates, and recycled material.
Thorium-230	●	●							●	●	●	●							●				●		●	●		●	Minor impurity (<1%) in ores and ore concentrates.
Radium-226	●	●							●	●	●	●						●	●				●		●	●		●	Impurity in uranium ores and ore concentrates.
Uranium-235/236	●	●	●	●	●	●	●	●	●	●	●	●			●	●		●	●	●			●	●	●	●	●	●	Ores, ore concentrates, and recycled material.
Thorium-232	●	●	●	●	●		●	●		●	●	●						●	●	●			●		●	●		●	Feed material (thorium nitrate tetrahydrate).
Radium-228	●	●	●	●	●		●	●		●	●	●						●	●				●		●	●		●	Impurity in thorium ores and ore concentrates.
Thorium-228	●	●	●	●	●		●	●		●	●	●						●	●	●			●		●	●		●	Feed material (thorium nitrate tetrahydrate).
Neptunium-237	●	●	●	●	●		●	●		●	●	●											●		●	●		●	Impurity in recycled uranium from other DOE facilities.
Plutonium-239/240	●	●	●	●	●		●	●		●	●	●											●		●	●		●	Impurity in recycled uranium from other DOE facilities.
Plutonium-238	●	●	●	●	●		●	●		●	●	●											●		●	●		●	Impurity in recycled uranium from other DOE facilities.
Strontium-90	●	●	●	●	●		●	●		●	●	●											●		●	●		●	Impurity in recycled uranium from other DOE facilities; fallout.
Technetium-99	●	●	●	●	●		●	●	●	●	●	●			●			●	●	●			●		●	●	●	●	Impurity in recycled uranium from other DOE facilities; fallout.
Cesium-137	●	●	●	●	●		●	●		●	●	●											●		●	●		●	Impurity in recycled uranium from other DOE facilities; fallout.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																											Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Organic Compounds																												
Acetone	●	●	●				●			●	●	●	●		●		●	●		●	●		●						Laboratory solvent.
Benzene				●	●					●	●	●			●								●						Laboratory solvent.
Carbon tetrachloride					●		●			●	●	●	●										●						Cleaning solvent.
Chlorobenzene					●						●	●																	Laboratory solvent.
Chloroform											●	●											●						Laboratory solvent.
Di-sec-butyl phenyl phosphonate										●	●	●								●									Solvent for thorium extraction.
Ethylbenzene							●																						Laboratory solvent.
Ethylene glycol											●	●										●	●						Antifreeze; laboratory reagent.
Methylethyl ketone (2-butanone)							●				●	●											●						Laboratory reagent.
Methylene chloride	●										●	●											●						Laboratory reagent.
Pentachlorophenol																													Laboratory reagent.
Polychlorinated biphenyls	●	●		●				●		●	●	●		●						●	●		●				●		Coolant in transformers.
Solvesso-100										●	●	●								●									Thorium extraction/purification.
Tetrachloroethene	●	●	●	●	●		●	●		●	●	●			●					●	●		●	●					Cleaning solvent; coolant in pilot plant remelt furnace.
1,1,1-Trichloroethane	●	●	●	●	●		●		●	●	●	●			●		●			●	●		●				●		Cleaning solvent.
Trichloroethene	●	●		●	●		●	●		●	●	●			●					●			●	●					Cleaning solvent.
Toluene					●		●				●	●											●				●		Laboratory reagent.
Vinyl chloride																								●					Degradation product of trichloroethene and tetrachloroethene.
Xylene	●						●				●	●											●						Laboratory reagent.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																											Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building ..	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Kerosene	●	●								●	●	●	●		●	●				●	●		●	●	●	●			Solvent for uranium/thorium extraction.
Various oils	●	●	●	●	●		●	●		●	●	●	●		●	●	●	●	●	●	●	●	●	●			●		Cooling, lubricating, hydraulics.
Metals																													
Aluminum	●	●						●		●	●	●			●		●		●				●						Minor impurity (<1%) in ores & ore concentrates; major (>10%) component in flyash; hydrated alumina used in raffinate treatment for fluoride removal; cladding on fuel elements.
Antimony	●	●									●	●																	Minor impurity (<1%) in ores & ore concentrates.
Arsenic	●	●					●				●	●											●						Minor impurity (<1%) in ores & ore concentrates; minor component (<100 ppm) in flyash.
Barium	●	●			●					●	●	●											●						BaSO4 used in thorium raffinate treatment for radium removal; minor component (<0.5%) in flyash.
Beryllium												●											●						Minor component (<20 ppm) in flyash.
Boron	●	●									●	●											●						Minor impurity (<1%) in ores & ore concentrates.
Cadmium	●	●		●	●		●	●		●	●	●							●				●						Minor impurity (<1%) in ores & ore concentrates.
Calcium	●	●			●		●	●	●	●		●			●		●		●				●						Lime [Ca(OH)2] used for neutralization; major impurity (<3%) in ores & ore concentrates; major component (>13%) in flyash; CaCO3 used in heat treating.
Hexavalent Chrome												●			●		●						●						Additive for process water treatment.
Chromium	●	●	●	●	●	●	●	●		●	●	●			●		●		●				●						Minor impurity (<1%) in ores & ore concentrates.
Cobalt	●	●									●	●											●						Minor impurity (<1%) in ores & ore concentrates.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																											Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Copper	●	●	●	●	●	●	●	●		●	●	●			●				●				●						Minor impurity (<1%) in ores & ore concentrates; cladding on fuel elements.
Cyanide											●	●											●						Laboratory reagent.
Iron	●	●	●	●	●	●	●	●		●	●	●			●		●	●	●				●						Major impurity (<5%) in ores & ore concentrates; major component (>5%) in flyash.
Lead	●	●		●	●		●	●		●	●	●			●		●						●	●					Minor impurity (<1%) in ores & ore concentrates.
Lithium	●			●	●		●	●		●	●	●											●						LiCO3 used in heat treating.
Magnesium	●	●	●	●	●		●	●	●	●	●	●			●		●		●				●	●			●		Reduction of UF4 to U; major impurity (<4%) in ores and ore concentrates; major component (>4%) in flyash.
Manganese	●	●					●				●	●											●						Minor impurity (<1%) in ores & ore concentrates.
Mercury		●	●	●			●	●		●	●	●			●		●						●						Al/U alloy dissolution in Plant 2/3; laboratory uses.
Molybdenum	●	●									●	●							●				●						Minor impurity (<1%) in ores & ore concentrates.
Nickel	●	●	●		●	●		●		●	●	●			●								●						Minor impurity (<1%) in ores & ore concentrates; cladding on fuel elements; corrosion product.
Potassium	●	●	●		●	●	●	●		●	●	●			●	●							●						KCl used in heat treating; HF neutralization and residue recovery.
Selenium												●																	Minor component (<100 ppm) in flyash.
Silicon	●	●					●			●	●	●			●								●						Major impurity (<5%) in ores & ore concentrates.
Silver	●		●								●	●			●				●				●						Algaecide in Plant 4 heat exchangers; photographic film coating/processing.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																											Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Sodium	●	●			●	●	●	●		●	●	●			●				●				●						Major impurity (<10%) in ores & ore concentrates; NaCl used in heat treating; neutralization (NaOH).
Thallium											●	●																	Laboratory reagent.
Vanadium	●	●									●	●																	Minor impurity (<3%) in ores & ore concentrates.
Zinc	●	●						●		●	●	●							●				●						Minor impurity (<1%) in ores & ore concentrates.
Zirconium	●	●		●				●		●	●	●											●						Cladding on fuel elements; coating on ingot molds.
Other Compounds																													
Ammonia		●	●		●	●	●	●		●	●	●				●									●	●			Minor impurity (<1%) in ores & ore concentrates; neutralization; residue from uranium recovery and UF4 production.
Carbonate	●	●			●		●	●		●	●	●			●										●	●			Major component in soil and groundwater; CaCO3 used in heat treating.
Chloride	●	●			●		●	●	●	●	●	●			●	●	●		●	●					●	●			Minor impurity (<1%) in ores & ore concentrates; NaCl & KCl used in heat treating; HCl used to dissolve U metal.
Fluoride	●	●	●	●	●	●	●	●		●	●	●			●	●			●	●					●	●			Minor impurity (<1%) in ores & ore concentrates; anhydrous & aqueous HF.
Nitrate	●	●			●		●	●	●	●	●	●			●	●			●						●	●			Nitric acid used to dissolve uranium and thorium feed materials for extraction.
Phosphate		●					●			●	●	●			●										●	●			Minor impurity (<1%) in ores & ore concentrates; UAP process.
Sulfate		●	●				●			●	●	●			●		●								●	●			Major impurity (<5%) in ores & ore concentrates; H2SO4 used for OU3 production.

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TABLE A-4
SUMMARY OF EXPECTED CONTAMINANTS WITHIN OU3

Analyte	Plant Area																												Primary Sources/Uses
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Sewage Treatment Plant (STP)	Pilot Plant (13)	Laboratory (15)	General Sump	Administration (14)	Electrical Substation (16)	Maintenance/Stores Building (12)	Tank Farm (19)	Boiler House (10)	Drum Baling	Scrap Metal Pile, Decontamination Building ..	Graphite Furnace & Oil Burner (10D)	KC-2 Warehouse (63)	Garage	Health & Safety Building	Service Building (11)	K-65/Clearwell Line W. of Prod.	Clearwell Line E. of Prod.	Fire Training (73)	Outfall Pipeline	
Diamyl-amyl phosphonate										●	●	●								●									Solvent for thorium extraction.
Magnesium fluoride	●	●		●			●	●		●	●	●							●	●					●	●			By-product of reduction of UF4 to uranium metal.
Tributyl phosphate		●					●			●	●	●				●				●					●	●			Solvent for uranium extraction.

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TABLE A - 5
CONSTITUENT OF CONCERN SCREENING

	PART B	CONCRETE	ACID BRICK	MASONRY	STEEL COATINGS	TRANSITE*	ASPHALT	WOOD	SOIL	LOOSE MEDIA	COC?
Radionuclides, pCi/g											
Americium-241	2.38E-01	1.30E+01	3.26E+01	1.20E+01	3.26E+01	N/A	ND	1.00E-01	ND	8.30E+01	Yes
Cesium-137+1D	2.08E-03	4.80E+00	2.09E+01	1.60E+01	4.10E+00	N/A	1.50E-01	ND	9.23E-01	1.30E+01	Yes
Lead-210+2D	1.20E-01	6.91E+01	1.75E+03	8.10E+02	1.04E+03	N/A	2.40E+00	8.80E+00	4.18E+00	1.00E+02	Yes
Neptunium-237+1D	9.44E-03	1.80E+01	1.72E+00	4.20E+00	4.90E+01	N/A	ND	9.00E-02	4.91E-01	6.80E+01	Yes
Polonium-210	5.30E-01	3.60E+01	2.97E+03	2.10E+02	7.97E+02	N/A	6.60E+00	6.80E+00	5.80E+00	8.68E+01	Yes
Plutonium-238	3.60E-01	2.46E+02	1.30E+03	6.00E+00	4.20E+02	N/A	1.50E-01	1.40E+00	1.55E-01	3.66E+02	Yes
Plutonium-239/240	3.44E-01	3.39E+01	7.45E+01	3.54E+00	9.20E+01	N/A	3.58E-02	3.00E-02	9.77E-02	6.90E+01	Yes
Plutonium-241	2.21E+01	1.29E+02	9.23E+02	2.20E+01	2.60E+02	N/A	N/A	ND	ND	2.89E+02	Yes
Radium-226+5D	6.94E-04	1.53E+03	5.30E+02	2.50E+03	6.71E+03	N/A	2.30E+00	1.90E+00	2.43E+00	2.82E+02	Yes
Radium-228	7.94E-01	1.50E+04	1.71E+03	6.20E+01	2.28E+03	N/A	1.60E+00	5.40E+00	1.74E+00	2.65E+03	Yes
Strontium-90	2.41E+00	5.97E+01	7.10E+00	1.30E+01	4.10E+01	N/A	2.80E+01	3.30E-01	5.40E-01	1.40E+02	Yes
Technetium-99	6.05E+01	8.10E+03	2.96E+02	6.30E+01	1.00E+03	N/A	7.70E+00	6.30E+00	3.96E+00	1.30E+04	Yes
Thorium-227	2.60E-02	6.70E+01	N/A	4.70E+01	8.00E+01	N/A	N/A	N/A	N/A	N/A	Yes
Thorium-228+7D	7.44E-04	8.95E+03	3.11E+01	2.20E+01	4.70E+02	N/A	1.80E+00	2.30E+00	2.27E+00	7.18E+02	Yes
Thorium-230	5.66E+00	9.80E+02	2.95E+02	7.40E+02	5.60E+03	N/A	1.90E+00	3.20E+00	9.82E+00	3.70E+03	Yes
Thorium-232	6.35E+00	1.27E+03	1.34E+01	2.00E+01	2.60E+02	N/A	1.20E+00	1.80E+00	2.03E+00	5.30E+02	Yes
Uranium-234	4.79E+00	4.90E+04	2.79E+03	2.80E+03	3.70E+04	N/A	2.53E+01	2.58E+02	3.83E+01	2.10E+05	Yes
Uranium-235/236	1.73E-02	6.80E+03	1.50E+02	1.70E+02	3.90E+03	N/A	3.43E+00	1.33E+01	1.73E+00	2.70E+04	Yes
Uranium-238+2D	1.10E-01	3.70E+04	3.80E+03	1.39E+03	3.30E+04	N/A	3.69E+01	2.54E+02	3.90E+01	1.80E+05	Yes
Metals, mg/kg											
Aluminum	NS	1.96E+04	4.40E+03	1.50E+04	6.94E+04	N/A	2.40E+03	1.15E+02	1.57E+04	1.50E+05	-
Antimony	1.10E+01	5.23E+01	9.00E+00	6.70E+00	3.93E+02	N/A	ND	2.04E+01	ND	2.14E+02	Yes
Arsenic	3.65E-02	3.68E+01	2.36E+01	3.38E+01	2.27E+02	ND	5.20E+00	2.69E+03	1.02E+01	2.46E+02	Yes
Barium	1.92E+03	5.89E+03	1.77E+03	3.82E+03	2.37E+04	ND	3.71E+01	1.30E+01	1.91E+02	4.08E+03	Yes
Beryllium	1.49E-02	4.80E+00	9.50E-01	1.40E+00	4.50E+00	N/A	ND	ND	2.40E+00	5.63E+01	Yes
Cadmium	1.37E+01	2.94E+01	3.40E+00	2.10E+01	5.58E+02	ND	ND	ND	3.00E-01	6.24E+01	Yes
Calcium	N S	2.73E+05	6.43E+03	2.18E+05	1.99E+05	N/A	2.21E+05	3.02E+03	1.42E+05	1.95E+05	-
Chromium	1.37E+02	6.40E+02	4.07E+02	3.06E+02	1.73E+04	1.19E+02	3.60E+00	2.74E+03	2.49E+01	3.21E+03	Yes
Cobalt	1.64E+03	2.20E+02	5.40E+00	1.38E+01	5.88E+02	N/A	1.90E+00	ND	1.06E+01	1.03E+02	-
Copper	1.02E+03	1.44E+03	1.78E+03	1.42E+02	2.31E+03	N/A	8.40E+00	1.69E+03	2.56E+01	2.63E+04	Yes
Iron	NS	1.05E+05	2.92E+04	1.47E+04	4.86E+05	N/A	6.15E+03	8.74E+02	3.84E+04	3.54E+05	-
Lead	NS [b]	2.73E+03	5.18E+02	1.63E+04	3.75E+05	ND	7.60E+00	3.20E+01	1.43E+02	1.03E+04	Yes
Magnesium	2.66E+05	7.50E+04	1.91E+03	5.98E+04	1.43E+04	N/A	5.73E+04	5.66E+02	3.39E+04	5.48E+04	-
Manganese	1.37E+02	1.47E+03	1.26E+02	4.09E+02	5.56E+03	N/A	4.46E+02	4.87E+01	7.95E+02	2.17E+03	Yes
Mercury	8.21E+00	1.26E+01	7.00E+00	5.20E+00	3.26E+01	8.68E-02	ND	ND	ND	1.80E+01	Yes

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CONSTITUENT OF CONCERN SCREENING

	PART B	CONCRETE	ACID BRICK	MASONRY	STEEL COATINGS	TRANSITE*	ASPHALT	WOOD	SOIL	LOOSE MEDIA	COC?
Nickel	5.48E+02	4.62E+02	1.68E+02	4.84E+01	2.57E+03	N/A	6.70E+00	ND	2.62E+01	5.35E+04	Yes
Potassium	NS	1.92E+04	9.63E+03	6.63E+03	2.49E+04	N/A	2.11E+02	1.47E+03	2.14E+03	2.21E+05	-
Selenium	1.37E+02	1.17E+01	3.60E+00	2.30E+00	7.75E+01	ND	ND	ND	1.30E+00	1.57E+02	Yes [1]
Silver	1.37E+02	3.88E+01	1.01E+01	8.47E+01	5.92E+01	4.40E+00	ND	ND	ND	1.36E+03	Yes [1]
Sodium	NS	1.10E+04	3.46E+03	4.17E+03	1.29E+04	N/A	5.16E+02	3.83E+03	6.00E+02	8.22E+04	-
Thallium	1.92E+00	1.60E+01	ND	3.20E-01	3.10E+00	N/A	ND	ND	ND	8.70E-01	Yes
Uranium	2.50E-01	6.50E+04	9.40E+03	7.72E+03	4.50E+04	N/A	2.40E+02	2.60E+03	7.01E+01	5.20E+05	Yes
Vanadium	1.90E+02	4.94E+02	1.06E+01	5.03E+01	1.46E+02	N/A	2.52E+01	ND	3.54E+01	3.02E+02	Yes
Zinc	8.21E+03	1.36E+05	2.30E+02	2.05E+03	2.15E+05	N/A	2.14E+02	7.73E+01	2.87E+02	1.19E+04	Yes
Volatile Organics, ug/kg											
1,1-Dichloroethane	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,1-Dichloroethene	1.06E+02	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
1,1,1-Trichloroethane	NS	3.60E+04	1.00E+01	2.50E+01	N/A	N/A	ND	ND	ND	1.50E+02	-
1,1,2-Trichloroethane	1.12E+03	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,1,2,2-Tetrachloroethane	3.19E+02	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,2-Dichloroethane	7.02E+02	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
1,2-Dichloroethene (total)	2.46E+05	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,2-Dichloropropane	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2-Butanone	1.64E+07	3.00E+03	8.00E+00	ND	N/A	ND	4.00E+00	ND	ND	5.80E+01	-
2-Hexanone	1.10E+06	4.90E+01	ND	ND	N/A	N/A	ND	ND	ND	ND	-
4-Methyl-2-pentanone	1.37E+06	5.30E+01	ND	ND	N/A	N/A	ND	ND	ND	1.00E+05	-
Acetone	2.74E+06	ND	ND	ND	N/A	N/A	N/A	ND	3.30E+01	2.20E+02	-
Benzene	2.20E+03	ND	ND	ND	N/A	ND	ND	ND	ND	2.80E+03	Yes [1]
Bromodichloromethane	1.03E+03	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Bromoform	8.09E+03	ND	ND	ND	N/A	N/A	ND	ND	ND	2.20E+02	-
Bromomethane	3.83E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Carbon disulfide	2.74E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Carbon tetrachloride	4.91E+02	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
Chlorobenzene	5.48E+05	ND	ND	ND	N/A	ND	ND	ND	ND	6.30E+01	-
Chloroethane	5.48E+05	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Chloroform	1.05E+04	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
Chloromethane	4.91E+03	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
cis-1,3-Dichloropropene	3.55E+02	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Dibromochloromethane	7.60E+02	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Ethylbenzene	2.74E+06	2.20E+05	5.00E+00	7.00E+00	N/A	N/A	ND	ND	ND	1.50E+03	-
Methylene chloride	8.52E+03	ND	9.00E+00	ND	N/A	N/A	ND	ND	ND	3.20E+03	-
Pyridine	2.74E+04	N/A	N/A	N/A	N/A	ND	N/A	N/A	N/A	N/A	-

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CONSTITUENT OF CONCERN SCREENING

	PART B	CONCRETE	ACID BRICK	MASONRY	STEEL COATINGS	TRANSITE*	ASPHALT	WOOD	SOIL	LOOSE MEDIA	COC?
Styrene	2.13E+03	ND	5.80E+01	ND	N/A	N/A	ND	ND	ND	4.50E+02	Yes [1]
Tetrachloroethene	1.23E+03	2.30E+01	5.00E+00	ND	N/A	1.18E+06	ND	ND	ND	2.90E+02	Yes
Toluene	5.48E+06	1.90E+01	2.00E+00	ND	N/A	N/A	ND	ND	ND	1.80E+03	-
Xylenes, Total	5.48E+07	1.30E+06	1.80E+01	4.20E+01	N/A	N/A	ND	ND	ND	2.40E+04	-
trans-1,3-Dichloropropene	3.55E+02	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Trichloroethene	5.81E+03	ND	ND	ND	N/A	ND	ND	ND	ND	4.20E+01	-
Trichlorofluoromethane	8.21E+06	ND	6.00E+00	N/A	N/A	N/A	N/A	N/A	N/A	ND	-
Vinyl Chloride	3.36E+01	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
Semi-Volatile Organics, ug/kg											
1,2,4-Trichlorobenzene	2.74E+05	ND	ND	ND	N/A	N/A	ND	ND	ND	3.90E+04	-
1,2-Dichlorobenzene	2.46E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,3-Dichlorobenzene	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
1,4-Dichlorobenzene	2.66E+03	ND	ND	ND	N/A	3.44E+05	ND	ND	ND	3.90E+04	Yes
2,2-Oxybis(1-chloropropane)	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2,4,5-Trichlorophenol	2.74E+06	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
2,4,6-Trichlorophenol	5.81E+03	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
2,4-Dichlorophenol	8.21E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	4.50E+02	-
2,4-Dimethylphenol	5.48E+05	ND	ND	ND	N/A	N/A	ND	ND	ND	1.40E+02	-
2,4-Dinitrophenol	5.48E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2,4-Dinitrotoluene	9.39E+01	ND	ND	ND	N/A	ND	ND	ND	ND	5.00E+04	Yes [1]
2,6-Dinitrotoluene	9.39E+01	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2-Chloronaphthalene	2.19E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2-Chlorophenol	1.37E+05	ND	9.00E+00	ND	N/A	N/A	ND	ND	ND	5.70E+04	-
2-Methylnaphthalene	1.10E+06	ND	ND	ND	N/A	N/A	1.70E+02	ND	4.90E+01	6.30E+03	-
2-Nitroaniline	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
2-Nitrophenol	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
3,3-Dichlorobenzidine	1.42E+02	ND	ND	ND	N/A	N/A	N/A	ND	ND	ND	-
4,6-Dinitro-2-methylphenol	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
4-Bromophenyl phenyl ether	1.59E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
4-Chloro-3-methylphenol	1.37E+06	ND	3.70E+01	ND	N/A	N/A	ND	ND	ND	6.90E+04	-
4-Chlorophenylphenyl ether	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
4-Nitroaniline	8.21E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
4-Nitrophenol	1.70E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	5.70E+04	-
Acenaphthene	1.64E+06	ND	2.00E+01	ND	N/A	N/A	ND	ND	7.70E+01	5.00E+04	-
Acenaphthylene	NS	ND	ND	ND	N/A	N/A	ND	ND	5.90E+01	2.60E+02	-
Anthracene	8.21E+06	ND	ND	ND	N/A	N/A	ND	ND	2.30E+02	3.70E+04	-
Benzo(a)anthracene	5.81E+01	5.20E+01	ND	ND	N/A	N/A	1.90E+02	1.10E+02	5.80E+02	6.10E+04	Yes

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CONSTITUENT OF CONCERN SCREENING

	PART B	CONCRETE	ACID BRICK	MASONRY	STEEL COATINGS	TRANSITE*	ASPHALT	WOOD	SOIL	LOOSE MEDIA	COC?
Benzo(a)pyrene	8.75E+00	ND	3.40E+02	ND	N/A	N/A	ND	8.50E+01	7.00E+02	4.40E+04	Yes
Benzo(b)fluoranthene	7.10E+01	ND	2.60E+02	ND	N/A	N/A	ND	1.00E+02	7.60E+02	6.60E+04	Yes
Benzo(g,h,i)perylene	NS	ND	ND	ND	N/A	N/A	ND	ND	8.10E+02	1.50E+04	-
Benzo(k)fluoranthene	1.68E+02	ND	ND	ND	N/A	N/A	ND	1.20E+02	6.40E+02	3.70E+04	Yes [1]
bis(2-Chloroethoxy)methane	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
bis(2-Chloroethyl)ether	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
bis(2-Chloroisopropyl) ether	9.13E+02	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A	ND	-
bis(2-Ethylhexyl)phthalate	4.56E+03	1.40E+03	2.00E+03	ND	N/A	N/A	ND	ND	1.30E+03	5.60E+05	Yes [1]
Butyl benzyl phthalate	5.48E+06	5.00E+02	ND	ND	N/A	N/A	ND	ND	ND	8.70E+03	-
Carbazole	3.19E+03	ND	ND	ND	N/A	N/A	ND	2.10E+01	9.90E+01	2.40E+04	Yes [1]
Chrysene	2.00E+03	5.50E+02	4.50E+02	ND	N/A	N/A	4.10E+02	1.70E+02	6.70E+02	4.30E+04	Yes [1]
Di-n-butyl phthalate	2.74E+06	5.80E+01	ND	ND	N/A	N/A	ND	ND	2.60E+03	4.20E+04	-
Di-n-octyl phthalate	5.48E+05	3.90E+01	1.00E+02	ND	N/A	N/A	ND	N/A	ND	6.70E+02	-
Dibenzo(a,h)anthracene	8.80E+00	ND	ND	ND	N/A	N/A	ND	ND	1.90E+02	8.00E+03	Yes [1]
Dibenzofuran	1.10E+05	ND	ND	ND	N/A	N/A	ND	1.90E+01	ND	1.30E+04	-
Diethyl phthalate	2.19E+07	ND	ND	ND	N/A	N/A	ND	ND	ND	7.00E+02	-
Dimethyl phthalate	2.74E+08	ND	ND	ND	N/A	N/A	ND	ND	ND	3.00E+03	-
Fluoranthene	1.10E+06	7.10E+02	6.70E+01	ND	N/A	N/A	5.20E+02	2.60E+02	1.20E+03	1.80E+05	-
Fluorene	1.10E+06	ND	ND	ND	N/A	N/A	ND	ND	7.90E+01	1.90E+04	-
Hexachloro-1,3-butadiene	NS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Hexachlorobenzene	3.99E+01	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
Hexachlorobutadiene	8.19E+02	ND	ND	ND	N/A	2.98E+05	ND	ND	ND	ND	Yes
Hexachlorocyclopentadiene	1.92E+05	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Hexachloroethane	4.56E+03	ND	ND	ND	N/A	ND	ND	ND	ND	ND	-
Indeno(1,2,3-cd)pyrene	3.19E+01	ND	ND	ND	N/A	N/A	ND	ND	6.30E+02	2.50E+04	Yes [1]
Isophorone	6.72E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	4.50E+04	-
m-Methylphenol	1.28E+03	N/A	N/A	N/A	N/A	ND	N/A	N/A	N/A	N/A	-
N-Nitroso-di-n-propylamine	9.11E+00	ND	ND	ND	N/A	N/A	ND	ND	ND	4.80E+04	Yes [1]
N-Nitrosodiphenylamine	1.30E+04	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
Naphthalene	1.10E+06	ND	ND	ND	N/A	N/A	ND	ND	ND	6.40E+03	-
Nitrobenzene	1.37E+04	ND	ND	ND	N/A	5.66E+05	ND	ND	ND	ND	Yes
o-Methylphenol	1.37E+06	ND	ND	ND	N/A	1.34E+05	ND	ND	ND	1.30E+03	-
p-Chloroaniline	NS	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	-
p-Methylphenol (cresol)	1.37E+06	6.50E+02	ND	ND	N/A	ND	ND	ND	ND	4.20E+02	-
Pentachlorophenol	5.32E+02	ND	ND	ND	N/A	ND	ND	ND	ND	1.40E+04	Yes [1]
Phenanthrene	NS	5.90E+02	2.20E+01	ND	N/A	N/A	4.70E+02	1.50E+02	8.20E+02	1.80E+05	-
Phenol	1.64E+07	ND	3.90E+01	ND	N/A	N/A	ND	ND	ND	6.70E+04	-

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CONSTITUENT OF CONCERN SCREENING

	PART B	CONCRETE	ACID BRICK	MASONRY	STEEL COATINGS	TRANSITE*	ASPHALT	WOOD	SOIL	LOOSE MEDIA	COC?
Pyrene	8.21E+05	7.20E+02	5.70E+01	ND	N/A	N/A	3.80E+02	2.60E+02	1.20E+03	1.00E+05	-
Pesticides/PCBs, ug/kg											
4,4'-DDD	2.66E+02	ND	N/A	N/A	N/A	N/A	ND	ND	1.90E+00	ND	-
4,4'-DDE	1.88E+02	9.40E+01	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
4,4'-DDT	1.88E+02	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
beta-BHC	3.55E+01	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
alpha-Chlordane	4.91E+01	7.10E+01	N/A	N/A	N/A	N/A	ND	ND	ND	ND	Yes
delta-BHC	NS	2.80E+00	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Dieldrin	3.99E+00	6.90E+00	N/A	N/A	N/A	N/A	ND	ND	3.00E+00	ND	Yes
Endosulfan II	1.64E+05	2.20E+00	N/A	N/A	N/A	N/A	ND	ND	1.10E+01	ND	-
Endosulfan sulfate	1.64E+05	8.20E+00	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Endosulfan-I	1.64E+05	2.70E+00	N/A	N/A	N/A	N/A	ND	1.50E+00	ND	ND	-
Endrin	8.21E+03	ND	N/A	N/A	N/A	N/A	ND	9.80E-01	2.20E+01	ND	-
Endrin aldehyde	8.21E+03	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Endrin ketone	NS	7.10E+00	N/A	N/A	N/A	N/A	ND	ND	1.60E+00	ND	-
gamma-BHC (Lindane)	4.90E+01	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
gamma-Chlordane	4.91E+01	7.60E+01	N/A	N/A	N/A	N/A	ND	ND	1.40E+00	ND	Yes
Heptachlor	1.42E+01	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Heptachlor epoxide	7.02E+00	1.10E+00	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Methoxychlor	1.37E+05	ND	N/A	N/A	N/A	N/A	ND	ND	ND	1.40E+02	-
Toxaphene	5.81E+01	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Aroclor-1016	8.30E+00	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Aroclor-1221	8.30E+00	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Aroclor-1232	8.30E+00	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Aroclor-1242	8.30E+00	ND	N/A	N/A	N/A	N/A	ND	ND	ND	ND	-
Aroclor-1248	8.30E+00	1.70E+03	N/A	N/A	N/A	N/A	ND	ND	5.30E+01	ND	Yes
Aroclor-1254	8.30E+00	4.10E+03	N/A	N/A	N/A	N/A	ND	ND	5.10E+03	1.00E+02	Yes
Aroclor-1260	8.30E+00	3.40E+03	N/A	N/A	N/A	N/A	ND	ND	7.70E+01	5.30E+02	Yes

[a] No radiological constituents were removed from consideration.
[b] No acceptable screening value for lead.
[1] found as COC in extraneous media (soil, loose media) only.
N/A Analyte not analyzed for in media.
ND Not detected in samples analyzed.
NS No screening criteria for this analyte.

* TCLP results for transite were multiplied by 20 to estimate the concentration of the solid phase (see Appendix A.3 for an explanation of the 20-fold TCLP test).

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TABLE A-6
CONSTITUENTS OF CONCERN

Radionuclides

Americium-241
Cesium-137+1Daughter
Lead-210+2Daughters
Neptunium-237+1Daughter
Polonium-210
Plutonium-238
Plutonium-239/240
Plutonium-241
Radium-226+5Daughters
Radium-228
Strontium-90
Technetium-99
Thorium-227
Thorium-228+7Daughters
Thorium-230
Thorium-232
Uranium-234
Uranium-235/236
Uranium-238+2Daughters

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Lead
Manganese
Mercury
Nickel

Metals (Cont'd)

[Selenium]
[Silver]
Thallium
Uranium
Vanadium
Zinc

Volatile Organics, ug/kg

[Benzene]
[Styrene]
Tetrachloroethene

Semi-Volatile Organics

1,4-Dichlorobenzene
[2,4-Dinitrotoluene]
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
[Benzo(k)fluoranthene]
[bis(2-Ethylhexyl)phthalate]
[Carbazole]
[Chrysene]
[Dibenzo(a,h)anthracene]
Hexachlorobutadiene
[Indeno(1,2,3-cd)pyrene]
[N-Nitroso-di-n-propylamine]Nitro
[Pentachlorophenol]

Pesticides/PCBs

alpha-Chlordane
Aroclor-1248
Aroclor-1254
Dieldrin
gamma-Chlordane

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TABLE A-7

COMPLETENESS TABLE
SOIL

COC-OU3	COC in OU5?
Radionuclides, pCi/g	
Cesium-137+1D	Yes
Lead-210+2D	Yes
Neptunium-237+1D	Yes
Polonium-210	Yes {1}
Radium-226+5D	Yes
Radium-228	Yes
Thorium-228+7D	Yes
Thorium-230	Yes
Uranium-234	Yes
Uranium-235/236	Yes
Uranium-238+2D	Yes
Metals, mg/kg	
Arsenic	Yes
Beryllium	Yes
Lead	Yes
Manganese	Yes
Uranium, total	Yes
Semi-Volatile Organics,	
Benzo(a)anthracene	Yes
Benzo(a)pyrene	Yes
Benzo(b)fluoranthene	Yes
Benzo(k)fluoranthene	Yes
Dibenzo(a,h)anthracene	Yes
Indeno(1,2,3-cd)pyrene	Yes
Pesticides/PCBs, ug/kg	
Aroclor-1248	Yes
Aroclor-1254	Yes
Aroclor-1260	Yes

{1} Considered as a daughter of Pb-210 in the OU5 FS.

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TABLE A-8
OU3 REFERENCE CRITERIA CONCENTRATIONS PER ANALYTE

	Part B Soil Screening [a,b]	OU5 Soil WAC [c,d]	20x TCLP	Source Material [e]	Envirocare WAC [f]	Concrete Baselines	Paint Baselines
Radionuclides, pCi/g							
Americium-241	0.24					0.10	0.12
Cesium-137	0.0021				560	0.15	0.34
Lead-210	0.12				230,000	0.89	0.60
Neptunium-237	0.0094	3.12E+09			2,000	0.10	0.23
Plutonium-238	0.36				10,000	0.09	0.33
Plutonium-239/240	0.34				10,000	0.10	0.18
Plutonium-241	22.0					3.30	10.00
Polonium-210	0.530				230,000	1.43	7.90
Radium-226	0.00069				2,000	1.75	4.54
Radium-228	0.79				1,800	0.30	2.71
Strontium-90	2.40	5.67E+10			20,000	NA	1.58
Technetium-99	61.0	29			100,000	0.40	1.45
Thorium-227	0.026					2.90	0.42
Thorium-228	0.00074				680	0.58	4.37
Thorium-230	5.7				15,000	0.86	15.00
Thorium-232	6.4				680	0.84	4.21
Uranium-234	4.8			167	37,000	7.75	64.00
Uranium-235/236	0.017			8	770	0.83	6.80
Uranium-238	0.11			167	28,000	6.50	63.00
Uranium-Total (ug/g)	0.25	1030		500		12.55	176.00
Metals, mg/kg							
Aluminum						5,039	14,371
Antimony	11					1.00	108.76
Arsenic	0.037		100			3.96	25.95
Barium	1,900	pure product	2000			50.4	3,279
Beryllium	0.015					1.40	1.10
Cadmium	14		20			2.40	66.52
Calcium						199,321	43,358
Chromium	140	pure product	100			8.15	4,540
Cobalt	1,600					2.89	253.04
Copper	1,000					11.1	318.65
Iron						10,438	129,610
Lead		pure product	100			3.42	239,000
Magnesium	270,000	pure product				50,632	6,396
Manganese	140					343	958.51
Mercury	8.2	5.66E+04	4			0.03	18.04
Nickel	550					9.37	134.74
Potassium						927	1,193
Selenium	140		20			0.47	0.83
Silver	140	pure product	100			5.42	6.40
Sodium						607	844.02
Thallium	1.9					0.32	NA
Vanadium	190					13.2	21.97
Zinc	8,200					27.5	55,005
Volatile Organics, ug/kg							
1,1-Dichloroethane							
1,1-Dichloroethene	110		14,000				
1,1,1-Trichloroethane							
1,1,2-Trichloroethane	1,100						
1,1,2,2-Tetrachloroethane	320						
1,2-Dichloroethane	702	pure product	10,000				
1,2-Dichloroethene (total)	250,000						
1,2-Dichloropropane							
2-Butanone	16,000,000	pure product	4,000,000				

TABLE A-8
OU3 REFERENCE CRITERIA CONCENTRATIONS PER ANALYTE

	Part B Soil Screening	OU5 Soil WAC	20x TCLP	Source Material	Envirocare WAC	Concrete Baselines	Paint Baselines
Volatile Organics, ug/kg (Cont'd)							
2-Hexanone	1,100,000						
4-Methyl-2-pentanone	1,400,000	pure product					
Acetone	2,700,000	pure product					
Benzene	2,200	pure product	10,000				
Bromodichloromethane	1,000	9.03E-01					
Bromoform	8,100						
Bromomethane	38,000						
Carbon disulfide	2,700,000						
Carbon tetrachloride	490		10,000				
Chlorobenzene	550,000		2,000,000				
Chloroethane	550,000						
Chloroform	10,000		120,000				
Chloromethane	4,900						
cis-1,3-Dichloropropene	360						
Dibromochloromethane	760						
Ethylbenzene	2,700,000	pure product					
Methylene chloride	8,500						
Pyridine	27,000		100,000				
Styrene	2,100						
Tetrachloroethene	1,200		14,000				
Toluene	5,500,000	pure product					
Xylenes, Total	55,000,000	pure product					
trans-1,3-Dichloropropene	350						
Trichloroethene	5,800		10,000				
Trichlorofluoromethane	8,200,000						
Vinyl Chloride	34		4,000				
Semi-Volatile Organics, ug/kg							
1,2,4-Trichlorobenzene	270,000						
1,2-Dichlorobenzene	2,500,000						
1,3-Dichlorobenzene							
1,4-Dichlorobenzene	2,700		150,000				
2,2-Oxybis(1-chloropropane)							
2,4,5-Trichlorophenol	2,700,000		8,000,000				
2,4,6-Trichlorophenol	5,800		40,000				
2,4-Dichlorophenol	82,000						
2,4-Dimethylphenol	550,000						
2,4-Dinitrophenol	55,000						
2,4-Dinitrotoluene	94		2,600				
2,6-Dinitrotoluene	94						
2-Chloronaphthalene	2,200,000						
2-Chlorophenol	140,000						
2-Methylnaphthalene	1,100,000						
2-Nitroaniline							
2-Nitrophenol							
3,3-Dichlorobenzidine	140						
4,6-Dinitro-2-methylphenol							
4-Bromophenyl phenyl ether	1,600,000						
4-Chloro-3-methylphenol	1,400,000						
4-Chlorophenylphenyl ether							
4-Nitroaniline	82,000	4.42E-02					
4-Nitrophenol	1,700,000						
Acenaphthene	1,600,000						
Acenaphthylene							
Anthracene	8,200,000						

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TABLE A-8
OU3 REFERENCE CRITERIA CONCENTRATIONS PER ANALYTE

	Part B Soil Screening [illegible]	OU5 Soil WAC [illegible]	20x TCLP	Source Material [illegible]	Envirocare WAC [illegible]	Concrete Baselines	Paint Baselines
Semi-Volatile Organics, ug/kg (Cont'd)							
Benzo(a)anthracene	58						
Benzo(a)pyrene	8.8						
Benzo(b)fluoranthene	71						
Benzo(g,h,i)perylene							
Benzo(k)fluoranthene	170						
bis(2-Chloroethoxy)methane							
bis(2-Chloroethyl)ether							
bis(2-Chloroisopropyl) ether	910						
bis(2-Ethylhexyl)phthalate	4,600						
Butyl benzyl phthalate	5,500,000						
Carbazole	3,200	7.27E+04					
Chrysene	2,000						
Di-n-butyl phthalate	2,700,000						
Di-n-octyl phthalate	550,000						
Dibenzo(a,h)anthracene	8.8						
Dibenzofuran	110,000						
Diethyl phthalate	22,000,000						
Dimethyl phthalate	270,000,000						
Fluoranthene	1,100,000						
Fluorene	1,100,000						
Hexachloro-1,3-butadiene	820		10,000				
Hexachlorobenzene	40		2,600				
Hexachlorobutadiene	820	pure product	10,000				
Hexachlorocyclopentadiene	190,000						
Hexachloroethane	4,600		60,000				
Indeno(1,2,3-cd)pyrene	32						
Isophorone	67,000						
m-Methylphenol	1,300		4,000,000				
N-Nitroso-di-n-propylamine	9.1						
N-Nitrosodiphenylamine	13,000						
Naphthalene	1,100,000						
Nitrobenzene	14,000		40,000				
o-Methylphenol	1,400,000		4,000,000				
p-Chloroaniline							
p-Methylphenol (cresol)	1,400,000		4,000,000				
Pentachlorophenol	530		2,000,000				
Phenanthrene							
Phenol	16,000,000						
Pyrene	820,000						
Pesticides/PCBs, ug/kg							
4,4'-DDD	270						
4,4'-DDE	190						
4,4'-DDT	190						
beta-BHC	35						
alpha-Chlordane	49	2.89E+00	6,000				
delta-BHC							
Dieldrin	4.0						
Endosulfan II	160,000						
Endosulfan sulfate	160,000						
Endosulfan-I	160,000						
Endrin	8,200	pure product	400				
Endrin aldehyde	8,200						
Endrin ketone							
gamma-BHC (Lindane)	49		8,000				

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TABLE A-8
OU3 REFERENCE CRITERIA CONCENTRATIONS PER ANALYTE

	Part B Soil Screening [a,b,e]	OU5 Soil WAC [c,d]	20x TCLP [f]	Source Material [a]	Envirocare WAC [b]	Concrete Baselines	Paint Baselines
Pesticides/PCBs, ug/kg (Cont'd)							
gamma-Chlordane	49						
Heptachlor	14	pure product	160				
Heptachlor epoxide	7.0	pure product	160				
Methoxychlor	140,000	pure product	200,000				
Toxaphene	58	1.06E+05	10,000				
Aroclor-1016	8.3						
Aroclor-1221	8.3						
Aroclor-1232	8.3						
Aroclor-1242	8.3						
Aroclor-1248	8.3						
Aroclor-1254	8.3						
Aroclor-1260	8.3						

[a] Pu-239/240 value is actually 0.34 pCi/g for Pu-239 and 0.34 pCi/g for Pu-240.
[b] U-235/236 value is for U-235 only.
[c] Alpha-chlordane only.
[d] Hexavalent chromium value.
[e] Based on natural uranium.
[f] Pu-239/240 value is for Pu-240 only.

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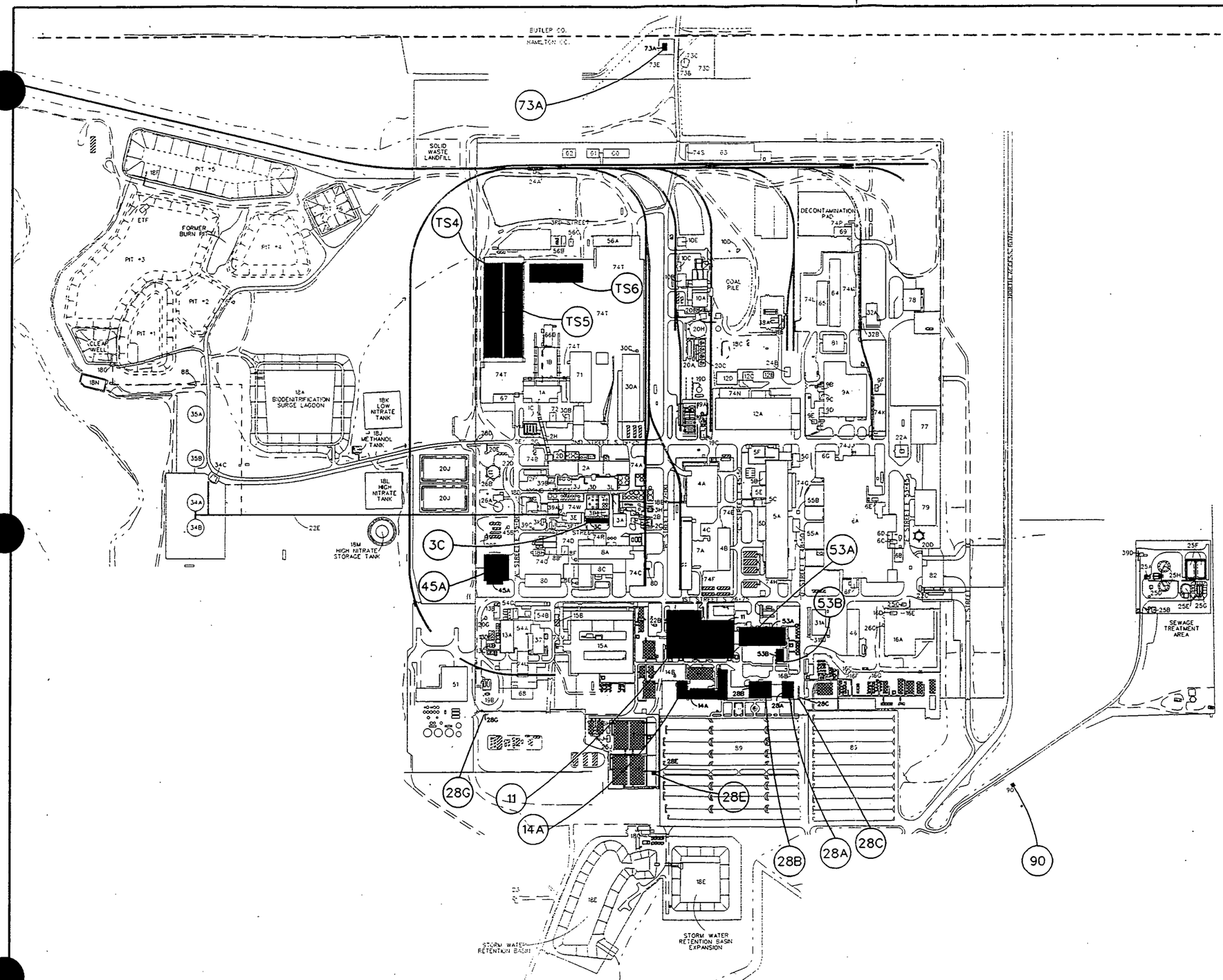

E 7171

CATEGORY 1 COMPONENT LOCATIONS
(1) BUILDING 3C - NAR CONTROL HOUSE
(2) BUILDING 11 - SERVICE BUILDING
(3) BUILDING 14A - ADMINISTRATION BUILDING
(4) BUILDING 28A - SECURITY BUILDING
(5) BUILDING 28B - HUMAN RESOURCES
(6) COMPONENT 28C - GAURD POST ON SOUTH END OF D STREET *
(7) COMPONENT 28E - GUARD POST EAST OF T-81
(8) COMPONENT 28G - GUARD POST SOUTH OF BUILDING 51
(9) BUILDING 45A - RUST ENGINEERING BUILDING
(10) BUILDING 53A - HEALTH AND SAFETY BUILDING
(11) BUILDING 53B - IN-VIVO BUILDING
(12) BUILDING 73A - FIRE TRAINING CENTER BUILDING *
(13) BUILDING 90 - SKEET RANGE BUILDING
(14) COMPONENT G-006 - PROCESS TRAILERS * *
(15) COMPONENT G-007 - NONPROCESS TRAILERS * *
(16) COMPONENT TS-004-TENSION SUPPORT STRUCTURE # 4
(17) COMPONENT TS-005-TENSION SUPPORT STURCTURE # 5
(18) COMPONENT TS-006-TENSION SUPPORT STURCTURE # 6

* - STRUCTURE HAS BE REMOVED

* * - LEGEND

- NON-PROCESS TRAILORS
- PROCESS TRAILORS

SCALE

0' 250' 500' 1000'

000188

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Fernald Environmental Management Project

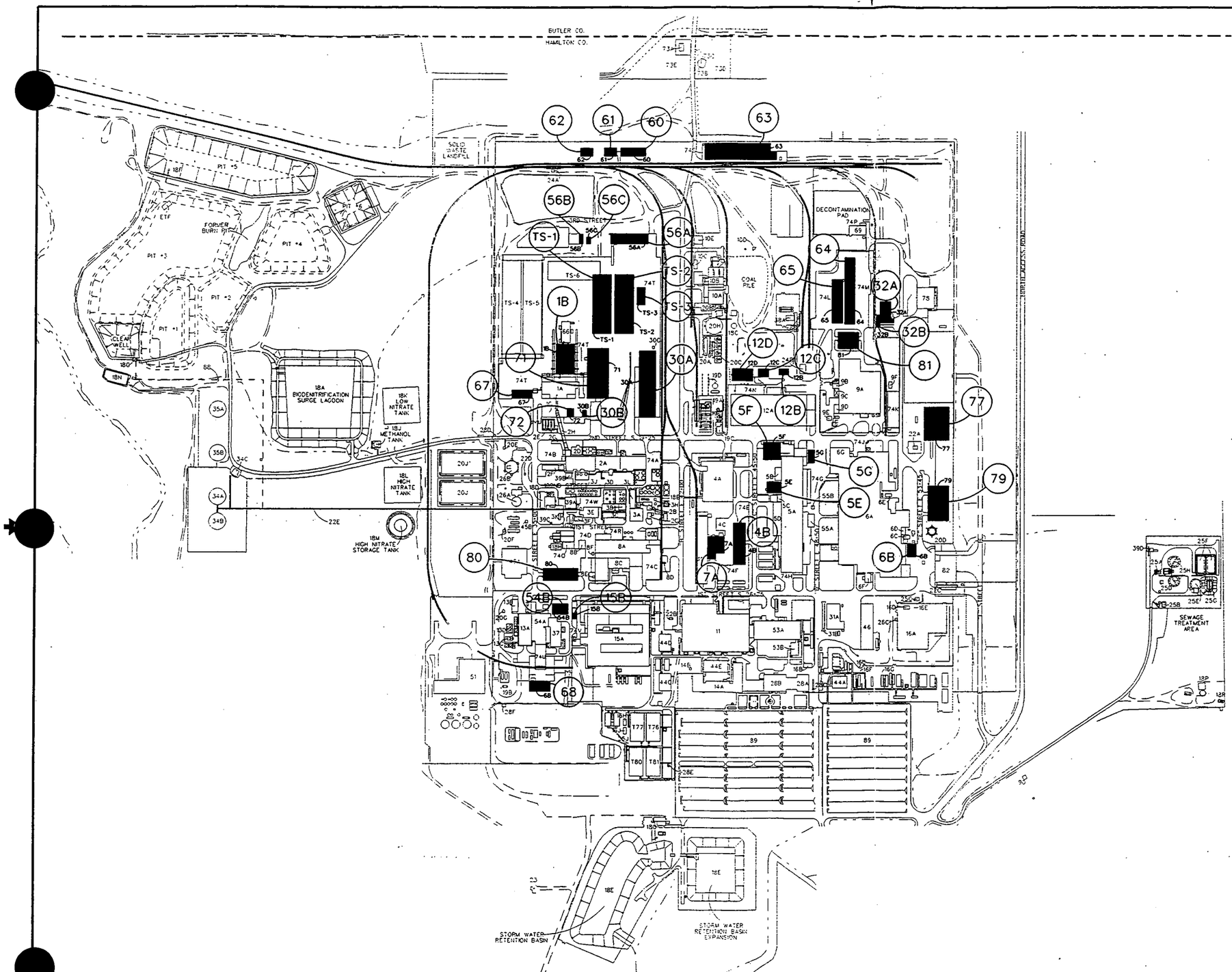
U.S. DEPARTMENT OF ENERGY

COMPONENT CATEGORY 1
ADMINISTRATIVE
AND
SUPPORT BUILDINGS

DATE 03/03/95
DRAWN

FIGURE A-1

FILE NAME: /usr/erma5/3aaa1/dgn/comcat1.dgn



E 7171

CATEGORY 2 COMPONENT LOCATIONS
(1) BUILDING 1B - PLANT 1 STORAGE SHELTER
(2) BUILDING 4B - PLANT 4 WAREHOUSE
(3) BUILDING 5E - PLANT 5 FILTER BUILDING
(4) BUILDING 5F - PLANT 5 COVERED STORAGE PAD
(5) BUILDING 5G - PLANT 5 INGOT STORAGE SHELTER
(6) BUILDING 6B - PLANT 6 COVERED STORAGE AREA
(7) BUILDING 7A - PLANT 7 URANIUM HEXAFLUORIDE REDUCTION FACILITY * *
(8) BUILDING 12B - CYLINDER STORAGE BUILDING
(9) BUILDING 12C - LUMBER STORAGE BUILDING
(10) BUILDING 12D - MAINTENANCE BUILDING WAREHOUSE
(11) BUILDING 15B -LABORATORY CHEMICAL STORAGE BUILDING
(12) BUILDING 30A - CHEMICAL WAREHOUSE
(13) BUILDING 30B - DRUM STORAGE WAREHOUSE
(14) BUILDING 32A - MAGNESIUM STORAGE BUILDING
(15) COMPONENT 32B - MAGNESIUM STORAGE COVERED LOADING DOCK
(16) BUILDING 54B - PILOT PLANT SHELTER
(17) BUILDING 56A - CP WAREHOUSE
(18) BUILDING 56B - STORAGE SHED
(19) BUILDING 56C - STORAGE SHED
(20) BUILDING 60 - QUONSET HUT 1
(21) BUILDING 61 - QUONSET HUT 2
(22) BUILDING 62 - QUONSET HUT 3
(23) BUILDING 63 - KC-2 WAREHOUSE
(24) BUILDING 64 - THORIUM WAREHOUSE
(25) BUILDING 65 - PLANT 5 WAREHOUSE
(26) BUILDING 67 - PLANT 1 THORIUM WAREHOUSE
(27) BUILDING 68 - PILOT PLANT WAREHOUSE
(28) BUILDING 71 - GENERAL IN-PROCESS WAREHOUSE
(29) BUILDING 72 - DRUM STORAGE BUILDING
(30) BUILDING 77 - FINISHED PRODUCTS WAREHOUSE
(31) BUILDING 79 - PLANT 6 WAREHOUSE
(32) BUILDING 80 - PLANT 8 WAREHOUSE
(33) BUILDING 81 - PLANT 9 WAREHOUSE
(34) COMPONENT TS-001 - TENSION SUPPORT STRUCTURE 1 * *
(35) COMPONENT TS-002 - TENSION SUPPORT STRUCTURE 2 * *
(36) COMPONENT TS-003 - TENSION SUPPORT STRUCTURE 3 * *

* * - STRUCTURE HAS BEEN REMOVED

SCALE

0' 250' 500' 1000'

000189

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COMPONENT CATEGORY 2 WAREHOUSE AND STORAGE BUILDINGS

DATE 03/20/95

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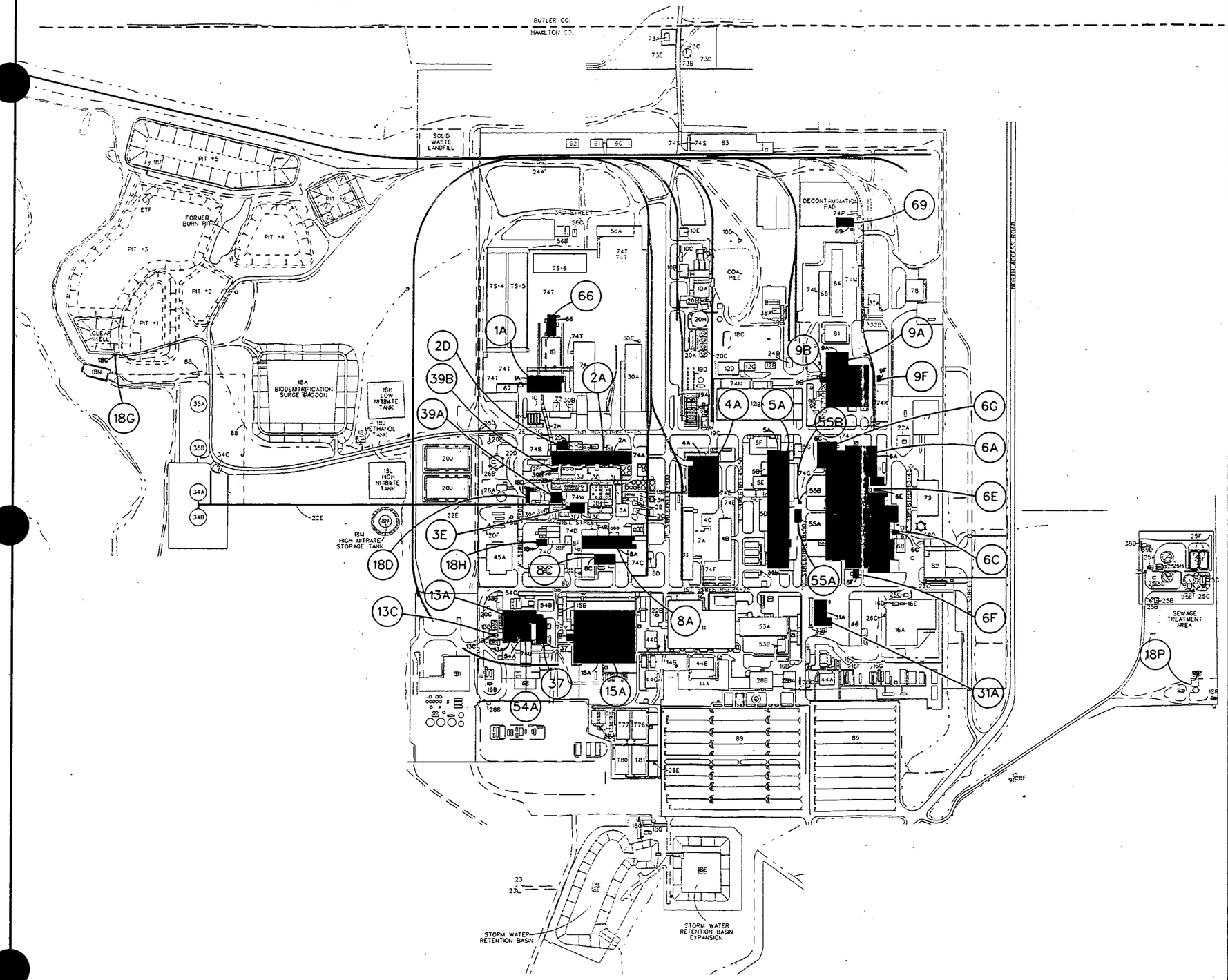
FIGURE A-2

FILE NAME: /usr/erma5/3aaa1/dgn/comcat2.dgn

E 7171



CATEGORY 3 COMPONENT LOCATIONS
(1) BUILDING 1A - PREPARATION PLANT
(2) BUILDING 2A - ORE REFINERY PLANT
(3) BUILDING 2D - METAL DISSOLVER BUILDING
(4) BUILDING 3E - HOT RAFFINATE BUILDING
(5) BUILDING 4A - GREEN SALT PLANT
(6) BUILDING 5A - METALS PRODUCTION PLANT
(7) BUILDING 6A - METALS FABRICATION PLANT
(8) BUILDING 6C - PLANT 6 ELECTROSTATIC PRECIPITATOR SOUTH
(9) BUILDING 6E - PLANT 6 ELECTROSTATIC PRECIPITATOR NORTH
(10) BUILDING 6F - SALT-OIL HEAT TREATMENT BUILDING
(11) BUILDING 6G - PLANT 6 SUMP BUILDING
(12) BUILDING 8A - RECOVERY PLANT
(13) BUILDING 8C - ROTARY KILN/DRUM RECONDITIONING BUILDING
(14) BUILDING 9A - SPECIAL PRODUCTS PLANT
(15) BUILDING 9B - PLANT 9 SUMP TREATMENT FACILITY
(16) BUILDING 9F - PLANT 9 ELECTROSTATIC PRECIPITATOR
(17) BUILDING 13A - PILOT PLANT WET SIDE
(18) BUILDING 13C - SUMP PUMP HOUSE
(19) BUILDING 15A - LABORATORY
(20) BUILDING 18D - BIODENITRIFICATION TOWERS
(21) BUILDING 18G - CLEARWELL PUMP HOUSE
(22) BUILDING 18H - BDN EFFLUENT TREATMENT FACILITY
(23) BUILDING 18P - DISSOLVED OXYGEN BUILDING
(24) BUILDING 31A - ENGINE HOUSE GARAGE
(25) BUILDING 37 - PILOT PLANT ANNEX
(26) BUILDING 39A - INCINERATOR BUILDING
(27) BUILDING 39B - WASTE OIL DECANT SHELTER
(28) BUILDING 54A - SIX TO FOUR REDUCTION FACILITY 1
(29) BUILDING 55A - SLAG RECYCLING BUILDING
(30) BUILDING 55B - SLAG RECYCLING PIT/ELEVATOR
(31) BUILDING 66 - DRUM RECONDITIONING BUILDING
(32) BUILDING 69 - DECONTAMINATION BUILDING

SCALE

0' 250' 500' 1000'

000190

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

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COMPONENT CATEGORY 3

PROCESS BUILDINGS

DATE 03/22/95

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FIGURE A-3

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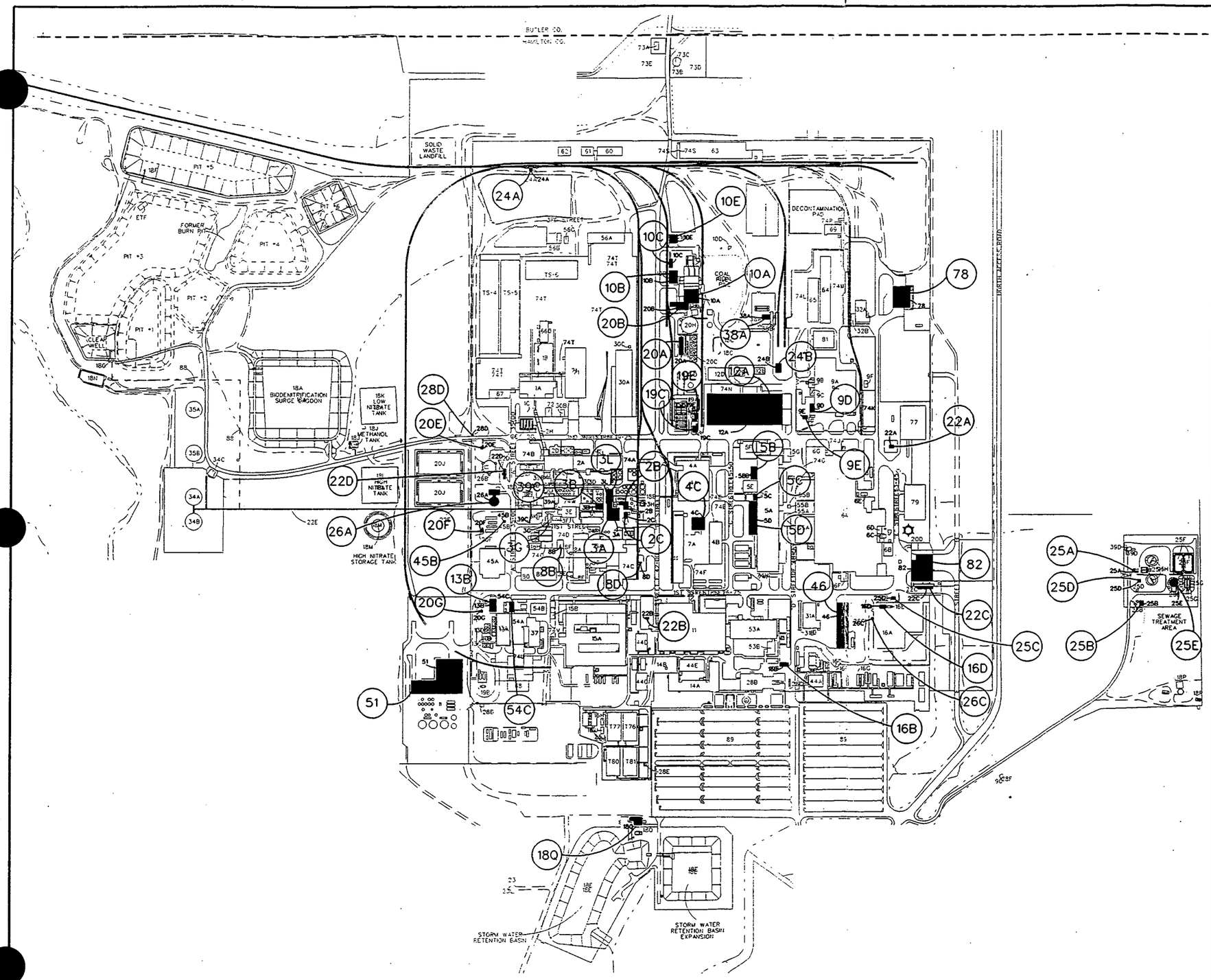

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CATEGORY 4 COMPONENT LOCATIONS
(1) BUILDING 2B - GENERAL/REFINERY SUMP CONTROL BUILDING
(2) BUILDING 2C - BULK LIME HANDLING BUILDING
(3) BUILDING 3A - REFINERY MAINTENANCE BUILDING
(4) BUILDING 3B - OZONE BUILDING
(5) BUILDING 3G - REFRIGERATION BUILDING
(6) BUILDING 3L - ELECTRICAL POWER CENTER BUILDING
(7) BUILDING 4C - PLANT 4 MAINTENANCE BUILDING x x
(8) BUILDING 5B - PLANT 5 INGOT PICKLING
(9) BUILDING 5C - PLANT 5 ELECTRICAL SUBSTATION
(10) BUILDING 5D - WEST DERBY BREAKOUT/SLAG MILLING
(11) BUILDING 8B - PLANT 8 MAINTENANCE BUILDING
(12) BUILDING 8D - PLANT 8 RAILROAD FILTER BUILDING
(13) BUILDING 9D - PLANT 9 ELECTRICAL SUBSTATION
(14) BUILDING 9E - PLANT 9 CYLINDER SHED
(15) BUILDING 10A - BOILER PLANT
(16) BUILDING 10B - BOILER PLANT MAINTENANCE BUILDING
(17) COMPONENT 10C - WET SALT STORAGE BIN
(18) BUILDING 10E - UTILITY HEAVY EQUIPMENT BUILDING
(19) BUILDING 12A - MAIN MAINTENANCE BUILDING
(20) BUILDING 13B - PILOT PLANT MAINTENANCE BUILDING
(21) BUILDING 16B - ELECTRICAL SUBSTATION
(22) BUILDING 16D - MAIN ELECTRICAL SWITCH HOUSE
(23) BUILDING 18Q - IAWWT VALVE HOUSE
(24) BUILDING 19C - TANK FARM CONTROL HOUSE
(25) BUILDING 19E - TANK FARM LIME SLITTER BUILDING
(26) BUILDING 20A - PUMP STATION AND POWER CENTER
(27) BUILDING 20B - WATER PLANT BUILDING
(28) BUILDING 20E - WELL HOUSE 1
(29) BUILDING 20F - WELL HOUSE 2
(30) BUILDING 20G - WELL HOUSE 3
(31) BUILDING 22A - GAS METER BUILDING
(32) COMPONENT 22B - STORM SEWER LIFT STATION
(33) COMPONENT 22C - TRUCK SCALE
(34) BUILDING 22D - SCALE HOUSE AND WEIGH SCALE
(35) BUILDING 24A - RAILROAD SCALE HOUSE
(36) BUILDING 24B - RAILROAD ENGINE GARAGE
(37) BUILDING 25A - CHLORINATION BUILDING
(38) COMPONENT 25B - MANHOLE 175 EFFLUENT LN/SAMPLING BUILDING
(39) BUILDING 25C - SEWAGE LIFT STATION BUILDING
(40) BUILDING 25D - U.V. DISINFECTION BUILDING
(41) BUILDING 25E - DIGESTER AND CONTROL BUILDING
(42) BUILDING 26A - PUMP HOUSE-HP FIRE PROTECTION
(43) BUILDING 26C - MAIN ELECTRICAL STRAINER HOUSE
(44) BUILDING 28D - GUARD POST
(45) BUILDING 38A - PROPANE STORAGE
(46) COMPONENT 39C - INCINERATOR SPRINKLER RISER HOUSE
(47) BUILDING 45B - UTILITY SHED EAST OF RUST TRAILERS
(48) BUILDING 46 - HEAVY EQUIPMENT BUILDING
(49) BUILDING 51 - SIX TO FOUR REDUCTION FACILITY 2
(50) BUILDING 54C - PILOT PLANT DISSOCIATOR SHELTER
(51) BUILDING 78 - D AND D BUILDING
(52) BUILDING 82 - RECEIVING/INCOMING MATERIALS INSPECTION

x x- STRUCTURE HAS BEEN REMOVED

SCALE

0' 250' 500' 1000'

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COMPONENT CATEGORY 4 PROCESS SUPPORT BUILDINGS

DATE 03/23/95

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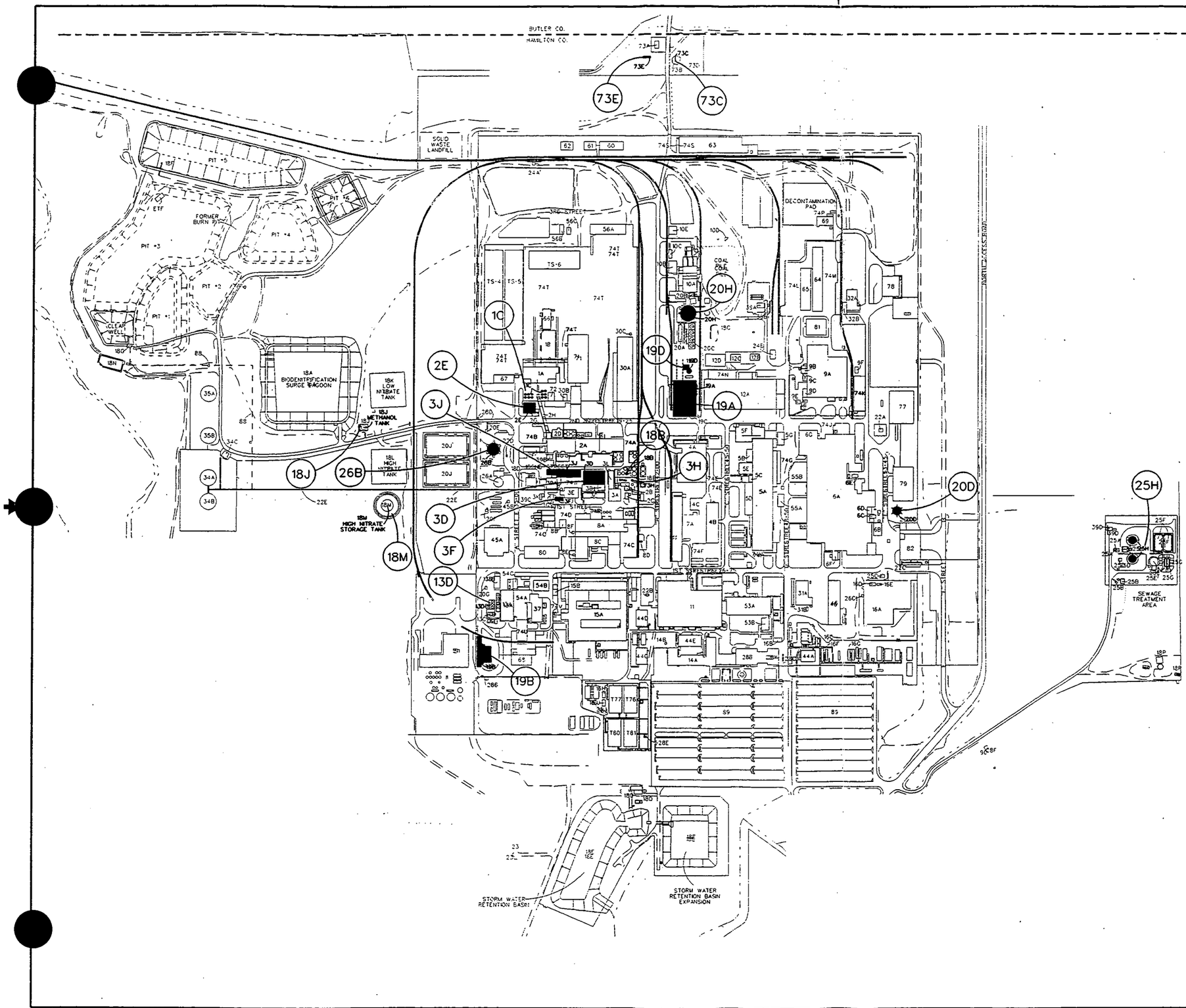
FIGURE A-4

FILE NAME: /usr/erma5/3aaa1/dgn/comcat4.dgn



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CATEGORY 5 COMPONENT LOCATIONS
(1) COMPONENT 1C - PLANT 1 ORE SILOS x x
(2) COMPONENT 2E - NFS STORAGE AND PUMP HOUSE
(3) COMPONENT 3D - NAR TOWERS
(4) COMPONENT 3F - HARSHAW DIGESTION FUME RECOVERY
(5) COMPONENT 3H - REFINERY SUMP
(6) COMPONENT 3J - COMBINED RAFFINATE TANKS
(7) COMPONENT 13D - PILOT PLANT THORIUM TANK FARM
(8) COMPONENT 18B - GENERAL SUMP
(9) COMPONENT 18J - METHANOL TANK
(10) COMPONENT 18M - HIGH NITRATE STORAGE TANK
(11) COMPONENT 19A - MAIN TANK FARM
(12) COMPONENT 19B - PILOT PLANT AMMONIA TANK FARM
(13) COMPONENT 19D - OLD NORTH TANK FARM
(14) COMPONENT 20D - ELEVATED POTABLE STORAGE TANK
(15) COMPONENT 20H - PROCESS WATER STORAGE TANK
(16) COMPONENT 25H - TRICKLING FILTERS
(17) COMPONENT 26B - ELEVATED WATER STORAGE TANK
(18) COMPONENT 73C - FIRE TRAINING TANK x x
(19) COMPONENT 73E - CONFINED-SPACE BURN TANK x x
(20) COMPONENT G-009 - NON-RCRA DRUMS x
(21) COMPONENT G-010 - RCRA DRUMS x
(22) COMPONENT G-011 - INVENTORY x
(23) COMPONENT G-012 - MOBILE CONTAINERS x

x - NOT HIGHLIGHTED IN THE FIGURE
x x - STURCTURE HAS BEEN REMOVED

SCALE
0' 250' 500' 1000'

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COMPONENT CATEGORY 5 CONTAINERS AND CONTAINERIZED MATERIAL (ABOVEGROUND)

DATE 03/24/95
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FIGURE A-5

FILE NAME: /usr/ermo5/3aaa1/dgn/comcat5.dgn

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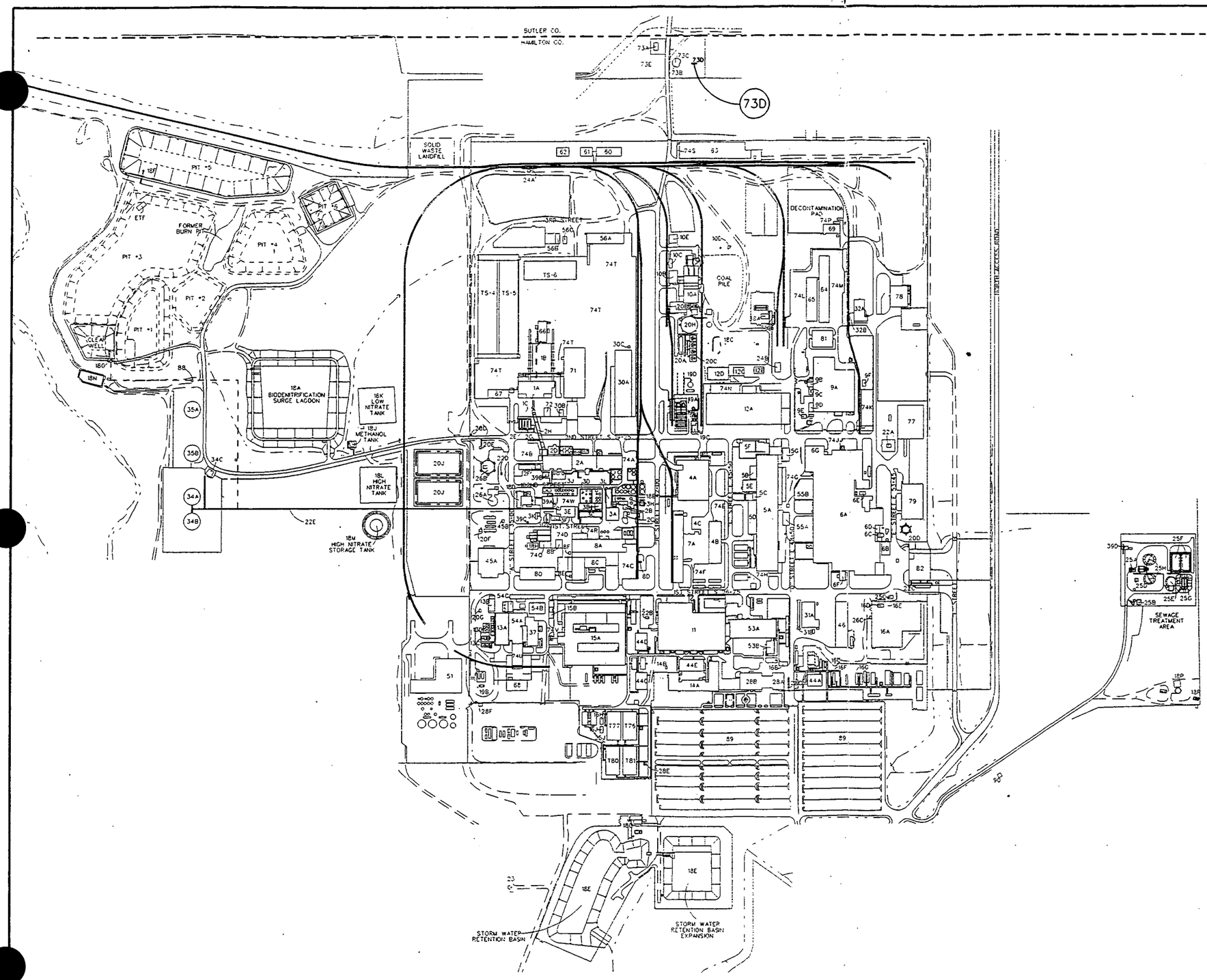

N

CATEGORY 6
COMPONENT LOCATIONS

(1) COMPONENT 73D - FIRE TRAINING BURN TROUGH x x
(2) COMPONENT G-005 - UNDERGROUND STORAGE TANKS x

x - NOT HIGHLIGHTED IN THE FIGURE
x x - STRUCTURE HAS BEEN REMOVED

SCALE
0' 250' 500' 1000'

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COMPONENT CATEGORY 6
CONTAINERS AND
CONTAINERIZED MATERIAL
(BELOWGROUND)

DATE 03/27/95
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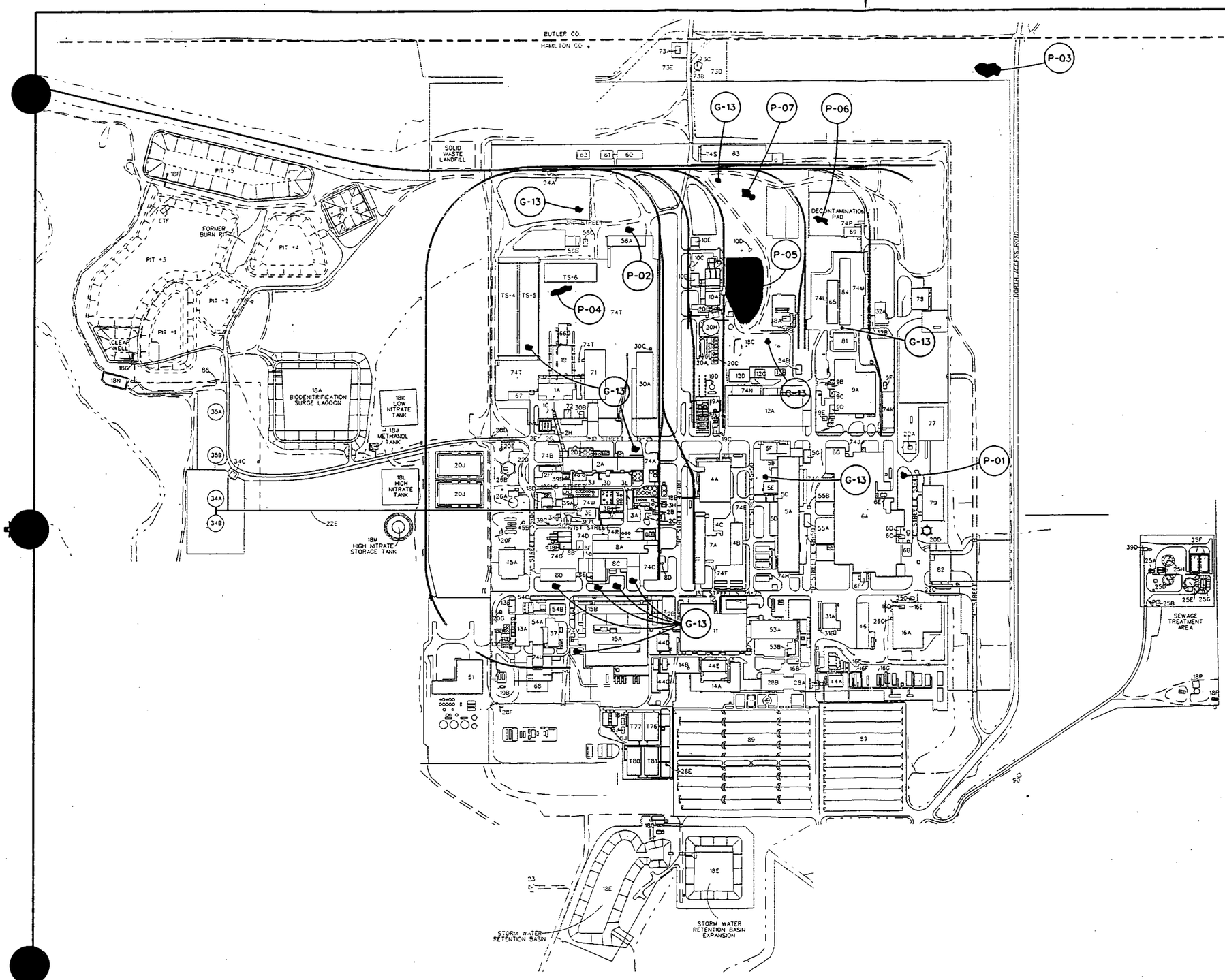
FIGURE A-6

FILE NAME: /usr/ermo5/3aaa1/dgn/comcat6.dgn

E 7171



CATEGORY 7 COMPONENT LOCATIONS
(1) COMPONENT G-013 - SOIL PILES
(2) COMPONENT P-001 - ROCK SALT PILE
(3) COMPONENT P-002 - SAND PILES
(4) COMPONENT P-003 - GRAVEL PILE
(5) COMPONENT P-004 - COPPER METAL SCRAP PILE * *
(6) COMPONENT P-005 - COAL PILE
(7) COMPONENT P-006 - SCRAP METAL PILE
(8) COMPONENT P-007 - OUTSIDE EQUIPMENT STORAGE AREA * *

* *- STRUCTURE HAS BEEN REMOVED

SCALE

0' 250' 500' 1000'

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COMPONENT CATEGORY 7

BULK MATERIAL

DATE 03/28/95

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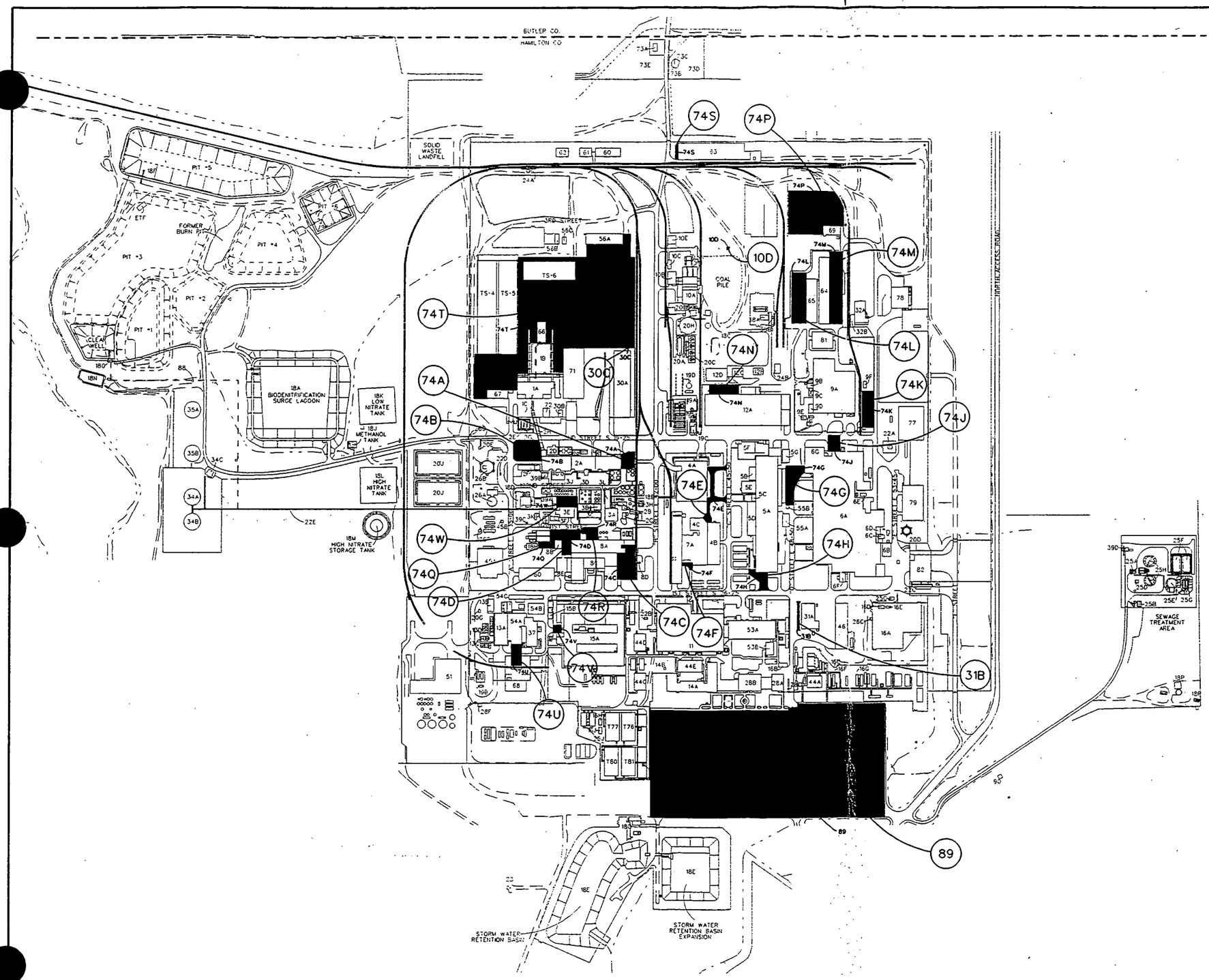
FIGURE A-7

FILE NAME: /usr/erma5/3aaa1/dgn/comcat7.dgn

E 7171



N

CATEGORY 8 COMPONENT LOCATIONS
(1) PAD 10 - CONTAMINATED OIL/GRAPHITE BURNER PAD
(2) COMPONENT 30C - OLD TEN-TON SCALE
(3) COMPONENT 31B - OLD TRUCK SCALE
(4) PAD 74A - PLANT 2 EAST PAD
(5) PAD 74B - PLANT 2 WEST PAD
(6) PAD 74C - PLANT 8 EAST PAD
(7) PAD 74D - PLANT 8 WEST PAD
(8) PAD 74E - PLANT 4 PAD
(9) PAD 74F - PLANT 7 PAD
(10) PAD 74G - PLANT 5 EAST PAD
(11) PAD 74H - PLANT 5 SOUTH PAD
(12) PAD 74J - PLANT 6 PAD
(13) PAD 74K - PLANT 9 PAD
(14) PAD 74L - BUILDING 65 WEST PAD
(15) PAD 74M - BUILDING 64 EAST PAD AND RAILROAD DOCK
(16) PAD 74N - BUILDING 12 NORTH PAD
(17) PAD 74P - DECONTAMINATION PAD
(18) COMPONENT 74Q - PLANT 8 OLD METAL DISSOLVER PAD
(19) PAD 74R - PLANT 8 NORTH PAD
(20) PAD 74S - KC-2 WAREHOUSE PAD
(21) PAD 74T - PLANT 1 STORAGE PAD
(22) PAD 74U - PILOT PLANT PAD
(23) PAD 74V - LABORATORY PAD
(24) PAD 74W - BUILDING 39A PAD
(25) COMPONENT 89 - PARKING LOT
(26) COMPONENT G-001 - RAILROAD TRACKS x
(27) COMPONENT G-002 - SITE ROADS x

x - NOT HIGHLIGHTED IN THE FIGURE

SCALE

0' 250' 500' 1000'

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COMPONENT CATEGORY 8 STORAGE PADS, PARKING LOT, ROADS, AND RAILROADS

DATE 03/27/95

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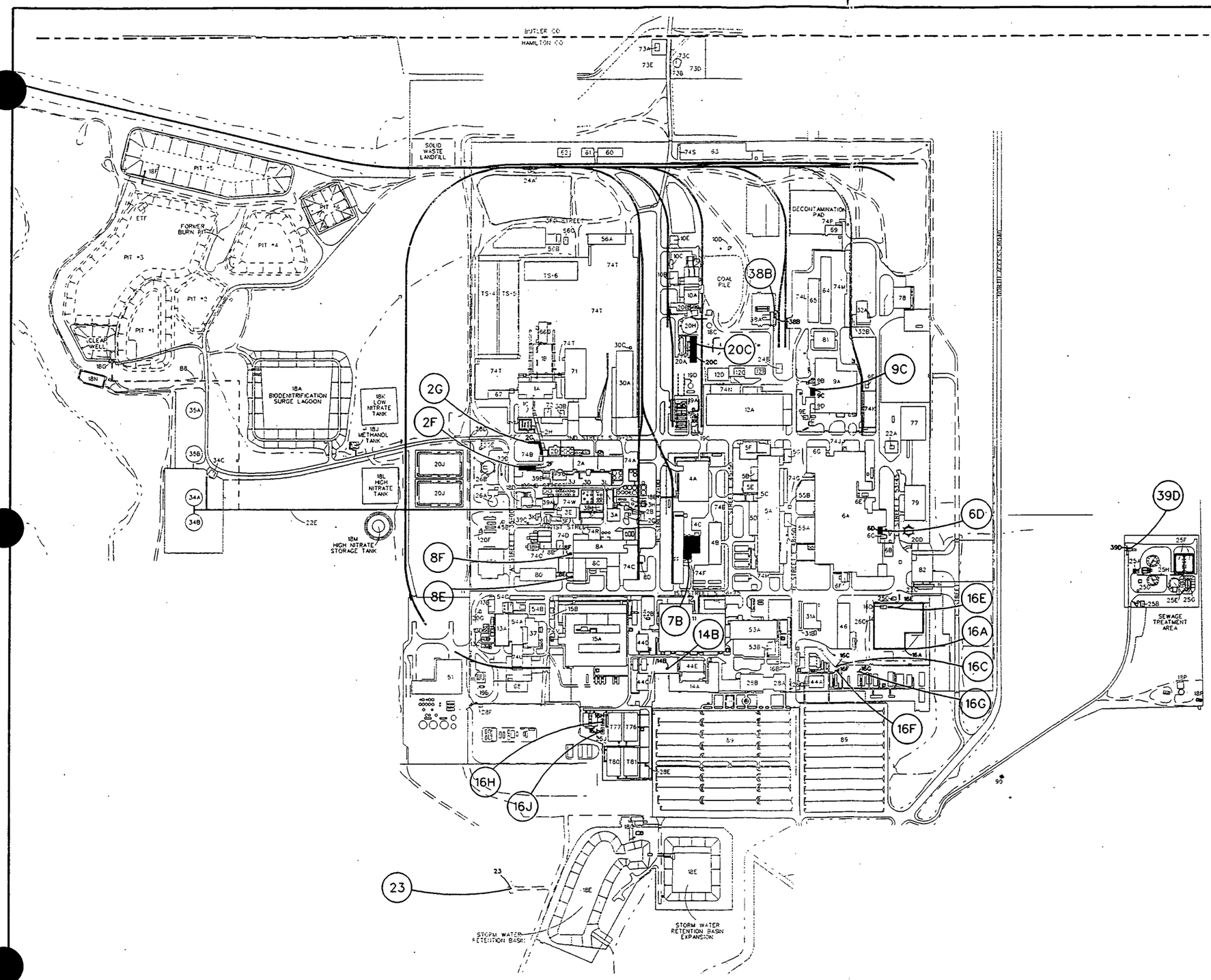
FIGURE A-8

FILE NAME: /usr/ermo5/3aaa1/dgn/comcat8.dgn



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CATEGORY 9 COMPONENT LOCATIONS
(1) COMPONENT 2F - COLD SIDE ORE CONVEYOR
(2) COMPONENT 2G - HOT SIDE ORE CONVEYOR
(3) COMPONENT 6D - PLANT 6 ELECTROSTATIC PRECIPITATOR CENTRAL
(4) COMPONENT 7B - PLANT 7 OVERHEAD CRANE x x
(5) COMPONENT 8E - DRUM CONVEYOR SHELTER
(6) COMPONENT 8F - OLD DRUM WASHER
(7) COMPONENT 9C - PLANT 9 DUST COLLECTOR
(8) COMPONENT 14B - BUILDING 14 EOC GENERATOR SET
(9) COMPONENT 16A - MAIN ELECTRICAL STATION
(10) COMPONENT 16C - ELECTRICAL PANELS AND TRANSFORMER
(11) COMPONENT 16E - MAIN ELECTRICAL TRANSFORMERS
(12) COMPONENT 16F - TRAILER SUBSTATION 1
(13) COMPONENT 16G - TRAILER SUBSTATION 2
(14) COMPONENT 16H - 10-PLEX NORTH SUBSTATION
(15) COMPONENT 16J - 10-PLEX SOUTH SUBSTATION
(16) COMPONENT 20C - COOLING TOWERS
(17) COMPONENT 23 - METEOROLOGICAL TOWER
(18) COMPONENT 38B - CYLINDER FILLING STATION
(19) COMPONENT 39D - SEWAGE TREATMENT PLANT INCINERATOR
(20) COMPONENT G-008 - PIPE BRIDGES x

x - NOT HIGHLIGHTED IN THE FIGURE
x x - STRUCTURE HAS BEEN REMOVED

SCALE
0' 250' 500' 1000'

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COMPONENT CATEGORY 9
PIPING, UTILITIES,
AND EQUIPMENT
(ABOVEGROUND)

DATE 03/27/95
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FIGURE A-9

FILE NAME: /usr/erma5/3aaa1/dgn/comcat9.dgn

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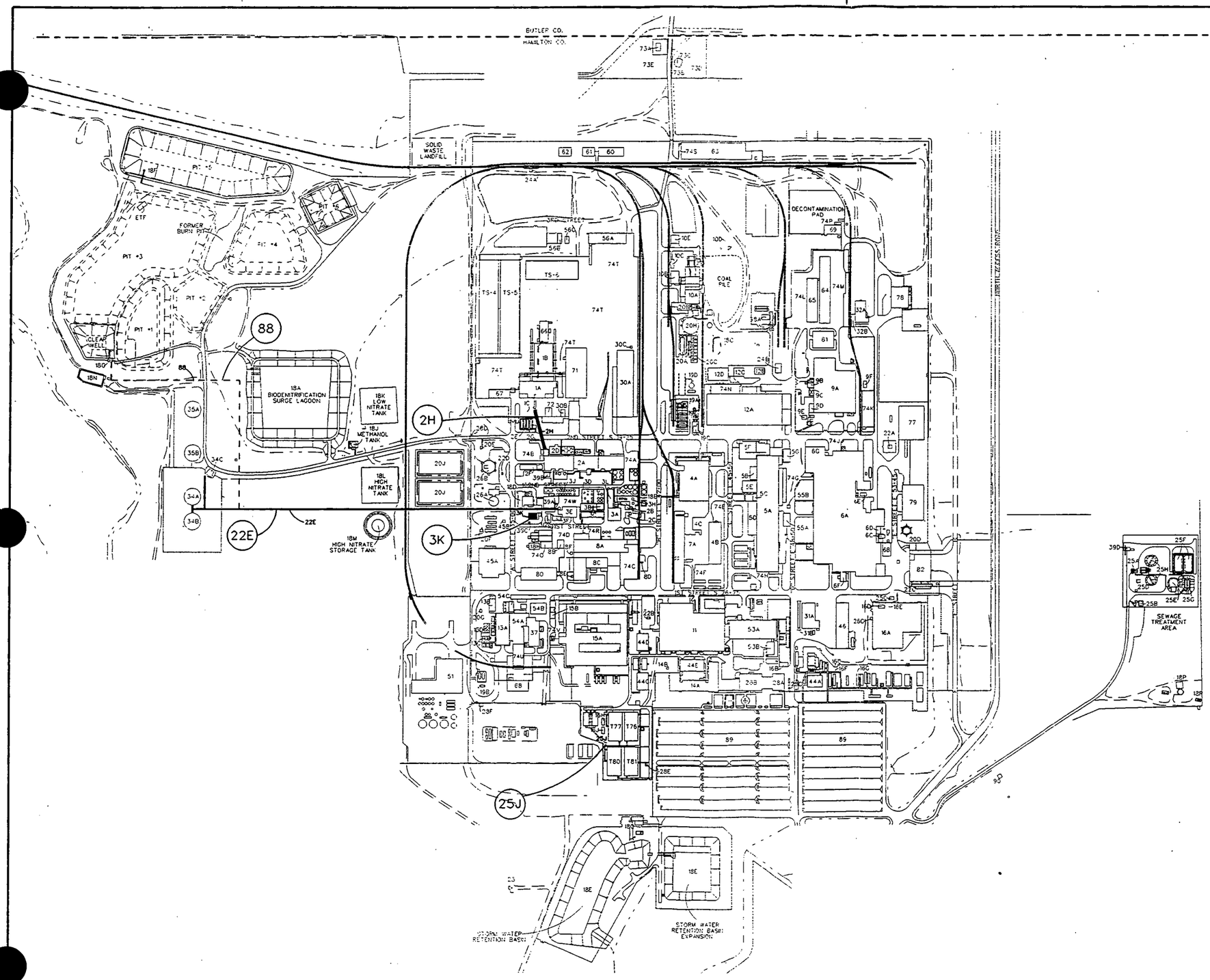

CATEGORY 10 COMPONENT LOCATIONS
(1) COMPONENT 2H - CONVEYOR TUNNEL FROM PLANT 1
(2) COMPONENT 3K - OLD COOLING WATER TOWER
(3) COMPONENT 22E - UTILITY TRENCH TO K-65 AREA
(4) COMPONENT 25J - 10-PLEX SEWAGE LIFT STATION
(5) COMPONENT 88 - CLEARWELL LINE
(6) COMPONENT G-003 - STORM SEWER SYSTEM*
(7) COMPONENT G-004 - UTILITY LINES*

* - NOT HIGHLIGHTED IN THE FIGURE

SCALE

0' 250' 500' 1000'

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COMPONENT CATEGORY 10
PIPING, UTILITIES,
AND EQUIPMENT
(BELOWGROUND)

DATE	03/27/95	FIGURE A-10
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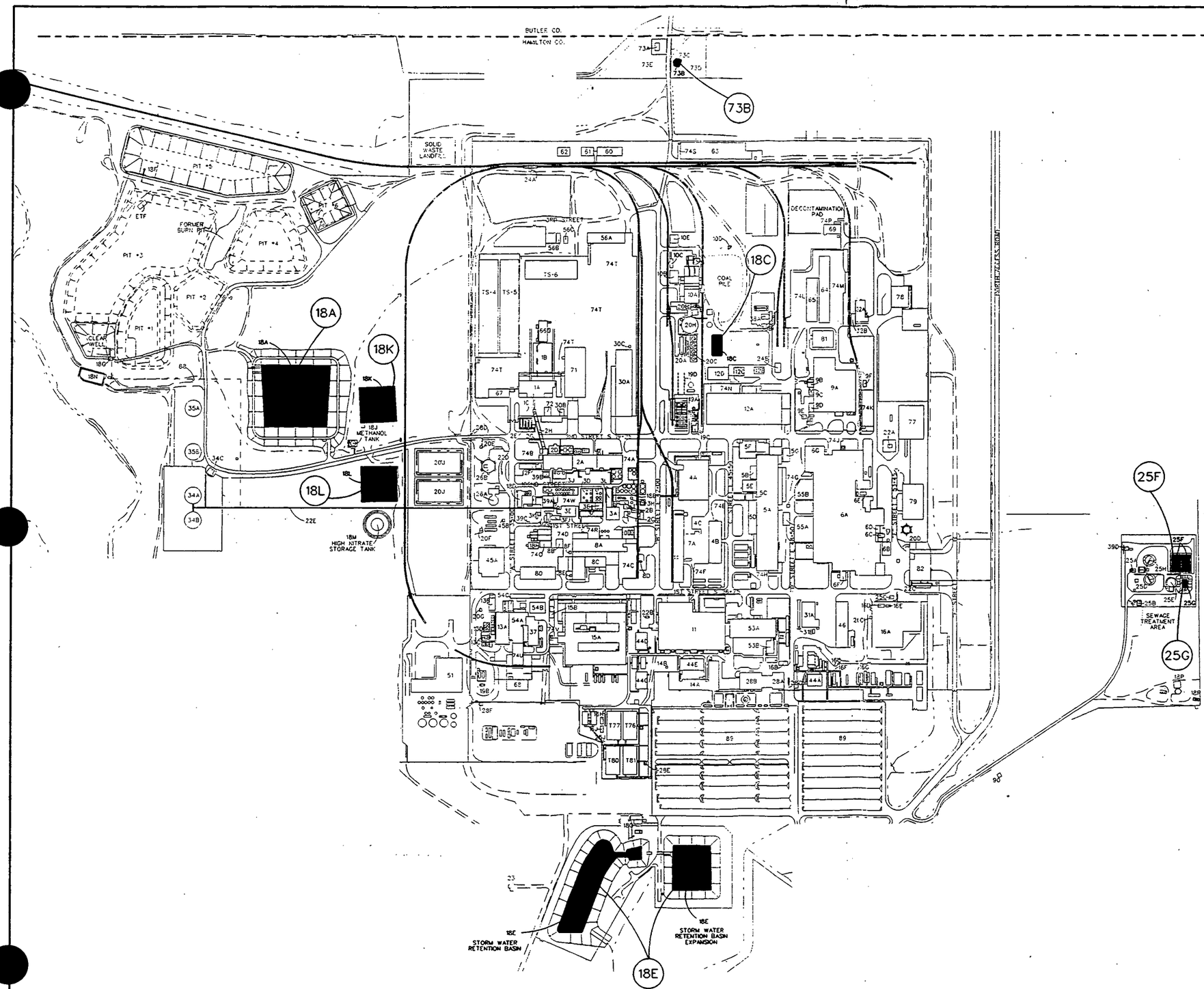
FILE NAME: /usr/erma5/3aaa1/dgn/comcat10.dgn



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CATEGORY 11 COMPONENT LOCATIONS
(1) COMPONENT 18A - BIODENITRIFICATION SURGE LAGOON
(2) COMPONENT 18C - COAL PILE RUNOFF BASIN
(3) COMPONENT 18E - STORM-WATER RETENTION BASIN
(4) COMPONENT 18K - LOW NITRATE TANK
(5) COMPONENT 18L - HIGH NITRATE TANK
(6) COMPONENT 25F - SLUDGE DRYING BEDS
(7) COMPONENT 25G - PRIMARY SETTLING BASINS
(8) COMPONENT 73B - FIRE TRAINING POND * *

* * - STRUCTURE HAS BEEN REMOVED

SCALE

0' 250' 500' 1000'

000198

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COMPONENT CATEGORY 11
PONDS AND BASINS

DATE 03/27/95
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FIGURE A-11

FILE NAME: /usr/erma5/3aaa1/dgn/comcat11.dgn

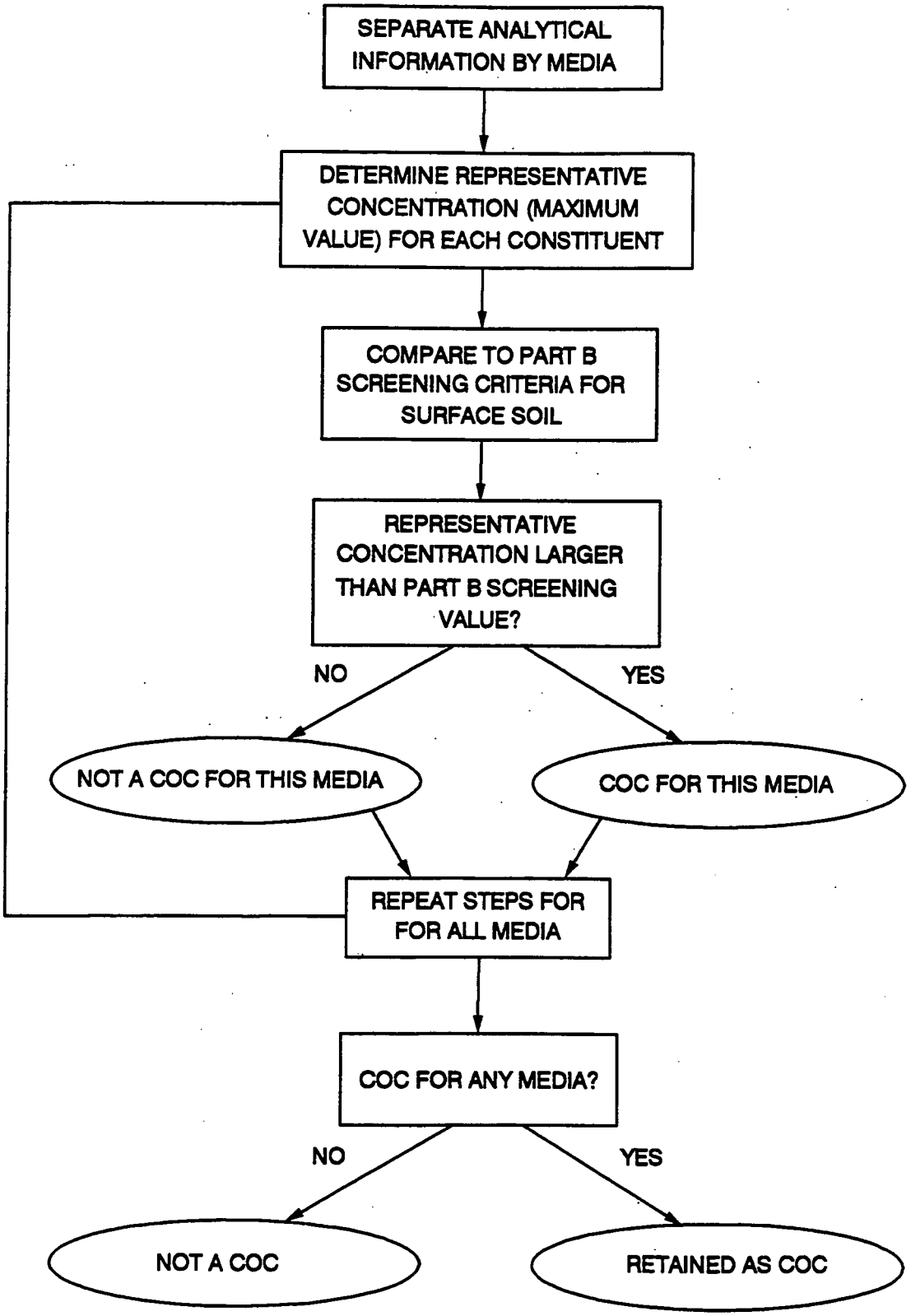

FIGURE A-12
CONSTITUENT OF CONCERN SELECTION PROCESS

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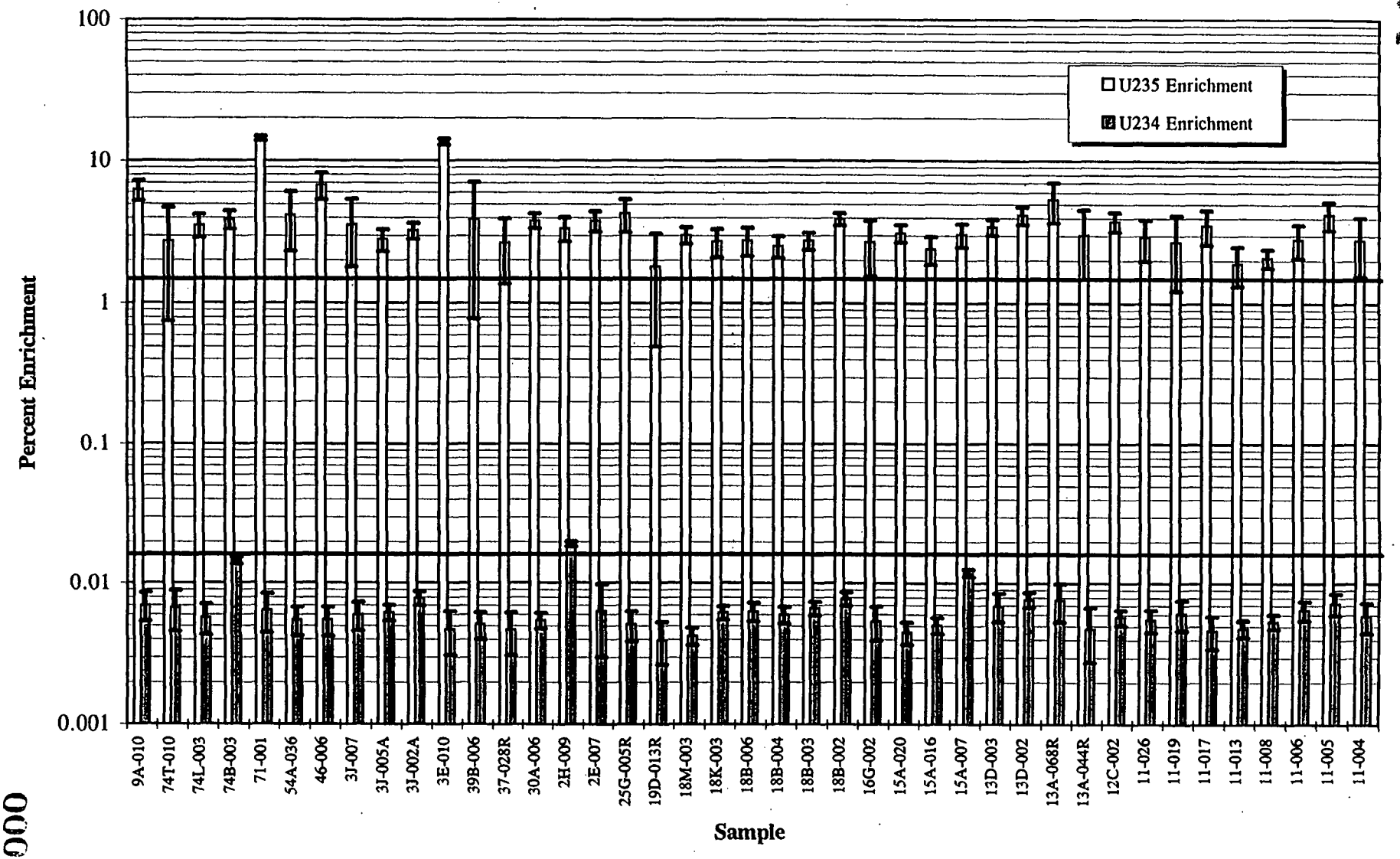

FIGURE A-13
COMPARISON OF URANIUM-234 AND URANIUM-235 ENRICHMENT RESULTS

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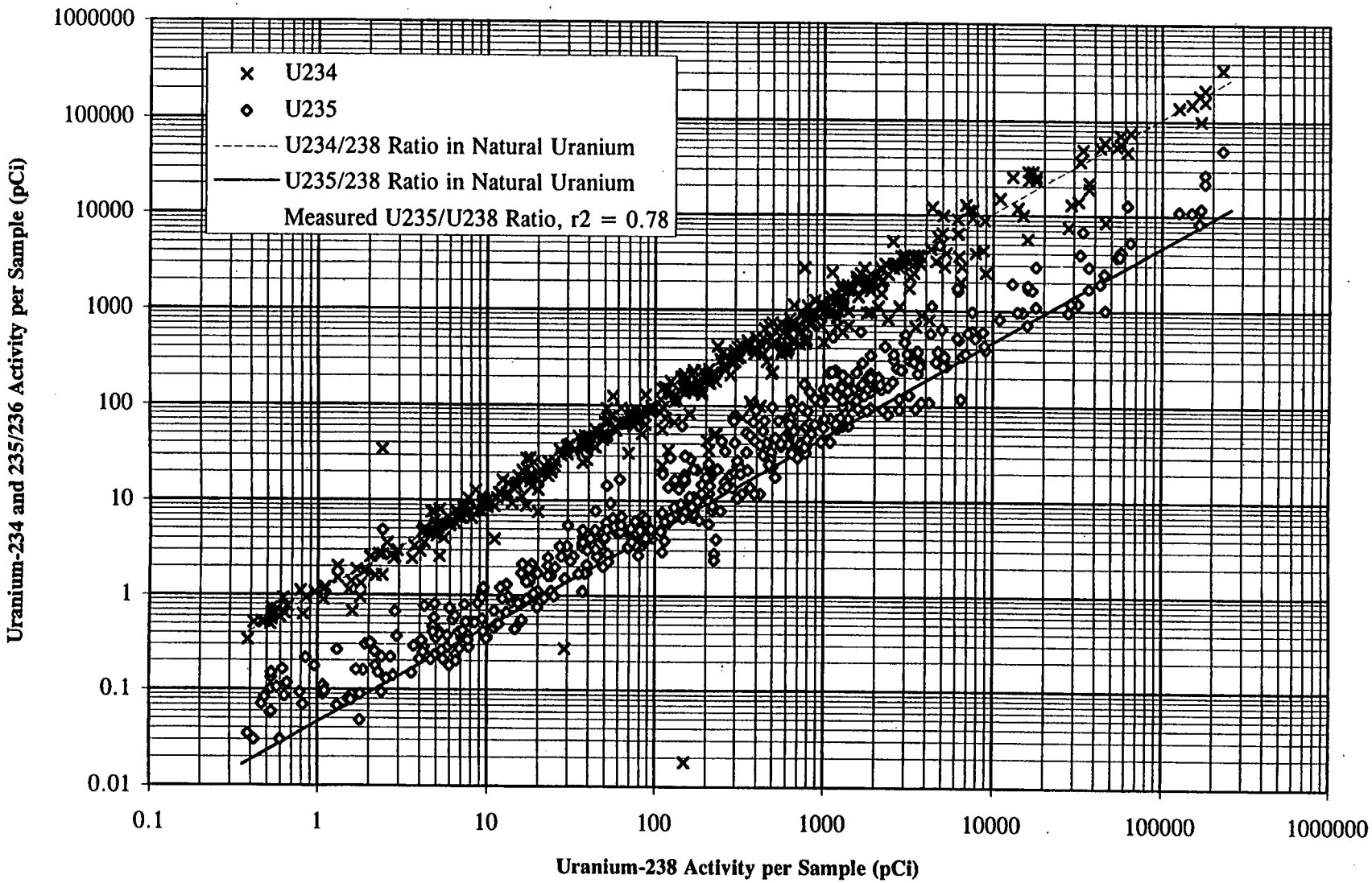

FIGURE A-14
ACTIVITIES OF URANIUM-234 AND URANIUM-235/236 VERSUS URANIUM-238

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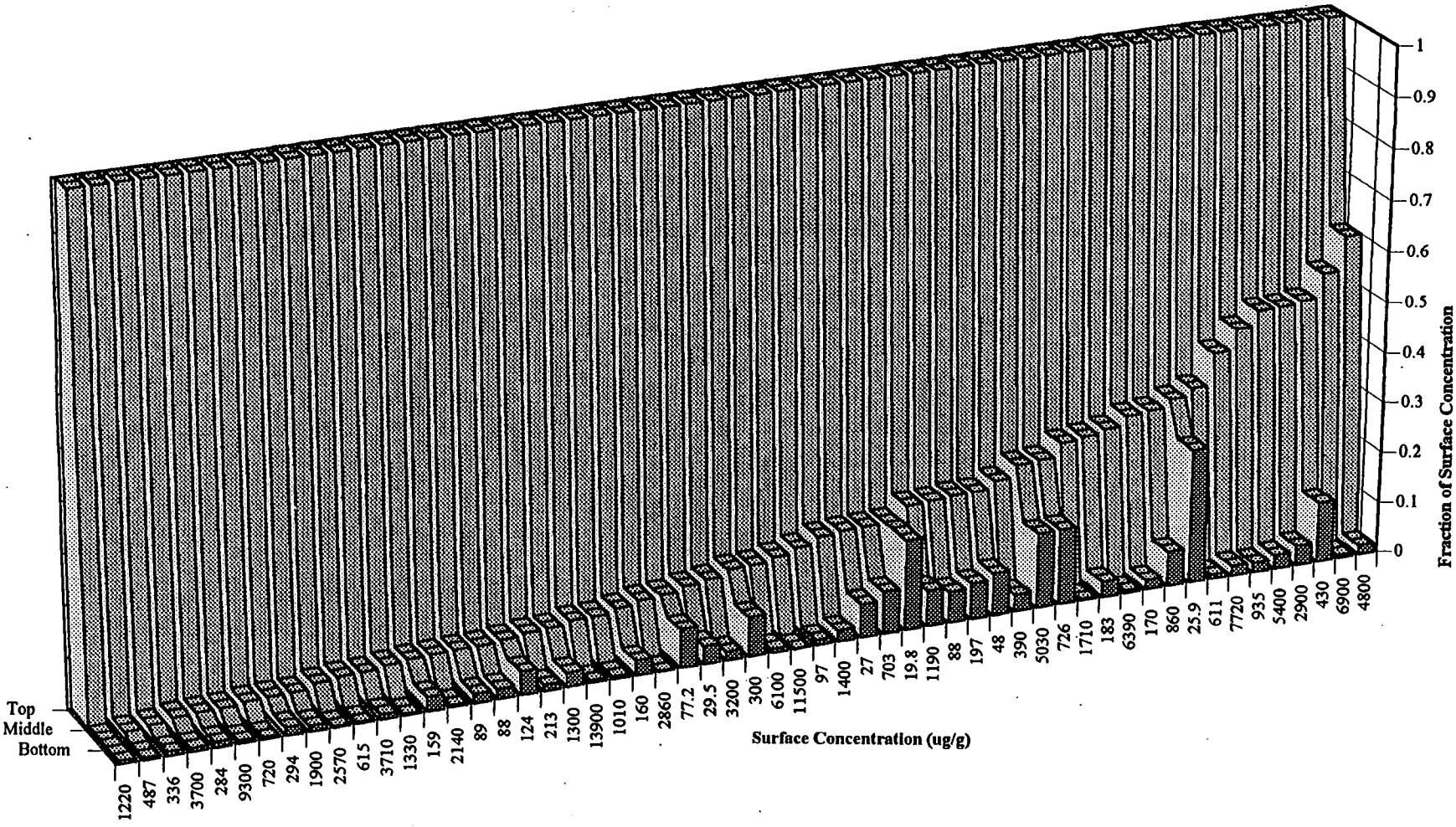

FIGURE A-15
DEPTH PROFILE OF URANIUM IN CONCRETE, NORMALIZED TO SURFACE CONCENTRATION, FOR CORES WITH A UNIFORM DEPTH PROFILE

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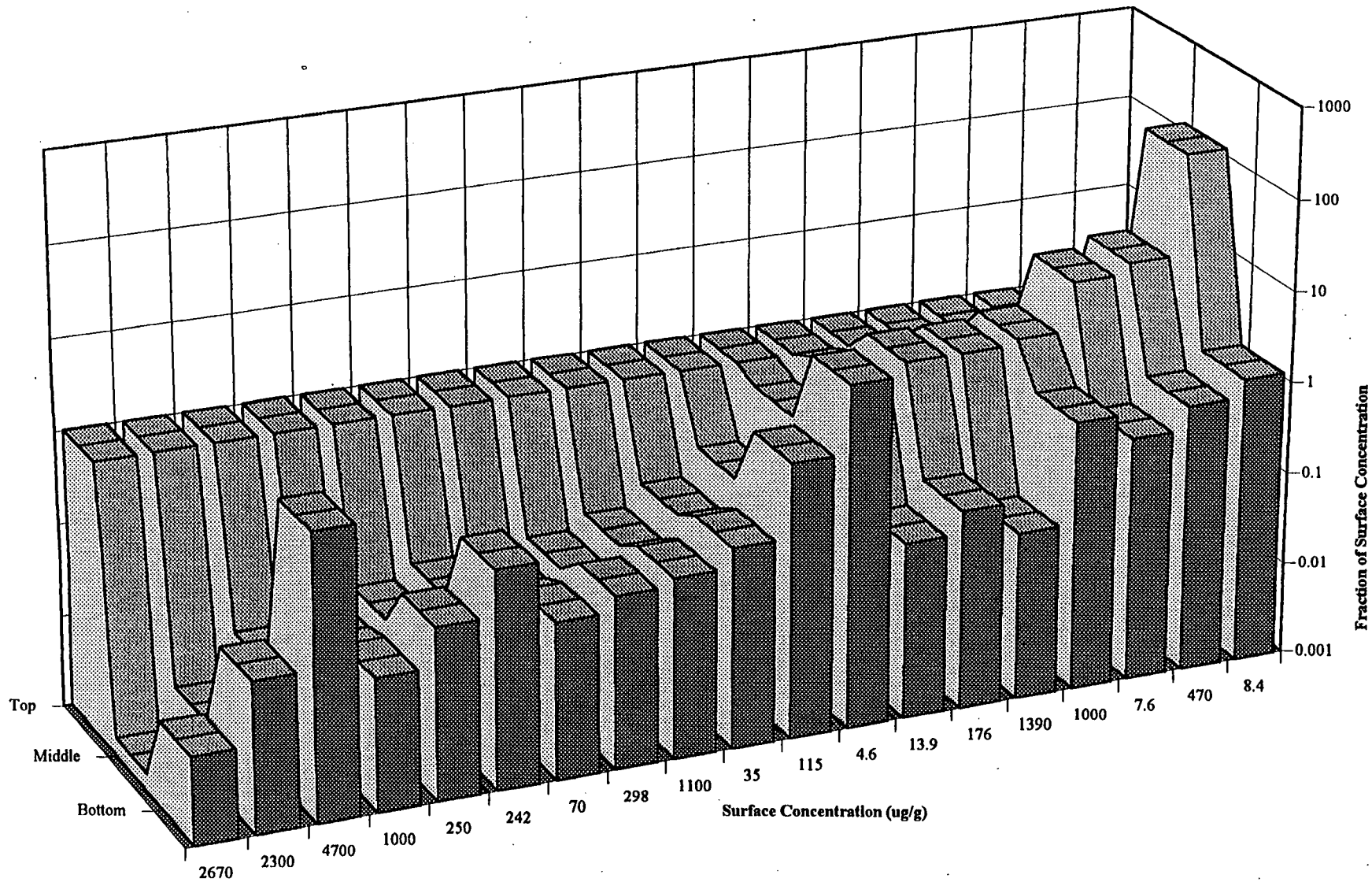

FIGURE A-16
DEPTH PROFILE OF URANIUM IN CONCRETE, NORMALIZED TO SURFACE CONCENTRATION, FOR CORES WITH ANOMOLOUS DEPTH PROFILES

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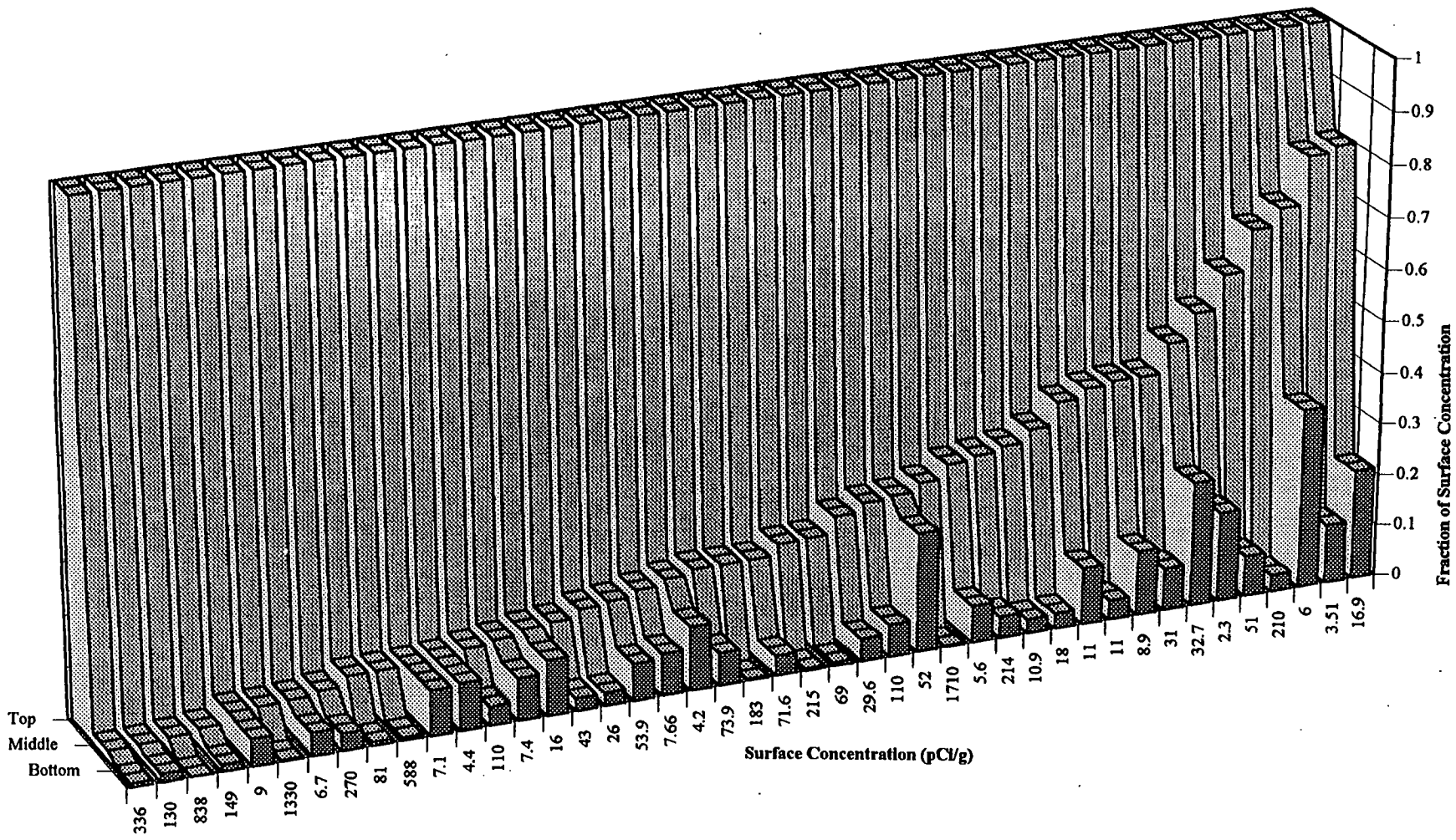

FIGURE A-17
DEPTH PROFILE OF TECHNETIUM-99 IN CONCRETE, NORMALIZED TO SURFACE CONCENTRATION, FOR CORES WITH A UNIFORM DEPTH PROFILE

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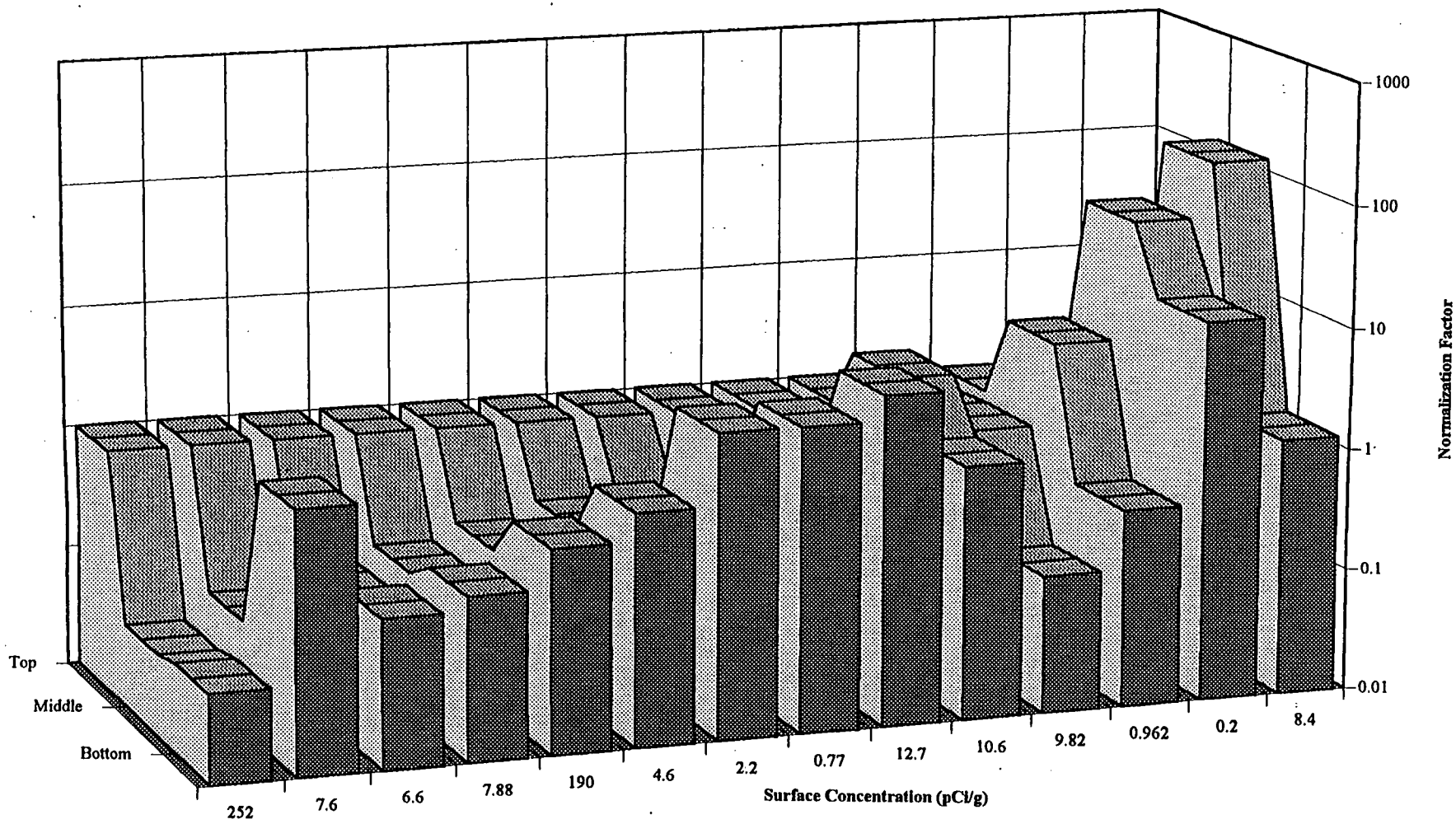

FIGURE A-18
DEPTH PROFILE OF TECNETIUM-99 IN CONCRETE, NORMALIZED TO SURFACE CONCENTRATION, FOR CORES WITH ANOMOLOUS DEPTH PROFILES

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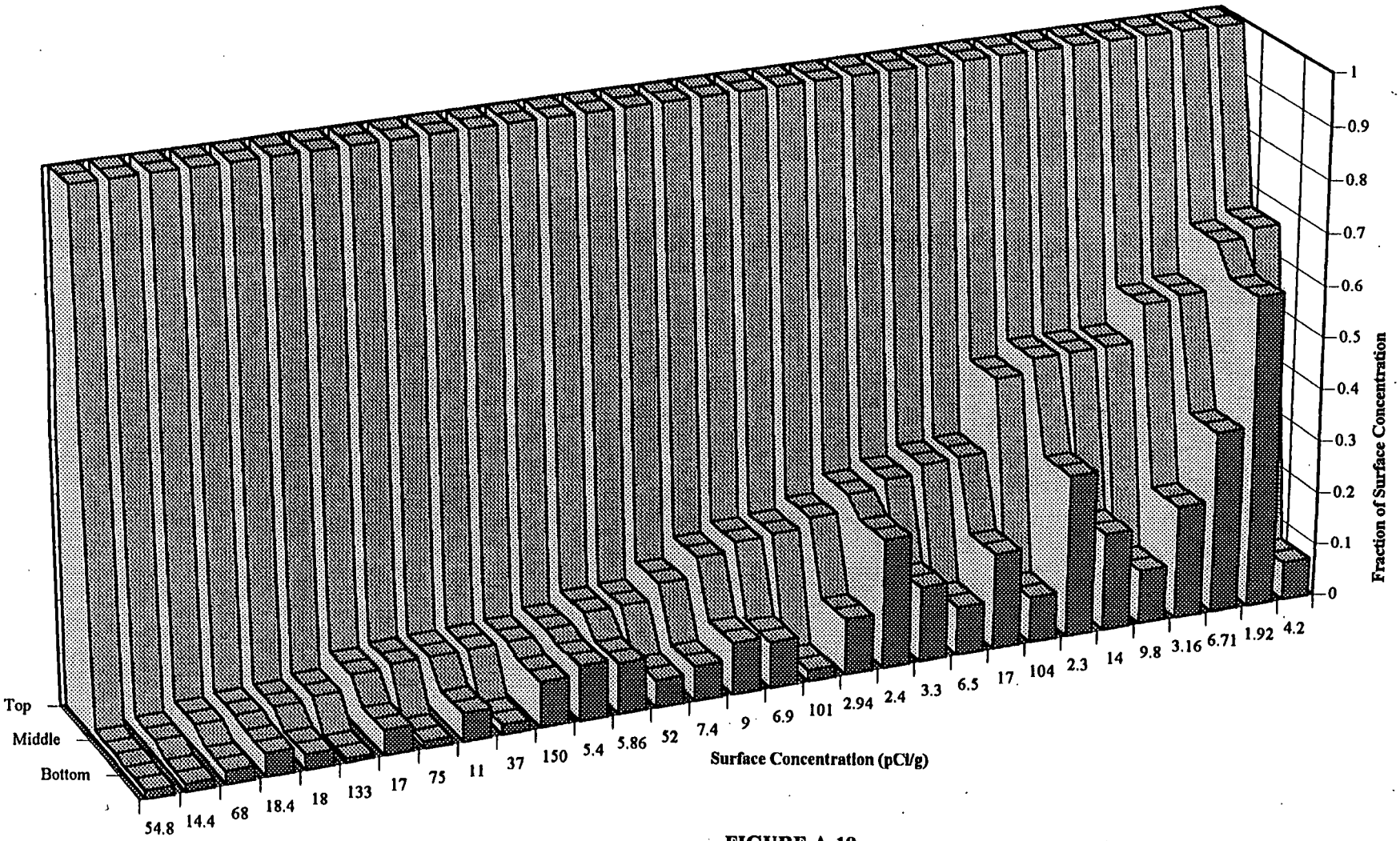

FIGURE A-19
DEPTH PROFILE OF THORIUM-230 IN CONCRETE, NORMALIZED TO SURFACE CONCENTRATION, FOR CORES WITH A UNIFORM DEPTH PROFILE

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ATTACHMENT A.I

DETERMINATION OF BASELINE CONDITIONS

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A.I.3 Estimated Baseline Concentrations of Radionuclides A.I-7

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A.I.3.2 Methodology A.I-8

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A.I DETERMINATION OF BASELINE CONDITIONS

A.I.1 INTRODUCTION

As described in Section 3, nearly 90 percent of the volume and over 80 percent of the weight of the construction materials in OU3 are concrete-related materials (concrete pads, roads, parking lots, foundations, floors, walls; asphalt roads, parking lots and pads; masonry walls; and transite walls and panels) and steel (equipment, structural, piping, etc.). This attachment to Appendix A presents baseline concentrations of radionuclides and metals in concrete and steel coatings, as well as representative constituents of steel. The baseline concentrations in concrete and steel coatings provide a reference for evaluating the level of contamination in samples collected from OU3 during the RI/FS sampling program (see Section 2).

Since steel is non-porous and assumed to contain no significant contamination in the steel itself, no samples of steel were collected (only samples of the coatings on steel, where any contamination is assumed to be contained). Therefore, the representative constituents of steel provide a conservative basis for estimating the source term of constituents that could eventually be available to the environment (say over a 1000 year period) through corrosion.

The development of baseline concentrations of radionuclides and metals in concrete are presented in Attachment A.I.2, in steel coatings in A.I.3, and the representative constituents in steel are presented in Attachment A.I.4.

A.I.2 ESTIMATED BASELINE CONCENTRATIONS OF TRACE METALS

This section addresses the approach to, and methodology for, determining baseline concentrations of trace metals within concrete and paint coatings of structural steel used in construction of OU3 buildings and structures. This data is used to assist in evaluating the level of contamination within these materials. No baseline concentration for organic parameters have been determined since baseline for organics is assumed to be zero.

A.I.2.1 Identification of Approach

This section discusses the methods by which baseline levels for trace metals and radionuclides were determined for concrete and steel coatings.

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Baseline of Trace Metals in Concrete and Steel Coatings

Trace metals are inherent within concrete and are also contaminants known to exist at the FEMP. To help determine the amount of trace metals attributable to production activities, baseline concentrations of these metals have been developed. Three possible approaches were identified to determine baseline concentrations in concrete:

1. Analytical results received from concrete manufacturers;
2. Laboratory analysis from "clean" concrete sources; or,
3. Laboratory analysis from concrete samples collected from uncontaminated (i.e., non-production) areas of the FEMP.

The first approach listed above is unrealistic, since few, if any, concrete manufacturers have a chemical analysis of concrete precise enough to be useable by environmental personnel. The second approach may be unrepresentative since concrete recipes vary according to their intended application. Using baseline concentrations from a single concrete source would not be representative of decades of construction at the FEMP. In addition, increased funding would be needed for laboratory analysis of other concrete sources. The third approach is much sounder because these samples, which were taken during the OU3 characterization effort, are representative of almost all construction at the FEMP. The data set for these samples is large enough to perform a statistical evaluation for the baseline level of concrete for OU3 structures. No additional analyses would be required since the concrete samples have already been analyzed in support of OU3 characterization.

The estimated baseline levels determined for trace metals in concrete then can be used to evaluate the nature of contamination of concrete, acid brick, asphalt, and masonry at the FEMP.

Similar to concrete, trace metals are inherent within steel coatings and are also contaminants known to exist at the FEMP. The estimate of baseline levels for trace metals in steel coatings have been calculated using available samples from non-process areas of the OU3 RI characterization study. The data set is sufficient to generate estimated baseline concentrations for steel coatings.

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A.I.2.2 Methodology

Trace Metals Methodology - Concrete

The sampling effort for determination of baseline levels involved collection of core samples from several OU3 structures from the non-process area of the FEMP that were at least partially constructed with concrete. The core samples were taken at three intervals:

1. 0.0" to 0.5"
2. 0.5" to 1.0"
3. 1.0" to either 4.0" or 6.0"

Since most of the trace metal contamination would be in the top one inch of concrete, only the bottom sample from each core was used in the data set for determining baseline levels. In a few cases, elevated levels of trace metals in the upper two intervals suggested that the bottom sample may also have an elevated amount of a certain analyte due to metals contamination. In cases where elevated amounts were reported in the upper two core depths, analytical results from the bottom core depths were not used in baseline calculations. In a few cases, a high undetected value for Antimony would affect the statistics of the dataset, causing the baseline concentration to be ten times higher than it should realistically be. Concrete cores containing high undetected values for Antimony were also removed from the data set for all metals. The sample ID numbers for the bottom depth of concrete cores outside of process area are listed in Table A.I-1. The samples removed from the dataset, along with the reason for removal from the baseline data set, are listed in Table A.I-2.

The sampling effort for determination of baseline levels in paint coatings involved collection of paint coating samples from several OU3 structural steel locations from the FEMP. The sample ID numbers for the paint coatings are also listed in Table A.I-3.

A.I.2.3 Statistical Analysis Approach for Trace Metals

Determination of Trace Metal Baseline Distribution

The baseline data set was evaluated to determine the probability distribution type (normal, lognormal, or undefined) that best describes the data set. Two methods were used to determine the distribution type: the Kolomogorov-Smirnov test and construction of a probability plot.

In the first method, the Kolmogorov-Smirnov test with Lilliefors adjustment (Lilliefor 1967), a quantitative technique, was employed to determine the appropriate distribution. This method is one of the recommended procedures in the United States Environmental Protection Agency's (US EPA's)

Statistical Analysis of Ground Water Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities. The test was performed on the untransformed data to test the normality assumption and on the log-transformed data to test the assumption of lognormality. If the test failed to provide sufficient evidence of either normality or lognormality, then a second method was employed.

The second method involved construction of a probability plot of the data set. If the plotted points fit a straight line reasonably well, a normal distribution was assumed. If the data did not follow a straight line on the probability plot, the data were log-transformed and a new plot was generated. If the log-transformed data reasonably fit a straight line, then a lognormal distribution was assumed. If a straight line did not fit the plotted points on either the normal probability plot or the log-transformed probability plot, the data set was assumed to be neither normally distributed nor lognormally distributed.

Visual inspection of the probability plot is often sufficient to determine whether the plotted points follow a normal or lognormal distribution though some experienced professional judgement may be necessary when there are minor deviations. The statistical methods employed to determine the estimated baseline concentration are robust to minor deviations from normality or lognormality. The statistical summary for concrete core baseline data, including the distribution for each analyte, is shown in Table A.I-4. The statistical summary for paint coatings baseline data, including the distribution for each analyte, is shown in Table A.I-5.

Tests for Outliers in Baseline Trace Metal Concentration Data

An outlier is defined as an abnormally high or low data value. Since an outlier can represent a true extreme value or can indicate data errors, each value must be evaluated to determine if it is an outlier or a true datum that will be included in the data set (Gilbert 1987). Visual inspection of the normal and lognormal probability plots of the data set (see Section 4.1.1) will be performed to see if any data points differ significantly from the remaining data. A value that is four to five times larger than the next higher data value is generally viewed with suspicion. A value that is an order of magnitude different from the other values can arise by the common error of misplacing a decimal (EPA 1989c).

When evaluated, if specific data points stood out as suspected outliers in the baseline data sets, Rosner's test for detecting multiple outliers (the 1983 method as outlined in Gilbert 1987) was performed. Since this test, as with most quantitative tests for outliers, assumes a normal distribution,

data sets that are not normally distributed are transformed to approximate a normal distribution, if possible, before the test is performed. Rosner's approach is designed to avoid masking outliers by the presence of multiple outliers. The procedure compares the suspected outlier with the mean and standard deviation of the remaining data, with the test statistic compared to tabulated probability values. Table A.I-6 shows the parameter, sample ID, validated result and validation qualifier for data points which were taken out of the data set as outliers.

Determination of 95 percent Upper Confidence Limits on the Mean Background Concentration for Trace Metals

The estimated baseline concentration for trace metals in concrete and steel coating uses the 95 percent Upper Confidence Level (UCL) of the mean value for each analyte in the data set. The initial step in calculating the estimated baseline concentration is determining the distribution of the data, as described above. The 95 percent UCLs are determined based on one of the following two methods dependent upon the distribution assumed to best fit the data.

Normal Distribution:

If the background data distribution is assumed to be normal, the equation used to calculate the 95 percent UCLs is:

$$95\%\ UCLs = \bar{x} + t_{(n-1,\ 0.025)} \times \frac{s}{\sqrt{n}}$$

where:

n = *number of samples*

$\bar{x}$ = *sample mean concentration*

$t_{(n-1,\ 0.025)}$ = *percentage point from the t distribution with $n-1$ degrees of freedom*

s = *sample standard deviation*

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i-\bar{x})^2} \quad \textit{where}$$

x_i = *individual data values*

Lognormal Distribution:

If the background data distribution is assumed to be lognormal, the equation used to calculate the 95 percent UCLs is:

$$95\%\ UCLs = e^{\bar{y} + t_{(n-1,\ 0.025)} \times \frac{S_y}{\sqrt{n}}}$$

where:

n = *number of samples*
$\bar{y}$ = *sample mean of the* log-*transformed data*
$t_{(n-1,\ 0.025)}$ = *percentage point from the t distribution with* $n-1$ *degrees of freedom*
s_y = *sample standard deviation of the* log-*transformed data*

$$s_y = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(y_i-\bar{y})^2} \quad \textit{where}$$

y_i = *individual* log-*transformed values*

Undetermined Distribution:

If the distribution of the background data could not be adequately determined, the 95 percent upper and lower confidence limits on the mean can not be determined because of the relatively small sample sizes obtained. In this case, a non-parametric method was used to estimate the 95th percentile concentration of the data set. The 95th percentile concentration would then be used as the estimated baseline concentration. The initial step in this procedure is to order the data such that:

$$x_1 \le x_2 \le \ldots \le x_i$$

where:

$x_{j,\ (j=1\ to\ i)}$ = *sample concentrations*
i = *the number of samples*

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The 95th percentile concentration then is determined to be

x_k where

$$k \geq i \times 0.95 \ (i = number\ of\ samples)$$

A.I.2.4 Analytical Results

Tables A.I-4 (concrete) and A.I-5 (steel coatings) present summaries of the data set for each trace metal. For each analyte, the number of samples in the data set is listed, preceded by the number of results above detectable levels. The maximum result, estimated mathematical mean, distribution and estimated baseline level also are presented for each analyte.

A.I.3 ESTIMATED BASELINE CONCENTRATIONS OF RADIONUCLIDES

Similar to the estimated baseline concentration for trace metals, estimated baseline concentrations have also been calculated for radioactive parameters. This section addresses the approach to and methodology for determining baseline concentrations of radionuclides within concrete and the paint coatings of structural steel used in construction of OU3 buildings and structures. This data is used to assess the nature of contamination within OU3.

A.I.3.1 Identification of Approach

This section discusses the methods by which baseline levels for radionuclides were calculated for concrete and steel coatings.

Baseline of Radioactive Parameters in Concrete and Paint Coatings

The estimate of baseline levels for radioactive parameters in concrete will be calculated in two ways. The first approach will utilize data from a study conducted by the University of Cincinnati, entitled Final Report - Measure of Naturally Occurring Radionuclides in Concrete Fill Material (July 1, 1987). The second approach will estimate baseline levels using a data set similar to the data set used for the trace metals estimated baseline calculation.

The estimate of baseline levels for radioactive parameters in paint coatings, referred to as steel coatings, will be calculated using samples from the OU3 RI characterization study. The data set for radioactive parameters will use only non-process area steel coating samples.

A.I.3.2 Methodology

Radioactive Parameters Methodology - Concrete

In the University of Cincinnati study, six different suppliers each produced one cubic yard of concrete using 1320 pounds of sand, 1860 pounds of gravel, 564 pounds of cement and 35 gallons of water. The six samples were tested for radium-226, uranium-238, and thorium-232 using a high-resolution, high-efficiency, intrinsic germanium detector. Table A.I-7 shows the concrete supplier and theradionuclide content in picocuries and picocuries per gram.

The second approach used for radioactive parameters in concrete will estimate baseline concentrations using the same sample locations used for the trace metals baselines calculations. The sample ID numbers for the concrete core samples outside of process areas are listed in Table A.I-8.
The sampling effort for determination of baseline levels in steel coatings involved collection of steel coating samples from several OU3 structural steel locations from the non-process area of the FEMP. Two samples were removed from the data set due to elevated contamination from radionuclides in the samples. The sample ID numbers for the steel coatings for non-process areas, along with the samples removed from the dataset, are listed in Table A.I-9.

A.I.3.3 Statistical Analysis Approach for Radionuclides

The background data set was evaluated to determine the probability distribution type (normal, lognormal, or undefined) that best describes the data set. The Shapiro-Wilkes test was used to determine the distribution type. The untransformed and transformed data were not plotted on normal probability paper because the data sets were relatively small and a determination of whether the plotted data adequately fit a straight line was felt to be too subjective.

Two special kinds of departures from the normal distribution are skewness, in which the data are unsymmetrically distributed around a mean, and kurtosis (curvature) in which the data are abnormally compressed or more spread out than for a true normal distribution. The Shapiro-Wilkes test measures the kurtosis and skewness of the data set. The test calculates a W statistic and a p value associated with the W statistic that identifies the false positive probability of concluding that the data were not obtained from a normally distributed population.

Since the Shapiro-Wilkes test is very powerful (and particularly so as the sample size increases) a 1 percent level of significance was selected. The statistical methods employed to determine the estimated baseline concentration and 95 percent upper and lower confidence limits on the mean are

robust to minor deviations from normality and lognormality. The Shapiro-Wilkes test was performed on the untransformed data to test the normality assumption and on the log-transformed data to test the assumption of lognormality. If this test failed to provide evidence of normality or lognormality, the probability distribution of the population from which the samples were drawn was listed as undefined.

Treatment of Non-Detected Results for Background Radioisotope Concentrations

Non-detected results (if present in the data set) must be considered, with positively detected background results, to determine the descriptive statistics for background data sets. Although US EPA's Risk Assessment Guidance for Superfund Part A, Human Health Evaluation Manual allows for best professional judgement in determining the most appropriate assignment of values for non-detected results (EPA 1989a), EPA Region V has requested that a value of one-half the minimum detectable concentration (MDC) be assigned for each non-detected result. Statistical treatment of background data for risk assessments will therefore conform to the methodology requested by EPA Region V.

Test for Outliers in Background Radioisotope Concentration Data

An outlier is defined as an abnormally high or low data value. Since an outlier can represent a true extreme value or can indicate data errors, each value was evaluated to determine if it is an outlier or a true datum. Because of the relatively small data sets any highest value that was at least two times larger than the second highest value or any lowest value that was an order of magnitude less than the second lowest value was viewed with suspicion.

The Dixon test for outliers is used to statistically identify a single anomaly in a given data set. A multiple outlier test was not used because of the relatively small data sets ($n \leq 6$). Since the Dixon test, as with most quantitative tests for outliers, assumes a normal distribution, data sets that were not normally distributed were transformed to approximate a normal distribution, if possible, before the test was performed. The data points were ranked from smallest to largest. After this was done, a point at either end that stood out as a suspected outlier was examined and the probability that point could had been selected by chance due to the variability of the data was calculated. A two-sided 1 percent level of significance was chosen for the Dixon test. This means that there is at least 99 percent confidence that rejecting an outlier is merited, and that there is also at most a 1 percent risk that the wrong decision (of rejecting the outlier) was made.

For concrete core samples, one outlier was identified and removed from the data set. For steel coatings, two outliers were identified and removed. Table A.I-10 shows the media, parameter,

sample ID, validated result and validation qualifier for data points which were taken out of the data set as outliers.

Determination of Estimated Background Radioisotope Concentration

The 95th percentile of the data set is used as the estimated baseline concentration for radionuclides in concrete. By using the 95th percentile of the data set, the estimated baseline concentration for radionuclide is a more conservative baseline estimate than using the UCL of the mean, which is used in calculating the estimated baseline concentration for trace metals. The initial step in calculating a estimated background concentration is determining the distribution of the data, as described above. The estimated background concentration is determined based on one of the following three methods dependent upon the distribution assumed to best fit the data.

Normal Distribution:

If the background data distribution is assumed to be normal, the equation used to calculate the 95th percentile is:

$$95th\ Percentile = \bar{x} + t_{(n-1,\ 0.05)} \times s$$

where:

n = *number of samples*

$\bar{x}$ = *sample mean concentration*

$t_{(n-1,\ 0.05)}$ = *percentage point from the t distribution with n−1 degrees of freedom*

s = *sample standard deviation*

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i-\bar{x})^2} \quad where$$

x_i = *individual data values*

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Lognormal Distribution:

If the background data distribution is assumed to be lognormal, the equation used to calculate the 95th percentile is:

$$95th\ Percentile = e^{\bar{y} + t_{(n-1,\,0.05)} \times S_y}$$

where:

n = *number of samples*
$\bar{y}$ = *sample mean of the* log-*transformed data*

$t_{(n-1,\,0.05)}$ = *percentage point from the t distribution with* $n-1$ *degrees of freedom*

s_y = *sample standard deviation of the* log-*transformed data*

$$s_y = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(y_i-\bar{y})^2} \quad where$$

y_i = *individual* log-*transformed values*

Undetermined Distribution:

If the distribution of the background data could not be adequately determined, a non-parametric method was used to estimate the 95th percentile concentration. The initial step in this procedure is to order the data such that:

$$x_1 \le x_2 \le \ldots \le x_i$$

where:

$x_{j,\,(j=1\ to\ i)}$ = *sample concentrations*
i = *the number of samples*

The 95th percentile concentration then is determined to be

$$x_k$$

$$k \ge i \times 0.95 \quad (i = number\ of\ samples)$$

The estimated baseline concentration for radionuclides in steel coatings uses the 95 percent UCL of the mean value for each analyte in the data set. This approach is the same approach used for the estimated baseline concentration for trace metals in steel coatings, and is discussed in Section A.I.2.3.

A.I.3.4 Analytical Results

Tables A.I-11 (University of Cincinnati study), A.I-12 (FEMP concrete cores) and A.I-13 (steel coatings) presents summaries of the data set for radionuclides. The maximum result, mathematical mean, distribution, and estimated baseline level are presented for each analyte and media.

In comparing the estimated baseline concentrations of concrete for the two approaches, the isotopic U-238 concentration must be converted into ug/g parts per million (ppm) units. Assuming the U-238 percentage is 99.285 percent (natural radioactive material is 0.71 percent U-235 and 0.005 percent U-234), the conversion of the U-238 baseline concentration in pCi/g to ppm is:

$$1.18 \text{ pCi/g} \div 0.99285 \times 1.478 = 1.76 \text{ ug/g total uranium.}$$

where:

0.99285 is the ratio of U-238 to total uranium and
1.478 is the conversion from pCi/g to ug/g for uranium

A.I.3.5 Summary

For the radionuclide baseline level estimates, the radium-226 and thorium-232 results compare similarly, with a slight elevation in the concrete samples for both parameters (1.75 versus 0.6 for radium-226 and 0.84 versus 0.23 for thorium-232). The elevation in the result for total uranium (12.55 versus 1.76) is more pronounced. This difference may be due to the decades of exposure of concrete at the FEMP to radiological contamination versus the absence of such exposure for concrete made from virgin materials. Although the difference in the two concentrations is noticeable, the absolute difference (10.79 ug/g) is not a large number relative to concentrations of total uranium in concrete from process areas (some results > 10,000 ug/g).

A.I.4 Representative Inorganic Constituents in Steel

Various types of metal, including carbon steel (structural, equipment and piping) and corrosion resistant material (i.e. stainless steel, monel and inconel piping and equipment), comprise a significant portion of the material in OU3 (see Section 3.__). Since this metal is considered non-porous, only samples of coatings (i.e. paint and rust) were taken and none of the metal itself (DOE 1993a). Since

these metals comprise such a significant portion of OU3, there is no characterization of the metal itself, and some of the constituents may become available to the environment over an extended period of time, representative compositions of various steels were developed for use in estimating contamination source terms.

Table A.I-14 presents representative values for inorganic constituents in carbon and stainless steel. These data are taken from the third edition of Structural Steel Design and the 65th edition of the CRC Handbook of Chemistry and Physics.

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TABLE A.I-1

CONCRETE SAMPLES TAKEN DURING OU3 RI/FS CHARACTERIZATION STUDY NON-PROCESS AREAS - TRACE METAL ANALYSIS

Sample ID	Depth	Sample ID	Depth
2C-005	1"-4"	12A-032	1"-6"
3A-005	1"-6"	12A-042	1"-6"
3B-005	1"-6"	12A-050	1"-6"
3D-004	1"-6"	13A-005A	1"-4"
3F-004	1"-4"	18B-004	1"-4"
3G-005	1"-4"	19D-005	1"-6"
3H-004	1"-4"	19D-011	1"-6"
3J-004	1"-4"	22E-004	1"-4"
3J-004A	1"-4"	25E-005	1"-6"
3K-005	1"-4"	25G-005	1"-6"
10B-006	1"-4"	25H-004	1"-4"
11-006A	1"-4"	26C-005	1"-4"
11-014	1"-4"	46-005	1"-4"
11-019	1"-4"	74P-005	1"-4"
12A-005	1"-4"	74R-005	1"-6"
12A-016	1"-6"	74W-004	1"-4"
12A-024	1"-6"		

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TABLE A.I-2

TRACE METALS IN CONCRETE SAMPLES REMOVED FROM THE DATA SET

Sample Removed	Reason for Removal
12A-042	Lead levels in adjacent samples
2C-005	Lead, Zinc levels in adjacent samples
3J-004	Lead, Arsenic, Mercury levels in adjacent samples; Antimony high detection level
18B-004	Antimony high detection level
22E-004	Antimony high detection level
25H-004	Antimony high detection level

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TABLE A.I-3

STEEL COATINGS SAMPLES TAKEN DURING OU3 RI/FS CHARACTERIZATION STUDY NON-PROCESS AREAS - TRACE METAL ANALYSIS

Sample ID	Sample ID	Sample ID
2B-004	5G-006	30A-007
2C-006	6B-003	32B-005
2F-004A	8F-002	39D-005
2G-005	9C-005	45A-005A
2H-004A	9D-005A	46-011
2H-005A	9E-004	4-011A
3A-007A	10B-009	46-012A
3B-007A	12A=-12	54B-004
3C-005A	12A-020	54C-003A
3D-005A	12A-028	56A-004
3F-007A	12A-035	64-004
3G-007A	12A-046	68-005
3H-006	12A-054	72-005
3J-006	18B-005	77-004A
3L-008	18M-006	79-005A
4C-005A	19D-007	80-005A
5C-004	30A-004	81-005A

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TABLE A.I-4

STATISTICAL SUMMARY OF TRACE METALS IN CONCRETE CORE DATA

ANALYTE	POSITIVE SAMPLES/TOTAL SAMPLES	MAXIMUM RESULT (mg/kg)	ESTIMATED MEAN (mg/kg)	DISTRIBUTION	ESTIMATED BASELINE LEVEL (mg/kg)
Aluminum	27/27	6420	4716	Normal	5039
Antimony	2/20	11.4	9.5 UJ	Undefined	1.0
Arsenic	22/27	7.4	3.35	Normal	3.96
Barium	27/27	73.6	46.1	Normal	50.4
Beryllium	7/27	1.5	0.23	Undefined	1.40
Cadmium	12/27	2.7	1.2 U	Undefined	2.40
Calcium	27/27	252000	190170	~Normal	199321
Chromium	24/24	10.8	7.52	Normal	8.15
Cobalt	15/26	4.9	2.31	~Lognormal	2.89
Copper	24/27	28	9.22	Lognormal	11.1
Iron	27/27	25200	8888	~Lognormal	10438
Lead	18/25	5.8	2.93	Normal	3.42
Magnesium	27/27	62800	47841	Normal	50632
Manganese	27/27	619	313	Normal	343
Mercury	3/25	0.07	0.06 U	Undefined	0.03
Nickel	25/27	16.3	7.60	Lognormal	9.37
Potassium	23/27	1680	812	Lognormal	927
Selenium	2/22	0.49	1.6 UJ	Undefined	0.47
Silver	16/27	9.3	2.67	Lognormal	5.42
Sodium	25/27	821	510	Lognormal	607
Thallium	1/26	0.32	0.44 UJ	Undefined	0.32
Vanadium	23/27	22.4	11.0	Lognormal	13.2
Zinc	24/26	70.9	21.8	Lognormal	27.5

* Median value given for undefined distributions

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TABLE A.I-5

STATISTICAL SUMMARY OF TRACE METALS IN STEEL COATINGS DATA

ANALYTE	POSITIVE SAMPLES/TOTAL SAMPLES	MAXIMUM RESULT (mg/kg)	ESTIMATED MEAN (mg/kg)	DISTRIBUTION	ESTIMATED BASELINE LEVEL (mg/kg)
Aluminum	49/51	42300	9115.4	LogNormal	14371.39
Antimony	21/42	224	46.9	~LogNormal	108.76
Arsenic	43/50	199	15.0	LogNormal	25.95
Barium	51/51	23700	1442.8	~LogNormal	3278.72
Beryllium	6/48	4.2	0.73 U	Undefined	1.10
Cadmium	36/50	232	27.5	LogNormal	66.52
Calcium	51/51	199000	29790.9	LogNormal	43357.59
Chromium	50/51	14800	2252.4	LogNormal	4539.90
Cobalt	49/51	588	158.1	~LogNormal	253.04
Copper	50/51	2020	212.7	LogNormal	318.65
Iron	51/51	306000	89083.9	LogNormal	129610.09
Lead	51/51	367000	26000-	Undefined	239000
Magnesium	50/51	14300	4930.8	LogNormal	6396.18
Manganese	51/51	5560	711.3	LogNormal	958.51
Mercury	39/51	26.2	5.6	~LogNormal	18.04
Nickel	49/51	2570	86.5	LogNormal	134.74
Potassium	34/51	6060	904.4	LogNormal	1193.38
Selenium	7/40	42.2	2.2 U	Undefined	0.83
Silver	17/51	9.4	5.4 U	Undefined	6.40
Sodium	44/51	4370	646.6	LogNormal	844.02
Thallium	0/43		0.82 U	Undefined	
Vanadium	27/49	72.4	12.3	LogNormal	21.97
Zinc	51/51	215000	21087.0	LogNormal	55005.39

* Median value given for undefined distributions

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TABLE A.I-6

OUTLIERS REMOVED FROM CONCRETE BASELINE DATA SET

PARAMETER	SAMPLE ID	RESULT REMOVED
Antimony	3H-004	27.7 U
Chromium	3K-005	25.6 -
Chromium	3B-005	25.2 J
Chromium	10B-006	15.4 -
Cobalt	74W-004	23.3 -
Lead	3D-004	25.6 -
Lead	74R-005	17.3 J
Mercury	26C-005	0.19 -
Zinc	3G-005	99.4 J

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TABLE A.I-7

NATURAL RADIONUCLIDE CONTENT IN ONE CUBIC YARD OF 4000 PSI MIX CONCRETE

Concrete Supplier	Ra-226 (pCi)	Ra-226 (pCi/g)	U-238 (pCi)	U-238 (pCi/g)	Th-232 (pCi)	Th-232 (pCi/g)
Miami Valley Ready Mix	1,049,700	0.57	993,582	0.54	311,924	0.17
Roth Concrete	1,053,140	0.58	1,374,382	0.75	348,738	0.19
Harrison Ready Mix	1,090,197	0.60	1,441,400	0.79	351,840	0.19
Hilltop Basic Resources	693,068	0.38	1,023,084	0.56	413,838	0.23
Ernst Enterprises	710,650	0.39	1,391,036	0.76	354,889	0.19
Plainville Concrete	800,025	0.44	2,176,965	1.19	316,297	0.17

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TABLE A.I-8

CONCRETE SAMPLES TAKEN DURING OU3 RI CHARACTERIZATION STUDY NON-PROCESS AREAS - RADIONUCLIDES ANALYSIS

Sample ID	Depth	Sample ID	Depth
2E-005	1"-4"	11-019	1"-4"
3A-005R	1"-4"	12A-050R	1"-4"
3B-005	1"-4"	13B-005	1"-4"
3D-004	1"-4"	19D-005R	1"-4"
3F-004	1"-4"	19D-011R	1"-4"
3G-005	1"-4"	22E-004	1"-4"
3J-004	1"-4"	25E-005R	1"-4"
3K-005	1"-4"	25H-004	1"-4"
10B-006	1"-4"	26C-005	1"-4"
11-014	1"-4"	74P-005	1"-4"

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TABLE A.I-9

STEEL COATINGS SAMPLES TAKEN DURING OU3 RI CHARACTERIZATION STUDY NON-PROCESS AREAS - RADIONUCLIDE ANALYSIS

Sample ID	
3C-005	REMOVED FROM DATA SET
3D-005	REMOVED FROM DATA SET
3F-007	INCLUDED IN DATA SET
45A-005	INCLUDED IN DATA SET
77-004	INCLUDED IN DATA SET
79-005	INCLUDED IN DATA SET
80-005	INCLUDED IN DATA SET
81-005	INCLUDED IN DATA SET

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TABLE A.I-10

OUTLIERS REMOVED FROM CONCRETE BASELINE DATA SET

MEDIA	PARAMETER	SAMPLE ID	RESULT REMOVED
CONCRETE	Technetium-99	3H-004	6.9 -
STEEL COATING	Cesium-137	3F-007	0.14 UJ
STEEL COATING	Lead-210	3F-007	9.1 -

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TABLE A.I-11

STATISTICAL SUMMARY ON CONCRETE
UNIVERSITY OF CINCINNATI STUDY

ANALYTE	MAXIMUM RESULT (pCi/g)	ESTIMATED MEAN (pCi/g)	DISTRIBUTION	95TH PERCENTILE CONCENTRATION (pCi/g)	ESTIMATED Baseline LEVEL (pCi/g)
Radium-226	0.6	0.49	Normal	0.6	0.6
Thorium-232	0.23	0.19	Lognormal	0.23	0.23
Uranium-238	1.19	0.76	Lognormal	1.18	1.18

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TABLE A.I-12

STATISTICAL SUMMARY ON CONCRETE CORE DATA
FEMP CONCRETE SAMPLES

ANALYTE	POSITIVE SAMPLES/ TOTAL SAMPLES	MAXIMUM RESULT	ESTIMATED MEAN	DISTRIBUTION	ESTIMATED BASELINE LEVEL
Americium-241	1/17	0.1 pCi/g	UJ 0.12 pCi/g	Undefined	0.100 pCi/g
Cesium-137	1/20	0.15 pCi/g	UJ 0.056 pCi/g	Undefined	0.150 pCi/g
Lead-210	18/20	0.89 pCi/g	0.616 pCi/g	LogNormal	0.89 pCi/g
Neptunium-237	2/20	0.12 pCi/g	0.045 pCi/g	Undefined	0.10 pCi/g
Plutonium-238	1/19	0.087 pCi/g	0.046 pCi/g	Undefined	0.09 pCi/g
Plutonium-239/240	1/20	0.1 pCi/g	0.040 pCi/g	Undefined	0.100 pCi/g
Plutonium-241	1/3	3.3 pCi/g	0.642 pCi/g	Undefined	3.300 pCi/g
Polonium-210	17/20	1.7 pCi/g	0.640 pCi/g	Normal	1.430 pCi/g
Radium-226	19/19	2.9 pCi/g	0.696 pCi/g	LogNormal	1.750 pCi/g
Radium-228	6/20	0.9 pCi/g	0.192 pCi/g	Undefined	0.300 pCi/g
Strontium-90	0/19		0.257 pCi/g	Undefined	
Technetium-99	2/19	0.4 pCi/g	1.232 pCi/g	Undefined	0.400 pCi/g
Thorium-227	3/3	2.9 pCi/g	2.200 pCi/g	Undefined	2.900 pCi/g
Thorium-228	17/19	1.04 pCi/g	0.338 pCi/g	LogNormal	0.580 pCi/g
Thorium-230	18/19	0.88 pCi/g	0.671 pCi/g	Normal	0.860 pCi/g
Thorium-232	17/19	0.84 pCi/g	0.229 pCi/g	Undefined	0.84 pCi/g
Uranium, Total	20/20	24 ug/g	3.531 ug/g	LogNormal	12.55 ug/g
Uranium-234	18/20	11.67 pCi/g	1.323 pCi/g	LogNormal	7.75 pCi/g
Uranium-235/236	10/19	1.2 pCi/g	0.145 pCi/g	LogNormal	0.83 pCi/g
Uranium-238	19/20	8.24 pCi/g	1.411 pCi/g	LogNormal	6.50 pCi/g

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TABLE A.I-13

STATISTICAL SUMMARY ON STEEL COATING DATA

ANALYTE	POSITIVE SAMPLES/ TOTAL SAMPLES	MAXIMUM RESULT	ESTIMATED MEAN	DISTRIBUTION	ESTIMATED BASELINE LEVEL
Americium-241	1/6	0.12 pCi/g	UJ 0.095 pCi/g	Undefined	0.12 pCi/g
Cesium-137	1/5	0.34 pCi/g	UJ 0.57 pCi/g	Undefined	0.34 pCi/g
Lead-210	0/5	0.60 pCi/g	UJ 0.64 pCi/g	Undefined	0.60 pCi/g
Neptunium-237	3/5	0.23 pCi/g	J 0.11 pCi/g	Undefined	0.23 pCi/g
Plutonium-238	4/6	0.33 pCi/g	UJ 0.14 pCi/g	Undefined	0.33 pCi/g
Plutonium-239/240	2/6	0.18 pCi/g	J 0.080 pCi/g	Undefined	0.180 pCi/g
Plutonium-241	1/6	3.0 pCi/g	UJ 11 pCi/g	Undefined	10.000 pCi/g
Polonium-210	6/6	7.9 pCi/g	1.41 pCi/g	LogNormal	7.90 pCi/g
Radium-226	5/6	4.54 pCi/g	3.95 pCi/g	LogNormal	4.54 pCi/g
Radium-228	3/6	2.71 pCi/g	UJ 1.1 pCi/g	Undefined	2.71 pCi/g
Strontium-90	2/6	1.58 pCi/g	UJ 0.5 pCi/g	Undefined	1.58 pCi/g
Technetium-99	2/6	0.63 pCi/g	J 0.57 pCi/g	Undefined	1.45 pCi/g
Thorium-227	1/1	0.42 pCi/g	J 0.42 pCi/g	Undefined	0.42 pCi/g
Thorium-228	5/6	4.37 pCi/g	1.47 pCi/g	LogNormal	4.37 pCi/g
Thorium-230	6/6	15. pCi/g	3.72 pCi/g	LogNormal	15.0 pCi/g
Thorium-232	6/6	4.21 pCi/g	1.03 pCi/g	LogNormal	4.21 pCi/g
Uranium, Total	6/6	176 μg/g	98.0 μg/g	LogNormal	176. μg/g
Uranium-234	6/6	64. pCi/g	33.5 pCi/g	LogNormal	64.0 pCi/g
Uranium-235/236	6/6	6.8 pCi/g	1.94 pCi/g	LogNormal	6.80 pCi/g
Uranium-238	6/6	63. pCi/g	31.9 pCi/g	LogNormal	63.0 pCi/g

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ATTACHMENT A.II

SUMMARY OF CONTAMINATION BY ANALYTE

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A.II SUMMARY OF CONTAMINATION BY ANALYTE

This attachment to Appendix A presents the results of the Operable Unit 3 (OU3) Remedial Investigation/Feasibility Study (RI/FS) sampling program in detail on an analyte basis. This organization is useful in identifies the abundance and level of contamination in OU3 by analyte, such as the occurrence of enriched uranium or which materials were detected at levels greater than toxicity characteristic leaching procedure (TCLP) limits.

A.II.1 STATISTICAL SUMMARY OF CONTAMINATION BY ANALYTE

Tables A.II-1 and A.II-2 summarize the frequency of detection and relative levels of contamination in OU3 by analyte and identify the constituents of concern (COCs) (see Appendix A.2). These tables are organized in the same general layout as the sections below: radionuclides, inorganics, volatiles, semivolatiles, and pesticides/PCBs.

A.II.1.1 Statistical Summary

Summary statistics for each analyte are presented in Tables A.III-1 and A.III-2 in Attachment A. This section describes the meaning and use of the statistical data included in this table.

A.II.1.2 Type of Distribution

The data for each analyte was evaluated to determine the type of distribution (i.e. normal, lognormal, undefined or undeterminable). The Shapiro-Wilkes test was used in conjunction with other statistics to determine the distribution type.

Two special kinds of departures from the normal distribution are skewness, in which the data are asymmetrically distributed around a mean, and kurtosis (curvature), in which the data are abnormally compressed or more spread out than for a true normal distribution. The Shapiro-Wilkes test measures the kurtosis and skewness of the data set. The test calculates a W statistic and a p value associated with the W statistic that identifies the false positive probability of concluding that the data were not obtained from a normally distributed population.

The Shapiro-Wilkes test was performed on the entire data set, excluding those values with validation qualifiers of Z (duplicate sample), R (rejected), or NR (not reported) to test for normality. If this test failed to provide evidence of normality, the coefficient of variation (CV) and the ratio of the maximum value to the minimum value (max/min) were calculated. If the CV was ≥ 115 percent and

if the max/min value was ≥ 18.0, the probability distribution was determined to be lognormal. If these test failed to determine normality or lognormality, the probability distribution of the population from which the samples were drawn was listed as undefined. If the data set contained less than seven (7) observations, the probability distribution was listed as undeterminable. Since the Shapiro-Wilkes test is very powerful (and particularly so as the sample size increases) a two-sided 0.03 percent level of significance was selected.

A.II.1.3 Measures of Central Tendency

Several measures of central tendency are presented in Tables in A.II.-1 and A.II-1. These include the arithmetic mean (mean or average), the geometric mean and the median. The use of geometric means or medians rather than arithmetic means allows representative estimates to be made of data sets that contain a few data points that are several orders of magnitude greater than the majority of data points in the data set. These few points would dominate the measure of central tendency if the arithmetic means were used.

The ***arithmetic mean*** (x) is defined by the equation:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

where: x_i = an individual data point
n = the number of data points

The ***median*** is defined as the 50th percentile, or midpoint, value.

The ***geometric mean*** (X_G) is defined by the equation:

$$\overline{X_G} = [(x_1)\ (x_2)\ (x_3)...(x_n)]^{\frac{1}{n}}$$

where: x_i = an individual data point
n = the number of data points

The geometric mean should be used as the measure of central tendency when the distribution of the data is lognormal or undefined and the proportion of nondetects is ≤ 20 percent or ≥ 50 percent. The median should be used when the distribution of the data is lognormal or undefined and the proportion of nondetects is > 20 percent and < 50 percent. The mean should be used if the distribution of the data is determined to be normal.

A.II.1.4 Measures of Dispersion

The dispersion of the data set is consistent with measurement precision or the random variability of the observed values about some true value (i.e., the spread of the distribution of the data).

The ***standard deviation*** should be used as the measure of dispersion when the distribution of the data is determined to be normal. The standard deviation a defined by the equation (i.e., σ) is:

$$\sigma = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i-\bar{x})^2}$$

where: $\bar{x}$ = the arithmetic mean

x_i = an individual data point

n = the number of data points

The ***inter-quartile range*** should be used when the distribution of the data is either lognormal or undefined. The inter-quartile range is defined as the difference between the 75th and 25th percentile values.

A.II.2 RADIONUCLIDES

A large fraction of the constituents investigated during this study are radioactive. This group of radioactive constituents (i.e., radionuclides) share a unique set of properties as a consequence of their radioactivity. This section first introduces basic concepts pertaining to radioactivity and then discusses analytical techniques used to determine the existence and quantities of radioactive materials present. The remainder of the section presents descriptive summaries of the analytical results obtained for each radioactive constituent investigated during the course of the study.

A.II.2.1 Radiological Data Issues

Many of the terms and concepts used in discussing radiological data collected for the Fernald Environmental Management Project (FEMP) OU3 RI/FS are unique to nuclear science. The next three subsections provide brief introductions to the concept of radioactivity, the methods used to detect and quantify radioactive materials, and naturally occurring environmental radioactivity.

A.II.2.1.1 Principles of Radioactive Decay

Atoms are composed of electrons orbiting a nucleus made up of protons and neutrons. The electrons are responsible for chemical properties, whereas the protons and neutrons determine nuclear properties. Most atoms found in nature have stable nuclei (i.e., the nucleus never changes unless acted on by outside forces). The nuclei of some atoms, however, are unstable (i.e., the nucleus will spontaneously disintegrate to form a new nucleus). This process is called radioactive decay. An example of this process is the decay of radium (radium-226) to form radon (radon-222).

Energy emission accompanies radioactive decay, either in the form of particles or photons. These particles and photons are known collectively as radiation. The three most common and important types of nuclear radiation are alpha and beta particles and gamma rays.

All elements have multiple isotopes. All isotopes of an element have the same number of protons in the nucleus, but each isotope has a different and distinct number of neutrons. As a consequence, each of an element's isotopes has different nuclear properties, including whether or not the isotope is radioactive. The nuclear configuration of an atom also determines the type and energy of radiation emitted, as well as the rate of decay, if it is radioactive. When describing an isotope, the elemental symbol or name and the mass must be stated. The mass is equal to the total number of protons and neutrons in the nucleus. Because each isotope of an element has the same number of protons, the number of neutrons provides a unique identification of the isotope. As an example, U-235 and U-238 are two isotopes of uranium. Each has 92 protons and differ only in the number of neutrons.

A.II.2.1.2 Methods for Analyzing Radionuclides

Radionuclides can be identified and quantified by examining the radiation emitted during their decay. The analysis of radionuclides is referred to as radioanalysis. The specific technique used depends upon the expected type of radiation emitted. Radioanalytical techniques can be sensitive with low detection limits. In most cases, samples being analyzed for radionuclides are first processed to remove the radionuclides from the sample matrix (i.e., radiochemistry). Processing is usually done

by leaching with strong acids or a total dissolution by fusion with a salt or caustic. The principal exception to this is gamma-ray analysis or gamma spectrometry, which does not require radiochemical processing prior to gamma-ray analysis.

Alpha spectrometry is normally used for the analysis of alpha-emitting radionuclides of concern at the FEMP. These radionuclides include the isotopes of uranium, plutonium, thorium, polonium, and neptunium. Alpha particles are emitted with discrete energies that are characteristic of specific radionuclides. The quality of alpha spectrometry data is largely dependent upon the effectiveness of the chemical separation of each element from others that may interfere with the measurement.

Many radionuclides emit gamma rays while undergoing decay by a primary decay mode, such as alpha or beta emission. Gamma spectrometry is a powerful analytical tool for such radionuclides because radiochemical processing is required and gamma rays are emitted with discrete energies that are characteristic of specific radionuclides. Each gamma emitter has a unique, energy-abundant distribution of gamma rays that can be used to identify and quantify radionuclides.

Most beta emitters have a sufficient number of gamma rays to be analyzed by gamma spectrometry. Unfortunately, there are a few that do not. Betas are not emitted with discrete energies, so it is not possible to use techniques similar to alpha or gamma spectrometry except in some special cases. Two radionuclides of concern to the FEMP which require beta analysis are technetium-99 and strontium-90. Radium-228 and lead-210 also may be analyzed using a beta technique. Once the sample is prepared by chemical extraction of the element in question, it is placed in a beta counter capable of detecting beta particles. Accurate results are dependent upon the removal of all materials from the final sample that could potentially interfere with the results. The presence of activity from other radionuclides could lead to an inaccurately high analytical result.

Typically, discussions of radioactive materials emphasize individual isotopes. Thorium and uranium are unusual in this regard because, under certain exposure scenarios, the chemical toxicity is comparable to, and may exceed, the hazards associated with the radiation. Because of this, thorium and uranium are often analyzed using techniques that do not distinguish between the isotopes. When isotopic techniques are used, the results for the individual isotopes are sometimes summed and reported as the total amount of the element present. When data are reported as the elemental content, rather than isotopic, the data are reported in mass concentration units, such as milligrams per kilogram for solids or milligrams per liter for liquids.

The term "total uranium" is used to distinguish this type of analysis from isotopic uranium analyses. It is possible to calculate the amount of uranium present from isotopic analytical data, but analytical techniques based on chemical properties are typically more cost effective. The elemental uranium techniques used for FEMP samples include fluorometry and kinetic phosphorescence analysis (KPA). These techniques are similar in that both rely upon the use of an external source of high-energy light to excite uranium atoms and thus cause them to emit light of a characteristic wavelength. The results of total uranium analyses should agree with elemental uranium values calculated from isotopic alpha spectrometry data. Unfortunately, this is not always the case. Both total and isotopic uranium techniques are subject to interferences and errors that cannot be accurately characterized for every sample. When discrepancies are noted, it is often not possible to determine which results are more accurate. In such cases, the data may be rejected as unusable or identified as being usable with qualification.

A.II.2.1.3 Environmental Radioactivity

Many radioactive materials are present in the environment. Some of these have been produced by radiation that is constantly bombarding the earth, some have been released from facilities using radioactive materials, and some have come from past atmospheric nuclear weapons tests around the world. The overwhelming majority are from radionuclides that occur naturally.

Uranium-238, thorium-232, and uranium-235 are the initial members of three natural decay chains, shown schematically in Figures A.II-1 (uranium series), A.II-2 (thorium series), and A.II-3 (actinium series), respectively. Each of these chains begins with a radionuclide with a very long half-life (i.e., the time for half of the atoms present to decay) and ends with a stable isotope of lead. The intermediary radionuclides have half-lives of varying lengths, some in hundreds of thousands of years and some in microseconds.

A.II.2.1.4 Potential FEMP Contaminants

Uranium was processed at the FEMP. In nature, uranium consists of three principal isotopes: uranium-234 (0.0057 percent), uranium-235 (0.72 percent), and uranium-238 (99.27 percent) (EGG 1988). The principal material processed at the FEMP was uranium in which the percentages of uranium-235 varied from below the natural abundance (depleted) to 2.5 percent of the total uranium (2.5 percent enrichment). Most processed uranium was depleted (less than 0.2 percent U-235), and most was received as ores, ore concentrates, and metal.

Some of the uranium processed at the FEMP was material that had been recycled from other DOE facilities. This recycled uranium contained trace amounts of fission products (such as cesium-137 and technetium-99) and activation products (such as americium-241, neptunium-237, plutonium-239, and uranium-236). During the processing of recycled material, small quantities of fission products and activation products were released to the environment and may have contributed to contamination in the vicinity of the FEMP. Because they are expected to be seen only in very low concentrations and many are difficult to measure at low levels, it is not practical to analyze samples for all possible fission and activation products. At the FEMP, certain radionuclides that would serve as indicators of fission or activation products are chosen for analysis. These include cesium-137, strontium-90, technetium-99, plutonium-238, plutonium-239/240, and neptunium-237.

Uranium was also extracted from ore concentrates at the FEMP. Ore concentrates were produced at off-site facilities. During this process, much of the extraneous bulk was stripped away from the uranium component, leaving uranium and some associated constituents. This ore concentrate was then shipped to the FEMP. In addition to uranium, these materials contained the long-lived decay products of uranium-238 and uranium-235, including protactinium-231, actinium-227, uranium-234, thorium-230, radium-226, and lead-210, as well as members of the thorium decay series.

Thorium was also processed at the FEMP on several occasions, and the FEMP was used for a period of time for storage of DOE's thorium inventory from other sites (much of which remains at the FEMP). Natural thorium contains thorium-232, thorium-230, and thorium-228. Thorium-232 and thorium-228 belong to the thorium decay series, whereas thorium-230 is produced by the uranium decay series. Other than thorium-232, none of the nuclides in the thorium series have a half-life longer than approximately six years. This means that if any thorium-232 had been released during operation of the FEMP, its decay products would also be present in concentrations approaching that of thorium-232 after about 20 years. Thorium-232, radium-228, and thorium-228 are the only members of the decay series that have half-lives long enough to be found in the environment without their parent radionuclides also being present.

To characterize radiological contamination in OU3, 795 samples were collected and analyzed for elemental uranium and 19 radionuclides. Almost 89 percent of these samples were from solid media (acid brick, concrete chips, concrete cores, loose media, masonry chips. sediment, sludge, soil, and wood), while the remaining 85 samples were from liquid media and air filters. Detailed results of this sampling and analysis for the 20 radioactive constituents are presented in the following sections.

A.II.2.2 Americium-241

Americium-241 is a suspected contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of americium-241 introduced to the site was small compared to other radiological contaminants.

Americium-241 analyses were performed on 653 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the americium-241 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Americium-241 was detected in 36 percent of the samples, with values ranging over four orders of magnitude. The sample population includes a high number of samples (64 percent) that did not contain detectable levels of americium-241, implying that large areas of the OU may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-1, suggests the underlying distribution of the data may be lognormal.

Figure A.II-1 also depicts the Part B reference criteria for americium-241 in residential soil. Approximately 23 percent of all sample concentrations reported exceed this reference concentration.

Figure A.II-2 displays americium-241 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within media and between media. Loose media produced many of the higher americium-241 concentrations found, including the maximum detected concentration of 83 (pCi/g). The group of concrete samples collected below 1" display noticeably lower concentrations than other media samples, a fact which implies that americium-241 contamination may be a surface phenomenon in concrete.

A.II.2.3 Cesium-137

Cesium-137 is a known contaminant in metal made with reprocessed uranium and handled at the FEMP. Even though the amount of cesium-137 introduced to the site was very small, its prompt daughter product, barium-137m, emits a relatively high-energy gamma radiation. Potential short-term impacts to workers during remediation make cesium-137 a constituent of concern in OU3.

Cesium-137 analyses were completed on 694 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the

cesium-137 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Cesium-137 was detected in 28 percent of the samples, with detected values ranging over three orders of magnitude The sample population includes a high number of samples (72 percent) that did not contain detectable levels of cesium-137, implying that large areas of the OU may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-3, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis presented in Table A-II.1. The figure also depicts the Part B reference criteria for cesium-137 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility. This figure illustrates that all reported sample concentrations are between these reference concentrations. In addition, the Part B reference criteria for cesium-137 is below the detection limit.

Figure A.II-4 displays cesium-137 results grouped by the type of solid materials sampled. This presentation is useful in focusing attention on notable trends both within and between media. Acid brick produced the maximum detected concentration of Cesium-137 of 21 pCi/g. Most structural media yielded cesium-137 concentrations in excess of the appropriate media baseline.

A.II.2.4 Lead-210

Lead-210 is a daughter product of radium-226 and a contaminant in ore concentrates and residues handled at the FEMP. Lead-210 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Lead-210 analyses were performed on 678 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the lead-210 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Lead-210 was detected in 61 percent of the samples, with detected values ranging over five orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-5, suggests the underlying distribution may be lognormal and supports the statistical analysis provided in Table A.II-1. The figure also depicts various reference concentrations, such as the Part B reference criteria for lead-210 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility. The lead-210 sample population includes 441 samples that exceed the Part B reference criteria. This

figure also illustrates that the detection limit for this naturally occurring radionuclide exceeds its risk-based Part B reference criteria.

Figure A.II-6 displays lead-210 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within media and between media. Acid brick produced many of the higher lead-210 concentrations found, including the maximum detected concentration of 1750 pCi/g. Most structural media yielded lead-210 concentrations in excess of the appropriate media baseline.

A.II.2.5 Neptunium-237

Neptunium-237 is a suspected contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of neptunium-237 introduced to the site was quite small, compared to other radiological contaminants.

Neptunium-237 analyses were performed on 647 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the neptunium-237 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Neptunium-237 was detected in 36 percent of the samples, with detected values ranging over three orders of magnitude. Approximately 64 percent of the samples did not contain detectable levels of neptunium-237, implying that large areas of OU3 may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-7, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis provided in Table A.II-1. The figure also depicts the Part B reference criteria for neptunium-237 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility. Virtually all results exceed the risk-based Part B reference criteria. All results meet the criterion of the representative disposal facility.

Figure A.II-8 groups neptunium-237 results by solid media. This presentation focuses attention on notable trends, both within and between media. Loose media produced many of the higher neptunium-237 concentrations found, including the maximum detected concentration of 68 pCi/g.

A.II.2.6 Plutonium-238

Plutonium-238 is a suspected contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-238 introduced to the site was small compared to other radiological contaminants.

Plutonium-238 analyses were performed on 672 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the plutonium-238 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Plutonium-238 was detected in 43 percent of the samples, with values ranging over six orders of magnitude. Almost half of the samples collected did not contain detectable levels of plutonium-238, implying that large areas of the OU may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-9, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis provided in Table A.II-1.

The Figure A.II-9 also depicts the Part B reference criteria for plutonium-238 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility for this radionuclide as reference concentrations. Approximately 22 percent of all sample concentrations reported exceed the Part B reference criteria for residential soil, and all meet the disposal facility criterion.

Figure A.II-10 displays plutonium-238 results grouped by solid media sampled. This presentation focuses attention on notable trends both within and between media. Acid brick produced many of the higher plutonium-238 concentrations found, including the maximum detected concentration of 1300 pCi/g. The group of samples from the 6" depth of the concrete cores, asphalt, and soil display noticeably lower levels of plutonium-238 contamination than other media samples.

A.II.2.7 Plutonium-239/240

Plutonium-239/240 is a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-239/240 introduced to the site was quite small compared to other radiological contaminants.

Plutonium-239/240 analyses were performed on 674 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the plutonium-239/240 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Plutonium-239/240 was detected in 47 percent of the samples. The 319 detected values ranged over four orders of magnitude. The sample population includes 355 samples that did not contain detectable levels of plutonium-239/240, implying that large areas of the OU may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-11, suggests the underlying distribution of the data may be lognormal, and supports the statistical analysis presented in Table A.II-1. The figure also depicts the Part B reference criteria for plutonium-239/240 in residential soil and waste acceptance concentration criterion of the representative commercial disposal facility as various reference concentrations. Approximately 27 percent of all sample concentrations reported exceeded the Part B reference criteria for residential soil. All samples meet the disposal facility criterion of the representative commercial disposal facility.

Figure A.II-12 displays plutonium-239/240 results grouped by solid media sampled. This presentation is useful in focusing attention on notable trends within media and for making comparisons between media. Steel coatings produced the maximum detected concentration of 92 pCi/g. All media except soil and asphalt contributed some samples containing plutonium 239/240 concentrations between 10 and 100 pCi/g.

A.II.2.8 Plutonium-241

Plutonium-241 is a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of plutonium-241 introduced to the site was quite small compared to other radiological contaminants.

Plutonium-241 analyses were performed on 444 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the plutonium-241 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Plutonium-241 was detected in 31 percent of the samples, implying that large areas of the OU may be free of this contaminant. The detected values range over three orders of magnitude. Nearly 70 percent of the samples did not contain detectable levels of plutonium-241, implying large areas of the OU may be free of this contaminant. A log concentration-cumulative

probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-13, suggests the underlying distribution of the data may be lognormal, and supports the statistical analysis presented in Table A.II-1.

Figure A.II-13 also depicts the Part B reference criteria for plutonium-241. Approximately 12 percent of all sample concentrations reported exceeded the Part B reference criteria for residential soil.

Figure A.II-14 displays plutonium-241 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within media and between media. Acid brick chips produced the maximum detected concentration of 923 pCi/g. Steel coatings and loose media samples also produce many of the highest detected concentrations.

A.II.2.9 Polonium-210

Polonium-210 is a daughter product of radium-226 and a contaminant in ore concentrates and residues handled at the FEMP. Polonium-210 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Polonium-210 analyses were performed on 669 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the polonium-210 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Polonium-210 was detected in 88 percent of the samples. The detected values range over five orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-15, suggests the underlying distribution may be lognormal but that more than one population may be involved.

Figure A.II-15 also depicts the polonium-210 Part B reference criteria and the waste acceptance concentration criterion of the representative commercial disposal facility. All samples meet the disposal facility criterion for waste acceptance. About two-thirds of the results exceed the Part B reference criteria.

Figure A.II-16 displays polonium-210 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within and between media. Acid brick produced two of the higher polonium-210 concentrations found, including the maximum detected concentration of 2970 pCi/g. Most structural media yielded concentrations in excess of the appropriate media baselines.

A.II.2.10 Radium-226

Radium-226 is a known contaminant in ore residues and concentrates handled at the FEMP. Radium-226 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Radium-226 analyses were performed on 673 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the radium-226 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Radium-226 was detected in 90 percent of the samples. The detected values range over six orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-17, suggests the underlying distribution may be lognormal, and supports the statistical analysis presented in Table A.II-1.

Figure A.II-17 also depicts the waste acceptance concentration of the representative commercial disposal facility for radium-226 and the Part B reference criteria for radium-226 in residential soil as reference concentrations. One percent of sample results reported to date have radium-226 concentrations exceeding the disposal facility criterion. The detection limit is above the Part B reference criteria for radium-226 and its daughter in residential soil.

Figure A.II-18 displays radium-226 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within and between media. Steel coatings produced many of the higher radium-226 concentrations found, including the maximum detected concentration of 6,710 pCi/g. Most structural media produced concentrations that exceeded the appropriate media baseline.

A.II.2.11 Radium-228

Radium-228 is a known contaminant in ore concentrates and residues handled at the FEMP. Radium-228 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations. The geographic distribution of radium-228 throughout the site may also be augmented by another potential radium-228 source, the processing of thorium fuel, but the largest source of radium-228 at the FEMP was the ore processing operations.

Radium-228 analyses were performed on 677 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the radium-228 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Radium-228 was detected in 72 percent of the samples. The detected values range over five orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, in Figure A.II-19, suggests the underlying distribution may be lognormal but that more than one population may be involved, and supports the statistical analysis presented in Table A.II-1.

Figure A.II-19 also presents the radium-228 waste acceptance concentration of the representative commercial disposal facility and the Part B reference criteria for radium-228 in residential soil as reference concentrations. About 50 percent of the sample concentrations exceed the radium-226 Part B reference criteria, whereas one percent of the samples have radium-228 concentrations exceeding the disposal facility criterion.

Figure A.II-20 displays radium-228 results grouped by solid media sampled. This presentation focuses attention on notable trends, both within and between media. All media produced concentrations that exceed the appropriate baseline for radium-228. Concrete chips produced many of the higher radium-228 concentrations found, including the maximum detected concentration of 15,000 pCi/g.

A.II.2.12 Strontium-90

Strontium-90 is a known contaminant in reprocessed uranium metal handled at the FEMP. In general, the amount of strontium-90 introduced to the site was very small compared to other

radiological contaminants. Strontium-90 and its daughter yttrium-90 are beta emitters. Potential short-term impacts to workers during remediation of some facilities make strontium-90 a constituent of concern in OU3.

Strontium-90 analyses were performed on 675 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the strontium-90 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Strontium-90 was detected in 172 of the samples (25 percent), with detected values ranging over four orders of magnitude. About 75 percent of the samples did not contain detectable levels of strontium-90, implying that large areas of OU3 may be free of this contaminant. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-21, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-21 also depicts the Part B reference criteria for strontium-90 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility as reference concentrations. Approximately 94 percent of the samples have strontium-90 concentrations below the Part B reference criteria for residential soil. All samples meet the disposal facility's concentration-based criterion for waste acceptance.

Figure A.II-22 depicts strontium-90 results, by media, in graphical form. This presentation focuses attention on notable trends, both within and between media. Loose media and concrete chips produced many of the higher strontium-90 concentrations found, including the maximum detected concentration of 140 pCi/g in loose media.

A.II.2.13 Technetium-99

Technetium-99 is a known contaminant at the FEMP. The major source of technetium-99 is recycled uranium from the Hanford site. The best estimate of the amount of technetium-99 introduced to the site is 97kg (1650 curies). This fission product's mobility and long half-life requires its inclusion in the OU3 COC list.

Technetium-99 analyses were performed on 672 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the

technetium-99 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Technetium-99 was detected in 75 percent of the samples. The detected values range over six orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-23, suggests the underlying distribution may be lognormal but that more than one population may be involved and supports the statistical analysis presented in Table A.II-1.

Figure A.II-23 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility and the Part B reference criteria for technetium-99 in residential soil as reference concentrations. This figure illustrates that approximately 17 percent of the samples concentrations exceed the Part B reference criteria for technetium-99 in residential soil. All samples meet the disposal facility's concentration-based waste acceptance criterion.

Figure A.II-24 depicts technetium-99 results, by media sampled, in graphical form. Loose media sediment and concrete chips produced many of the higher technetium-99 concentrations found, including the maximum detected concentration of 13,000 pCi/g. Eight material types exceed the Part B reference criteria for technetium-99 concentrations.

A.II.2.14 Thorium-227

Thorium-227 is a daughter product of actinium-227, a constituent of ore and ore concentrates. Thorium-227 has a short half-life and will not be present for long in the environment unless it is accompanied by actinium-227. Thus, the presence of thorium-227 within OU3 can be taken as an indication of the presence of actinium-227. Actinium-227/thorium-227 was separated from the uranium product and remained in the ore residues handled by the FEMP. Thorium-227 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations.

Thorium-227 analyses were performed on 97 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the thorium-227 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Thorium-227 was detected in 57 percent of the samples, with detected values ranging over two orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding

detected values. A qualitative analysis, provided in Figure A.II-25, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-25 also provides the Part B reference criteria as a reference point. The thorium-227 detection limit exceeds its Part B reference criteria by an order of magnitude.

Figure A.II-26 depicts thorium-227 results, by media sampled, in graphical form. This presentation is useful in focusing attention on notable trends within media and for making comparisons between media. Steel coatings produced many of the higher thorium-227 concentrations found, including the maximum detected concentration of 80 pCi/g. The higher values are found in surface samples, taken from structural media, a fact which implies that elevated levels of actinium-227/thorium-227 are scattered throughout the surfaces of structural media of components with a history of handling ore.

A.II.2.15 Thorium-228

Thorium-228 is a known contaminant in ore residues handled at the FEMP. Thorium-228 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations. The geographic distribution of thorium-228 throughout the site may also be augmented by another potential source, the processing of thorium fuel, but the largest source of thorium-228 at the FEMP was the ore processing operations.

Thorium-228 analyses were performed on 671 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the thorium-228 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Thorium-228 was detected in 80 percent of the samples. The detected values range over four orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-27, suggests more than one sample population is present but the underlying distribution may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-27 also depicts the Part B reference criteria for thorium-228 in residential soil and the waste acceptance concentration criterion of the representative commercial disposal facility as reference concentrations. The detection limit of thorium-228 exceeds its Part B reference criteria by over one

order of magnitude. All but two percent of the samples meet concentration-based disposal facility criterion.

Figure A.II-28 depicts thorium-228 results, by media sampled, in graphical form. Surface concrete, including both chips and the two upper levels of cores, produced many of the higher thorium-228 concentrations found, including the maximum detected concentration of 8,950 pCi/g, which exceeds the disposal facility criterion. This information indicates that off-site disposal at a licensed NORM (naturally occurring radioactive material) facility such as Envirocare's Clive, Utah, facility may not be an option for some small fraction of this waste. All media types contain concentrations that exceed the Part B reference criteria.

A.II.2.16 Thorium-230

Thorium-230 is a known contaminant in ore residues and concentrates handled at the FEMP. Thorium-230 contamination attributable to ore processing operations is expected in older areas of the site which housed the ore preparation and uranium extraction operations. The geographic distribution of thorium-230 throughout the site may also be augmented by another potential thorium-230 source, the processing of thorium fuel, but the largest source of thorium-230 at the FEMP was the ore processing operations.

Thorium-230 analyses were performed on 670 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the thorium-230 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Thorium-230 was detected in 88 percent of the samples. The detected values range over four orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-29, suggests the underlying distribution may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-29 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility for thorium-230 and its Part B reference criteria in residential soil as reference concentrations. About 40 percent of sample results exceed the Part B reference criteria for thorium-230 in residential soil. All sample concentrations meet concentration-based criterion of the disposal facility.

Figure A.II-30 depicts thorium-230 results, by media sampled, in graphical form. This presentation is useful in focusing attention on notable trends within media and for making comparisons between media. Steel coating samples produced many of the higher thorium-230 concentrations found, including the maximum detected concentration of 5,600 pCi/g. Most structural media such as concrete and steel coatings, exceed the Part B reference criteria for residential soil.

A.II.2.17 Thorium-232

Thorium-232 is a major component of thorium metal handled at the FEMP. Thorium-232 contamination attributable to fuel pellet processing operations is expected in areas of the site which housed the fuel-handling operations and those areas used to store thorium. The geographic distribution of thorium-232 throughout the site may also be augmented by another potential thorium-232 source, the processing of uranium ore.

Thorium-232 analyses were performed on 670 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the thorium-232 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Thorium-232 was detected in 81 percent of the samples. The detected values range over five orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-31, suggests more than one sample population may be included, but the underlying distribution may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-31 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility for thorium-232 and its Part B reference criteria in residential soil as reference concentrations. About 20 percent exceed the Part B reference criteria for thorium-232 in residential soil. Only one percent of sample concentrations exceed the concentration-based criterion of the disposal facility.

Figure A.II-32 depicts thorium-232 results, by media sampled. Concrete samples taken within one inch of the surface produced many of the higher thorium-232 concentrations found, including the maximum detected concentration of 1270 pCi/g. Most structural media yielded concentrations exceeding the Part B reference criteria for residential soil.

A.II.2.18 Uranium

Three naturally occurring isotopes comprise the environmental uranium found at the FEMP: uranium-234, uranium-235, and uranium-238. One additional anthropogenic isotope of uranium, uranium-236, associated with reprocessed fuel handling, is occasionally found in trace amounts in some places on the site.

A.II.2.18.1 Elemental Uranium

Total uranium analyses were performed on 709 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the elemental uranium results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Elemental uranium was detected in almost all (97 percent) of the samples. The detected values range over seven orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-33, suggests the underlying distribution may be lognormal, and supports the statistical analysis presented in Table A.II-1.

Figure A.II-33 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility for uranium, the source material definition from 10 CFR 20 (REF), and the Part B reference criteria. These provide points of reference that aid in describing the data. It is also interesting to note that 59 percent of the samples collected in OU3 qualify as source material under 10 CFR 20. All of the concentrations exceed the Part B reference criteria for uranium in residential soil. Approximately two or three percent of the concentration results exceed the commercial disposal facility criterion.

Figure A.II-34 depicts elemental uranium results, by media sampled. Loose media, sediment, concrete chips, and steel coatings contain some of the higher concentrations encountered, including the maximum detected concentration of 520,000 pCi/g. All the media considered exceeded the Part B reference criteria. Concrete chips, loose media, and sediment exceed the commercial disposal facility criterion.

A.II.2.18.2 Uranium-234

Uranium-234 analyses were performed on 680 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the

uranium-234 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Uranium-234 was detected in 88 percent of the samples. The detected values range over seven orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-35, suggests the underlying distribution may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-35 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility and the Part B reference criteria as reference concentrations. Over 75 percent of the sample concentrations exceed Part B reference criteria. Less than one percent of the samples fail to meet the disposal facility's concentration-based criterion.

Figure A.II-36 depicts uranium-234 results, by media sampled. Loose media produced many of the higher uranium-234 concentrations found, including the maximum detected concentration of 210,000 pCi/g. Ten materials exceed the concrete baseline.

A.II.2.18.3 Uranium-235/236

Uranium-235/236 analyses were performed on 668 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the uranium-235/236 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Uranium-235/236 was detected in 83 percent of the samples. The detected values range over six orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-37, suggests the underlying distribution may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-37 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility for uranium 235/236 and its Part B reference criteria as reference concentrations. The detection limit for uranium 235/236 exceeds its Part B reference criteria in residential soil. About five percent of the samples exceed the disposal facility's concentration-based acceptance criterion.

Figure A.II-38 depicts uranium-235/236 results, by media sampled. Masonry chips produced many of the higher uranium-235/236 concentrations found, including the maximum detected concentration of 27,000 pCi/g. All materials yield concentrations that exceed the Part B reference criteria.

A.II.2.18.4 Uranium-238

Uranium-238 analyses were performed on 663 solid media samples. These samples were collected as part of a positively biased sampling program. Table A.II-1 presents summary statistics for the uranium-238 results reported by this study. Table A.II-2 presents the number of detections found above established criteria. Uranium-238 was detected in 90 percent of the samples. The detected values range over six orders of magnitude. A log concentration-cumulative probability plot of the data was created by ranking results from all samples and plotting results from samples yielding detected values. A qualitative analysis, provided in Figure A.II-39, suggests the underlying distribution of the data may be lognormal and supports the statistical analysis presented in Table A.II-1.

Figure A.II-39 also depicts the waste acceptance concentration criterion of the representative commercial disposal facility for uranium-238 and its Part B reference criteria in residential soil as reference concentrations. This figure illustrates that the detection limit for uranium-238 is above its Part B reference criteria. Two percent of sample concentrations exceed the disposal facility's concentration-based acceptance criterion.

Figure A.II-40 depicts uranium-238 results, by media. Loose media produced many of the higher uranium-238 concentrations found, including the maximum detected concentration of 180,000 pCi/g. All media types exceed the Part B reference criteria for uranium-238 in residential soil.

A.II.3 INORGANICS

Several inorganic chemicals were used at the FEMP and are therefore expected contaminants in OU3. Inorganic contaminants were analyzed in 643 major media samples (acid brick - 19 samples, asphalt - 4 samples, concrete chips - 154 samples, concrete cores - 256 samples, masonry chips - 65 samples, steel coatings - 134 samples, and transite - 11 samples) and 85 supplemental media samples (air filters, loose media, sediment, sludge, soil, and wood). The following sections discuss the frequency of detections and relative levels of detections for each inorganic contaminant analyzed in OU3 materials.

A.II.3.1 Aluminum

Aluminum is the most abundant metal (8.1 percent) in the earth's crust. It is also a trace constituent in concrete (up to a baseline level of 5040 milligrams per kilogram (mg/kg) at the FEMP) and is a constituent of coal and the resulting flyash when the coal is burned. Aluminum was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.01 to 0.35 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process. Hydrated alumina (Al_2O_3) also was used to complex fluoride in the refining process, and some fuel rods processed at the FEMP were clad with an aluminum alloy.

As depicted on Figure A.II-41 and shown on Table A.II-1, aluminum was detected in 98 percent (711 of 722) of solid media samples, with concentrations ranging from 43 to 150,000 mg/kg. The geometric mean of all aluminum results is 4660 mg/kg. The maximum concentration of aluminum was found in a loose media sample collected from the Metal Dissolver Building (2D). The next 17 highest concentrations were detected in steel coating samples. As reference points, approximately 55 percent of these aluminum results were at or below the OU3 baseline level for concrete (5040 mg/kg), and approximately 93 percent were at or below the OU3 baseline level for steel coatings (14,400 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of aluminum in OU3 is further confirmed by its detection in 54 of 91 unknown liquid samples, with concentrations ranging from 27.4 to 148,000 micrograms per liter (μg/L) (average of 7040 μg/L).

Figure A.II-42 depicts the aluminum contamination by media. As indicated, aluminum was detected in several samples of all sampled media, with the highest concentrations detected in loose media and steel coatings.

Since aluminum is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.3.2 Antimony

Antimony is not an abundant metal in the earth's crust but it is found in more than 100 minerals. It is also a trace constituent of concrete (up to a baseline level of 1.0 mg/kg at the FEMP). Antimony is also a minor impurity in uranium ores and ore concentrates ranging from 0.001 to 0.002 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-43 and shown on Table A.II-1, antimony was detected in 26 percent (151 of 589) of the samples of solid media, with concentrations ranging from 0.83 to 393 mg/kg. The median of all antimony results is 9.3 mg/kg. Of the 12 highest reported concentrations of antimony, 11 were detected in steel coatings, with the maximum concentration detected in a sample collected from the Metals Production Plant (5A). As reference points, approximately 82 percent of these antimony results were at or below the Part B reference criteria (11.0 mg/kg), approximately 75 percent were at or below the OU3 baseline level for concrete (1.0 mg/kg), and approximately 97 percent were at or below the OU3 baseline level for steel coatings (109 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The limited presence and relatively low levels of antimony in OU3 are further confirmed by its detection in only 7 of 90 unknown liquid samples, with concentrations ranging from 4.3 to 62.2 μg/L (average of 61.9 μg/L).

Figure A.II-44 depicts the antimony contamination by media. As indicated, antimony was detected in all sampled media except asphalt and lower depths of concrete. The highest concentrations were detected in loose media and steel coatings, where this analyte is also the most abundant.

Antimony is a COC because 18 percent of the results were above the Part B reference criteria, indicating a potential concern with direct contact. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no waste acceptance criteria (WAC) for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganic COCs and is not further discussed in Section 3.0.

A.II.3.3 Arsenic

Arsenic is a trace element in the earth's crust and has been used in agricultural insecticides and poisons. It is a trace constituent of concrete (up to a baseline level of 3.96 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Arsenic was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 0.80 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-45 and shown on Table A.II-1, arsenic was detected in 87 percent (635 of 726) of the samples of solid media, with concentrations ranging from 0.23 to 2690 mg/kg. The geometric mean of all arsenic results is 5.0 mg/kg. The maximum concentration of arsenic was found in a wood sample collected from the Electrical Panels & Transformer (16C). The next three highest

arsenic concentrations were detected in loose media and steel coating samples collected from the Green Salt Plant (4A). As a reference point, all of the detected arsenic results were above the Part B reference criteria (0.037 mg/kg). Arsenic has a TCLP limit of 5 milligrams per liter (mg/L) in the leachate. Concentrations of 11 samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous. Table A.II-2 presents the number of detections found above established criteria. The presence of arsenic in OU3 at levels of concern is further confirmed by its detection in 29 of 91 unknown liquid samples, with concentrations ranging from 0.89 to 43.7 μg/L (average of 4.52 μg/L).

The 11 samples in which arsenic concentrations exceeded 20 times the TCLP limit (100 mg/kg) include five steel coatings samples (with concentrations ranging from 109 to 227 mg/kg), four loose media samples (with concentrations ranging from 110 to 246 mg/kg), one sediment sample (with a concentration of 140 mg/kg), and the wood sample. No concrete, masonry, or acid brick samples exceeded 20 times the TCLP limit for arsenic.

The steel coatings samples which exceeded 20 times the TCLP limit were collected from the Preparation Plant (1A), the Green Salt Plant (4A), the Recovery Plant (8A), the Incinerator Building (39A), and the Pilot Plant Warehouse (68). The sediment samples were collected from the Ore Refinery Plant (2A), the Metal Dissolver Building (2D), and the Green Salt Plant (4A) (two samples); the loose media sample was collected from the Coal Pile Runoff Basin (18C); and the wood was collected from the Electrical Panels and Transformers (16C).

Eight of these 11 samples exceeding 20 times the TCLP limit were collected from components located in the process buildings component category. One each was collected from the warehouse/storage buildings, the ponds and basins, and the aboveground piping.

Figure A.II-46 depicts the arsenic contamination by media. As indicated, arsenic was detected in all sampled media, at the highest levels in loose media and steel coatings. Arsenic was detected at consistently high levels in steel coatings.

Arsenic is a COC and, because of the number and frequency of the major media samples exceeding the TCLP limit, is considered *more significant* compared to other inorganic COCs and is further discussed in Appendix A and Section 3.0.

A.II.3.4 Barium

Barium is a trace element in the earth's crust. It is a trace constituent in concrete (up to a baseline level of 50.4 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Barium carbonate was used in thorium extractions in the Pilot Plant. Barium compounds also were involved in operations at the Preparation Plant (1A), the Graphite Furnace and Oil Burner (10D), the Coal Pile (P-005), and the Laboratory (15A).

As depicted on Figure A.II-47 and shown on Table A.II-1, barium was detected in 98 percent (720 of 733) of the samples of solid media, with concentrations ranging from 3.3 to 23,700 mg/kg (geometric mean of 109 mg/kg). The 12 highest concentrations of barium were detected in steel coatings samples, with the maximum concentration detected in a sample collected from the High Nitrate Storage Tank (18M). As reference points, 5 percent of the detected results for barium were above the Part B reference criteria (1900 mg/kg), approximately 32 percent were at or below the OU3 baseline level for concrete (50 mg/kg), and 96 percent were at or below the OU3 baseline level for steel coatings (3300 mg/kg). Barium has a TCLP limit of 100 mg/L in the leachate. Concentrations of 33 samples exceeded 20 times the TCLP limit (2000 mg/kg) and are therefore potentially hazardous. Table A.II-2 presents the number of detections found above established criteria. The presence of barium in OU3 at levels of concern is further confirmed by its detection in 79 of 90 unknown liquid samples, with concentrations ranging from 3.2 to 10,300 μg/L (average of 257 μg/L).

The 33 samples in which the barium concentration exceeded 20 times the TCLP limit (2000 mg/kg) include 24 steel coatings samples (with concentrations ranging from 2670 to 23,700 mg/kg), five concrete samples (with concentrations ranging from 3000 to 5890 mg/kg), two loose media samples (with concentrations of 2850 and 4080 mg/kg), one masonry sample (with a concentration of 3820 mg/kg), and one sediment sample (with a concentration of 2690 mg/kg). No acid brick samples exceeded 20 times the TCLP limit for barium.

The components with the most samples exceeding 20 times the TCLP limit in the steel coatings were the Metals Production Plant (5A) with four; the Incinerator Building (39A) and the Heavy Equipment Building (46) with three each; and the Drum Reconditioning Building (66) and the Metals Fabrication Plant (6A) with two each. All of the concrete samples exceeding 20 times the TCLP limit for barium were taken from the top half inch of concrete. Three of the five concrete samples exceeding 20 times the TCLP limit were collected from the Recovery Plant (8A); the remaining concrete samples were collected from the Special Products Plant (9A) and the Sump Pump House (13C). The single

masonry sample exceeding 20 times the TCLP limit was collected from the Engine House/ Garage (31A).

Of the 33 samples exceeding 20 times the TCLP limit, 23 were collected from the process buildings component category; three were collected from the process support buildings category, all from the Heavy Equipment Building (46); two samples each were collected from the warehouse/storage buildings and the aboveground containers categories; and one sample each was collected from the administrative buildings, aboveground piping, utilities and equipment, and belowground piping, utilities, and equipment categories.

Figure A.II-48 depicts the barium contamination by media. As indicated, barium was detected in all sampled media, with the highest concentrations and most consistently high concentrations in steel coatings.

Barium is a COC and, because of the number and frequency of the major media samples exceeding the TCLP limit, is considered *more significant* compared to other inorganic COCs and is further discussed in Appendix A and Section 3.0.

A.II.3.5 Beryllium

Beryllium is a trace element in the earth's crust, being found in some 30 minerals. It is a trace constituent in concrete (up to a baseline level of 1.40 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned.

As depicted on Figure A.II-49 and shown on Table A.II-1, beryllium was detected in 29 percent (199 of 698) of the samples of solid media, with concentrations ranging from 0.03 to 56.3 mg/kg (median of 0.41 mg/kg). The two highest concentrations of beryllium were detected in loose media, and the maximum concentration was detected in a sample collected from the Special Products Plant (9A). As reference points, 100 percent of detected beryllium results were above the Part B reference criteria (0.015 mg/kg), approximately 93 percent of all results were at or below the OU3 baseline level for concrete (1.40 mg/kg), and approximately 92 percent were at or below the OU3 baseline value for steel coatings (1.10 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The limited presence and relatively low levels of beryllium in OU3 are further confirmed by its detection in only 15 of 87 unknown liquid samples, with concentrations ranging from 1.2 to 49 μg/L (average of 3.5 μg/L).

Figure A.II-50 depicts the beryllium contamination by media. As indicated, beryllium was detected in all sampled media except asphalt, with the highest concentrations in loose media.

Beryllium is a COC because 100 percent of the detected results exceed the Part B reference criteria, indicating a potential concern with direct contact. However, it was only detected in 29 percent of the solid samples collected from OU3, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other inorganic COCs and is not further discussed in Section 3.0.

A.II.3.6 Cadmium

Cadmium is a trace element in the earth's crust, most often associated with zinc ores. Its sulfide salt is used as a yellow pigment in paints. It is also a trace constituent in concrete (up to a baseline level of 2.40 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Cadmium was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.006 to 0.007 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-51 and Table A.II-1, cadmium was detected in 42 percent (305 of 732) of the solid media samples, with concentrations ranging from 0.11 to 558 mg/kg. The median of all cadmium results is 1.2 mg/kg. The 13 highest concentrations of cadmium were detected in steel coatings samples, with the highest three concentrations collected from the Incinerator Building (39A). As reference points, approximately 80 percent of these cadmium results were at or below the Part B reference criteria (14.0 mg/kg), approximately 75 percent were at or below the OU3 baseline level for concrete (2.40 mg/kg), and approximately 98 percent were at or below the OU3 baseline level for steel coatings (66.5 mg/kg). Cadmium has a TCLP limit of 1.00 mg/L in the leachate. Concentrations of 44 samples exceeded 20 times the TCLP limit (20 mg/kg) and are therefore potentially hazardous. Table A.II-2 presents the number of detections found above established criteria. The presence of cadmium in OU3 is further confirmed by its detection in 25 of 91 unknown liquid samples, with concentrations ranging from 1.4 to 351 μg/L (average of 17.5 μg/L).

The 44 samples in which the cadmium concentrations exceeded 20 times the TCLP limit (20 mg/kg) include 37 steel coatings samples (with concentrations ranging from 20.5 to 558 mg/kg), four loose

media samples (with concentrations ranging from 20.5 to 62.4 mg/kg), one concrete chip sample (with a concentration of 29.4 mg/kg), one masonry sample (with a concentration of 21.0 mg/kg), and one sediment sample (with a concentration of 28.4 mg/kg). No acid brick samples exceeded 20 times the TCLP limit for cadmium.

The five components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Incinerator Building (39A), the Pilot Plant Wet Side (13A), and the Main Maintenance Building (12A) with four each; and the Ore Refinery Plant (2A) and the Green Salt Plant (4A) with three each. The single concrete chip sample exceeding 20 times the TCLP limit was collected from the Recovery Plant (8A), and the single masonry sample was collected from the Service Building (11).

Of the 44 samples exceeding 20 times the TCLP limit, 27 were collected from the process buildings, six samples were collected from the process support buildings, four samples were collected from the warehouse/storage buildings; two samples each were collected from the above-ground containers and the belowground piping, utilities, and equipment; and one sample each was collected from the administrative buildings, the storage pads, and the aboveground piping, utilities, and equipment component categories.

Figure A.II-52 depicts the cadmium contamination by media. As indicated, cadmium was detected in all media sampled, with the highest concentrations detected in steel coatings.

Because cadmium is a COC and because of the number and frequency of major media samples exceeding the TCLP limit, it is considered *more significant* compared to other inorganic contaminants and is further discussed in Appendix A and Section 3.0.

A.II.3.7 Calcium

Calcium is the fifth most abundant element in the earth's crust and is a major constituent in concrete (up to a baseline level of 199,000 mg/kg at the FEMP). Calcium metal was used to reduce thorium tetrafluoride (ThF_4) to metallic thorium in the Pilot Plant and in Plant 9. Lime (calcium oxide - CaO) was used extensively throughout the process in the General Sump to precipitate metals prior to discharge of wastewater and in the softening of water at the Boiler House. Calcium carbonate also was used in heat-treating salt baths and was an impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.05 to 2.18 percent (DOE 1994a). However, the

impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-53 and shown on Table A.II-1, calcium was detected in 98 percent (706 of 722) of the solid media samples collected from OU3, with concentrations ranging from 164 to 663,000 mg/kg. The geometric mean of all calcium results is 77,300 mg/kg. The maximum concentration of calcium was detected in a sediment sample from the Plant 5 Electrical Substation (5C). As a reference point, approximately 85 percent of all calcium results were at or below the OU3 baseline level for concrete (199,000 mg/kg), and approximately 25 percent were at or below the OU3 baseline level for steel coatings (43,400 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of calcium is further confirmed by its detection in 90 of 91 unknown liquid samples, with concentrations ranging from 8810 to 2,090,000 μg/L (average of 114,000 μg/L).

Figure A.II-54 depicts the calcium contamination by media. As indicated, calcium was detected in all media with the highest concentrations detected in sediment. Since calcium is not a COC and has no WAC governing its on-property or off-site disposal, it is not further discussed in Appendix A or in Section 3.0.

A.II.3.8 Chromium

Chromium is a trace element in the earth's crust, and lead chromate is used as a pigment in paints. Chromium is a trace constituent in concrete (up to a baseline level of 8.15 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Chromium compounds were used as a biocide in the treatment of cooling-tower water at the FEMP. Chromium is a major constituent in stainless steel, which was used in many of the wet process areas. Chromium was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 0.045 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-55 and shown on Table A.II-1, chromium was detected in 89 percent (653 of 733) of solid media samples collected from OU3, with concentrations ranging from 1 to 17,300. The geometric mean of all chromium results is 35 mg/kg. The 48 highest concentrations of chromium were detected in steel coatings, with the maximum concentration detected in the same sample collected from the Metals Production Plant (5A) that contained the highest antimony

concentration. As reference points, approximately 76 percent of all chromium results were at or below the Part B reference criteria (137 mg/kg), approximately 30 percent of all results were at or below the OU3 baseline level for concrete (8.15 mg/kg), and approximately 95 percent of all results were at or below the OU3 baseline level for steel coatings (4540 mg/kg). Chromium has a TCLP limit of 5.0 mg/L in the leachate. Concentrations of chromium in 175 samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous. Table A.II-2 presents the number of detections found above established criteria.

The 175 samples in which the chromium concentration exceeded 20 times the TCLP limit consisted of 123 steel coatings samples (with concentrations ranging from 115 to 17,300 mg/kg), 21 loose media samples (with concentrations ranging from 111 to 3210 mg/kg), 10 sediment samples (with concentrations ranging from 114 to 857 mg/kg), eight concrete core samples (with concentrations ranging from 102 to 424 mg/kg), five concrete chip samples (with concentrations ranging from 169 to 640 mg/kg), three masonry samples (with concentrations from 306 to 407 mg/kg), two acid brick samples (with concentrations of 127 and 189 mg/kg), and one air filter (with a concentration of 197 mg/kg), one transite (with a concentration of 358 mg/kg, extrapolated from the TCLP leachate result), and one wood (with a concentration of 2,740 mg/kg). As previously discussed, the loose media and sediment are not part of the decision-making process of this RI/FS. The six components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Recovery Plant (8A) with 15; the Metals Production Plant (5A) with nine; and the Preparation Plant (1A), the Metals Fabrication Plant (6A), the Special Products Plant (9A), and the Six to Four Reduction Plant #1 (54A) with seven each.

The Six to Four Reduction Facility #1 (54A) has a chromium concentration exceeding 20 times the TCLP limit in a depth of 4.0 inches in the concrete core sample collected. Three components, the Old Cooling Water Tower (3K), the Nuclear Fuel Services Storage and Pump House (2E), and the Metals Fabrication Plant (6A), have chromium concentrations exceeding 20 times the TCLP limit in depths to 1.0 inch in the concrete core samples collected. The NFS Storage and Pump House (2E), the Old Cooling Water Tower (3K), the Ore Refinery Plant (2A), and the Ozone Building (3B) all had chromium concentrations exceeding 20 times the TCLP limit in the top one-half inch depth of the concrete core samples. Concrete chip samples from the Pilot Plant Thorium Tank Farm (13D), the Boiler Plant (10A), the Cooling Towers (20C), and the Recovery Plant (8A) also showed chromium concentrations above 20 times the TCLP limit. The acid brick samples were collected from the Special Products Plant (9A) and the Pilot Plant Wet Side (13A). Two of the three masonry samples

were collected from the Special Products Plant (9A) with the third collected from the Recovery Plant (8A).

Of the 175 samples exceeding 20 times the TCLP limit, 107 were collected from the process buildings; 26 of the samples were collected from the process support buildings; 13 were collected from the warehouse buildings; seven were collected from the aboveground containers; six each were collected from the below-ground piping, utilities, and equipment; six each were collected each from the aboveground piping; and from the ponds and basins; three were collected from the administrative buildings; and one was collected from the storage pads. The presence of chromium in OU3 is further confirmed by its detection in 32 of 91 unknown liquid samples, with concentrations ranging from 5.8 to 4190 μg/L (average of 200 μg/L).

Figure A.II-56 depicts the summary of contamination by media sampled for the chromium. As indicated, chromium was detected in all sampled media with the highest levels in steel coatings.

Because chromium is a COC and because of the number and frequency of the major media samples exceeding the TCLP limit, it is considered *more significant* compared to other inorganic contaminants and is further discussed in Appendix A and Section 3.0.

A.II.3.9 Cobalt

Cobalt is a trace element in the earth's crust often associated with nickel, silver, lead, copper, and iron ores. It is a trace constituent in concrete (up to a baseline level of 2.89 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Cobalt was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 0.004 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-57 and Table A.II-1, cobalt was detected in 68 percent (488 of 722) of the solid media samples collected from OU3, with concentrations ranging from 0.47 to 588 mg/kg. The geometric mean of all cobalt results is 7.26 mg/kg. The maximum concentration of cobalt was found in the same steel coatings sample collected from the Plant 5 Electrical Substation (5C) in which the highest concentration of calcium was detected. As reference points, all cobalt results were below the Part B reference criteria (1600 mg/kg), approximately 50 percent of all results were at or below the OU3 baseline level for concrete (2.89 mg/kg), and approximately 99 percent of all results were at or

below the OU3 baseline level for steel coatings (253 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of cobalt is further confirmed by its detection in 23 of 91 unknown liquid samples ranging from 3.4 to 324 μg/L (average of 24.9 μg/L).

Figure A.II-58 depicts the summary of contamination by media sampled for the analyte cobalt. As indicated, cobalt was detected in all sampled media, with the highest concentrations detected in steel coatings.

Since cobalt is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.3.10 Copper

Copper is a trace element in the earth's crust although it is found in many minerals. It is a trace constituent in concrete (up to a baseline level of 11.1 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Copper was present in Zircalloy-2 cladding from the coextrusions sections received from Hanford, which were dissolved during processing in Plant 9. Copper sulfate also was used in the WINLO process in Plant 8 in the conversion of black oxide (uranium dioxide - UO_2) to uranium tetrafluoride (UF_4). Copper components are also part of most electrical switchgear assemblies. Copper was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 0.20 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-59 and Table A.II.1, copper was detected in 86 percent (612 of 714) of solid media samples collected from OU3, with concentrations ranging from 2 to 26,300 mg/kg. The geometric mean of all copper results is 32.9 mg/kg. The maximum concentration of copper was found in a loose media sample collected from the Green Salt Plant (4A). As reference points, approximately 97 percent of all copper results were at or below the Part B reference criteria (1000 mg/kg), approximately 39 percent of all results were at or below the OU3 baseline level for concrete (11.1 mg/kg), and approximately 90 percent of all results were at or below the OU3 baseline level for steel coatings (319 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of copper in OU3 is further confirmed by its detection in 58 of 91 unknown liquid samples, with concentrations ranging from 3.7 to 18,200 μg/L (average of 800 μg/L).

Figure A.II-60 depicts the summary of contamination by media sampled for the analyte copper. As indicated, copper was detected in all sampled media, with the highest concentrations detected in loose media.

Copper is a COC because three percent of all results were above the Part B reference criteria; however, there is no WAC for its on-property or off-site disposal. Therefore, copper is considered to be *not as significant* compared to other inorganic compounds and is not further discussed in Appendix A or Section 3.0.

A.II.3.11 Iron

Iron is relatively abundant in the universe, is the fourth most abundant metal in the earth's crust, and is a major constituent in concrete (up to a baseline level of 10,400 mg/kg at the FEMP). Iron was also an impurity in uranium ores and ore concentrates used at the FEMP, with concentrations from 0.02 to 4.14 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-61 and Table A.II-1, iron was detected in 99 percent (717 of 722) of all solid media samples collected from OU3, with concentrations ranging from 76.4 to 486,000 mg/kg. The geometric mean of all iron results is 13,600 mg/kg. The maximum concentration of iron was found in a steel coatings sample collected from the Metals Fabrication Plant (6A). As reference points, approximately 61 percent of all iron results were at or below the OU3 baseline level for concrete (10,400 mg/kg), and 93 percent of all results were at or below the OU3 baseline level for steel coatings (130,000 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of iron in OU3 is further confirmed by its detection in 72 of 91 unknown liquid samples, with concentrations ranging from 34.6 to 492,000 μg/L (average of 31,700 μg/L).

Figure A.II-62 depicts the summary of contamination by media sampled for the analyte iron. As indicated, iron was detected in all sampled media, with the highest levels in steel coatings.

Since iron is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.3.12 Lead

Lead is rare in nature but is a trace constituent in concrete (up to a baseline level of 3.42 mg/kg at the FEMP). Lead (lead dioxide) is used in storage batteries, and lead compounds have been used extensively in paints. At the FEMP, lead, as lead oxide, was an impurity in uranium ores and ore concentrates, with concentrations ranging from 0.09 to 4.78 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-63 and on Table A.II.1, lead was detected in 90 percent (658 of 731) of solid media samples collected from OU3, with concentrations ranging from 0.54 to 375,000 mg/kg. The geometric mean for all lead results is 77.3 mg/kg The maximum concentration of lead was found in a steel coatings sample collected from the Metals Production Plant (5A). Ten other steel coatings samples collected from this component also exceeded 20 times the TCLP limit (100 mg/kg). Another component, the Recovery Plant (8A), had 16 steel coatings samples which exceeded 20 times the TCLP limit. As reference points, approximately 17 percent of all lead results were at or below the OU3 baseline level for concrete (3.42 mg/kg), and 99 percent of all results were at or below the OU3 baseline level for steel coatings (239,000 mg/kg). Table A.II-2 presents the number of detections found above established criteria.

Lead has a TCLP limit of 5.0 mg/L in the leachate. Concentrations of lead in 247 samples exceeded 20 times the TCLP limit and are therefore potentially hazardous. The presence of lead in OU3 is further confirmed by its presence in 53 of 88 unknown liquid samples, with concentrations ranging from 1.2 to 13,500 μg/L (average of 330 μg/L).

These 247 samples consisted of 131 steel coatings samples (with concentrations ranging from 106 to 375,000 mg/kg), 34 loose media samples (with concentrations ranging from 117 to 10,300 mg/kg), 23 masonry samples (with concentrations ranging from 101 to 16,300 mg/kg), 21 concrete core samples (with concentrations ranging from 101 to 1210 mg/kg), 20 sediment samples (with concentrations ranging from 107 to 12,500 mg/kg), 13 concrete chip samples (with concentrations ranging from 130 to 2730 mg/kg), and five acid brick samples (with concentrations ranging from 153 to 518 mg/kg). As previously discussed, the loose media, sediment, and soil are not part of the decision-making process of this RI/FS. The seven components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Recovery Plant (8A) with 16; the Metals Production Plant (5A) with 10; the Six to Four Reduction Plant #1 (54A) with eight; the Preparation Plant (1A), the

Special Products Plant (9A), the Metals Fabrication Plant (6A) with seven each, and the Main Maintenance Building (12A) with six.

Two components, the Metals Fabrication Plant (6A) and the Pilot Plant Wet Side (13A), have lead concentrations exceeding 20 times the TCLP limit in depths to 1.0 inch in the concrete core samples collected. A third concrete core sample collected from the Pilot Plant Wet Side at a depth of 0.5 to 1.0 inch also exceeded 20 times the TCLP limit; however, the top half inch of the core sample did not. Two other components, the Preparation Plant (1A) and the Old Cooling Water Tower (3K), had lead concentrations exceeding 20 times the TCLP limit in the concrete core samples collected at depths of 0.5 to 1.0 inch; however the top half inch of the core sample did not. The Ore Refinery Plant (2A) had three samples from the top half inch of concrete which exceeded 20 times the TCLP limit. The Main Maintenance Building (12A), the Metals Production Plant (5A), and the Old North Tank Farm (19D) had two samples from the top half inch of concrete which exceeded 20 times the TCLP limit. Five other components also had one sample from the top half inch of concrete core samples collected which exceeded 20 times the TCLP limit.

Lead exceeded 20 times the TCLP limit in concrete chip samples collected in the top half inch in one component (the Pilot Plant Annex - 37) in three different samples. Concrete chip samples from three other components -- the Green Salt Plant (4A), the Metals Fabrication Plant (6A), and the Recovery Plant (8A) -- exceeded 20 times the TCLP limit in two different samples. Four other components also had one concrete chip sample which exceeded 20 times the TCLP limit.

The Six to Four Reduction Facility #1 (54A) had seven masonry samples which exceeded 20 times the TCLP limit for lead. The Pilot Plant Annex (37) had four masonry samples which exceeded 20 times the TCLP limit. Two masonry samples from three other components -- the Incinerator Building (39A), the Main Maintenance Building (12A), and the Plant 8 Maintenance Building (8B) -- exceeded 20 times the TCLP limit. Six other components also had one masonry sample which exceeded 20 times the TCLP limit.

The five acid brick samples, which exceeded 20 times the TCLP limit for lead, were collected from the Ore Refinery Plant (2A - four samples) and the Metal Dissolver Building (2D - one sample).

Of the 247 samples exceeding 20 times the TCLP limit, 156 of the samples were collected from the process buildings; 36 of the samples were collected from the process support buildings; 12 of the

samples were collected from both the aboveground containers category and the ponds and basins; eleven of the samples were collected from the warehouse buildings and the ponds and basins; six of the samples were collected from the aboveground piping, utilities and equipment category; five each were collected from the storage pads category and from the belowground piping, utilities, and equipment category; three samples were collected from the administrative buildings; and one sample was collected from the bulk materials category.

Figure A.II-64 depicts the summary of contamination by media sampled for lead. As indicated, lead was detected in all sampled media, and at the highest levels in steel coatings.

Because lead is a COC and because of the number and frequency of the major media samples exceeding the TCLP limit, it is considered *more significant* compared to other inorganic contaminants and is further discussed in Appendix A and Section 3.0.

A.II.3.13 Magnesium

Magnesium is the eighth most abundant element in the earth's crust. It is a major constituent in concrete (up to a baseline level of 50,600 mg/kg at the FEMP), is a trace constituent of coal and the resulting flyash when the coal is burned, and is wide-spread in the environment. Magnesium metal was used extensively in Plant 5 at the FEMP to reduce UF_4 to uranium metal, with a by-product of magnesium fluoride (MgF_2), which was processed in Plant 8 to remove excess uranium. Magnesium was also an impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.09 to 3.24 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-65 and on Table A.II-1, magnesium was detected in 98 percent (709 of 722) of solid media samples collected from OU3, with concentrations ranging from 92.5 to 75,000 mg/kg. The geometric mean for all magnesium results is 18,500 mg/kg. The maximum concentration of magnesium (75,000 mg/kg) was found in a concrete chip sample collected from the Plant 8 Maintenance Building (8B). As reference points, all magnesium results were below the Part B reference criteria (270,000 mg/kg), approximately 88 percent of all results were at or below the OU3 baseline level for concrete (50,600 mg/kg), and 19 percent of all results were at or below the OU3 baseline level for steel coatings (6400 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of magnesium is further confirmed by its

detection in 87 of 91 unknown liquid samples, with concentrations ranging from 1130 to 852,000 μg/L (average of 37,500 μg/L).

Figure A.II-66 depicts the summary of contamination by media sampled for magnesium. As indicated, magnesium was detected in all sampled media, at the highest levels in concrete chips.

Since magnesium is not a COC and there is no WAC for its on-property or off-site disposal, it is not further discussed in Appendix A or Section 3.0.

A.II.3.14 Manganese

Manganese minerals are widely distributed, and manganese is used to improve the qualities of steel. It is a trace constituent in concrete (up to a baseline level of 343 mg/kg at the FEMP). Manganese was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.001 to 0.091 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-67 and on Table A.II.1, manganese was detected in 99 percent (717 of 722) of solid media samples collected from OU3, with concentrations ranging from 1.8 to 5560 mg/kg. The geometric mean for all manganese results is 320 mg/kg. The maximum concentration of manganese (5560 mg/kg) was found in a steel coatings sample collected from the Plant 4 Maintenance Building (4C). As reference points, approximately 8 percent of all manganese results were at or below the Part B reference criteria (140 mg/kg), approximately 58 percent of all results were at or below the OU3 baseline level for concrete (340 mg/kg), and 94 percent were at or below the OU3 baseline level for steel coatings (960 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of manganese is further confirmed by its detection in 70 of 91 unknown liquid samples, with concentrations ranging from 6.2 to 14,000 μg/L (average of 620 μg/L).

Figure A.II-68 depicts the summary of contamination by media sampled for the analyte manganese. As indicated, manganese was detected in all sampled media, at the highest levels in steel coatings.

Manganese is a COC; however, since there is no WAC for on-property of off-site disposal, it is considered *not as significant* compared to other inorganic compounds.

A.II.3.15 Mercury

Mercury is a trace element in the earth's crust, and mercuric sulfide is used as a pigment in paints. Mercury is a trace constituent in concrete (up to a baseline level of 0.03 mg/kg at the FEMP) and a trace constituent of coal and the resulting flyash when the coal is burned. Mercury was used in the dissolution of alloys in Plant 2/3, as well as in the Laboratory (15A).

As depicted on Figure A.II-69 and on Table A.II-1, mercury was detected in 42 percent (299 of 712) of solid media samples collected from OU3, with concentrations ranging from 0.024 to 223 mg/kg. The median of all mercury results is 0.1 mg/kg. The maximum concentration of mercury (223 mg/kg) was found in a sediment sample collected from the Laboratory (15A). Five other sediment samples collected from two components, one sample from the Low Nitrate Tank (18K) and four samples from the BDN Surge Lagoon (18A), also exceeded 20 times the TCLP limit (4 mg/kg).

Mercury has a TCLP limit of 0.2 mg/L in the leachate. Concentrations of mercury in 50 samples exceeded 20 times the TCLP limit and are therefore potentially hazardous. As reference points, approximately 99 percent of all mercury results were at or below the Part B reference criteria, approximately 8 percent of all results were at or below the OU3 baseline level for concrete, and 98 percent of all results were at or below the OU3 baseline for steel coatings. Table A.II-2 presents the number of detections found above established criteria. The presence of mercury in OU3 at levels of concern is further confirmed by its detection in 26 of 90 unknown liquid samples, with concentrations ranging from 0.1 to 26.9 μg/L (average of 1.5 μg/L).

The 50 samples in which mercury exceeded 20 times the TCLP limit consisted of 32 steel coatings samples (with concentrations ranging from 4.5 to 32.6 mg/kg), five loose media samples (with concentrations ranging from 6.2 to 18.0 mg/kg), six sediment samples (with concentrations ranging from 4.2 to 223 mg/kg), two masonry samples (with concentrations ranging from 4.6 to 5.2 mg/kg), two acid brick samples (with concentrations ranging from 5.2 to 7.0 mg/kg), one concrete core sample (with a concentration of 12.6 mg/kg), and two concrete chip samples (with concentrations of 4 and 4.8 mg/kg). As previously discussed, the loose media and sediment are not part of the decision-making process of this RI/FS.

The four components with the most samples exceeding 20 times the TCLP limit in the steel coatings samples were the Metals Production Plant (5A) and the Six to Four Reduction Facility #1 (54A) with six; the Main Maintenance Building (12A) with four; the Special Products Plant (9A) with three.

The Main Electrical Strainer House (26C) had a mercury concentration exceeding 20 times the TCLP limit in the top half inch in the concrete core sample collected. Both concrete chip samples were collected from the Electrical Power Center Building (3L). The masonry samples collected were from the Main Electrical Strainer House (26C) and the Digester and Control Building (25E). Two acid brick samples, both collected from the Main Maintenance Building (12A), exceeded 20 times the TCLP limit for mercury.

Of the 50 samples exceeding 20 times the TCLP limit, 24 of the samples were collected from the process buildings; 15 of the samples were collected from the process support buildings; 5 of the samples were collected from the ponds and basins; and two samples each were collected from the warehouse buildings, the aboveground containers, and the aboveground piping, utilities, and equipment category.

Figure A.II-70 depicts the summary of contamination by media for the analyte mercury. As indicated, mercury was detected in all sampled media, except for asphalt and soil, and at the highest levels in sediment.
Mercury is a COC and, because of the number and frequency of the major media samples exceeding the TCLP limit, it is considered *more significant* compared to other inorganic contaminants and is further discussed in Appendix A and Section 3.0.

A.II.3.16 Nickel

Nickel is a trace element in the earth's crust and is used in stainless steel and other corrosion-resistant alloys. It is a trace constituent in concrete (up to a baseline level of 9.37 mg/kg at the FEMP) and a trace constituent of coal and the resulting flyash when the coal is burned. Nickel cladding was dissolved in the Zirnlo process in Plant 9. Nickel was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.001 to 0.003 percent (DOE 1994a). The impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-71 and on Table A.II-1, nickel was detected in 78 percent (562 of 722) of solid media samples collected from OU3, with concentrations ranging from 0.48 to 53,500 mg/kg. The geometric mean for all nickel results is 18.7 mg/kg. The maximum concentration of nickel (53,500 mg/kg) was found in the same loose media sample collected from the Green Salt Plant (4A) in which the maximum concentration of copper was detected. As reference points, approximately

99 percent of all nickel results were at or below the Part B reference criteria (550 mg/kg), approximately 50 percent of all results were at or below the OU3 baseline level for concrete (9.4 mg/kg), and approximately 94 percent were at or below the OU3 baseline for steel coatings (135 mg/kg). The presence of nickel in OU3 is further confirmed by its detection in 36 of 91 unknown liquid samples, with concentrations ranging from 8.2 to 57,800 μg/L (average of 850 μg/L).

Figure A.II-72 depicts the summary of contamination by media sampled for the analyte nickel. As indicated, nickel was detected in all sampled media, with the highest concentrations detected in loose media.

Nickel is a COC; however, since there is no WAC for on-property or off-site disposal of nickel, it is considered *not as significant* an inorganic compound compared to other inorganic contaminants and is not further discussed in Appendix A or Section 3.0.

A.II.3.17 Potassium

Potassium is the seventh most abundant metal in the earth's crust and is used as a fertilizer (potash). It is a trace constituent in concrete (up to a baseline level of 927 mg/kg at the FEMP) and is a constituent of coal and the resulting flyash when the coal is burned. Potassium carbonate was used in heat-treating salts at the FEMP and was removed from metal surface in Plant 9.

As depicted on Figure A.II-73 and Table A.II-1, potassium was detected in 77 percent (559 of 722) of solid media samples collected from OU3, with concentrations ranging from 96.9 to 221,000 mg/kg. The geometric mean of all nickel results is 1200 mg/kg. The maximum concentration of potassium was found in a loose media sample collected from the Special Products Plant (9A). As reference points, approximately 55 percent of all potassium results were at or below the OU3 baseline level for concrete (930 mg/kg), and approximately 65 percent is were at or below the OU3 baseline level for steel coatings (1190 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of potassium is further confirmed by its detection in 83 of 91 unknown liquid samples with concentrations ranging from 750 to 716,000 μg/L (average of 44,700 μg/L).

Figure A.II-74 depicts the summary of contamination by media sampled for the analyte potassium. As indicated, potassium was detected in all sampled media, with the highest concentrations detected in loose media.

Since potassium is not a COC and it has no WAC for its on-property or off-site disposal, it is not further discussed is Appendix A or Section 3.0.

A.II.3.18 Selenium

Selenium is a trace element in the earth's crust and is found in a few minerals. It is a trace constituent in concrete (up to a baseline level of 0.47 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned.

As depicted on Figure A.II-75 and on Table A.II-1, selenium was detected in 16 percent (96 of 601) of solid media samples collected from OU3, with concentrations ranging from 0.29 to 157 mg/kg. The geometric mean of all selenium results is 1.13 mg/kg. The maximum concentration of selenium (157 mg/kg) was found in a loose media sample collected from the Metals Fabrication Plant (6A). Three other loose media samples collected from two components, one sample from the Ore Refinery Plant (2A) and two samples from the Green Salt Plant (4A), also exceeded 20 times the TCLP limit (20 mg/kg). As reference points, approximately 99 percent of all detected selenium results were at or below the Part B reference criteria (140 mg/kg), approximately 84 percent of all results were at or below the OU3 baseline level for concrete (0.47 mg/kg), and approximately 87 percent of all selenium results were at or below the OU3 baseline for steel coatings (0.83 mg/kg). Table A.II-2 presents the number of detections found above established criteria.

Selenium has a TCLP limit of 1.0 mg/L in the leachate. Concentrations of selenium in seven samples exceeded 20 times the TCLP limit (20 mg/kg) and are therefore potentially hazardous. The presence of selenium in OU3 is further confirmed by its detection in 15 of 86 unknown liquid samples, ranging from 1 to 64.6 μg/L (average of 6.0 μg/L).

The seven samples in which selenium exceeded 20 times the TCLP limit consisted of four loose media samples discussed above (with concentrations ranging from 49.8 to 157 mg/kg) and three steel coatings samples (with concentrations ranging from 36.4 to 77.5 mg/kg). No concrete, masonry, or acid brick samples exceeded 20 times the TCLP limit for selenium. As previously discussed, the loose media and sediment are not part of the decision-making process of this RI/FS. The three steel coatings samples exceeding 20 times the TCLP limit were collected from the Green Salt Plant (4A), the Combined Raffinate Tanks (3J), and the Incinerator Building (39A).

Six of the seven samples exceeding 20 times the TCLP limit were collected from the process buildings component category, and the remaining sample was collected from the aboveground container category.

Figure A.II-76 depicts the summary of contamination by media sampled for the analyte selenium. As indicated, selenium was detected in all sampled media, except asphalt, with the highest concentrations detected in loose media.

Selenium is a COC; however, since it has no WAC for on-property or off-site disposal, it is considered *not as significant* compared to other inorganic contaminants and is not further discussed in Appendix A or Section 3.0.

A.II.3.19 Silver

Silver is a trace element in the earth's crust. It is a trace constituent in concrete (up to a baseline level of 5.42 mg/kg at the FEMP) and is a trace constituent of coal and the resulting flyash when the coal is burned. Silver compounds were used as an algicide in the Plant 4 heat exchangers, but silver is not reported to have been used in other production-related activities at the FEMP.

As depicted on Figure A.II-77 and on Table A.II-1, silver was detected in 36 percent (257 of 722) of solid media samples collected from OU3, with concentrations ranging from 0.17 to 1360 mg/kg. The geometric mean for all silver results is 1.41 mg/kg. The maximum concentration of silver was found in a loose media sample collected from the Special Products Plant (9A) as was a second sample. Two other loose media samples collected from two components, one sample from the Recovery Plant (8A) and one sample from the Metal Dissolver Building (2D), also exceeded 20 times the TCLP limit (100 mg/kg). As reference points, approximately 99 percent of all silver results were at or below the Part B reference criteria (140 mg/kg), approximately 91 percent of all results were at or below the OU3 baseline level for concrete (5.42 mg/kg), and approximately 92 percent were at or below the OU3 baseline for steel coatings (6.40 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of silver in OU3 is further confirmed by its detection in 23 of 84 unknown liquid samples, with concentrations ranging from 1 to 357 μg/L (average of 19.7 μg/L).

Silver has a TCLP limit of 5.0 mg/L in the leachate. Concentrations of silver in five samples exceeded 20 times the TCLP limit (100 mg/kg) and are therefore potentially hazardous.

These five samples in which silver exceeded 20 times the TCLP limit consisted of four loose media samples discussed above (with concentrations ranging from 143 to 1360 mg/kg) and one sediment sample (with a concentration of 435 mg/kg) collected from the Laboratory (15A). No concrete, masonry, or acid brick samples exceeded 20 times the TCLP limit for silver. As previously discussed, the loose media and sediment are not part of the decision-making process of this RI/FS.

All of the five samples exceeding 20 times the TCLP limit were collected from the process buildings.

Figure A.II-78 depicts the summary of contamination by media sampled for the analyte silver. As indicated, silver was detected in all sampled media, except asphalt and soil, and at the highest levels in loose media.

Silver is a COC; however, since it has no WAC for on-property or off-site disposal, it is considered *not as significant* compared to other inorganic contaminants. The samples which exceeded the TCLP limit were not for a major media.

A.II.3.20 Sodium

Sodium is the sixth most abundant element in the earth's crust and is a trace constituent in concrete (up to a baseline level of 610 mg/kg at the FEMP). Sodium chloride (NaCl) was used in the heat treating processes at the FEMP, and sodium hydroxide (NaOH) was used extensively in the processing areas and the General Sump to precipitate metals in wastewater prior to discharge. Sodium was also an impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.001 to 9.90 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-79 and Tables A.II-1 and A.II-2, sodium was detected in 84 percent (607 of 722) of solid media samples collected from OU3, with concentrations ranging from 50.1 to 82,200 mg/kg. The geometric mean of all sodium results is 676 mg/kg. The maximum concentration of sodium was found in the same loose media sample collected from the Special Products Plant (9A) in which the highest silver concentration was detected. As reference points, approximately 53 percent of all sodium results were at or below the OU3 baseline level for concrete (610 mg/kg), and 68 percent of the results were at or below the OU3 baseline for steel coatings (840 mg/kg). The presence of sodium in OU3 is further confirmed by its detection in 85 of 91

unknown liquid samples, with concentrations ranging from 907 to 3,490,000 μg/L (average of 150,000 μg/L).

Figure A.II-80 depicts the summary of contamination by media sampled for the analyte sodium. As indicated, sodium was detected in several samples of all sampled media, with the highest concentrations detected in loose media.

Since sodium is not a COC and it has no WAC for on-property or off-site disposal, it is not further discussed in Appendix A or in Section 3.0.

A.II.3.21 Thallium

Thallium is present in a few minerals and has been used as a rodenticide and as an ant killer. Thallium is a trace constituent in concrete (up to a baseline level of 0.32 mg/kg at the FEMP).

As depicted on Figure A.II-81 and Table A.II-1, thallium was detected in 5 percent (36 of 668) of solid media samples collected from OU3, with concentrations ranging from 0.04 to 16 mg/kg. The geometric mean for all thallium results is 0.45 mg/kg. The maximum concentration of thallium was found in a concrete chip sample collected from the Pilot Plant Annex (37). As reference points, approximately 94 percent of all detected thallium results were at or below the Part B reference criteria (1.9 mg/kg), and approximately 98 percent of all results were at or below the OU3 baseline level for concrete (0.3 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of thallium is further confirmed by its detection in 4 of 88 unknown liquid samples, with concentrations ranging from 0.76 to 2.1 μg/L (average of 2.30 μg/L).

Figure A.II-82 depicts the summary of contamination by media sampled for the analyte thallium. As indicated, thallium was detected in steel, concrete, masonry, loose media, and sediment, with the highest concentrations detected in concrete chips and steel coatings.

Thallium is a COC; however, it is considered *not as significant* an inorganic compound compared to other inorganic contaminants, and there is no WAC for on-property or off-site disposal of thallium. Therefore thallium is not further discussed in Appendix A or in Section 3.0.

A.II.3.22 Vanadium

Vanadium is a trace element in the earth's crust and is found in approximately 65 minerals, vanadium is used in the production of steel. It is a trace constituent in concrete (up to a baseline level of 13.2 mg/kg at the FEMP), and is a trace constituent of coal and the resulting flyash when the coal is burned. Vanadium was also a minor impurity in uranium ores and ore concentrates used at the FEMP, with concentrations ranging from 0.003 to 2.59 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-83 and Table A.II-1, vanadium was detected in 73 percent (517 of 713) of solid media samples collected from OU3, with concentrations ranging from 0.23 to 494 mg/kg. The geometric mean for all vanadium results is 10.3 mg/kg. The maximum concentration of vanadium (494 mg/kg) was found in a concrete core sample collected from the Ore Refinery Plant (2A). As reference points, approximately 99 percent of all vanadium results were at or below the Part B reference criteria (190 mg/kg), approximately 71 percent of all results were at or below the OU3 baseline level for concrete (13 mg/kg), and approximately 83 percent of all results were at or below the OU3 baseline for steel coatings (22 mg/kg). Table A.II-2 presents the number of detections found above established criteria. The presence of vanadium in OU3 is further confirmed by its detection in 15 of 89 unknown liquid samples, with concentrations ranging from 5.3 to 697 μg/L (average of 29.4 μg/L).

Figure A.II-84 depicts the summary of contamination by media sampled for vanadium. As indicated, vanadium was detected in several samples of all sampled media, with the highest concentrations being detected in concrete cores and loose media.

Vanadium is a COC; however it is considered *not as significant* compared to other inorganic contaminants, and there is no WAC for the on-property or off-site disposal of vanadium. Therefore, vanadium is not further discussed in Appendix A or Section 3.0.

A.II.3.23 Zinc

Zinc is an element in the earth's crust and is commonly used to form alloys with other metals and to galvanize steel. It is a trace constituent in concrete (up to a baseline level of 27.5 mg/kg at the FEMP), and a constituent of coal and the resulting flyash when the coal is burned. Zinc fluoride was used in the production of thorium metal in the Pilot Plant, and zinc chloride was used in a similar process in Plant 9. Zinc was also a minor impurity in uranium ores and ore concentrates used at the

FEMP with concentrations ranging from 0.006 to 0.145 percent (DOE 1994a). However, the impurities were concentrated up to five times through the removal of the uranium in the refining process.

As depicted on Figure A.II-85 and Table A.II-1, zinc was detected in 92 percent (665 of 722) of solid media samples collected from OU3, with concentrations ranging from 2.7 to 215,000 mg/kg. The geometric mean of all zinc results is 136 mg/kg. The maximum concentration of zinc (215,000 mg/kg) was found in a steel coatings sample collected from the Refinery Sump (3H). As reference points, approximately 93 percent of all zinc results were at or below the Part B reference criteria (8200 mg/kg), approximately 30 percent of all results were at or below the OU3 baseline level for concrete (27.5 mg/kg), and approximately 99 percent of all results are at or below the OU3 baseline level for steel coatings (55,000 mg/kg). The presence of zinc in OU3 is further confirmed by its detection in 60 of 91 unknown liquid samples, with concentrations ranging from 6.1 to 265,000 μg/L (average of 4230 μg/L). Table A.II-2 presents the number of detections found above established criteria. The presence of zinc in OU3 is further confirmed by its detection in 60 of 91 unknown liquid samples, with core concentrations ranging from 6.1 to 27.4 μg/L (average of 4200 μg/L).

Figure A.II.2-86 depicts the summary of contamination by media sampled for the analyte zinc. As indicated, zinc was detected in several samples of all sampled media, with the highest concentrations detected in steel coatings.

Zinc is a COC; however, it is considered *not as significant* compared to other inorganic compounds, and there is no WAC for the on-property or off-site disposal of zinc. Therefore, zinc is not further discussed in Appendix A or in Section 3.0.

A.II.4 VOLATILE ORGANICS

Several volatile organic compounds were used at the FEMP and are therefore expected contaminants in OU3. Volatile contaminants were analyzed in 46 major media samples (acid brick - 4 samples, asphalt - 2 samples, concrete chips - 9 samples, concrete cores - 18 samples, masonry chips - 2 samples, and transite - 11 samples) and 160 supplemental media samples (loose media, sediment, sludge, soil, and wood). The following sections discuss the frequency of detections and relative levels of detections for each volatile organic contaminant analyzed in OU3 materials. Nineteen volatile organic contaminants were detected during analyses of the OU3 remedial investigation

samples. Only one of the samples analyzed for volatile organics exceeded 20 times the TCLP level (tetrachloroethene in transite).

Figures were generated only for those volatile that had greater than 20 detects. As a result, there are very few figures for this section. Note that most of the volatile compounds were used in various materials throughout the FEMP. Therefore, in most cases, their exact source and used are not known.

A.II.4.1 1,1,1-Trichloroethane

1,1,1-trichloroethane is a common solvent and was used in cleaning and degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, 1,1,1-trichloroethane was detected in 10 percent (11 of 115 samples) of solid media samples, with concentrations ranging from 1.0 to 36,000 μg/kg. The geometric mean of all 1,1,1-trichloroethane results is 67.2 μg/kg. Five of the detected results were in loose media, four in concrete, one in masonry chip, and one in acid brick. The maximum detected concentration was in the same concrete chip sample collected from the Pilot Plant Wet Side (13A) in which the maximum o-xylene and m,p-xylene results were detected. There are no regulatory levels for use as reference points. The presence of 1,1,1-trichloroethane in OU3 is further confirmed by its detection in 9 of 92 unknown liquid samples, with concentrations ranging from 0.4 to 290 μg/L (average of 117 μg/L).

Since 1,1,1-trichloroethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.2 1,1,2,2-Tetrachloroethane

As shown on Table A.II-1, 1,1,2,2-tetrachloroethane was not detected in any of the 113 solid media samples. The absence of 1,1,2,2-tetrachloroethane in OU3 is further confirmed by its detection in only 1 of 93 unknown liquid samples, with a concentration of 2.0 μg/L. Since 1,1,2,2-tetrachloroethane is not a COC, is not further discussed in Appendix A or Section 3.0.

A.II.4.3 1,1,2-Trichloroethane

As shown on Tables A.II-1 and A.II-2, 1,1,2-trichloroethane was not detected in any of the 115 solid media samples. The absence of 1,1,2-trichloroethane in OU3 is further confirmed because it was not

detected in any of the 93 unknown liquid samples. Since 1,1,2,-trichloroethane is not a COC, is not further discussed in Appendix A or Section 3.0.

A.II.4.4 1,1-Dichloroethane

As shown on Table A.II-1, 1,1-dichloroethane was not detected in any of the 118 solid media samples. The absence of 1,1-dichloroethane in OU3 is further confirmed by its detection in only 10 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 200 μg/L. Since 1,1-dichloroethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.5 1,1-Dichloroethene

As shown on Table A.II-1, 1,1-dichloroethene was not detected in any of the 130 solid media samples. The absence of 1,1-dichloroethene in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since 1,1-dichloroethene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.6 1,2-Dichloroethane

As shown on Table A.II-1, 1,2-dichloroethane was not detected in any of the 130 solid media samples. The absence of 1,2-dichloroethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since 1,2-dichloroethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.7 1,2-Dichloroethene (Total)

As shown on Table A.II-1, 1,2-dichloroethene (total) was not detected in any of the 115 solid media samples. The absence of 1,2-dichloroethene (total) in OU3 is further confirmed by its detection in only 1 of 86 unknown liquid samples, with a concentration of 40 μg/L. Since 1,2-dichloroethene (total) is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.8 1,2-Dichloropropane

As shown on Table A.II-1, 1,2-dichloropropane was not detected in any of the 115 solid media samples. The absence of 1,2-dichloropropane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since 1,2-dichloropropane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.9 2-Butanone

2-Butanone (methyl ethyl ketone) is a common solvent and was used in the laboratory and in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, 2-butanone was detected in 12 percent (15 of 128 samples) of solid media samples, with concentrations ranging from 4.0 to 9600 μg/kg. The geometric mean of all 2-butanone results is 99.3 μg/kg. Nine of the detected results were found in loose media, two in concrete, two in acid brick, one was found in transite, and one in asphalt. The maximum detected concentration was in the same sediment sample collected from the Storm Sewer Retention Basin (18E) in which the maximum carbon disulfide result was detected. As reference points, none of the samples were above the Part B reference criteria (16,000,000 μg/kg) nor above 20 times the TCLP regulatory limit (4,000,000 μg/kg). The presence of 2-butanone in OU3 is further confirmed by its detection in 11 of 89 unknown liquid samples, with concentrations ranging from 18 to 6100 μg/L (average of 216 μg/L).

Since 2-butanone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.10 2-Hexanone

As shown on Tables A.II-1 and A.II-2, 2-hexanone was detected in one percent (1 of 107 samples) of solid media samples, with a concentration of 49 μg/kg. The geometric mean of all 2-hexanone results is 64.7 μg/k. The sample in which the volatile organic was detected was a concrete chip sample taken from the top half inch of concrete in the Metal Production Plant (5A). As a reference point, the 2-hexanone result was below the Part B reference criteria (1,100,000 μg/kg). The absence of 2-hexanone in OU3 is further confirmed by its detection in only 1 of 87 unknown liquid samples, with a concentration of 8.0 μg/L.

Since 2-hexanone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.11 4-Methyl-2-Pentanone

As shown on Tables A.II-1 and A.II-2, 4-methyl-2-pentanone was detected in seven percent (8 of 112 samples) of solid media samples, with concentrations ranging from 5.0 to 100,000 μg/kg. The geometric mean of all 4-methyl-2-pentanone results is 73.0 μg/kg. Five of the detected results were in loose media with the other three in concrete. The maximum detected concentration was in the same loose media sample from the Ore Refinery Plant (2A) in which the maximum benzene and methylene

chloride results were detected. As a reference point, all 4-methyl-2-pentanone results were below the Part B reference criteria (1,400,000 μg/kg). The absence of 4-methyl-2-pentanone in OU3 is further confirmed by its detection in only 4 of 92 unknown liquid samples, with concentrations ranging from 6.0 to 95 μg/L.

Since 4-methyl-2-pentanone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.12 Acetone

Acetone is a common solvent and laboratory chemical and was used in the laboratory and in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, acetone was detected in 14 percent (10 of 73 samples) of solid media samples, with concentrations ranging from 10 to 300 μg/kg. The geometric mean of all acetone results is 133 μg/kg. All ten of the detected results were in loose media. The maximum detected concentration was in a loose media sample from the BDN Surge Lagoon (18A). As a reference point, all acetone results were below the Part B reference criteria (2,700,000 μg/kg). The presence of acetone in OU3 is further confirmed by its detection in 15 of 67 unknown liquid samples, with concentrations ranging from 7.0 to 510,000 μg/L (average of 7869 μg/L).

Since acetone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.13 Benzene

Benzene is a common solvent and is a major constituent in gasoline. It was used in the laboratory and in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, benzene was detected in two percent (3 of 127 samples) of solid media samples, with concentrations ranging from 18 to 2800 μg/kg. The geometric mean of all benzene results is 82.6 μg/kg. All three of the detected results were in loose media. The maximum detected concentration was in the same loose media sample from the Ore Refinery Plant (2A) in which the maximum 4-methyl-2-pentanone and methylene chloride results were detected. As a reference point, 99 percent of all benzene results were at or below the Part B reference criteria (2200 μg/kg), and none exceeded 20 times the TCLP regulatory limit (10,000 μg/kg). The absence of benzene in OU3 is further confirmed by its detection in only 1 of 93 unknown liquid samples, with a concentration of 11 μg/L.

Benzene is a COC because one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was only detected in two percent of all solid media samples, and the maximum detected concentration is well below 20 times the TCLP regulatory limit. Therefore it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.0.

A.II.4.14 Bromodichloromethane

As shown on Table A.II-1, bromodichloromethane was not detected in any of the 115 solid media samples. The absence of bromodichloromethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since bromodichloromethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.15 Bromoform

As shown on Tables A.II-1 and A.II-2, bromoform was detected in two percent (2 of 115 samples) of solid media samples, with concentrations ranging from 140 to 220 μg/kg. The geometric mean of all bromoform results is 65.4 μg/kg. Both of the detected results were in loose media from the Metals Production Plant (5A). As a reference point, all bromoform results were below the Part B reference criteria (8100 μg/kg). The absence of bromoform in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples.

Since bromoform is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.16 Bromomethane

As shown on Table A.II-1, bromomethane was not detected in any of the 118 solid media samples. The absence of bromomethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since bromomethane it is not a COC, is not further discussed in Appendix A or Section 3.0.

A.II.4.17 Carbon Disulfide

As shown on Tables A.II-1 and A.II-2, carbon disulfide was detected in one percent (1 of 118 samples) of solid media samples, with a concentration of 500 μg/kg. The geometric mean of all carbon disulfide results is 64.9 μg/kg. The sample in which the volatile organic was detected was the same sediment sample collected from the Storm Water Retention Basin (18E) in which the maximum 2-butanone was detected. As a reference point, the carbon disulfide result was below the Part B

reference criteria (2,700,000 μg/kg). The absence of carbon disulfide in OU3 is further confirmed by its detection in 1 of 93 unknown liquid samples, with a concentration of 2.0 μg/L.

Since carbon disulfide is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.18 Carbon Tetrachloride

As shown on Table A.II-1, carbon tetrachloride was not detected in any of the 127 solid media samples. The absence of carbon tetrachloride in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since carbon tetrachloride is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.19 Chlorobenzene

Chlorobenzene is a common solvent and was used in the laboratory at the FEMP.

As shown on Tables A.II-1 and A.II-2, chlorobenzene was detected in one percent (1 of 125 samples) of solid media samples, with a concentration of 63 μg/kg. The geometric mean of all chlorobenzene results is 88.2 μg/kg. The sample in which the volatile organic was detected was the same loose media sample collected from the Slag Recycling Pit/Elevator (55B) in which the maximum trichloroethene result was detected. As reference points, all sample results were below the Part B reference criteria (550,000 μg/kg), and none of the sample results exceeded 20 times the TCLP regulatory limit (2,000,000 μg/kg). The absence of chlorobenzene in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples.

Since chlorobenzene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.20 Chloroethane

As shown on Table A.II-1, chloroethane was not detected in any of the 116 solid media samples. The absence of chloroethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since chloroethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.21 Chloroform

As shown on Table A.II-1, chloroform was not detected in any of the 130 solid media samples. The absence of chloroform in OU3 is further confirmed because it was not detected in any of the 93

unknown liquid samples. Since chloroform is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.22 Chloromethane

As shown on Table A.II-1, chloromethane was not detected in any of the 118 solid media samples. The absence of chloromethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since chloromethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.23 cis-1,3-Dichloropropene

As shown on Table A.II-1, cis-1,3-dichloropropene was not detected in any of the 115 solid media samples. The absence of cis-1,3-dichloropropene in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since cis-1,3-dichloropropene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.24 Dibromochloromethane

As shown on Table A.II-1, dibromochloromethane was not detected in any of the 115 solid media samples. The absence of dibromochloromethane in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since dibromochloromethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.25 Ethylbenzene

Ethylbenzene is a common solvent and is a major constituent in gasoline. It was used in the laboratory and in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, ethylbenzene was detected in 20 percent (23 of 113 samples) of solid media samples, with concentrations ranging from 1.0 to 220,000 μg/kg. The geometric mean of all ethylbenzene results is 67.2 μg/kg. Eleven of the detected results were found in loose media, ten in concrete, one from acid brick, and one from masonry chips. The maximum concentration of ethylbenzene was found in a concrete core sample collected from the top 1/2-inch of concrete from the Metals Production Plant (5A). The other depths of the same core sample (collected from the same location, but at 1-inch and 4-inch depths), as well as a second concrete chip from the same process area, also had detected amounts of ethylbenzene. In addition, 10 of the 23 detected results were from the Pilot Plant Wet Side (13A). As a reference point, all of the ethylbenzene results were below the

Part B reference criteria (2,700,000 μg/kg). The presence of ethylbenzene in OU3 is further confirmed by its detection in 5 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 13 μg/L.

Since ethylbenzene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.26 m,p-Xylene

As shown on Tables A.II-1 and A.II-2, m,p-xylene was detected in 100 percent (4 of 4 samples) of solid media samples, with concentrations ranging from 14 to 68,000 μg/kg. The majority of OU3 samples were analyzed for (total) xylene, not m,p-xylene. The geometric mean of all m,p-xylene results is 474 μg/kg. All of the samples were collected from the Pilot Plant Wet Side (13A). One sample from each of the following media was collected: concrete chip, masonry chip, acid brick, and loose media, with the maximum detected result being in the concrete chip collected from the top half inch of concrete. This same concrete chip sample is where the maximum o-xylene and 1,1,1-trichloroethane results were detected. There are no regulatory levels for use as reference points. The presence of m,p-xylene in OU3 was not confirmed because it was not detected in any of the three unknown liquid samples collected.

Since m,p-xylene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.27 Methylene Chloride

Methylene chloride is a common solvent and was used in the laboratory and in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, methylene chloride was detected in five percent (6 of 117 samples) of solid media samples, with concentrations ranging from 1.0 to 3200 μg/kg. The geometric mean of all methylene chloride results is 62.5 μg/kg. Five of the detected results were found in loose media, with the sixth found in acid brick. The maximum concentration of methylene chloride was found in the same loose media sample collected from the Ore Refinery Plant (2A) in which the maximum 4-methyl-2-pentanone and benzene results were detected. As a reference point, all of the methylene chloride results were below the Part B reference criteria (8500 μg/kg). The absence of methylene chloride in OU3 is further confirmed by its detection in only 2 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 5100 μg/L.

Since methylene chloride is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.28 o-Xylene

As shown on Tables A.II-1 and A.II-2, o-xylene was detected in 100 percent (4 of 4 samples) of solid media samples, with concentrations ranging from 4.0 to 40,000 μg/kg. The majority of OU3 samples were analyzed for (total) xylene, not o-xylene. The geometric mean of all o-xylene results is 224 μg/kg. All of the samples were collected from the Pilot Plant Wet Side (13A). One sample from each of the following media was collected: concrete chip, masonry chip, acid brick, and loose media, with the maximum detected result being in the concrete chip collected from the top half inch of concrete. This same concrete chip sample is where the maximum m,p-xylene and 1,1,1-trichloroethane results were detected. There are no regulatory levels for use as reference points. The presence of o-xylene in OU3 was not confirmed because it was not detected in any of the three unknown liquid samples collected.

Since o-xylene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.29 Pyridine

As shown on Table A.II-1, pyridine was not detected in any of the 11 solid media samples. The absence of pyridine in OU3 is further confirmed because it was not detected in either of the two unknown liquid samples. Since pyridine is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.30 Styrene

As shown on Tables A.II-1 and A.II-2, styrene was detected in eight percent (9 of 113 samples) of solid media samples, with concentrations ranging from 25 to 3100 μg/kg. The geometric mean of all styrene results is 65.8 μg/kg. Seven of the detected results were found in loose media, with the eighth found in acid brick. The maximum concentration was found in a loose media sample collected from the Storm Water Retention Basin (18E), as were four of the remaining seven loose media samples. As a reference point, 99 percent of the styrene results were below the Part B reference criteria (2100 μg/kg). The absence of styrene in OU3 is further confirmed by its detection in 3 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 17 μg/L.

Styrene is a COC because one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was detected in only eight percent of all

solid media samples, 99 percent of the detected concentrations are below the Part B reference criteria, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.0.

A.II.4.31 Tetrachloroethene

Tetrachloroethene is a common solvent and was used in degreasing operations at the FEMP as well as a coolant in the Pilot Plant Remelt Furnace.

As shown on Tables A.II-1 and A.II-2, tetrachloroethene was detected in 12 percent (15 of 125 samples) of solid media samples, with concentrations ranging from 1.0 to 1,180,000 μg/kg. The geometric mean of all tetrachloroethene results is 81.5 μg/kg. Six of the detected results were found in loose media, seven in concrete, one in acid brick, and one in transite. The maximum concentration of tetrachloroethene was found in a transite sample (the solid phase result having been extrapolated from the TCLP leachate result of 59 mg/L) collected from the Ore Refinery Plant (2A). Also, 7 of the 15 detected results were located in the Pilot Plant Wet Side (13A). As a reference point, 99 percent of the tetrachloroethene results were below the Part B reference criteria (1200 μg/kg). The transite was the only result above 20 times the TCLP regulatory limit (14,000 μg/kg), being well above the TCLP leachate limit (0.7 mg/L) also. The presence of tetrachloroethene in OU3 is further confirmed by its detection in 12 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 6800 μg/L (average of 193 μg/L).

Tetrachloroethene is a COC because one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact, and tetrachloroethene exceeded 20 times the TCLP limit. Therefore it is considered *more significant* compared to other organic COCs and is further discussed in Section 3.0.

A.II.4.32 Toluene

Toluene is a common solvent and a major constituent in gasoline. It was used in degreasing operations at the FEMP as well as in the laboratory.

As depicted on Figure A.II-87, and shown on Tables A.II-1 and A.II-2, toluene was detected in 20 percent (23 of 113 samples) of solid media samples, with concentrations ranging from 1.0 to 27,000 μg/kg. The geometric mean of all toluene results is 65.6 μg/kg. Fourteen of the detected concentrations were found in loose media, eight in concrete, and one was found in acid brick. The

maximum detected result was found in a loose media sample collected from the Storm Water Retention Basin (18E), as was the second highest sample collected. As a reference point, all results were below the Part B reference criteria (5,500,000 μg/kg). The presence of toluene in OU3 was confirmed by its detection in 14 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 370 μg/L (average of 119 μg/L).

Figure A.II-88 depicts the summary of contamination by media sampled for the analyte toluene. As indicated, toluene was found only in loose media, concrete, and acid brick.

Since toluene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.33 trans-1,2-Dichloroethene

As shown on Table A.II-1, trans-1,2-dichloroethene was not detected in any of the two solid media samples. The absence of trans-1,2-dichloroethene in OU3 is further confirmed because it was not detected in any of the seven unknown liquid samples. Since trans-1,2-dichloroethene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.34 trans-1,3-Dichloropropene

As shown on Table A.II-1, trans-1,3-dichloropropene was not detected in any of the 115 solid media samples. The absence of trans-1,3-dichloropropene in OU3 is further confirmed because it was not detected in any of the 93 unknown liquid samples. Since trans-1,3-dichloropropene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.35 Trichloroethene

Trichloroethene is a common solvent and was used in degreasing operations at the FEMP.

As shown on Tables A.II-1 and A.II-2, trichloroethene was detected in one percent (1 of 127 samples) of solid media samples, with a concentration of 42 μg/kg. The geometric mean of all trichloroethene results is 83.8 μg/kg. The sample in which the volatile organic was detected was the same loose media sample taken from the Slag Recycling Pit/Elevator (55B) in which the maximum chlorobenzene result was detected. As reference points, all trichloroethene results were below the Part B reference criteria (5800 μg/kg), and all samples were well below 20 times the TCLP regulatory limit

(10,000 μg/kg). The absence of trichloroethene in OU3 was confirmed by its detection in only 3 of 93 unknown liquid samples, with concentrations ranging from 3.0 to 78 μg/L.

Since trichloroethene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.36 Trichlorofluoromethane

As shown on Tables A.II-1 and A.II-2, trichlorofluoromethane was detected in one percent (1 of 13 samples) of solid media samples, with a concentration of 6.0 μg/kg. The geometric mean of all trichlorofluoromethane results is 51.9 μg/kg. The sample in which the volatile organic was detected was an acid brick sample collected from the Ore Refinery Plant (2A). As a reference point, the trichlorofluoromethane result was below the Part B reference criteria (8,200,000 μg/kg). The absence of trichlorofluoromethane in OU3 was confirmed because it was not detected in any of the 14 unknown liquid samples.

Since trichlorofluoromethane is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.37 Vinyl Chloride

As shown on Tables A.II-1 and A.II-2, vinyl chloride was not detected in any of the 130 solid media samples. The absence of vinyl chloride in OU3 is further confirmed by its detection in only 1 of 93 unknown liquid samples, with a concentration of 9.0 μg/L. Since vinyl chloride is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.4.38 Xylenes (Total)

(Total) xylene is a common solvent and a major constituent in gasoline. It was used in degreasing operations at the FEMP.

As depicted on Figure A.II-89 and Table A.II-1, (total) xylene was detected in 28 percent (32 of 113 samples) of solid media samples, with concentrations ranging from 2.0 to 1,300,000 μg/kg. The median of all (total) xylene results is 17 μg/kg. Eighteen of the detected results were found in loose media, eleven in concrete, two in masonry chips, and one was found in acid brick. The maximum concentration of (total) xylene was found in the same concrete core sample collected from the top half inch of concrete from the Metals Production Plant (5A) in which the maximum ethylbenzene result was detected. The other depths of the same concrete core (collected from the same location, but from 1-inch and 4-inch depths) had the next highest detected results of (total) xylene. Also, 9 of the 13

detected results in major media (excluding loose media) were located in the Metals Production Plant (51) and the Pilot Plant Wet Side (13A). As a reference point, all of the (total) xylene results were below the Part B reference criteria (55,000,000 μg/kg). The presence of (total) xylene in OU3 is further confirmed by its detection in 8 of 93 unknown liquid samples, with concentrations ranging from 1.0 to 93 μg/L.

Figure A.II-90 depicts the summary of contamination by media sampled for the analyte (total xylene).

Since (total) xylene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5 SEMIVOLATILE ORGANICS

Semivolatile organic compounds were used at the FEMP and are therefore expected contaminants in OU3. Semivolatiles were analyzed in 29 major media samples (acid brick - 3 samples, asphalt - 2 samples, concrete chips - 8 samples, concrete cores - 3 samples, masonry - 2 samples, and transite - 11 samples) and 84 supplemental media samples (air filters, loose media, sediment, sludge, soil and wood). Of the 66 semivolatile contaminants analyzed, 44 were detected in solid media during analyses of the OU3 remedial investigation samples. Sixty-nine of the samples analyzed for semivolatiles exceeded the Part B reference criteria for at least one of the 16 analytes for which criteria have been established, and two samples exceeded 20 times the TCLP limit (40 CFR 261.24). These two samples were transite from the Special Products Plant (9A) and loose media from the Green Salt Plant (4A).

The following sections discuss the frequency of detections and relative levels of detections for each semivolatile compound analyzed in OU3 materials. Figures were generated only for those semivolatiles with 30 or more detects. As a result, there are only a few figures for this section. Note that most of the semivolatile compounds were used in various materials throughout the FEMP. Therefore, in most cases, their exact source and use are not known.

A.II.5.1 1,2,4-Trichlorobenzene

As shown on Tables A.II-1 and A.II-2, 1,2,4-trichlorobenzene was detected in only one percent (1 of 102 samples) solid media samples, with a concentration of 39,000 μg/kg. The geometric mean of all 1,2,4-trichlorobenzene results is 2150 μg/kg. This loose media sample was collected from the Green Salt Plant (4A). As a reference point, the 1,2,4-trichlorobenzene result was below the Part B

reference criteria (270,000 μg/kg). The presence of 1,2,4-trichlorobenzene in limited quantity in OU3 is further confirmed by its detection in only one of 92 unknown liquid samples, with a concentration of 22 μg/L.

Since 1,2,4-trichlorobenzene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.2 1,2-Dichlorobenzene

As shown on Table A.II-1, 1,2-dichlorobenzene was not detected in any of 101 solid media samples. The absence of 1,2-dichlorobenzene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 1,2-dichlorobenzene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.3 1,3-Dichlorobenzene

As shown on Table A.II-1, 1,3-dichlorobenzene was not detected in any of 101 solid media samples. The absence of 1,3-dichlorobenzene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 1,3-dichlorobenzene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.4 1,4-Dichlorobenzene

As shown on Tables A.II-1 and A.II-2, 1,4-dichlorobenzene was detected in two percent (2 of 112) of solid media samples, with concentrations of 39,000 and 344,000 μg/kg. The geometric mean of all 1,4-dichlorobenzene results is 2020 μg/kg. These samples were of loose media collected from the Green Salt Plant (4A) and of transite collected from the Special Products Plant (9A), respectively. The transite solid phase result was extrapolated from the TCLP leachate result of 17.2 mg/L. As reference points, both of the results are above the Part B reference criteria (2700 μg/kg). One of the results is above 20 times the TCLP limit (150,000 μg/kg). The limited presence of 1,4-dichlorobenzene in OU3 is further confirmed by its detection in only one of 92 unknown liquid samples, at a concentration of 5 μg/L.

1,4-Dichlorobenzene is a COC for two reasons. First, detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. Secondly, one detected result exceeded 20 times the TCLP limit, a fact which indicates a potential for the transite to be hazardous. Therefore, it is considered *more significant* compared to other organic COCs and will be discussed further in Appendix A and Section 3.0.

A.II.5.5 2,2-Oxybis-(1-Chloropropane)

As shown on Table A.II-1, 2,2-oxybis-(1-chloropropane) was not detected in any of 73 solid media samples. The absence of 2,2-oxybis-(1-chloropropane) in OU3 is further confirmed because it was not detected in any of 75 unknown liquid samples. Since 2,2-oxybis-(1-chloropropane) is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.6 2,4,5-Trichlorophenol

As shown on Table A.II-1, 2,4,5-trichlorophenol was not detected in any of 102 solid media samples. The absence of 2,4,5-trichlorophenol in OU3 is further confirmed because it was not detected in any of 91 unknown liquid samples. Since 2,4,5-trichlorophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.7 2,4,6-Trichlorophenol

As shown on Tables A.II-1 and A.II-2, 2,4,6-trichlorophenol was detected in one percent (one of 102) solid media samples, at a concentration of 970 μg/kg (geometric mean of all results is 1900 μg/kg). The loose media sample was collected from the Sludge Drying Beds (25F). As reference points, all the 2,4,6-trichlorophenol results were below the Part B reference criteria (5800 μg/kg), and none of the results exceeded 20 times the TCLP limit (40,000 μg/kg). The absence of 2,4,6-trichlorophenol in OU3 is further confirmed because it was not detected in any of 91 unknown liquid samples.

Since 2,4,6-trichlorophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.8 2,4-Dichlorophenol

As shown on Tables A.II-1 and A.II-2, 2,4-dichlorophenol was detected in four percent (4 of 95) of solid media samples, with concentrations ranging from 48 to 450 μg/kg (geometric mean of all results is 1900 μg/kg). All four samples in which 2,4-dichlorophenol was detected were loose media samples, with the maximum detected concentration (along with one of the other detected result) collected from the General Sump (18B). As a reference point, all 2,4-dichlorophenol results were below the Part B reference criteria (82,000 μg/kg). The limited presence of 2,4-dichlorophenol in OU3 is further confirmed by its detection in only one of 91 unknown liquid samples, at a concentration of 3 μg/L.

Since 2,4-dichlorophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.9 2,4-Dimethylphenol

As shown on Tables A.II-1 and A.II-2, 2,4-dimethylphenol was detected in two percent (2 of 95) of solid media samples, with concentrations ranging from 32 to 140 μg/kg (geometric mean of all results is 1950 μg/kg). Both samples in which 2,4-dimethylphenol was detected were loose media samples, with the maximum concentration collected from the Special Products Plant (9A). As a reference point, all 2,4-dimethylphenol results were below the Part B reference criteria (550,000 μg/kg). The limited presence of 2,4-dimethylphenol in OU3 is further confirmed by its detection in only 5 of 92 unknown liquid samples, with concentrations ranging from 1 to 71 μg/L.

Since 2,4-dimethylphenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.10 2,4-Dinitrophenol

As shown on Table A.II-1, 2,4-dinitrophenol was not detected in any of 86 solid media samples. The absence of 2,4-dinitrophenol in OU3 is further confirmed by its detection in only 2 of 82 unknown liquid samples, with concentrations of 7 and 18 μg/L. Since 2,4-dinitrophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.11 2,4-Dinitrotoluene

As shown on Tables A.II-1 and A.II-2, 2,4-dinitrotoluene was detected in one percent (1 of 112) of solid media samples, with a concentration of 50,000 μg/kg (geometric mean of all results is 1800 μg/kg). The sample in which the organic was detected was the same loose media sample from the Green Salt Plant (4A) in which the maximum 1,2,4-trichlorobenzene were detected. As a reference point, 99 percent of the 2,4-dinitrotoluene results were below the Part B reference criteria (94.0 μg/kg) and also below 20 times the TCLP limit (2600 μg/kg). The limited presence of 2,4-dinitrotoluene in OU3 is further confirmed because it was not detected in any of 92 unknown liquid samples.

This sample exceeded 20 times the TCLP limit for 2,4-dinitrotoluene (2600 μg/kg) and is potentially hazardous.

2,4-Dinitrotoluene is a COC because one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was only detected in one percent of all solid media samples, 99 percent of the results are below the Part B reference criteria, and 99 percent of the results are below 20 times the TCLP limit which is the hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore 2,4-dinitrotoluene is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.12 2,6-Dinitrotoluene

As shown on Table A.II-1, 2,6-dinitrotoluene was not detected in any of 102 solid media samples. The absence of 2,6-dinitrotoluene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 2,6-dinitrotoluene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.13 2-Chloronaphthalene

As shown on Table A.II-1, 2-chloronaphthalene was not detected in any of 102 solid media samples. The absence of 2-chloronaphthalene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 2-chloronaphthalene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.14 2-Chlorophenol

As shown on Tables A.II-1 and A.II-2, 2-chlorophenol was detected in two percent (2 of 95) of solid media samples, with concentrations ranging from 9.0 to 57,000 μg/kg (geometric mean of all results is 2000 μg/kg). These samples were of acid brick collected from the Pilot Plant Wet Side (13A) and of loose media collected from the Green Salt Plant (4A), respectively. The sample in which the 2-chlorophenol was detected was the same loose media sample in which the maximum concentrations of 1,2,4-trichlorobenzene and 2,4-dinitrotoluene were detected. As a reference point, all 2-chlorophenol results were below the Part B reference criteria (140,000 μg/kg). The limited presence of 2-chlorophenol in OU3 is further confirmed because it was not detected in any of 91 unknown liquid samples.

Since 2-chlorophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.15 2-Methylnaphthalene

As shown on Tables A.II-1 and A.II-2, 2-methylnaphthalene was detected in 25 percent (26 of 102) of solid media samples, with concentrations ranging from 17 to 6300 μg/kg (the median of all results is 1350 μg/kg). Twenty-four of the results were loose media, with the other two results being asphalt samples from the Roads (G02). The maximum concentration of 2-methylnaphthalene was found in a loose media sample from the Recovery Plant (8A). As a reference point, all 2-methylnaphthalene results were below the Part B reference criteria (1,100,000 μg/kg). The limited presence of 2-methylnaphthalene in OU3 is further confirmed by its detection in 3 of 93 unknown liquid samples, with concentrations ranging from 0.1 to 4 μg/L.

Since 2-methylnaphthalene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.16 2-Nitroaniline

As shown on Table A.II-1, 2-nitroaniline was not detected in any of 102 solid media samples. The absence of 2-nitroaniline in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 2-nitroaniline is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.17 2-Nitrophenol

As shown on Table A.II-1, 2-nitrophenol was not detected in any of 95 solid media samples. The absence of 2-nitrophenol in OU3 is further confirmed by its detection in only 2 of 91 unknown liquid samples, with concentrations of 1 and 2 μg/L. Since 2-nitrophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.18 3,3'-Dichlorobenzidine

As shown on Table A.II-1, 3,3'-dichlorobenzidine was not detected in any of 90 solid media samples. The absence of 3,3'-dichlorobenzidine in OU3 is further confirmed because it was not detected in any of 73 unknown liquid samples. Since 3,3'-dichlorobenzidine is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.19 3-Nitroaniline

As shown on Table A.II-1, 3-nitroaniline was not detected in any of 97 solid media samples. The absence of 3-nitroaniline in OU3 is further confirmed because it was not detected in any of 90 unknown liquid samples. Since 3-nitroaniline is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.20 4,6-Dinitro-2-Methylphenol

As shown on Table A.II-1, 4,6-dinitro-2-methylphenol was not detected in any of 95 solid media samples. The absence of 4,6-dinitro-2-methylphenol in OU3 is further confirmed because it was not detected in any of 91 unknown liquid samples. Since 4,6-dinitro-2-methylphenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.21 4-Bromophenyl Phenyl Ether

As shown on Table A.II-1, 4-bromophenyl phenyl ether was not detected in any of 102 solid media samples. The absence of 4-bromophenyl phenyl ether in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 4-bromophenyl phenyl ether is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.22 4-Chloro-3-Methylphenol

As shown on Tables A.II-1 and A.II-2, 4-chloro-3-methylphenol was detected in two percent (2 of 95) of solid media samples, with concentrations of 37 and 69,000 μg/kg (geometric mean of all results is 2000 μg/kg). The maximum concentration was found in the same loose media sample collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, and 2-chlorophenol were detected. The remaining detected sample was an acid brick sample. As a reference point, all 4-chloro-3-methylphenol results were below the Part B reference criteria (1,400,000 μg/kg). The limited presence of 4-chloro-3-methylphenol in OU3 is further confirmed by its detection in one of 90 unknown liquid samples, with a concentration of 0.4 μg/L.

Since 4-chloro-3-methylphenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.23 4-Chlorophenyl-phenyl Ether

As shown on Table A.II-1, 4-chlorophenyl-phenyl ether was not detected in any of 102 solid media samples. The absence of 4-chlorophenyl-phenyl ether in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since 4-chlorophenyl-phenyl ether is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.24 4-Nitroaniline

As shown on Table A.II-1, 4-nitroaniline was not detected in any of 98 solid media samples. The absence of 4-nitroaniline in OU3 is further confirmed because it was not detected in any of 91 unknown liquid samples. Since 4-nitroaniline is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.25 4-Nitrophenol

As shown on Tables A.II-1 and A.II-2, 4-nitrophenol was detected in one percent (1 of 94) solid media samples, with a concentration of 57,000 μg/kg (geometric mean of all results is 5100 μg/kg). The sample in which the organic was detected was the same loose media sample collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, 2-chlorophenol, and 4-chloro-3-methylphenol were detected. As a reference point, the 4-nitrophenol result was below the Part B reference criteria (1,700,000 μg/kg). The limited presence of 4-nitrophenol in OU3 is further confirmed by its detection in 3 of 88 unknown liquid samples, with concentrations ranging from 1 to 7 μg/L.

Since 4-nitrophenol is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.26 Acenaphthene

As depicted on Figure A.II-91 and shown on Tables A.II-1 and A.II-2, acenaphthene was detected in 29 percent (30 of 102) of solid media samples, with concentrations ranging from 20 to 50,000 μg/kg (median of all results is 1300 μg/kg). The sample in which the maximum result was detected was the same loose media sample collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, 2-chlorophenol, 4-chloro-3-methylphenol, and 4-nitrophenol were detected. Twenty-nine samples in which acenaphthene was detected were loose media samples, with the last sample being acid brick. As a reference point, all acenaphthene results were below the Part B reference criteria (1,600,000 μg/kg).

The limited presence of acenaphthene in OU3 is further confirmed by its detection in 1 of 92 unknown liquid samples, with a concentration of 0.2 μg/L.

Figure A.II-92 depicts the summary of contamination by media sampled for the analyte acenaphthene. Of the 30 detected results, 29 were in loose media and 1 in acid brick.

Since acenaphthene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.27 Acenaphthylene

As shown on Tables A.II-1 and A.II-2, acenaphthylene was detected in nine percent (9 of 102) solid media samples, with concentrations ranging from 21 to 260 μg/kg (geometric mean of all results is 1900 μg/kg). All of the detected results were found in loose media, with the maximum concentration found in the same sample collected from the Special Products Plant (9A) in which the maximum concentration of 2,4-dimethylphenol was detected. There are no regulatory levels for use as reference points. The limited presence of acenaphthylene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples.

Since acenaphthylene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.28 Anthracene

As depicted on Figure A.II-93 and shown on Tables A.II-1 and A.II-2, anthracene was detected in 32 percent (33 of 102) of solid media samples, with concentrations ranging from 31 to 43,000 μg/kg (median of all results is 1300 μg/kg). All of the detected results were found in loose media, with the maximum concentration collected from the Laboratory (15A). As a reference point, all anthracene results were below the Part B reference criteria (8,200,000 μg/kg). The limited presence of anthracene in OU3 is further confirmed by its detection in 4 of 93 unknown liquid samples, with concentrations ranging from 0.02 to 4 μg/L.

Figure A.II-94 depicts the summary of contamination by media sampled for the analyte anthracene. All detected results were found in loose media.

Since anthracene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.29 Benzo(a)anthracene

As depicted on Figure A.II-95 and shown on Tables A.II-1 and A.II-2, benzo(a)anthracene was detected in 59 percent (60 of 101) of solid media samples, with concentrations ranging from 18 to 73,000 μg/kg. The geometric mean of all results is 1300 μg/kg. The maximum concentration was the same loose media sample collected from the Laboratory (15A) in which the maximum concentration of anthracene was detected. As a reference point, 45 percent of the benzo(a)anthracene results were below the Part B reference criteria (58.1 μg/kg). The presence of benzo(a)anthracene in OU3 is not confirmed because it was found in only 4 of 93 unknown liquid samples, with concentrations ranging from 0.7 to 4 μg/L.

Figure A.II-96 depicts the summary of contamination by media sampled for the analyte benzo(a)anthracene. Of the 60 detected results, 56 were in loose media samples, two in asphalt, one in concrete, and one in wood.

Benzo(a)anthracene is a COC because 56 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 59 percent of all solid media samples and 55 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24), and the majority of the detects were found in supplemental media. Therefore, it is considered *not as significant* compared to other organic COCs and will be discussed further in Appendix A but will not be further discussed in Section 3.0.

A.II.5.30 Benzo(a)pyrene

As depicted on Figure A.II-97 and shown on Tables A.II-1 and A.II-2, benzo(a)pyrene was detected in 50 percent (51 of 101) of solid media samples, with concentrations ranging from 23 to 74,000 μg/kg. The geometric mean of all results is 1700 μg/kg. The maximum concentration was the same loose media sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene and benzo(a)anthracene were detected. As a reference point, 50 percent of the benzo(a)pyrene results were below the Part B reference criteria (8.80 μg/kg), and all samples were below 20 times the TCLP limit (100,000 μg/kg). The presence of benzo(a)pyrene in OU3 is not confirmed because it was found in only two of 93 unknown liquid samples, with concentrations ranging from 0.2 to 5 μg/L.

Figure A.II-98 depicts the summary of contamination by media sampled for benzo(a)pyrene. Of the 51 detected results, 49 were in loose media samples, one was in acid brick, and one in wood.

Benzo(a)pyrene is a COC because all 51 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 50 percent of all solid media samples and 50 percent of the results are above the Part B reference criteria. However, all samples were below 20 times the TCLP limit, which is the hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.31 Benzo(b)fluoranthene

As depicted on Figure A.II-99 and shown on Tables A.II-1 and A.II-2, benzo(b)fluoranthene was detected in 61 percent (62 of 101) of solid media samples, with concentrations ranging from 19 to 81,000 μg/kg. The geometric mean of all results is 1600 μg/kg. The maximum concentration was the same loose media sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, and benzo(a)pyrene were detected. As a reference point, 42 percent of the benzo(b)fluoranthene results were below the Part B reference criteria (71 μg/kg). The presence of benzo(b)fluoranthene in OU3 is not confirmed because it was found in only 3 of 92 unknown liquid samples, with concentrations ranging from 0.6 to 7 μg/L.

Figure A.II-100 depicts the summary of contamination by media sampled for benzo(b)fluoranthene. Of the 62 detected results, 59 were in loose media samples, two in acid brick, and one in wood.

Benzo(b)fluoranthene is a COC because 59 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 61 percent of all solid media samples, and 59 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.32 Benzo(g,h,i)perylene

As depicted on Figure A.II-101 and shown on Tables A.II-1 and A.II-2, benzo(g,h,i)perylene was detected in 42 percent (42 of 101) of solid media samples, with concentrations ranging from 31 to 56,000 μg/kg. The median of all results is 1200 μg/kg. The maximum concentration was the same

loose media sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, and benzo(a)pyrene, and benzo(b)fluoranthene were detected. There are no regulatory levels to use as reference points. The presence of benzo(g,h,i)perylene in OU3 is not confirmed because no detects were found in 92 unknown liquid samples.

Figure A.II-102 depicts the summary of contamination by media sampled for benzo(g,h,i)perylene. Of the 42 detected results, all were in loose media samples.

Since benzo(g,h,i)perylene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.33 Benzo(k)fluoranthene

As depicted on Figure A.II-103 and shown on Tables A.II-1 and A.II-2, benzo(k)fluoranthene was detected in 46 percent (46 of 101) of solid media samples, with concentrations ranging from 18 to 69,000 μg/kg. The median of all results is 920. The maximum concentration was the same loose media sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(g,h,i)perylene were detected. As a reference point, 60 percent of the benzo(k)fluoranthene results were below the Part B reference criteria (170 μg/kg). The presence of benzo(k)fluoranthene in OU3 is not confirmed because it was found in only 2 of 92 unknown liquid samples, with concentrations of 0.2 to 1 μg/L. Figure A.II-104 depicts the summary of contamination by media sampled for benzo(k)fluoranthene. Of the 46 detected results, 45 were in loose media samples and one was in wood.

Benzo(k)fluoranthene is a COC because 40 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 46 percent of all solid media samples, and 60 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, benzo(k)fluoranthene is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.34 bis(2-Chloroethoxy)Methane

As shown on Table A.II-1, bis(2-chloroethoxy)methane was not detected in any of 102 solid media samples. The absence of bis(2-chloroethoxy)methane in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since bis(2-chloroethoxy)methane is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.35 bis(2-Chloroethyl)Ether

As shown on Table A.II-1, bis(2-chloroethyl)ether was not detected in any of 101 solid media samples. The absence of bis(2-chloroethyl)ether in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since bis(2-chloroethyl)ether is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.36 bis(2-Chloroisopropyl)Ether

As shown on Table A.II-1, bis(2-chloroisopropyl)ether was not detected in any of 16 solid media samples. The absence of bis(2-chloroisopropyl)ether in OU3 is further confirmed because it was not detected in any of 16 unknown liquid samples. Since bis(2-chloroisopropyl)ether is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.37 bis(2-Ethylhexyl)Phthalate

As depicted on Figure A.II-105 and shown on Tables A.II-1 and A.II-2, bis(2-ethylhexyl)phthalate was detected in 34 percent (34 of 101) of solid media samples, with concentrations ranging from 44 to 560,000 μg/kg. The median of all results is 3700 μg/kg. The maximum concentration was found in a loose media sample collected from the Recovery Plant (8A), as was the second highest sample. As a reference point, 83 percent of the bis(2-ethylhexyl)phthalate results were below the Part B reference criteria (4600 μg/kg). The presence of bis(2-ethylhexyl)phthalate in OU3 is confirmed by its detection in 21 of 93 unknown liquid samples, with concentrations ranging from 0.8 to 280 μg/L.

Figure A.II-106 depicts the summary of contamination by media sampled for bis(2-ethylhexyl)phthalate. Of the 34 detected results, 32 were in loose media samples, one was in concrete, and one in acid brick.

Bis(2-ethylhexyl)phthalate is a COC because 17 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 34 percent of all solid media samples, and only 17 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.4.38 Butyl Benzyl Phthalate

As shown on Tables A.II-1 and A.II-2, butyl benzyl phthalate was detected in 21 percent (21 of 102) of solid media samples, with concentrations ranging from 49 to 8700 μg/kg. The median of all results is 780 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations of 2,4-dimethylphenol and acenaphthylene were detected. As a reference point, all butyl benzyl phthalate results were below the Part B reference criteria (5,500,000 μg/kg). The presence of butyl benzyl phthalate in OU3 is confirmed by its detection in 6 of 93 unknown liquid samples, with concentrations ranging from 0.2 to 130 μg/L.

Since butyl benzyl phthalate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.39 Carbazole

As depicted on Figure A.II-107 and shown on Tables A.II-1 and A.II-2, carbazole was detected in 33 percent (33 of 100) of solid media samples, with concentrations ranging from 21 to 24,000 μg/kg. The median of all results is 900 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations of 2,4-dimethylphenol, acenaphthylene, and butyl benzyl phthalate were detected. As a reference point, 93 percent of the carbazole results were below the Part B reference criteria (3200 μg/kg). The presence of carbazole in OU3 is not confirmed because it was detected in only 1 of 91 unknown liquid samples, with a concentration of 0.7 μg/L.

Figure A.II-108 depicts the summary of contamination by media sampled for carbazole. Of the 33 detected results, 32 were in loose media samples and one was in wood.

Carbazole is a COC because seven detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 33 percent of all solid media samples, and only seven percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

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A.II.5.40 Chrysene

As depicted on Figure A.II-109 and shown on Tables A.II-1 and A.II-2, chrysene was detected in 70 percent (71 of 101) of solid media samples, with concentrations ranging from 18 to 81,000 μg/kg. The geometric mean of all results is 720 μg/kg. The maximum concentration was found in the same sediment sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and benzo(k)fluoranthene were detected. As a reference point, 78 percent of the chrysene results were below the Part B reference criteria (2000 μg/kg). The presence of chrysene in OU3 is confirmed by its detection in five of 93 unknown liquid samples, with concentrations ranging from 0.5 to 6 μg/L.

Figure A.II-110 depicts the summary of contamination by media sampled for chrysene. Of the 71 detected results, 65 were in loose media samples, 2 in concrete, 2 in acid brick, 2 in asphalt, and one was detected in wood.

Chrysene is a COC because 22 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 70 percent of all solid media samples, and 23 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.41 Di-n-butyl Phthalate

As depicted on Figure A.II-111 and shown on Tables A.II-1 and A.II-2, di-n-butyl phthalate was detected in 31 percent (32 of 102) of solid media samples, with concentrations ranging from 58 to 42,000 μg/kg. The median of all results is 1400 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations of 2,4-dimethylphenol, acenaphthylene, butyl benzyl phthalate, and carbazole were detected. As a reference point, all di-n-butyl phthalate results were below the Part B reference criteria (2,700,000 μg/kg). The limited presence of di-n-butyl phthalate in OU3 is confirmed by its detection in 5 of 92 unknown liquid samples, with concentrations ranging from 1 to 290 μg/L.

Figure A.II-112 depicts the summary of contamination by media sampled for di-n-butyl phthalate. Of the 32 detected results, 31 were in loose media samples and one was in concrete.

Since di-n-butyl phthalate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.42 Di-n-octyl Phthalate

As depicted on Figure A.II-113 and shown on Tables A.II-1 and A.II-2, di-n-octyl phthalate was detected in 26 percent (26 of 100) of solid media samples, with concentrations ranging from 39 to 37,000 μg/kg. The median of all results is 605 μg/kg. The maximum concentration was found in the same sediment sample collected from the Storm Water Retention Basin (18E) in which the maximum concentration of 2-methylphenol was detected. A total of seven detected results, including the next four highest results, were also from the same location. As a reference point, all of the di-n-octyl phthalate results were well below the Part B reference criteria (550,000 μg/kg). The limited presence of di-n-octyl phthalate in OU3 is confirmed by its detection in only 9 of 93 unknown liquid samples, with concentrations ranging from 0.3 to 87 μg/L.

Figure A.II-114 depicts the summary of contamination by media sampled for di-n-octyl phthalate. Of the 26 detected results; 24 were in loose media samples, 1 was in concrete, and 1 in acid brick.

Since di-n-octyl phthalate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.43 Dibenzo(a,h)anthracene

As shown on Tables A.II-1 and A.II-2, dibenzo(a,h)anthracene was detected in 14 percent (14 of 101) of solid media samples, with concentrations ranging from 55 to 15,000 μg/kg. The geometric mean of all results is 1200 μg/kg. All detected results were in loose media, with the maximum concentration found in the same sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, and chrysene were detected. As a reference point, 86 percent of the dibenzo(a,h)anthracene results were below the Part B reference criteria (8.8 μg/kg). The limited presence of dibenzo(a,h)anthracene in OU3 is confirmed because it was not detected in any of 92 unknown liquid samples.

Dibenzo(a,h)anthracene is a COC because 14 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was only detected in 14 percent of all solid media samples, 14 percent of the results are above the Part B reference criteria, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24).

Therefore, it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.0.

A.II.5.44 Dibenzofuran

As shown on Tables A.II-1 and A.II-2, dibenzofuran was detected in 25 percent (26 of 102) of solid media samples, with concentrations ranging from 19 to 13,000 μg/kg. The median of all results is 720 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations of 2,4-dimethylphenol, acenaphthylene, butyl benzyl phthalate, carbazole, and di-n-butyl phthalate were detected. As a reference point, all dibenzofuran results were below the Part B reference criteria (110,000 μg/kg). The limited presence of dibenzofuran in OU3 is confirmed by its detection in 1 of 93 unknown liquid samples, with a concentration of 0.2 μg/L.

Since dibenzofuran is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.45 Diethyl Phthalate

As shown on Tables A.II-1 and A.II-2, diethyl phthalate was detected in eight percent (8 of 102) of solid media samples, with concentrations ranging from 34 to 700 μg/kg. The geometric mean of all results is 750 μg/kg. All detected results were found in loose media, with the maximum concentration collected from the Refinery Sump (3H). Also, four of the eight detected results were from the Storm Water Retention Basin (18E). As a reference point, all diethyl phthalate results were below the Part B reference criteria (22,000,000 μg/kg). The limited presence of diethyl phthalate in OU3 is confirmed by its detection in only 7 of 93 unknown liquid samples, with concentrations ranging from 0.1 to 190 μg/L.

Since diethyl phthalate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.46 Dimethyl Phthalate

As shown on Tables A.II-1 and A.II-2, dimethyl phthalate was detected in three percent (3 of 102) solid media samples, with concentrations ranging from 170 to 3000 μg/kg. The geometric mean of all results is 1050 μg/kg. All detected results were found in loose media, with the maximum concentration collected from the same sample from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, 2-chlorophenol, 4-chloro-3-methylphenol, 4-nitrotoluene, and acenaphthene were detected. The second highest result

was from the same component. As a reference point, all dimethyl phthalate results were below the Part B reference criteria (270,000,000 (μg/kg). The limited presence of dimethyl phthalate in OU3 is confirmed by its detection in only 3 of 93 unknown liquid samples, with concentrations ranging from 0.2 to 14 μg/L.

Since dimethyl phthalate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.47 Fluoranthene

As depicted on Figure A.II-115 and shown on Tables A.II-1 and A.II-2, fluoranthene was detected in 76 percent (78 of 102) of solid media samples, with concentrations ranging from 36 to 190,000 μg/kg. The geometric mean of all results is 1200 μg/kg. The maximum concentration was found in the same sample collected from the Laboratory (15A) in which the maximum concentration of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene were detected. As a reference point, all fluoranthene results were below the Part B reference criteria (1,100,000 μg/kg). The presence of fluoranthene in OU3 is confirmed by its detection in 14 of 92 unknown liquid samples, with concentrations ranging from 0.2 to 11 μg/L.

Figure A.II-116 depicts the summary of contamination by media sampled for fluoranthene. Of the 78 detected results, 70 were in loose media samples, 3 in concrete, 2 in asphalt, 2 in acid brick, and one was detected in wood.

Since fluoranthene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.48 Fluorene

As shown on Tables A.II-1 and A.II-2, fluorene was detected in 27 percent (28 of 102) of solid media samples, with concentrations ranging from 24 to 19,000 μg/kg. The median of all results is 750 μg/kg. The maximum concentration was found in the same sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and fluoranthene were detected. As a reference point, all fluorene results were below the Part B reference criteria (1,100,000 μg/kg). The limited presence of fluorene in OU3 is confirmed by its detection in only 1 of 93 unknown liquid samples, with a concentration of 0.3 μg/L.

Since fluorene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.49 Hexachlorobenzene

As shown on Table A.II-1, hexachlorobenzene was not detected in any of 113 solid media samples. The absence of hexachlorobenzene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since hexachlorobenzene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.50 Hexachlorobutadiene

As shown on Tables A.II-1 and A.II-2, hexachlorobutadiene was detected in one percent (1 of 102) of solid media samples, with a concentration of 298,000 μg/kg. The geometric mean of all results is 2000 μg/kg. The sample in which the detected result was found was the same transite from the Special Products Plant (9A) in which the maximum concentration of 1,4-dichlorobenzene was detected. The transite solid-phase result was extrapolated from the TCLP leachate result of 14.9 mg/L. As reference points, the one sample of the hexachlorobutadiene exceeded the Part B reference criteria (820 μg/kg) and exceeded 20 times the TCLP limit (10,000 μg/kg). The limited presence of hexachlorobutadiene in OU3 is confirmed because it was not detected in any of 93 unknown liquid samples.

Hexachlorobutadiene is a COC because the one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. Furthermore, the one detected result exceeded 20 times the TCLP limit, a fact which indicates a potential for the transite to be hazardous. Therefore, hexachlorobutadiene is considered *more significant* compared to other organic COCs and will be discussed further in Appendix A and Section 3.0.

A.II.5.51 Hexachlorocyclopentadiene

As shown on Tables A.II-1 and A.II-2, hexachlorocyclopentadiene was not detected in any of 102 solid media samples. The absence of hexachlorocyclopentadiene in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since hexachlorocyclopentadiene is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.52 Hexachloroethane

As shown on Table A.II-1, hexachloroethane was not detected in any of 112 solid media samples. The absence of hexachloroethane in OU3 is further confirmed because it was not detected in any of

93 unknown liquid samples. Since hexachloroethane is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.53 Indeno(1,2,3-cd)pyrene

As depicted on Figure A.II-117 and shown on Tables A.II-1 and A.II-2, indeno(1,2,3-cd)pyrene was detected in 50 percent (51 of 101) of solid media samples, with concentrations ranging from 20 to 49,000 μg/kg. The geometric mean of all results is 1400 μg/kg. The maximum concentration was found in the same sediment sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and fluorene were detected. As a reference point, 50 percent of the indeno(1,2,3-cd)pyrene results were below the Part B reference criteria (32.0 μg/kg). The presence of indeno(1,2,3-cd)pyrene in OU3 is not confirmed because it was not detected in any of 92 unknown liquid samples.
Figure A.II-118 depicts the summary of contamination by media sampled for indeno(1,2,3-cd)pyrene. All detected results were in loose media samples.

Indeno(1,2,3-cd)pyrene is a COC because 50 detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. The organic was detected in 50 percent of all solid media samples, and 50 percent of the results are above the Part B reference criteria. However, there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, indeno(1,2,3-cd)pyrene is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.54 Isophrone

As shown on Tables A.II-1 and A.II-2, isophrone was detected in one percent (1 of 102) solid media samples, with a concentration of 45,000 μg/kg. The geometric mean of all results is 2200 μg/kg. The sample in which the detected result was found was a loose media sample collected from the Engine House/Garage (31A). As a reference point, the one sample result was below the Part B reference criteria (67,000 μg/kg). The limited presence of isophrone in OU3 is confirmed because it was not detected in any of 93 unknown liquid samples.

Since isophrone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.55 m-Methylphenol

As shown on Tables A.II-1 and A.II-2, m-methylphenol was detected in 33 percent (one of three) of solid media samples, with a concentration of 288 μg/kg. The geometric mean of all results is 570 μg/kg. The sample in which the detected result was found was a transite sample collected from the Recovery Plant (8A). The transite solid phase result was extrapolated from the TCLP leachate result of 0.014 mg/L. As reference points, the result is below the Part B reference criteria (1300 μg/kg) and below 20 times the TCLP limit (4,000,000 μg/kg) and the TCLP leachate limit (200 mg/L). There were no unknown liquid samples analyzed for m-methylphenol.

Since m-methylphenol is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.56 n-Nitroso-di-n-Propylamine

As shown on Tables A.II-1 and A.II-2, n-nitroso-di-n-propylamine was detected in one percent (1 of 101) of solid media samples, with a concentration of 48,000 μg/kg. The geometric mean of all results is 2200 μg/kg. The sample in which the detected result was found is the same loose media sample which was collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, 2-chlorophenol, 4-chloro-3-methylphenol, 4-nitrophenol, acenaphthene, and dimethyl phthalate were detected. As a reference point, 99 percent of the n-nitroso-di-n-propylamine results were below the Part B reference criteria (9.1 μg/kg). The absence of n-nitroso-di-n-propylamine in OU3 is further confirmed because it was not detected in any of 92 unknown liquid samples.

n-Nitroso-di-n-propylamine is a COC because the one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, the organic was detected in only one percent of all solid media samples, 99 percent of the results are below the Part B reference criteria, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore it is considered *not as significant* compared to other organic COCs and is not further discussed in Section 3.0.

A.II.5.57 n-Nitrosodiphenylamine

As shown on Tables A.II-1 and A.II-2, n-nitrosodiphenylamine was not detected in any of 102 solid media samples. The absence of n-nitrosodiphenylamine in OU3 is further confirmed because it was not detected in any of 93 unknown liquid samples. Since n-nitrosodiphenylamine is not a COC, it will not be discussed further in Appendix A or Section 3.0.

A.II.5.58 Naphthalene

As shown on Table A.II-1, naphthalene was detected in 28 percent (29 of 102) of solid media samples, with concentrations ranging from 30 to 6400 μg/kg. The median of all results is 520 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations of 2,4-dimethylphenol, acenaphthylene, butyl benzyl phthalate, carbazole, di-n-butyl phthalate, and dibenzofuran were detected. As a reference point, all naphthalene results were below the Part B reference criteria (1,100,000 μg/kg). The limited presence of naphthalene in OU3 is confirmed by its detection in only 7 of 93 unknown liquid samples, with concentrations ranging from 0.09 to 200 μg/L.

Since naphthalene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.59 Nitrobenzene

As shown on Tables A.II-1 and A.II-2, nitrobenzene was detected in two percent (2 of 113) of solid media samples, with concentrations of 140 and 566,000 μg/kg. The geometric mean of all results is 1900 μg/kg. The detected results were found in loose media and transite, respectively. The maximum detected result was found was the same transite from the Special Products Plant (9A) in which the maximum concentrations of 1,4-dichlorobenzene and hexachlorobutadiene were detected. The transite solid-phase result was extrapolated from the TCLP leachate result of 28.3 mg/L. As reference points, 99 percent of the nitrobenzene results are below the Part B reference criteria (14,000 μg/kg), and the transite sample exceeded 20 times the TCLP limit (40,000 μg/kg). The limited presence of nitrobenzene in OU3 is confirmed because it was not detected in any of 93 unknown liquid samples.

Nitrobenzene is a COC because one detected result exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. Furthermore, one detected result exceeded 20 times the TCLP limit, a fact which indicates a potential for the transite to be hazardous. Therefore, nitrobenzene is considered *more significant* compared to other organic COCs and will be discussed further in Appendix A and Section 3.0.

A.II.5.60 o-Methylphenol

As shown on Tables A.II-1 and A.II-2, o-methylphenol was detected in six percent (6 of 102) of solid media samples, with concentrations ranging from 57 to 134,000 μg/kg. The geometric mean of the results is 1800 μg/kg. Five of the detected results were found in loose media and the sixth was found

in transite. The maximum detected result was found was the same transite sample from the Special Products Plant (9A) in which the maximum concentrations of 1,4-dichlorobenzene, hexachlorobutadiene, and nitrobenzene were detected. The transite solid phase result was extrapolated from the TCLP leachate result of 6.7 mg/L. As reference points, all o-methylphenol results were below the Part B reference criteria (1,400,000 μg/kg), and the transite sample did not exceed 20 times the TCLP limit (4,000,000 μg/kg) or the TCLP leachate limit (200 mg/L). The limited presence of o-methylphenol in OU3 is confirmed by its detection in only 4 of 92 unknown liquid samples, with concentrations ranging from 0.5 to 10 μg/L.

Since o-methylphenol is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.61 p-Chloroaniline

As shown on Tables A.II-1 and A.II-2, p-chloroaniline was detected in one percent (1 of 98) of solid media samples, with a concentration of 140 μg/kg. The geometric mean of all results is 2000 μg/kg. The sample in which the detected result was found is the same loose media sample collected from the Sludge Drying Beds (25F) in which the maximum concentration 2,4,6-trichlorophenol was detected. There are no regulatory levels to use as reference points. The absence of p-chloroaniline in OU3 is confirmed because it was not detected in any of 86 unknown liquid samples.

Since p-chloroaniline is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.62 p-Methylphenol (Cresol)

As shown on Tables A.II-1 and A.II-2, p-methylphenol (cresol) was detected in 20 percent (21 of 103) of solid media samples, with concentrations ranging from 13 to 20,000 μg/kg. The geometric mean of all results is 1300 μg/kg. The maximum concentration was found in the same sediment sample collected from the Storm Water Retention Basin (18E) in which the maximum concentration of di-n-octyl phthalate was detected. As a reference point, all of the p-methylphenol (cresol) results were below the Part B reference criteria (1,400,000 μg/kg) and 20 times the TCLP limit (4,000,000 μg/kg). The presence of p-methylphenol (cresol) in OU3 is not confirmed by its detection in only 7 of 91 unknown liquid samples, with concentrations ranging from 0.5 to 20 μg/L.

Since p-methylphenol (cresol) is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.63 Pentachlorophenol

As shown on Tables A.II-1 and A.II-2, pentachlorophenol was detected in two percent (2 of 100) of solid media samples, with concentrations of 730 and 14,000 μg/kg. The geometric mean of all results is 4600 μg/kg. Both of the detected results were found in loose media with the maximum concentration collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorobenzene, 2,4-dinitrotoluene, 2-chlorophenol, 4-chloro-3-methylphenol, 4-nitrophenol, acenaphthene, dimethyl phthalate, and n-nitroso-di-n-propylamine were detected. As a reference point, 98 percent of the pentachlorophenol results were below the Part B reference criteria (530 μg/kg), and all results were below 20 times the TCLP limit (2,000,000 μg/kg). The presence of pentachlorophenol in OU3 is not confirmed because it was not detected in any of 91 unknown liquid samples.

Pentachlorophenol is a COC because both of the detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, the organic was detected in only two percent of all solid media samples; 98 percent of the results are below the Part B reference criteria; and none were above 20 times the TCLP limit which is the hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, pentachlorophenol is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.5.64 Phenanthrene

As depicted on Figure A.II-119 and shown on Tables A.II-1 and A.II-2, phenanthrene was detected in 75 percent (77 of 102) of solid media samples, with concentrations ranging from 22 to 180,000 μg/kg. The geometric mean of all results is 1300 μg/kg. The maximum concentration was found in the same loose media sample collected from the Special Products Plant (9A) in which the maximum concentrations 2,4-dimethylphenol, acenaphthylene, butyl benzyl phthalate, carbazole, di-n-butyl phthalate, dibenzofuran, and naphthalene were detected. There are no regulatory levels for use as reference points. The presence of phenanthrene in OU3 is confirmed by its detection in 11 of 93 unknown liquid samples, with concentrations ranging from 0.06 to 8 μg/L.

Figure A.II-120 depicts the summary of contamination by media sampled for phenanthrene. Of the 75 detected results, 66 were in loose media samples, five in concrete, two in asphalt, one was in acid brick, and one in wood.

Since phenanthrene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.65 Phenol

As shown on Tables A.II-1 and A.II-2, phenol was detected in 13 percent (13 of 95) of solid media samples, with concentrations ranging from 18 to 67,000 μg/kg. Twelve of the detected results were found in loose media, with the last result in acid brick. The geometric mean of all results is 1600 μg/kg. The maximum concentration was found in the same loose media sample collected from the Green Salt Plant (4A) in which the maximum concentrations of 1,2,4-trichlorbenzene, 2,4-dinitrotoluene, 2-chlorophenol, 4-chloro-3-methylphenol, 4-nitrophenol, acenaphthene, dimethyl phthalate, n-nitroso-di-n-propylamine, and pentachlorophenol were detected. As a reference point, all phenol results were below the Part B reference criteria (16,000,000 μg/kg). The limited presence of phenol in OU3 is confirmed by its detection in 10 of 90 unknown liquid samples, with concentrations ranging from 0.2 to 520 μg/L.

Since phenol not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.5.66 Pyrene

As depicted on Figure A.II-121 and shown on Tables A.II-1 and A.II-2, pyrene was detected in 74 percent (76 of 102) of solid media samples, with concentrations ranging from 40 to 170,000 μg/kg. The geometric mean of all results is 1800 μg/kg. The maximum concentration was found in the same sediment sample collected from the Laboratory (15A) in which the maximum concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene were detected. As a reference point, all of the pyrene results were below the Part B reference criteria (820,000 μg/kg). The presence of pyrene in OU3 is further confirmed by its detection in 12 of 92 unknown liquid samples, with concentrations ranging from 0.2 to 9 μg/L.

Figure A.II-122 depicts the summary of contamination by media sampled for pyrene. Of the 76 detected results, 70 were in loose media samples, two in concrete, two in asphalt, one was in acid brick, and one in wood.

Since pyrene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6 PESTICIDES & POLYCHLORINATED BIPHENYLS (PCBS)

As described in Appendix A.2.2, pesticides/PCBs were used at the FEMP and are therefore expected contaminants in OU3. However, they are expected to be limited in both level and abundance. Pesticides/PCBs were analyzed in 22 major media samples (asphalt - 2 samples, concrete chips - 14 samples, and concrete cores - 6 samples) and 15 supplemental media samples (air filters, loose media, sediment, sludge, soil, and wood). Of the 28 PCB/pesticide contaminants for which analyses were performed, 16 were detected during analyses of the OU3 remedial investigation samples. Of the samples analyzed for pesticides/PCBs, 27 exceeded the Part B reference criteria; however, none of the samples exceeded 20 times the TCLP limit. Also, none of the samples analyzed exceeded the 50 parts per million (ppm) TSCA limit for PCBs established by the Toxic Substances Control Act (TSCA) (40 CFR 761). The following sections discuss the frequency of detections and relative levels of detections for each pesticide/PCB analyzed in OU3 materials.

A.II.6.1 4,4'-DDD

As shown on Tables A.II-1 and A.II-2, 4,4'-DDD was detected in only three percent (one of 35) of solid media samples, at a concentration of 1.9 μg/kg. The geometric mean of all results is 3.8 μg/kg. The sample in which the pesticide was detected was collected from soil from Pile #2 (Southeast of Building 8) (G13). This same sample also detected maximum concentrations for Endosulfan II and Endrin. As a reference point, all 4,4'-DDD results were below the Part B reference criteria (270 μg/kg).

Since 4,4'-DDD is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.2 4,4'-DDE

As shown on Tables A.II-1 and A.II-2, 4,4'-DDE was detected in nine percent (three of 35) of solid media samples, with concentrations ranging from 0.69 to 94 μg/kg. The geometric mean of all results is 4.4 μg/kg. All three of the detected results were in concrete chip samples, with the maximum concentration in a sample collected from the Clearwell Pump House (18G). As a reference point, the Part B reference criteria for 4,4'-DDE is 190 μg/kg, well above the detected concentrations.

Since 4,4-DDE is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.3 4,4'-DDT

As shown on Table A.II-1, 4,4'-DDT was not detected in any of the 34 solid media samples. Since 4,4'-DDT is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.4 Aldrin

As shown on Table A.II-1, aldrin was not detected in any of the 34 solid media samples. Since aldrin is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.5 alpha-BHC

As shown on Table A.II-1, alpha-BHC was not detected in any of the 35 solid media samples. Since alpha-BHC is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.6 alpha-Chlordane

As shown on Tables A.II-1 and A.II-2, alpha-chlordane was detected in six percent (2 of 35) of solid media samples, with concentrations of 5.4 and 71 μg/kg. The geometric mean of all results is 2.1 μg/kg. Both of the detected results were in concrete chip samples, with the maximum concentration in a sample collected from the Quonset Hut #3 (62). This same sample also detected the maximum concentration for gamma-chlordane. As reference points, one of the detected results exceeded the Part B reference criteria for alpha-chlordane (49 μg/kg) but did not exceed 20 times the TCLP limit for total chlordane (6000 μg/kg).

alpha-Chlordane is a COC because its concentration in one sample exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was detected in only six percent of all solid media samples, and its detected concentrations are well below hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, alpha-chlordene is considered *not as significant* compared to other organic COCs and will be further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.7 Aroclor-1016

As shown on Table A.II-1, aroclor-1016 was not detected in any of the 37 solid media samples. Since aroclor-1016 is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.8 Aroclor-1221

As shown on Table A.II-1, aroclor-1221 was not detected in any of the 37 solid media samples. Since aroclor-1221 is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.9 Aroclor-1232

As shown on Table A.II-1, aroclor-1232 was not detected in any of the 37 solid media samples. Since aroclor-1232 is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.10 Aroclor-1242

As shown on Table A.II-1, aroclor-1242 was not detected in any of the 37 solid media samples. Since aroclor-1242 is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.11 Aroclor-1248

As shown on Tables A.II-1 and A.II-2, aroclor-1248 was detected in five percent (2 of 37) of solid media samples, at concentrations of 53 and 1700 μg/kg. The geometric mean for all results is 42 μg.kg. These detections were in samples of soil and concrete chips, respectively, with the maximum concentration collected from the Sewage Treatment Plant Incinerator (39D). As reference points, both detected results exceed the Part B reference criteria for aroclor-1248 (8.3 μg/kg) and the TSCA limit of 50,000 μg/kg (40 CFR 761).

Aroclor-1248 is a COC because both detected results exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was detected in only six percent of all solid media samples, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site disposal, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, Aroclor-1248 is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.12 Aroclor-1254

As shown on Tables A.II-1 and A.II-2, aroclor-1254 was detected in 38 percent (14 of 37) of solid media samples, with concentrations ranging from 41 to 5100 μg/kg. The median of all results is 110 μg/kg. Five of the detected results were in soil samples, eight were in concrete samples, and one was in a loose media sample. The maximum detected concentration was in a soil sample collected from Pile #7 (Third Street) (G13). As reference points, all of the detected aroclor-1254 results were

above the Part B reference criteria (8.3 μg/kg), but none exceeded the TSCA limit of 50,000 μg/kg (40 CFR 761).

Aroclor-1254 is a COC because all of the detected results were above the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was detected in only 38 percent of all solid media samples, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site disposal, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, aroclor-1254 is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.13 Aroclor-1260

As shown on Tables A.II-1 and A.II-2, aroclor-1260 was detected in 22 percent (eight of 37) of solid media samples, with concentrations ranging from 24 to 3400 μg/kg. The median of all results is 62 μg/kg. Five of the detected results were in concrete, two were in soil, and one was in loose media. The maximum detected concentration of aroclor-1260 was in a concrete core sample collected from the top half inch from the Contaminated Oil/Graphite Burn Pad (10D). As reference points, all of the detected aroclor-1260 results were above the Part B reference criteria (8.3 μg/kg), but none exceeded the TSCA limit of 50,000 μg/kg (40 CFR 761).

Aroclor-1260 is a COC because all of the detected results were above the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, it was only detected in 22 percent of all solid media samples, the maximum detected concentration is well below the TSCA limit controlling its on-property and off-site disposal, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, aroclor-1260 is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.14 beta-BHC

As shown on Table A.II-1, beta-BHC was not detected in any of the 35 solid media samples. Since beta-BHC is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.15 delta-BHC

As shown on Tables A.II-1 and A.II-2, delta-BHC was detected in three percent (1 of 35) of solid media samples, with a concentration of 2.8 μg/kg. The geometric mean of all results is 1.9 μg/kg. The pesticide was detected in a concrete chip sample collected from the top half inch from the Plant 9 Substation (9D). There are no regulatory levels for use as reference points.

Since delta-BHC is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.16 Dieldrin

As shown on Tables A.II-1 and A.II-2, dieldrin was detected in 15 percent (5 of 34) of solid media samples, with concentrations ranging from 1.6 to 6.9 μg/kg. The geometric mean of all results is 3.9 μg/kg. These detections were in samples of soil and concrete chips with the maximum concentration in a concrete chip sample collected from the top half inch from the Main Electrical Station (16A). Results for this same concrete chip sample also indicated maximum concentrations for endosulfan I, endosulfan sulfate, and endrin ketone. As a reference point, two of the detected dieldrin results were above the Part B reference criteria (4 μg/kg).

Dieldrin is a COC because two of the detected results were above the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, dieldrin was detected in only 15 percent of all solid media samples, and there are no hazardous criteria governing its disposal in a landfill (40 CFR 261.24). Therefore, dieldrin is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.17 Endosulfan I

As shown on Tables A.II-1 and A.II-2, endosulfan I was detected in six percent (two of 35) of solid media samples, with concentrations ranging from 1.5 to 2.7 μg/kg. The geometric mean of all results is 1.9 μg/kg. These detections were in wood and concrete chip, respectively, with the maximum concentration collected from the Main Electrical Station (16A). This same sample also detected maximum concentrations for dieldrin, endosulfan sulfate, and endrin ketone. As a point of reference, all endosulfan I results were below the Part B reference criteria (160,000 μg/kg).

Since endosulfan I is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.18 Endosulfan II

As shown on Tables A.II-1 and A.II-2, endosulfan II was detected in nine percent (3 of 35) of solid media samples, with concentrations ranging from 1.6 to 11 μg/kg. The geometric mean of all results is 3.8 μg/kg. These detections were in samples of concrete chips and soil, with the maximum concentration from soil from Pile #2 (Southeast of Building 8) (G13). Also in the Pit #2 sample maximum concentrations for 4,4'-DDD and endrin were detected. As a point of reference, all endosulfan II results were below the Part B reference criteria (160,000 μg/kg).

Since endosulfan II is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.19 Endosulfan Sulfate

As shown on Tables A.II-1 and A.II-2, endosulfan sulfate was detected in nine percent (3 of 35) of solid media samples, with concentrations ranging from 2.4 to 8.2 μg/kg. The geometric mean of all results is 3.8 μg/kg. All of the detected results were in concrete chips, with two of the three maximum concentrations collected from the Main Electrical Station (16A). In the same sample having the maximum concentration for endosulfan sulfate, maximum concentrations for dieldrin, endosulfan I, and endrin ketone were detected. As a point of reference, all endosulfan sulfate results were below the Part B reference criteria (160,000 μg/kg).

Since endosulfan sulfate is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.20 Endrin

As shown on Tables A.II-1 and A.II-2, endrin was detected in six percent (2 of 34) of solid media samples, with concentrations ranging from 0.98 to 22 μg/kg. The geometric mean of all results is 3.8 μg/kg. These detections were in samples of wood and soil, respectively, with the maximum concentration from soil Pile #2 (Southeast of Building 8) (G13). In this same sample, maximum concentrations for 4,4'-DDD and endosulfan II were detected. As reference points, the 20 times the TCLP limit for endrin is 400 μg/kg and all results were below the Part B reference criteria (8200 μg/kg).

Since endrin is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.21 Endrin aldehyde

As shown on Table A.II-1, endrin aldehyde was not detected in any of the 35 solid media samples. Since endrin aldehyde is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.22 Endrin Ketone

As shown on Tables A.II-1 and A.II-2, endrin ketone was detected in six percent (2 of 35) of solid media samples, with concentrations ranging from 1.6 to 7.1 μg/kg. The geometric mean of all results is 3.7 μg/kg. These detections were in samples of soil and concrete chips, respectively, with the maximum concentration from the Main Electrical Station (16A). Also in this same sample, from component 16A maximum concentrations for dieldrin, endosulfan I, and endosulfan sulfate were detected. There are no regulatory levels for use as reference points.

Since endrin ketone is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.23 gamma-BHC (Lindane)

As shown on Table A.II-1, gamma-BHC (lindane) was not detected in any of the 34 solid media samples. Since gamma-BHC (lindane) is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.24 gamma-Chlordane

As shown on Tables A.II-1 and A.II-2, gamma-chlordane was detected in nine percent (3 of 35) of solid media samples, with concentrations ranging from 0.42 to 76 μg/kg. The geometric mean of all results is 2.0 μg/kg. These detections were in samples of soil and concrete chips, with the maximum detected concentration of gamma-chlordane from Quonset Hut #3 (62). Also in this same sample from component 62, the maximum concentration for alpha-chlordane was detected. As a reference point, approximately 3 percent of the gamma-chlordane results exceeded the Part B reference criteria (49 μg/kg).

gamma-Chlordane is a COC because its concentration in one sample exceeded the Part B reference criteria, a fact which indicates a potential concern with direct contact. However, gamma-chlordane was detected in only nine percent of all solid media samples, and there is no WAC for its on-property or off-site disposal. Therefore, it is considered *not as significant* compared to other organic COCs and is further discussed in Appendix A but will not be discussed in Section 3.0.

A.II.6.25 Heptachlor

As shown on Table A.II-1, heptachlor was not detected in any of the 34 solid media samples. Since heptachlor is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.26 Heptachlor Epoxide

As shown on Tables A.II-1 and A.II-2, heptachlor epoxide was detected in three percent (1 of 35) of solid media samples, with a concentration of 1.1 μg/kg. The geometric mean of all results is 1.9 μg/kg. The sample in which the pesticide was detected was a concrete chip sample collected from the top 1/2-inch from the Plant 6 Electrostatic Precipitator (Central) (6D). Also in this same component (6D) the maximum concentration for methoxychlor was detected, however in a different media (loose media). As reference points, none of the results exceed the Part B reference criteria for heptachlor epoxide (7 μg/kg) or 20 times the TCLP limit for heptachlor (and its epoxide) (160 μg/kg).

Since heptachlor epoxide is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.27 Methoxychlor

As shown on Tables A.II-1 and A.II-2, methoxychlor was detected in three percent (one of 35) of solid media samples, with a concentration of 140 μg/kg. The geometric mean of all results is 20.4 μg/kg. The sample in which the pesticide was detected was a loose media sample collected from the Plant 6 Electrostatic Precipitator (Central) (6D). Also in this same component (6d), the maximum concentration for heptachlor epoxide, however in a different media (concrete chip). As a reference point, the result is below 20 times the TCLP limit for methoxychlor (200,000 μg/kg) and the Part B reference criteria (140,000 μg/kg).

Since methoxychlor is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.6.28 Toxaphene

As shown on Table A.II-1, toxaphene was not detected in any of the 35 solid media samples. Since toxaphene is not a COC, it is not further discussed in Appendix A or Section 3.0.

A.II.7 TCLP Results

Forty-six samples of OU3 media (2 masonry, 6 acid brick, 12 transite, 10 concrete chip and 16 concrete core) were collected for analysis by the toxicity characteristic leaching procedure (TCLP) (40

CFR 261 App. II). This procedure is designed to conservatively estimate the amount of a contaminant that will leach from a sample in a landfill. In simple terms, the procedure specifies that 100 grams (g) of a solid sample be ground, placed in 2 liters (L) of acidified water, shaken together for a period of time, the liquid separated from the solids, and the concentration of contaminants in the liquid measured. If the concentration of specified contaminants in the liquid exceeds regulatory levels (40 CFR 261.24), the solid material is classified as hazardous. Samples of liquids that exceed the regulatory limits are also considered hazardous.

A significant factor in the procedure is that contaminants in the solid sample that leach are diluted by a factor of 20 (i.e., 20000 milliliters [ml] per 100 g or 20 ml/g or 20 L/kilogram [kg]). Stated another way:

> *if a 100 mg solid sample contains 2.0 mg of a given contaminant (i.e., a concentration of 2.0 mg/100 mg or 20 mg/kg) and it all leaches in the TCLP test, its concentration in the leachate will be 1 mg/L.*

This factor is useful in making determinations as to whether or not a material can be hazardous based on the concentration of regulated chemicals in the solid sample. If the concentration of a specified chemical is less than 20 times the respective TCLP limit, it cannot be hazardous. If the concentration is greater than 20 times the TCLP limit, it may be hazardous, but a TCLP analysis must be performed to be sure.

In the 46 samples that were analyzed using the TCLP test, 17 regulated chemicals were detected. Chromium, lead, and cadmium were detected the most often: chromium in seven samples (three acid brick and four concrete), lead in seven samples (three in acid brick, three in concrete, and one in masonry), and cadmium in six samples (three acid brick and three concrete). Of the samples that had detected levels of regulated chemicals, the concentrations in three samples exceeded specified TCLP limits for five chemicals, as shown below, and are considered hazardous.

Sample Number	Sampled Media	Contaminant	TCLP Result (mg/L)	TCLP Limit (mg/L)
54A-040	Masonry	Lead	11	5.0
9A-028	Transite	1,4-Dichlorobenzene	17.2	7.5
		Hexachlorobutadiene	14.9	0.5
		Nitrobenzene	28.3	2.0
2A-014	Transite	Tetrachloroethene	59	0.7

Another use for the TCLP results is to determine the amount of individual chemicals that leach during the test to evaluate: 1) whether the 20 times TCLP level is too conservative, and 2) how much may leach after disposal. To determine this, the concentration of the contaminant in the solid sample must be known. Of the 46 samples for which TCLP analyses were performed, the concentration of at least one fraction of contaminants (i.e., radiological, inorganics, semivolatiles and/or volatiles) was determined in the solid phase of 33 of the same or nearby samples (6 acid brick, 2 masonry, 9 concrete chip, and 16 concrete cores). Tables A.II-3, A.II-4, A.II-5, and A.II-6 compare the total and TCLP results for these samples for radionuclides, inorganics, semivolatiles, and volatiles, respectively. Note that only analyses in which the leachate concentration was below the theoretical maximum concentration, based on all of the metal in the solid sample leaching, are considered reasonable. Note also that, for comparison purposes, non-detected results are designated with a *less than* (<) sign.

A.II.7.1 Radionuclides

Note that there are no TCLP limits for radionuclides. However, a few acid brick and concrete samples were analyzed using the TCLP test to obtain a conservative estimate of the percentage of contaminants that leach.

Acid Brick

Two acid brick samples were analyzed for radionuclides using the TCLP test. All of the radionuclides, except cesium-137, were detected in both the solid phase and the leachate. Cesium-137, however, was not detected in the leachate of either sample. From 0.3 percent (technetium-99) to 78 percent (neptunium-237) of the radionuclides leached in the TCLP test.

Concrete

Four concrete samples were analyzed for radionuclides using the TCLP test. Sample results indicate that most of the radionuclides were detected in both the solid phase and the leachate. The major exceptions were cesium-137, and strontium-90. Cesium-137 was not detected in the solid phase or leachate of any of the samples, and strontium-90 was not detected in the solid phase of three samples. Because of the low apparent percentage of most radionuclides that leached from the samples taken from the Metals Production Plant (5A), the two samples are not considered representative. Even excluding these samples, a quantity of less than 0.1 percent (thorium-230) to 56 percent (technetium-99) of the radionuclides leached in the TCLP test.

Masonry

Neither of the masonry samples were analyzed for radionuclides.

A.II.7.2 Inorganics

Acid Brick

Three acid brick samples were analyzed for inorganics using the TCLP test. Only two TCLP metals, chromium (at 127 mg/kg) and lead (at 169 mg/kg), were detected at greater than 20 times the TCLP limit. Chromium was detected in the TCLP leachate of the corresponding sample at 0.116 mg/L, well below the TCLP limit of 5.0 mg/L. Analytical results indicate that only two percent of available chromium leached from the solid sample. Lead was detected in the TCLP leachate of the solid sample exceeding 20 times TCLP at 0.0727 mg/L, well below the TCLP limit of 5.0 mg/L. Results indicate that only one percent of the available lead leached from the solid sample. Based on these results (assuming a maximum of two percent of any TCLP metal with a high initial concentration in the solid phase would leach during the TCLP test), no acid brick samples would be considered characteristically hazardous due to TCLP metals.

In all of the samples, from 0.9 percent (arsenic) to 66 percent (cobalt) of the TAL inorganics and a maximum of 35 percent (lead) of any TCLP metal, leached out in the TCLP test. Based on these data (assuming a maximum of 35 percent of any TCLP metal would leach during a TCLP test), only four samples would be considered characteristically hazardous due to TCLP metals, two for chromium and two for lead. Conservatively, however, **a concentration of 20 times the TCLP limit in the solid sample will be used to estimate the amount of acid brick that is potentially hazardous**.

Concrete

For five of the concrete samples that were analyzed for inorganics using the TCLP test, a corresponding solid sample was also analyzed. Only one TCLP metal, lead (at 105 mg/kg), was detected at greater than 20 times the TCLP limit in the solid sample corresponding to the sample analyzed using the TCLP test. Lead was detected in the leachate of the corresponding sample at 0.0075 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only 0.14 percent of the available lead leached from the solid sample. Based on this result (assuming a maximum of 0.2 percent of any TCLP metal would leach during the TCLP test), no concrete samples would be considered characteristically hazardous due to TCLP metals.

From 0.1 percent (iron) to 57.9 percent (sodium) of the TAL inorganics, and a maximum of ten percent (silver) of TCLP metals, leached in the TCLP test. Based on these data (conservatively assuming a maximum of 25 percent of any TCLP metal would leach during a TCLP test), ten samples would be considered hazardous for lead and two for chromium.

As noted in Section 2.3, the concrete chip samples are not truly representative. In most cases, the samples were taken from the top 1/2-inch of an assumed 8-inch thickness. The concrete below the concrete chip is assumed to be at the OU3 baseline concentration for all inorganics. This would indicate that even the sample with the highest lead concentration would not be hazardous.

Although all of these data indicate that 20 times the TCLP limit is overly conservative, they are not consistent enough to make a definitive assessment. Therefore, **a concentration of 20 times the TCLP limit in the solid sample will be used to estimate the amount of concrete that is potentially hazardous.**

Masonry

In the two masonry samples analyzed for both total and TCLP inorganics, only one TCLP metal, lead (at 13,000 mg/kg), was detected at greater than 20 times the TCLP limit in the solid sample corresponding to the sample analyzed using the TCLP. Lead was detected in the leachate of the corresponding sample at 11 mg/L, above the TCLP limit of 5.0 mg/L. But only 1.7 percent of the available lead leached from the solid sample. Based on this result (assuming a maximum of two percent of any TCLP metal would leach during the TCLP test), two masonry samples would be considered characteristically hazardous due to lead.

The sample in which the leachate concentration exceeded the TCLP limit for lead is the only one for which the estimate of the amount of any inorganic that leached is considered reliable. Based on these results, no conclusions can be made regarding the leachability of inorganics from masonry.

As noted in Section 2.3, the masonry samples are not truly representative. In most cases, the samples were taken from the top 1/2-inch of an assumed 8-inch thickness. The masonry below the concrete chip is assumed to be at the OU3 baseline concentration for all inorganics. This would indicate that both masonry samples with the maximum lead concentrations would still be hazardous if a representative sample were collected. Therefore, **a concentration of 20 times the TCLP limit in the solid sample will be used to estimate the amount of concrete that is potentially hazardous.**

A.II.7.3 Semivolatiles

Acid Brick

Two acid brick samples were analyzed for both total and TCLP semivolatile organics. Only nine (2-chloronapthalene, 4-bromophenyl phenyl ether, 4-nitrophenol, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, phenol, and pyrene) semivolatiles were detected in the solid phase of one sample and only two (di-n-octyl phthalate and fluoranthene) in the second. No semivolatiles were detected in the leachate from either sample. There are no TCLP limits for any of the detected semivolatiles. Since there were so few detections of semivolatiles in acid brick, no conclusions can be made regarding the leachability of semivolatiles. In addition, although the detection limits for most of the non-detected results are somewhat higher than the detected results, they are still well above TCLP limits, for the leachate and well above 20 times TCLP for the solids. No acid brick is expected to be characteristically hazardous due to semivolatiles. Conservatively, **20 times the TCLP limit is used to estimate the amount that is potentially hazardous**.

Concrete

Four concrete samples for which TCLP analyses were performed were also analyzed for semivolatile contamination. Only eight semivolatiles (benzo(a)anthracene, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, fluoranthene, phenanthrene - in all four, and pyrene) were detected in the solid sample, and only one (phenanthrene) was detected in the leachate. Phenanthrene was detected in all four solid samples, but only in one leachate sample, and fluoranthene was detected in two solid samples. All other detected semivolatiles were only detected in one solid. There are no TCLP limits for any of the detected semivolatiles.

Because of the large number of non-detected results, only one of the estimates of the amount of any semivolatile that leached is considered reliable, thus no conclusions can be made regarding the leachability of semivolatiles from concrete. Therefore, **20 times the TCLP limit is used to estimate the amount that is potentially hazardous**.

Masonry

Neither of the masonry samples was analyzed for semivolatiles using the TCLP test.

A.II.7.4 Volatiles

Acid Brick

The solid phase of two of the acid brick samples for which the TCLP test was performed were was analyzed for volatile organics. Only seven volatiles (1,1,1,-trichloroethane, ethylbenzene, methylene chloride, tetrachloroethene, xylenes (m/p, o, and total), one of which is regulated by RCRA (tetrachloroethene), were detected in the solid sample and only one, benzene (which is regulated by RCRA) was detected in the leachate. The solid sample did not exceed 20 times the TCLP limit, and the leachate sample did not exceed the TCLP limit. None of the estimates of the amount of any volatile that leached are considered reliable; thus no conclusions can be made regarding the leachability of volatiles from acid brick. Therefore, **20 times the TCLP limit is used to estimate the amount that is potentially hazardous.**

Concrete

The solid phase of 18 concrete samples for which TCLP analyses were performed was also analyzed for volatile organic contamination. Only 10 volatiles were detected in the solid sample, and only 11 volatiles were detected in the leachate. The following volatiles were detected in the solid samples: 1,1,1-trichloroethane - in four samples; 2-butanone, 2-hexanone, and 4-methyl-2-pentanone - in three samples; benzene, and ethylbenzene - in ten samples, methylene chloride, and tetrachloroethene - in five samples; toluene - in seven samples; and xylenes [m/p, o, and total] - in eight samples. Volatiles detected in the leachate were 1,1,1-trichloroethane - in seven samples [including the four where it was detected in the solid phase]; 2-butanone, 4-methyl-2-pentanone - in three samples [including two in which it was detected in the solid phase]; benzene - in two samples; carbon disulfide - in nine samples; chlorobenzene, chloroform, and ethylbenzene - in eight samples [including seven in which it was detected in the solid phase]; tetrachloroethene, and toluene - in five samples 9 [including two in which it was detected in the solid phase]; and total xylenes - in eight samples [including seven in which it was detected in the solid phase]. Because of the detection of ethylbenzene, toluene, and xylenes in many of the same samples, it is likely that this contamination is a result of spills of gasoline or other petroleum product.

TCLP limits exist for only four of the detected volatiles, 2-butanone, benzene, chloroform, and tetrachloroethene. The concentration of 2-butanone in the one solid in which it was detected was well below 20 times the TCLP limit (2.6 mg/kg detected, versus a 20 times the TCLP limit value of 4000 mg/kg). Both detected concentrations of benzene in the leachate were well below the TCLP limit (a maximum detected concentration of 0.048 mg/L versus a TCLP limit of 0.5 mg/L). The detected

concentration of chloroform in the leachate of one sample was well below the TCLP limit (0.001 mg/L detected, versus the TCLP limit of 6.0 mg/L). All detected concentrations of tetrachloroethene in the solid samples were well below 20 times the TCLP limit (maximum of 23 μg/kg detected, versus a 20 times the TCLP limit value of 14,000 μg/kg).

Primarily because of the large number of non-detected results, only nine of the estimates of the amount of any volatile that leached are considered reliable; thus no conclusions can be made regarding the leachability of volatiles from concrete. Therefore, **20 times the TCLP limit is used to estimate the amount that is potentially hazardous.**

Masonry

Neither of the masonry samples was analyzed for volatiles using the TCLP test.

DRAFT

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

RADIONUCLIDES	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
Americium-241	235	653	Lognormal	0.886	0.11	0.17	5.12	0.193	0.00378	83	pCi/g
Cesium-137	194	694	Lognormal	1.43	0.12	0.183	18.2	0.375	0.02	20.9	pCi/g
Gross Alpha	.	123	Lognormal	1400	54	76.1	7770	331	.	.	
Gross Beta	.	123	Lognormal	1140	54	80	4980	327	.	.	
Lead-210	412	678	Lognormal	15	1.71	1.98	98.8	3.66	0.0937	1750	pCi/g
Neptunium-237	231	647	Lognormal	0.702	0.12	0.158	3.76	0.264	0.01	68	pCi/g
Plutonium-238	291	672	Lognormal	6.11	0.0985	0.144	58	0.358	0.00136	1300	pCi/g
Plutonium-239/240	319	674	Lognormal	1.8	0.1	0.161	8.02	0.451	0.00649	92	pCi/g
Plutonium-241	137	444	Lognormal	11.7	1.81	3.88	56.8	6.57	0.758	923	pCi/g
Polonium-210	589	669	Lognormal	15.1	0.832	1.22	130	1.69	0.058	2970	pCi/g
Radium-226	603	673	Lognormal	36	1	1.41	379	1.95	0.0354	6710	pCi/g
Radium-228	488	677	Lognormal	58.6	0.8	1.35	614	3.1	0.1	15000	pCi/g
Strontium-90	172	675	Lognormal	1.55	0.4	0.464	9.6	0.81	0.043	140	pCi/g
Technetium-99	506	672	Lognormal	139	4.05	5.21	835	29.4	0.075	13000	pCi/g
Thorium-227	55	97	Lognormal	7.09	1.41	1.42	15.3	3.62	0.15	80	pCi/g
Thorium-228	535	671	Lognormal	38	0.86	1.6	362	4.66	0.11	8950	pCi/g
Thorium-230	590	670	Lognormal	64.1	2.3	3.85	336	16.3	0.114	5600	pCi/g
Thorium-232	542	670	Lognormal	16	0.56	1.06	80.7	3.27	0.0562	1270	pCi/g
Uranium, Total	689	709	Lognormal	4530	190	152	28100	1350	0.0263	520000	ug/g
Uranium-234	601	680	Lognormal	1900	76.5	66.5	11500	683	0.018	210000	pCi/g
Uranium-235/236	555	668	Lognormal	219	5.9	6.22	1560	60.6	0.03	27000	pCi/g
Uranium-236	.	4	Undeterminable	0.0475	0.0475	0.0364	0.0431	0.061	.	.	
Uranium-238	599	663	Lognormal	2110	87.1	72.8	12700	723	0.138	180000	pCi/g

000355

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
INORGANICS											
Aluminum	711	722	Lognormal	6470	4900	4660	8900	2100	43.1	150000	mg/kg
Antimony	151	589	Lognormal	21.3	9.3	8.24	38.6	13.4	0.83	393	mg/kg
Arsenic	635	726	Lognormal	13.6	4.3	4.96	102	4	0.23	2690	mg/kg
Barium	720	733	Lognormal	506	65	109	1960	150	3.3	23700	mg/kg
Beryllium	199	698	Lognormal	1.03	0.41	0.33	2.69	0.81	0.03	56.3	mg/kg
Cadmium	305	732	Lognormal	7.29	1.2	1.75	30.6	4.39	0.11	558	mg/kg
Calcium	706	722	Undefined	133000	169000	77300	81200	149000	164	663000	mg/kg
Chromium	653	733	Lognormal	653	13.8	34.9	2060	81.6	1	17300	mg/kg
Cobalt	488	722	Lognormal	23.3	4.5	7.26	49.5	10.3	0.47	588	mg/kg
Copper	612	714	Lognormal	168	21.7	32.9	1060	90.2	2	26300	mg/kg
Iron	717	722	Lognormal	31300	8570	13600	57500	17100	76.4	486000	mg/kg
Lead	658	731	Lognormal	11700	26.8	77.3	38300	351	0.54	375000	mg/kg
Magnesium	709	722	Undefined	30500	35900	18500	18700	36100	92.5	75000	mg/kg
Manganese	717	722	Undefined	423	321	320	436	195	1.8	5560	mg/kg
Mercury	299	712	Lognormal	1.47	0.1	0.162	9.13	0.265	0.024	223	mg/kg
Nickel	562	722	Lognormal	124	14.6	18.7	2000	31.6	0.48	53500	mg/kg
Potassium	559	722	Lognormal	2190	1030	1200	8560	1210	96.9	221000	mg/kg
Selenium	96	601	Lognormal	2.67	1	1.13	8.97	1.6	0.29	157	mg/kg
Silver	257	722	Lognormal	6.69	0.995	1.41	54.9	3.74	0.17	1360	mg/kg
Sodium	607	722	Lognormal	1070	642	676	3260	592	50.1	82200	mg/kg
Thallium	36	668	Lognormal	0.792	0.4	0.449	1.42	0.61	0.04	16	mg/kg
Vanadium	517	713	Lognormal	17.1	10.7	10.3	28	12.6	0.23	494	mg/kg
Zinc	665	722	Lognormal	2210	68.9	136	11200	571	2.7	215000	mg/kg

000359

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	11	115	Lognormal	2160	15	67.2	7570	570	1	36000	ug/kg
1,1,2,2-Tetrachloroethane	.	113	Lognormal	1920	14	69.9	6930	570	.	.	
1,1,2-Trichloroethane	.	115	Lognormal	1890	14	67.7	6870	570	.	.	
1,1-Dichloroethane	.	118	Lognormal	1840	14	65.8	6790	540	.	.	
1,1-Dichloroethene	.	130	Lognormal	1740	22.5	81.2	6480	750	.	.	
1,2-Dichloroethane	.	130	Lognormal	1740	22.5	81.3	6480	750	.	.	
1,2-Dichloroethene (Total)	.	115	Lognormal	1890	15	69.1	6870	570	.	.	
1,2-Dichloropropane	.	115	Lognormal	1890	14	67.7	6870	570	.	.	
2-Butanone	15	128	Lognormal	1900	42.5	99.3	6480	1240	4	9600	ug/kg
2-Hexanone	1	107	Lognormal	1970	14	64.7	7110	540	49	49	ug/kg
4-Chloroaniline	.	1	Undeterminable	800	800	800	.	.	.	.	
4-Methyl-2-pentanone	8	112	Lognormal	2760	15	73	11500	820	5	100000	ug/kg
Acetone	10	73	Lognormal	1940	51	133	6270	1290	10	300	ug/kg
Benzene	3	127	Lognormal	1690	18	82.6	6440	890	18	2800	ug/kg
Bromodichloromethane	.	115	Lognormal	1890	14	67.7	6870	570	.	.	
Bromoform	2	115	Lognormal	1870	14	65.4	6880	530	140	220	ug/kg
Bromomethane	.	118	Lognormal	1840	14	65.8	6790	540	.	.	
Carbon Tetrachloride	.	127	Lognormal	1790	17	83.9	6550	890	.	.	
Carbon disulfide	1	118	Lognormal	1820	14	64.9	6790	530	500	500	ug/kg
Chlorobenzene	1	125	Lognormal	1840	28	88.2	6600	890	63	63	ug/kg
Chloroethane	.	116	Lognormal	1870	14.5	67.9	6840	555	.	.	
Chloroform	.	130	Lognormal	1740	22.5	81.2	6480	750	.	.	
Chloromethane	.	118	Lognormal	1840	14	65.8	6790	540	.	.	
Dibromochloromethane	.	115	Lognormal	1890	14	67.7	6870	570	.	.	
Ethylbenzene	23	113	Lognormal	3900	15	67.2	21700	600	1	220000	ug/kg
Methylene chloride	6	117	Lognormal	1710	15	62.5	6700	530	1	3200	ug/kg
Pyridine	.	11	Lognormal	1230	800	603	2260	600	.	.	
Styrene	9	113	Lognormal	1900	15	65.8	6940	440	25	3100	ug/kg
Tetrachloroethene	15	125	Lognormal	11200	23	81.5	106000	730	1	1180000	ug/kg
Toluene	23	113	Lognormal	2150	17	65.6	7320	750	1	27000	ug/kg
Trichloroethene	1	127	Lognormal	1790	17	83.8	6550	890	42	42	ug/kg
Trichlorofluoromethane	1	13	Lognormal	1280	11	51.9	4130	410	6	6	ug/kg

000357

2121

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS (cont.)											
Vinyl chloride	.	130	Lognormal	1790	22.5	83.6	6480	750	.	.	
Xylenes, Total	32	113	Lognormal	18100	17	85.7	126000	890	2	1300000	ug/kg
cis-1,3-Dichloropropene	.	115	Lognormal	1890	14	67.7	6870	570	.	.	
m,p-Xylene	4	4	Undeterminable	17500	964	474	33700	34900	14	68000	ug/kg
o-Xylene	4	4	Undeterminable	10300	607	224	19800	20600	4	40000	ug/kg
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	1	102	Lognormal	8180	1300	2150	14400	10600	39000	39000	ug/kg
1,2-Dichlorobenzene	.	101	Lognormal	7990	1400	2170	14200	10600	.	.	
1,3-Dichlorobenzene	.	101	Lognormal	7990	1400	2170	14200	10600	.	.	
1,4-Dichlorobenzene	2	112	Lognormal	10600	964	2020	34700	10100	39000	344000	ug/kg
2,2-oxybis(1-Chloropropane	.	73	Lognormal	7670	700	1790	15700	9630	.	.	
2,4,5-Trichlorophenol	.	102	Lognormal	14500	1850	3960	24700	11100	.	.	
2,4,6-Trichlorophenol	1	102	Lognormal	7370	860	1900	14100	9600	970	970	ug/kg
2,4-Dichlorophenol	4	95	Lognormal	7730	1000	1890	14500	10600	48	450	ug/kg
2,4-Dimethylphenol	2	95	Lognormal	7850	1100	1950	14500	10600	32	140	ug/kg
2,4-Dinitrophenol	.	86	Lognormal	19200	2600	4890	36400	25000	.	.	
2,4-Dinitrotoluene	1	112	Lognormal	7300	800	1820	14000	9610	50000	50000	ug/kg
2,6-Dinitrotoluene	.	102	Lognormal	7920	1300	2140	14100	10600	.	.	
2-Chloronaphthalene	.	102	Lognormal	7920	1300	2140	14100	10600	.	.	
2-Chlorophenol	2	95	Lognormal	8320	1100	1970	15400	10600	9	57000	ug/kg
2-Methylnaphthalene	26	102	Lognormal	7310	750	1350	14000	9660	17	6300	ug/kg
2-Nitroaniline	.	102	Lognormal	15600	3150	4620	24800	17100	.	.	
2-Nitrophenol	.	95	Lognormal	7860	1100	2030	14500	10600	.	.	
3,3'-Dichlorobenzidine	.	90	Lognormal	8410	1700	2300	14800	10600	.	.	
3-Nitroaniline	.	97	Lognormal	16400	5200	5020	25200	18000	.	.	
4,6-Dinitro-2-methylphenol	.	95	Lognormal	19400	2900	5110	35400	25100	.	.	
4-Bromophenyl phenyl ether	.	102	Lognormal	7950	1700	2180	14100	10600	.	.	
4-Chloro-3-methylphenol	2	95	Lognormal	8450	1100	2000	15800	10600	37	69000	ug/kg
4-Chlorophenylphenyl ether	.	102	Lognormal	7920	1300	2140	14100	10600	.	.	
4-Nitroaniline	.	98	Lognormal	19900	4200	5430	35000	25100	.	.	
4-Nitrophenol	1	94	Lognormal	19800	2850	5140	35800	25100	57000	57000	ug/kg

003358

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Acenaphthene	30	102	Lognormal	6460	750	1330	13500	8950	20	50000	ug/kg
Acenaphthylene	9	102	Lognormal	7880	1300	1860	14100	10600	21	260	ug/kg
Anthracene	33	102	Lognormal	6660	690	1310	14100	8860	31	43000	ug/kg
Benzo(a)anthracene	60	101	Lognormal	7510	740	1310	15700	8990	18	73000	ug/kg
Benzo(a)pyrene	51	101	Lognormal	7850	920	1660	15500	9620	23	74000	ug/kg
Benzo(b)fluoranthene	62	101	Lognormal	6930	1300	1650	12700	8910	19	81000	ug/kg
Benzo(g,h,i)perylene	42	101	Lognormal	6300	1200	1670	13400	8740	31	56000	ug/kg
Benzo(k)fluoranthene	46	101	Lognormal	6980	920	1560	14400	9630	18	69000	ug/kg
Butyl benzyl phthalate	21	101	Lognormal	7180	780	1550	14100	9620	49	8700	ug/kg
Carbazole	33	100	Lognormal	6230	900	1430	13000	8840	21	24000	ug/kg
Chrysene	71	101	Lognormal	6310	720	1370	11500	8820	18	81000	ug/kg
Di-n-butyl phthalate	32	102	Lognormal	10800	1450	1880	39300	10600	58	42000	ug/kg
Di-n-octyl phthalate	26	100	Lognormal	6810	605	1450	13800	9630	39	37000	ug/kg
Dibenzo(a,h)anthracene	14	101	Lognormal	7530	1200	1850	13800	10600	55	15000	ug/kg
Dibenzofuran	26	102	Lognormal	6720	715	1380	13400	9650	19	13000	ug/kg
Diethyl phthalate	8	102	Lognormal	7650	750	1750	14100	10600	34	700	ug/kg
Dimethyl phthalate	3	102	Lognormal	7690	1050	2000	14100	9610	170	3000	ug/kg
Fluoranthene	78	102	Lognormal	11200	1150	1630	29100	9640	36	190000	ug/kg
Fluorene	28	102	Lognormal	6240	750	1420	12700	9640	24	19000	ug/kg
Hexachloro-1,3-butadiene	.	1	Undeterminable	800	800	800	.	.	.		
Hexachlorobenzene	.	113	Lognormal	7220	800	1870	13600	9610	.	.	
Hexachlorobutadiene	1	112	Lognormal	9910	889	1960	30700	10100	298000	298000	ug/kg

000559

1212

A.II-1

STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Hexachlorocyclopentadiene	.	102	Lognormal	7920	1300	2140	14100	10600	.	.	
Hexachloroethane	.	112	Lognormal	7260	860	1870	13600	9610	.	.	
Indeno(1,2,3-cd)pyrene	51	101	Lognormal	6230	870	1370	13300	8930	20	49000	ug/kg
Isophorone	1	102	Lognormal	8350	1700	2230	14600	10600	45000	45000	ug/kg
N-Nitroso-di-n-propylamine	1	101	Lognormal	8350	1400	2200	14700	10600	48000	48000	ug/kg
N-Nitrosodiphenylamine	.	102	Lognormal	7950	1700	2180	14100	10600	.	.	
Naphthalene	29	102	Lognormal	7200	520	1320	14000	9670	30	6400	ug/kg
Nitrobenzene	2	113	Lognormal	12200	800	1900	54300	9620	140	566000	ug/kg
Pentachlorophenol	2	100	Lognormal	17600	2600	4570	34200	24600	730	14000	ug/kg
Phenanthrene	77	102	Lognormal	8910	745	1260	26500	6360	22	180000	ug/kg
Phenol	13	95	Lognormal	6980	820	1610	11800	9630	18	67000	ug/kg
Pyrene	76	101	Lognormal	10100	1500	1790	23700	8920	40	170000	ug/kg
bis(2-Chloroethoxy)methane	.	102	Lognormal	7920	1300	2130	14100	10600	.	.	
bis(2-Chloroethyl)ether	.	101	Lognormal	7990	1400	2170	14200	10600	.	.	
bis(2-Chloroisopropyl)ether	.	16	Normal	10100	10000	3420	9500	20000	.	.	
bis(2-Ethylhexyl)phthalate	34	101	Lognormal	18300	3700	3520	61700	13400	44	560000	ug/kg
m-Methylphenol	1	3	Undeterminable	629	800	569	296	512	288	288	ug/kg
o-Methylphenol	6	102	Lognormal	8090	860	1780	18500	9630	57	134000	ug/kg
p-Chloroaniline	1	98	Lognormal	7800	1150	2010	14300	9620	140	140	ug/kg
p-Methylphenol (Cresol)	21	103	Lognormal	6350	540	1290	13500	9640	13	20000	ug/kg

000360

A.II-1
STATISTICS BY ANALYTE FOR ALL SOLID MEDIA

	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	1	35	Lognormal	5.08	3.5	3.8	6.99	0.2	1.9	1.9	ug/kg
4,4'-DDE	3	35	Lognormal	8.11	3.5	4.37	16.6	0.4	0.69	94	ug/kg
4,4'-DDT	.	34	Undefined	4.39	3.5	3.72	4.93	0.3	.	.	
Aldrin	.	34	Undefined	2.22	1.8	1.88	2.46	0.2	.	.	
Aroclor-1016	.	37	Undefined	43.2	35	37	47.3	3	.	.	
Aroclor-1221	.	37	Undefined	86.4	70	73.2	96.5	6	.	.	
Aroclor-1232	.	37	Undefined	43.2	35	37	47.3	3	.	.	
Aroclor-1242	.	37	Undefined	43.2	35	37	47.3	3	.	.	
Aroclor-1248	2	37	Lognormal	88.7	35	41.6	276	3	53	1700	ug/kg
Aroclor-1254	14	37	Lognormal	631	38	111	1320	286	41	5100	ug/kg
Aroclor-1260	8	37	Lognormal	296	36	62.2	750	6	24	3400	ug/kg
Chlordane	.	2	Undeterminable								
Dieldrin	5	34	Lognormal	5.23	3.5	3.88	7.1	0.3	1.6	6.9	ug/kg
Endosulfan II	3	35	Undefined	4.54	3.5	3.79	5	0.3	1.6	11	ug/kg
Endosulfan sulfate	3	35	Undefined	4.49	3.5	3.79	4.91	0.4	2.4	8.2	ug/kg
Endosulfan-I	2	35	Undefined	2.22	1.8	1.89	2.43	0.2	1.5	2.7	ug/kg
Endrin	2	34	Lognormal	4.84	3.5	3.76	5.82	0.3	0.98	22	ug/kg
Endrin aldehyde	.	35	Undefined	4.36	3.5	3.71	4.86	0.3	.	.	
Endrin ketone	2	35	Undefined	4.4	3.5	3.69	4.9	0.3	1.6	7.1	ug/kg
Heptachlor	.	34	Undefined	2.22	1.8	1.88	2.46	0.2	.	.	
Heptachlor epoxide	1	35	Undefined	2.21	1.8	1.9	2.42	0.2	1.1	1.1	ug/kg
Methoxychlor	1	35	Lognormal	27.1	18	20.4	33.2	2	140	140	ug/kg
Toxaphene	.	35	Undefined	220	180	187	243	20	.	.	
alpha-BHC	.	35	Undefined	2.2	1.8	1.87	2.43	0.2	.	.	
alpha-Chlordane	2	35	Lognormal	4.28	1.8	2.15	11.9	0.3	5.4	71	ug/kg
beta-BHC	.	35	Undefined	2.2	1.8	1.87	2.43	0.2	.	.	
delta-BHC	1	35	Undefined	2.23	1.8	1.9	2.43	0.2	2.8	2.8	ug/kg
gamma-BHC (Lindane)	.	34	Lognormal	2.83	1.8	2.07	3.69	0.2	.	.	
gamma-Chlordane	3	35	Lognormal	4.29	1.8	2.03	12.7	0.2	0.42	76	ug/kg

000361

TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

RADIONUCLIDES	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
Americium-241	235	653	137	NA [a]	0	0
Cesium-137	194	694	194	NA [a]	0	0
Gross Alpha	.	123	.	NA [a]	.	.
Gross Beta	.	123	.	NA [a]	.	.
Lead-210	412	678	411	NA [a]	0	0
Neptunium-237	231	647	231	NA [a]	0	0
Plutonium-238	291	672	146	NA [a]	0	0
Plutonium-239/240	319	674	166	NA [a]	0	0
Plutonium-241	137	444	36	NA [a]	0	0
Polonium-210	589	669	404	NA [a]	0	0
Radium-226	603	673	603	NA [a]	0	4
Radium-228	488	677	286	NA [a]	0	5
Strontium-90	172	675	35	NA [a]	0	0
Technetium-99	506	672	111	NA [a]	0	0
Thorium-227	55	97	55	NA [a]	0	0
Thorium-228	535	671	536	NA [a]	0	5
Thorium-230	590	670	233	NA [a]	0	0
Thorium-232	542	670	98	NA [a]	0	2
Uranium, Total	689	709	683	NA [a]	272	0
Uranium-234	601	680	473	NA [a]	243	5
Uranium-235/236	555	668	555	NA [a]	271	22
Uranium-236	.	4	.	NA [a]	.	.
Uranium-238	599	663	599	NA [a]	254	10

a-There are no TCLP limits for radionuclides

000362

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TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
INORGANICS						
Aluminum	711	722	0	0	0	0
Antimony	151	589	75	0	0	0
Arsenic	635	726	635	11	0	0
Barium	720	733	35	33	0	0
Beryllium	199	698	199	0	0	0
Cadmium	305	732	62	44	0	0
Calcium	706	722	0	0	0	0
Chromium	653	733	156	175	0	0
Cobalt	488	722	0	0	0	0
Copper	612	714	19	0	0	0
Iron	717	722	0	0	0	0
Lead	658	731	0	247	0	0
Magnesium	709	722	0	0	0	0
Manganese	717	722	662	0	0	0
Mercury	299	712	30	49	0	0
Nickel	562	722	8	0	0	0
Potassium	559	722	0	0	0	0
Selenium	96	601	1	7	0	0
Silver	257	722	5	5	0	0
Sodium	607	722	0	0	0	0
Thallium	36	668	2	0	0	0
Vanadium	517	713	3	0	0	0
Zinc	665	722	44	0	0	0

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TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
VOLATILE ORGANICS						
1,1,1-Trichloroethane	11	115	0	0	0	0
1,1,2,2-Tetrachloroethane	.	113	.	.	.	.
1,1,2-Trichloroethane	.	115	.	.	.	.
1,1-Dichloroethane	.	118	.	.	.	.
1,1-Dichloroethene	.	130	.	.	.	.
1,2-Dichloroethane	.	130	.	.	.	.
1,2-Dichloroethene (Total)	.	115	.	.	.	.
1,2-Dichloropropane	.	115	.	.	.	.
2-Butanone	15	128	0	0	0	0
2-Hexanone	1	107	0	0	0	0
4-Chloroaniline	.	1	.	.	.	.
4-Methyl-2-pentanone	8	112	0	0	0	0
Acetone	10	73	0	0	0	0
Benzene	3	127	1	0	0	0
Bromodichloromethane	.	115	.	.	.	.
Bromoform	2	115	0	0	0	0
Bromomethane	.	118	.	.	.	.
Carbon Tetrachloride	.	127	.	.	.	.
Carbon disulfide	1	118	0	0	0	0
Chlorobenzene	1	125	0	0	0	0
Chloroethane	.	116	.	.	.	.
Chloroform	.	130	.	.	.	.
Chloromethane	.	118	.	.	.	.
Dibromochloromethane	.	115	.	.	.	.
Ethylbenzene	23	113	0	0	0	0
Methylene chloride	6	117	0	0	0	0
Pyridine	.	11	.	.	.	.
Styrene	9	113	1	0	0	0
Tetrachloroethene	15	125	1	1	0	0
Toluene	23	113	0	0	0	0
Trichloroethene	1	127	0	0	0	0

000364

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TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
VOLATILE ORGANICS (cont.)						
Trichlorofluoromethane	1	13	0	0	0	0
Vinyl chloride	.	130	.	.	.	.
Xylenes, Total	32	113	0	0	0	0
cis-1,3-Dichloropropene	.	115	.	.	.	.
m,p-Xylene	4	4	0	0	0	0
o-Xylene	4	4	0	0	0	0
SEMI-VOLATILE ORGANICS						
1,2,4-Trichlorobenzene	1	102	0	0	0	0
1,2-Dichlorobenzene	.	101	.	.	.	.
1,3-Dichlorobenzene	.	101	.	.	.	.
1,4-Dichlorobenzene	2	112	2	1	0	0
2,2-oxybis(1-Chloropropane	.	73	.	.	.	.
2,4,5-Trichlorophenol	.	102	.	.	.	.
2,4,6-Trichlorophenol	1	102	0	0	0	0
2,4-Dichlorophenol	4	95	0	0	0	0
2,4-Dimethylphenol	2	95	0	0	0	0
2,4-Dinitrophenol	.	86	.	.	.	.
2,4-Dinitrotoluene	1	112	1	1	0	0
2,6-Dinitrotoluene	.	102	.	.	.	.
2-Chloronaphthalene	.	102	.	.	.	.
2-Chlorophenol	2	95	0	0	0	0
2-Methylnaphthalene	26	102	0	0	0	0
2-Nitroaniline	.	102	.	.	.	.
2-Nitrophenol	.	95	.	.	.	.
3,3'-Dichlorobenzidine	.	90	.	.	.	.
3-Nitroaniline	.	97	.	.	.	.
4,6-Dinitro-2-methylphenol	.	95	.	.	.	.
4-Bromophenyl phenyl ether	.	102	.	.	.	.
4-Chloro-3-methylphenol	2	95	0	0	0	0
4-Chlorophenylphenyl ether	.	102	.	.	.	.

000363

TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
SEMI-VOLATILE ORGANICS (cont.)						
4-Nitroaniline	.	98	.	.	.	.
4-Nitrophenol	1	94	0	0	0	0
Acenaphthene	30	102	0	0	0	0
Acenaphthylene	9	102	0	0	0	0
Anthracene	33	102	0	0	0	0
Benzo(a)anthracene	60	101	56	0	0	0
Benzo(a)pyrene	51	101	51	0	0	0
Benzo(b)fluoranthene	62	101	59	0	0	0
Benzo(g,h,i)perylene	42	101	0	0	0	0
Benzo(k)fluoranthene	46	101	40	0	0	0
Butyl benzyl phthalate	21	101	0	0	0	0
Carbazole	33	100	7	0	0	0
Chrysene	71	101	22	0	0	0
Di-n-butyl phthalate	32	102	0	0	0	0
Di-n-octyl phthalate	26	100	0	0	0	0
Dibenzo(a,h)anthracene	14	101	14	0	0	0
Dibenzofuran	26	102	0	0	0	0
Diethyl phthalate	8	102	0	0	0	0
Dimethyl phthalate	3	102	0	0	0	0
Fluoranthene	78	102	0	0	0	0
Fluorene	28	102	0	0	0	0
Hexachloro-1,3-butadiene	.	1	.	.	.	.
Hexachlorobenzene	.	113	.	.	.	.
Hexachlorobutadiene	1	112	1	1	0	0

000566

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TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
SEMI-VOLATILE ORGANICS (cont.)						
Hexachlorocyclopentadiene	.	102	.	.	.	.
Hexachloroethane	.	112	.	.	.	.
Indeno(1,2,3-cd)pyrene	51	101	50	0	0	0
Isophorone	1	102	0	0	0	0
N-Nitroso-di-n-propylamine	1	101	1	0	0	0
N-Nitrosodiphenylamine	.	102	.	.	.	.
Naphthalene	29	102	0	0	0	0
Nitrobenzene	2	113	1	1	0	0
Pentachlorophenol	2	100	2	0	0	0
Phenanthrene	77	102	0	0	0	0
Phenol	13	95	0	0	0	0
Pyrene	76	101	0	0	0	0
bis(2-Chloroethoxy)methane	.	102	.	.	.	.
bis(2-Chloroethyl)ether	.	101	.	.	.	.
bis(2-Chloroisopropyl)ether	.	16	.	.	.	.
bis(2-Ethylhexyl)phthalate	34	101	16	0	0	0
m-Methylphenol	1	3	0	0	0	0
o-Methylphenol	6	102	0	0	0	0
p-Chloroaniline	1	98	0	0	0	0
p-Methylphenol (Cresol)	21	103	0	0	0	0

000367

TABLE A.II-2
NUMBER OF DETECTS EXCEEDING REFERENCE CRITERIA FOR SOLID MEDIA

	# of Detects	# of Samples	Detects Above Per Criteria: Part B Soil Screening Levels	20 Times TCLP Limit	Criteria For Source Material	Envirocare WAC
PESTICIDES/PCBs						
4,4'-DDD	1	35	0	0	0	0
4,4'-DDE	3	35	0	0	0	0
4,4'-DDT	.	34	.	.	.	.
Aldrin	.	34	.	.	.	.
Aroclor-1016	.	37	.	.	.	.
Aroclor-1221	.	37	.	.	.	.
Aroclor-1232	.	37	.	.	.	.
Aroclor-1242	.	37	.	.	.	.
Aroclor-1248	2	37	2	0	0	0
Aroclor-1254	14	37	14	0	0	0
Aroclor-1260	8	37	8	0	0	0
Chlordane	.	2	.	.	.	.
Dieldrin	5	34	2	0	0	0
Endosulfan II	3	35	0	0	0	0
Endosulfan sulfate	3	35	0	0	0	0
Endosulfan-I	2	35	0	0	0	0
Endrin	2	34	0	0	0	0
Endrin aldehyde	.	35	.	.	.	.
Endrin ketone	2	35	0	0	0	0
Heptachlor	.	34	.	.	.	.
Heptachlor epoxide	1	35	0	0	0	0
Methoxychlor	1	35	0	0	0	0
Toxaphene	.	35	.	.	.	.
alpha-BHC	.	35	.	.	.	.
alpha-Chlordane	2	35	1	0	0	0
beta-BHC	.	35	.	.	.	.
delta-BHC	1	35	0	0	0	0
gamma-BHC (Lindane)	.	34	.	.	.	.
gamma-Chlordane	3	35	1	0	0	0

000368

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TABLE A.II-3
COMPARISON OF TOTAL AND TCLP RESULTS
RADIONUCLIDES

Material/Sample Number	Units	Radiological Contaminant									
		Americium-241	Cesium-137	Lead-210	Neptunium-237	Plutonium-238	Plutonium-239/240	Plutonium-241	Polonium-210	Radium-226	Radium-228
Acid Brick											
13A-033R	pCi/g	1.93	1.47	87.3	0.438	41.5	2.22	35.4	31.8	86.6	583
13A-042R	pCi/L	156	<7.3	501	17.2	884	534		24.5	440	556
Percent Leached		**>100%**	**<9.9%**	**11.5%**	**78.5%**	**42.6%**	**>100%**	**NA**	**1.5%**	**10.2%**	**1.9%**
13A-060R	pCi/g	3.99	2.6	9.02	0.45	99.3	4.26	52.4	10.7	16.1	225
13A-068R	pCi/L	354	<7.9	308	R	750	981		2.8	618	167
Percent Leached		**>100%**	**<6.1%**	**68.3%**	**NA**	**15.1%**	**>100%**	**NA**	**0.5%**	**76.8%**	**1.5%**
Concrete											
5A-025	pCi/g	<0.16	<0.73	<7.5	0.19	<0.024	0.034	4.6	1.6	3.6	<2
5A-027	pCi/L	<0.13	<7.1	140	<0.1	<0.052	<0.075	NA	<0.13	0.36	<1.4
Percent Leached		**NA**	**NA**	**>37.3%**	**<1.1%**	**NA**	**<4.4%**	**NA**	**<0.2%**	**0.2%**	**NA**
13A-022R	pCi/g	<0.032	<0.94	13	0.203	100	3.67	65.4	2.42	<0.18	312
13A-044R	pCi/L	<5.9	<7.2	4.6	<2.9	<4.1	<2.8		<1.5	23.9	197
Percent Leached		**NA**	**NA**	**0.7%**	**<28.6%**	**<0.1%**	**<1.5%**		**<1.2%**	**>100%**	**1.3%**
13A-046R	pCi/g	2.85	<0.29	4.58	0.096	49.4	3.74	40	1.53	6.17	165
13A-069R	pCi/L	R	<5.8	2.6	<2.4	<5.2	<3.6		<1.1	12.8	54.1
Percent Leached		**NA**	**NA**	**1.1%**	**<50%**	**<0.2%**	**<1.9%**	**NA**	**<1.4%**	**4.1%**	**0.7%**
13A-046R	pCi/g	2.85	<0.29	4.58	0.096	49.4	3.74	40	1.53	6.17	165
13A-070R	pCi/L	18.7	<5	3.5	R	<4.3	<2.8		<1.1	13.9	59.2
Percent Leached		**13.1%**	**NA**	**1.5%**	**NA**	**<0.2%**	**<1.5%**	**NA**	**<1.4%**	**4.5%**	**0.7%**

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TABLE A.II-3
COMPARISON OF TOTAL AND TCLP RESULTS
RADIONUCLIDES

Material/Sample Number	Units	Radiological Contaminant									
		Strontium-90	Technetium-99	Thorium-227	Thorium-228	Thorium-230	Thorium-232	Uranium, Total (µg/L and µg/g)	Uranium-234	Uranium-235/236	Uranium-238
Acid Brick											
13A-033R	pCi/g	1.09	296	9.28	31.1	9.22	13.4	5390	1460	65.1	1190
13A-042R	pCi/L	1.5	42	NA	1080	588	1030	111000	8520	1020	46500
Percent Leached		**2.8%**	**0.3%**	**NA**	**69.5%**	**>100%**	**>100%**	**41.2%**	**11.7%**	**31.3%**	**78.2%**
13A-060R	pCi/g	1.49	1.71	1.89	18.7	5.98	6.67	814	411	10.8	310
13A-068R	pCi/L	2.7	130	4960	1340	3810	NA	10200	9090	1720	6170
Percent Leached		**3.6%**	**>100%**	**>100%**	**>100%**	**>100%**	**NA**	**25.1%**	**44.2%**	**>100%**	**39.8%**
Concrete											
5A-025	pCi/g	<0.084	29	0.16	0.46	2.1	0.37	10000	800	110	4200
5A-027	pCi/L	<0.84	160	NA	<0.22	<0.14	<0.064	48	13	1.1	20
Percent Leached		**NA**	**11.0%**	**0.0%**	**<1%**	**<0.1%**	**<0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
13A-022R	pCi/g	<0.51	7.88		254	101	259	726	412	22	236
13A-044R	pCi/L	3.1	222		<4.3	7.5	<4	4040	2450	598	1660
Percent Leached		**>12.2%**	**56.3%**		**<0.1%**	**0.1%**	**<0.1%**	**11.1%**	**11.9%**	**54.4%**	**14.1%**
13A-046R	pCi/g	<0.56	11.9		214	45.4	234	3770	1750	75.8	1260
13A-069R	pCi/L	1.7	151		R	R	R	36000	14900	818	11000
Percent Leached		**>6.1%**	**25.4%**		**NA**	**NA**	**NA**	**19.1%**	**17.0%**	**21.6%**	**17.5%**
13A-046R	pCi/g	<0.56	11.9		214	45.4	234	3770	1750	75.8	1260
13A-070R	pCi/L	2.3	146		<3.2	<3.3	<2.9	45700	23300	1690	16200
Percent Leached		**>8.2%**	**24.5%**		**<0.1%**	**<0.1%**	**<0.1%**	**24.2%**	**26.6%**	**44.6%**	**25.7%**

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant								
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Acid Brick										
2A-015	mg/kg	599	8.2	2	236	<0.15	<0.28	6430	1	5.4
2A-015	mg/L	1.1	<0.0265	<0.0008	R	<0.00047	0.0036	105	0.0573	0.0407
Percent Leached		**3.7%**	**<6.5%**	**<0.8%**	**NA**	**NA**	**>25.7%**	**32.7%**	**>100%**	**15.1%**
13A-033	mg/kg	642	R	0.81	434	<0.03	<0.08	1020	3.3	<1.9
13A-042	mg/L	13.8	<0.05	<0.018	R	<0.001	0.0181	32.6	0.0491	0.0296
Percent Leached		**43.0%**	**NA**	**<44.4%**	**NA**	**NA**	**>100%**	**63.9%**	**29.8%**	**>31.2%**
13A-068	mg/kg	4030		5	1120	<0.03	0.69	5520	127	1.4
13A-068R	mg/L	15.4	<0.025	0.0023	R	<0.004	0.0756	155	0.116	0.0464
Percent Leached		**7.6%**	**NA**	**0.9%**	**NA**	**NA**	**>100%**	**56.2%**	**1.8%**	**66.3%**
Concrete										
5A-025	mg/kg	3480	0.83	4	62.7	0.86	3.1	201000	18.6	<1.4
5A-027	mg/L	0.985	0.0167	<0.002	<0.373	0.0229	0.0098	1570	0.006	0.007
Percent Leached		**0.6%**	**40.2%**	**<1%**	**<11.9%**	**53.3%**	**6.3%**	**15.6%**	**0.6%**	**>10%**
9A-048	mg/kg	4040	<2	3.3	41.8	<0.02	<0.25	153000	7.7	2.1
9A-048	mg/L	<0.0693	<0.0408	0.0044	0.344	<0.0005	<0.0022	1531	<0.0077	<0.0078
Percent Leached		**<0.0%**	**NA**	**2.7%**	**16.5%**	**NA**	**NA**	**20.0%**	**<2%**	**<7.4%**
13A-022	mg/kg	4840	R	11.1	259	<0.03	3.8	191000	33.3	3.6
13A-044R	mg/L	3.09	<0.025	<0.01	R	0.0225	R	3910	0.0137	0.0308
Percent Leached		**1.3%**	**NA**	**<1.8%**	**NA**	**>100%**	**NA**	**40.9%**	**0.8%**	**17.1%**

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant								
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Concrete, continued										
13A-046	mg/kg	5060	R	8.7	55.4	<0.03	3.1	180000	11.5	4.2
13A-069	mg/L	<0.094	<0.05	<0.018	R	<0.001	0.007	1750	0.0185	<0.019
Percent Leached		**<0.0%**	**NA**	**<4.1%**	**NA**	**NA**	**4.5%**	**19.4%**	**3.2%**	**<9%**
13A-046	mg/kg	5060	R	8.7	55.4	<0.03	3.1	180000	11.5	4.2
13A-070	mg/L	<0.094	<0.05	<0.018	R	<0.001	0.0039	1490	0.0104	<0.019
Percent Leached		**<0.0%**	**NA**	**<4.1%**	**NA**	**NA**	**2.5%**	**16.6%**	**1.8%**	**<9%**
Masonry										
54A-040	mg/kg	3520	<9.2	2	38.1	0.21	0.6	145000	13.8	4.5
54A-040	mg/L			<2	<10		<0.1		<0.5	
Percent Leached				**>100%**	**>100%**		**>100%**		**<72.5%**	
54A-041	mg/kg	9610	<9.3	5.9	69.3	0.35	<0.61	78500	13.3	5.8
54A-041	mg/L			<2	<10		<0.1		<0.5	
Percent Leached				**>100%**	**>100%**		**NA**		**<75.2%**	

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant								
		Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium
Acid Brick										
2A-015	mg/kg	44.6	2220	169	860	40.7	<0.05	17.2	<317	0.8
2A-015	mg/L	<0.0938	1.24	0.0727	11	0.204	<0.0001	0.107	<3.16	<0.009
Percent Leached		**<4.2%**	**11.0%**	**0.9%**	**25.6%**	**10.0%**	**NA**	**12.4%**	**NA**	**<22.5%**
13A-033	mg/kg	5.2	1590	33.4	133	40.1	0.05	5.8	<164	<1
13A-042	mg/L	0.499	3.43	0.587	3.57	0.403	<0.0001	1.3	11.1	<0.02
Percent Leached		**>100%**	**4.3%**	**35.1%**	**53.7%**	**20.1%**	**<4%**	**>100%**	**>100%**	**NA**
13A-068	mg/kg	196	9620	78.7	955	54.9	1.2	31.9	1070	<1
13A-068R	mg/L	0.47	9.13	1.14	11.3	0.645	0.00073	0.644	22.4	R
Percent Leached		**4.8%**	**1.9%**	**29.0%**	**23.7%**	**23.5%**	**1.2%**	**40.4%**	**41.9%**	**NA**
Concrete										
5A-025	mg/kg	30.8	11400	37.8	42000	341	<0.1	<21.1	2280	R
5A-027	mg/L	<0.0092	<0.056	0.001	17.4	<0.0096	<0.00014	0.011	12	R
Percent Leached		**<0.6%**	**<0.0%**	**0.1%**	**0.8%**	**<0.1%**	**NA**	**>1%**	**10.5%**	**NA**
9A-048	mg/kg	8.5	5470	14.2	37000	213	<0.03	3.8	1160	<1.7
9A-048	mg/L	<0.0134	<0.0281	0.0047	88	1.02	<0.00007	0.0159	20.1	<0.0065
Percent Leached		**<3.2%**	**<0.0%**	**0.7%**	**4.8%**	**9.6%**	**NA**	**8.4%**	**34.7%**	**NA**
13A-022	mg/kg	62.4	10600	105	27600	217	1.2	32.6	1180	3.5
13A-044R	mg/L	<0.0191	0.616	0.0075	145	2.1	<0.0001	0.125	17.8	R
Percent Leached		**<0.6%**	**0.1%**	**0.1%**	**10.5%**	**19.4%**	**<0.2%**	**7.7%**	**30.2%**	**NA**

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant								
		Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium
Concrete, continued										
13A-046	mg/kg	18.3	6600	42.5	37700	210	0.11	13.5	1680	3.7
13A-069	mg/L	<0.024	0.0587	<0.028	93.5	0.719	<0.0001	0.173	43.9	<0.02
Percent Leached		**<2.6%**	**0.0%**	**<1.3%**	**5.0%**	**6.8%**	**<1.8%**	**25.6%**	**52.3%**	**<10.8%**
13A-046	mg/kg	18.3	6600	42.5	37700	210	0.11	13.5	1680	3.7
13A-070	mg/L	<0.024	0.042	<0.028	91.7	0.233	<0.0001	0.0401	22	<0.02
Percent Leached		**<2.6%**	**0.0%**	**<1.3%**	**4.9%**	**2.2%**	**<1.8%**	**5.9%**	**26.2%**	**<10.8%**
Masonry										
54A-040	mg/kg	5.7	4480	13000	52100	279	0.6	<4.2	1090	<0.6
54A-040	mg/L			11			<0.02			<0.1
Percent Leached				**1.7%**			**<66.7%**			**NA**
54A-041	mg/kg	12.9	11200	4.3	9650	173	2.7	21.8	4710	<0.61
54A-041	mg/L			<1			<0.02			<0.1
Percent Leached				**>100%**			**<14.8%**			**NA**

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant				
		Silver	Sodium	Thallium	Vanadium	Zinc
Acid Brick						
2A-015	mg/kg	2.1	<128	<0.3	<1.3	13.3
2A-015	mg/L	<0.0034	R	<0.0019	<0.0123	R
Percent Leached		**<3.2%**	**NA**	**NA**	**NA**	**NA**
13A-033	mg/kg	<0.13	106	<0.09	1.1	<6.7
13A-042	mg/L	<0.005	R	<0.018	<0.012	R
Percent Leached		**NA**	**NA**	**NA**	**<21.8%**	**NA**
13A-068	mg/kg	<0.48	2200	<0.09	4.1	59.5
13A-068R	mg/L	<0.002	R	<0.001	0.0185	3.61
Percent Leached		**NA**	**NA**	**NA**	**9.0%**	**>100%**
Concrete						
5A-025	mg/kg	<0.2	1240	<0.2	38	56.2
5A-027	mg/L	<0.001	R	0.0017	<0.0624	0.102
Percent Leached		**NA**	**NA**	**>17%**	**<3.3%**	**3.6%**
9A-048	mg/kg	<0.2	926	<0.32	8.9	34.6
9A-048	mg/L	<0.0046	26.8	0.0024	<0.0114	0.0841
Percent Leached		**NA**	**57.9%**	**>15%**	**<2.6%**	**4.9%**
13A-022	mg/kg	5.6	818	<0.93	8.5	111
13A-044R	mg/L	0.002	14.7	<0.001	0.633	R
Percent Leached		**0.7%**	**35.9%**	**NA**	**>100%**	**NA**

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TABLE A.II-4
COMPARISON OF TOTAL AND TCLP RESULTS
INORGANICS

Material/Sample Number	Units	Inorganic Contaminant				
		Silver	Sodium	Thallium	Vanadium	Zinc
Concrete, continued						
13A-046	mg/kg	3.7	934	<0.09	10.1	151
13A-069	mg/L	<0.005	R	<0.018	<0.012	R
Percent Leached		<2.7%	NA	NA	<2.4%	NA
13A-046	mg/kg	3.7	934	<0.09	10.1	151
13A-070	mg/L	<0.005	R	<0.018	<0.012	R
Percent Leached		<2.7%	NA	NA	<2.4%	NA
Masonry						
54A-040	mg/kg	<0.8	609	<0.8	7	119
54A-040	mg/L	<0.5				
Percent Leached		NA				
54A-041	mg/kg	<0.81	1220	<0.81	17.2	28
54A-041	mg/L	<0.5				
Percent Leached		NA				

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TABLE A.II-5
COMPARISON OF TOTAL AND TCLP RESULTS
SEMIVOLATILES

Material/Sample Number	Units	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2,2-oxybis(1-Chloropropane)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Chloronaphthalene
		Semivolatile Contaminant												
Acid Brick														
13A-042	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	R	<9200	<9200	<9200
13A-042	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<700	<700	<700	<700	<700	<700	<700	<700	<1700	<700	<700	<700	9
13A-068R	mg/L	<0.01	<0.01	<0.01	<0.01	<0.025	<0.01	<0.01	<0.01	<0.025	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%
Concrete														
13A-044	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	R	<9200	<9200	<9200
13A-044	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-069	µg/kg	<34000	<34000	<34000	<34000	<34000	<82000	<34000	<34000	<34000	R	<34000	<34000	<34000
13A-069	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	<10000	<10000	<10000	<10000	<10000	R	R	R	R	R	<10000	<10000	<10000
74T-003A	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.025	<0.01	<0.01	<0.01	<0.025	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9A-048	µg/kg	<9300	<9300	<9300	<9300	<9300	R	R	R	R	R	<9300	<9300	<9300
9A-048	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.1	<0.04	<0.04	<0.04	<0.1	<0.04	<0.04	<0.04
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-5
COMPARISON OF TOTAL AND TCLP RESULTS
SEMIVOLATILES

Material/Sample Number	Units	2-Chlorophenol	2-Methylnaphthalene	2-Nitroaniline	2-Nitrophenol	3,3'-Dichlorobenzidine	3-Nitroaniline	4,6-Dinitro-2-methylphenol	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol	4-Chlorophenylphenyl ether	4-Nitroaniline	4-Nitrophenol	Acenaphthene
		Semivolatile Contaminant												
Acid Brick														
13A-042	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<23000	<9200	<9200	<9200	<23000	<23000	<9200
13A-042	mg/L	<0.4	<0.4	<1	<0.4	<0.4	<1	<1	<0.4	<0.4	<0.4	<1	<1	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<700	<700	<700	<700	<700	<1700	<700	37	<700	<1700	<1700	20	<700
13A-068R	mg/L	<0.01	<0.025	<0.01	<0.01	<0.025	<0.025	<0.01	<0.01	<0.01	<0.025	0.009	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	>100%	NA	NA	>10.6%	>100%	NA
Concrete														
13A-044	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<23000	<9200	<9200	<9200	<23000	<23000	<9200
13A-044	mg/L	<0.4	<0.4	<1	<0.4	<0.4	<1	<1	<0.4	<0.4	<0.4	<1	<1	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-069	µg/kg	<34000	<34000	<82000	<34000	<34000	<82000	<82000	<34000	<34000	<34000	<82000	<82000	<34000
13A-069	mg/L	<0.4	<0.4	<1	<0.4	<0.4	<1	<1	<0.4	<0.4	<0.4	<1	<1	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	R	<10000	<26000	R	<560	<26000	R	<10000	R	<10000	<26000	R	<10000
74T-003A	mg/L	<0.01	<0.01	<0.025	<0.01	<0.01	<0.025	<0.025	<0.01	<0.01	<0.01	<0.025	<0.025	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9A-048	µg/kg	R	<9300	<9300	R	<9300	<9300	R	<9300	R	<9300	<23000	R	<9300
9A-048	mg/L	<0.04	<0.04	<0.1	<0.04	<0.04	<0.1	<0.1	<0.04	<0.04	<0.04	<0.1	<0.1	<0.04
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-5
COMPARISON OF TOTAL AND TCLP RESULTS
SEMIVOLATILES

Material/Sample Number	Units	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	bis(2-Chloroethoxy)methane	bis(2-Chloroethyl)ether	bis(2-Ethylhexyl)phthalate	Butyl benzyl phthalate	Carbazole	Chrysene
		Semivolatile Contaminant												
Acid Brick														
13A-042	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200
13A-042	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<700	<700	<700	19	<700	<700	<700	<700	NA	<700	<700	<700	18
13A-068R	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA	NA	>100%
Concrete														
13A-044	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	500	<9200	<9200
13A-044	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	NA	NA
13A-069	µg/kg	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000
13A-069	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	<10000	<560	52	<560	<560	<560	<560	<10000	<10000	<560	<560	<560	83
74T-003A	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%
9A-048	µg/kg	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300
9A-048	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-5
COMPARISON OF TOTAL AND TCLP RESULTS
SEMIVOLATILES

Material/Sample Number	Units	Di-n-butyl phthalate	Di-n-octyl phthalate	Dibenzo(a,h)anthracene	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene
		Semivolatile Contaminant												
Acid Brick														
13A-042	µg/kg	<9200	100	<9200	<9200	<9200	<9200	67	<9200	<9200	<9200	<9200	<9200	<9200
13A-042	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	R	<0.4	<0.4	<0.4
Percent Leached		NA	>100%	NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<700	<700	<700	<700	<700	<700	40	<700	<700	<700	<700	<700	<700
13A-068R	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA
Concrete														
13A-044	µg/kg	<9200	39	<9200	<9200	<9200	<9200	160	<9200	<9200	<9200	<9200	<9200	<9200
13A-044	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	R	<0.4	<0.4	<0.4
Percent Leached		NA	>100%	NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA
13A-069	µg/kg	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000
13A-069	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	R	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	58	<560	<560	<10000	<10000	<10000	220	<10000	<10000	<10000	<10000	<10000	<560
74T-003A	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		>100%	NA	NA	NA	NA	NA	<90.9%	NA	NA	NA	NA	NA	NA
9A-048	µg/kg	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300	<9300
9A-048	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-5
COMPARISON OF TOTAL AND TCLP RESULTS
SEMIVOLATILES

Material/Sample Number	Units	Isophorone	N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitrobenzene	o-Methylphenol	p-Chloroaniline	p-Methylphenol (Cresol)	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
		Semivolatile Contaminant											
Acid Brick													
13A-042	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<23000	<9200	<9200	<9200
13A-042	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<700	<700	<700	<700	<700	<700	<700	<700	NA	22	39	57
13A-068R	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.025	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	>100%	>100%
Concrete													
13A-044	µg/kg	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<9200	<23000	130	<9200	<9200
13A-044	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	NA	NA
13A-069	µg/kg	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<34000	<82000	250	<34000	<34000
13A-069	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	0.018	<0.4
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	>1.1%	NA
74T-003A	µg/kg	<10000	<10000	<10000	<10000	<10000	R	<10000	R	R	420	R	230
74T-003A	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.001	0.002	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	9.5%	NA	<87%
9A-048	µg/kg	<9300	<9300	<9300	<9300	<9300	R	<9300	R	R	590	R	<9300
9A-048	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.1	<0.04	<0.04	<0.04
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloroethene (Total)	1,2-Dichloropropane	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone
		Volatile Contaminant											
Acid Brick													
13A-042	µg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-042	mg/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.22
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420
13A-068R	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Concrete													
5A-027	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50	R	49	48	R
5A-027	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	>100%	NA
5A-058	ug/kg	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	R
5A-058	mg/L	0.017	<0.05	<0.05	<0.05	0.012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	R
Percent Leached		>0.7%	NA	NA	NA	>0.5%	NA	NA	NA	NA	NA	NA	NA
5A-059	ug/kg	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	R
5A-059	mg/L	0.009	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	R
Percent Leached		>1.5%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-060	ug/kg	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	R
5A-060	mg/L	0.008	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	R
Percent Leached		>1.3%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloroethene (Total)	1,2-Dichloropropane	2-Butanone	2-Hexanene	4-Methyl-2-pentanone	Acetone
Concrete, continued													
5A-061	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
5A-061	mg/L	0.088	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	R
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-062	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	R
5A-062	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-063	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
5A-063	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-064	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
5A-064	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	8	<10	<10	
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
5A-065	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
5A-065	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.007	<0.01	<0.01	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	>100%	NA	NA	NA
9A-048	µg/kg	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300	2600	<1300	<1300	<1300
9A-048	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	R	R	<0.032
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	<7.7%	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloroethene (Total)	1,2-Dichloropropane	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone
Concrete, continued													
13A-044	µg/kg	36000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000
13A-044	mg/L	0.14	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Percent Leached		7.8%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-069	µg/kg	8	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-069	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.087
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-077	ug/kg	150	<51	<51	<51	<51	<51	<51	<51	<51	<51	53	R
13A-077	mg/L	0.098	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.007	R
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	>100%	NA
13A-078	ug/kg	8	<10	<10	<10	<10	<10	<10	<10	<10	<10	29	R
13A-078	mg/L	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.009	R
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-079	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
13A-079	mg/L	0.004	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.006	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-080	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
13A-080	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloroethene (Total)	1,2-Dichloropropane	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone
Concrete, continued													
13A-082	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	R
13A-082	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<14
74T-003A	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	R
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Benzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,3-Dichloropropene	Dibromochloromethane
Acid Brick													
13A-042	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-042	mg/L	0.17	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Percent Leached		>100%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-068	µg/kg	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420
13A-068R	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Concrete													
5A-027	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
5A-027	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-058	ug/kg	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000	<49000
5A-058	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-059	ug/kg	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000
5A-059	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5A-060	ug/kg	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000	<12000
5A-060	mg/L	<0.02	<0.02	<0.02	<0.02	0.059	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Percent Leached		NA	NA	NA	NA	>9.8%	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Benzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,3-Dichloropropene	Dibromochloromethane
Concrete, continued													
5A-061	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
5A-061	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	<0.05	<0.05	<0.05	<0.05	<0.05
Percent Leached		NA	NA	NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA
5A-062	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
5A-062	mg/L	<0.01	<0.01	<0.01	<0.01	0.087	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
5A-063	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
5A-063	mg/L	<0.01	<0.01	<0.01	<0.01	0.058	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
5A-064	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
5A-064	µg/L	<10	<10	<10	<10	8	<10	<10	<10	<10	<10	<10	<10
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
5A-065	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
5A-065	mg/L	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
9A-048	µg/kg	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300	<1300
9A-048	mg/L	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.001	<0.01	<0.01	<0.01
Percent Leached		>4.6%	NA	NA	NA	NA	NA	NA	NA	>1.5%	NA	NA	NA

TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Benzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,3-Dichloropropene	Dibromochloromethane
Concrete, continued													
13A-044	µg/kg	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000
13A-044	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-069	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-069	mg/L	0.048	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-077	ug/kg	<51	<51	<51	<51	<51	<51	<51	<51	<51	<51	<51	<51
13A-077	mg/L	<0.01	<0.01	<0.01	<0.01	0.025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13A-078	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-078	mg/L	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
13A-079	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-079	mg/L	<0.025	<0.025	<0.025	<0.025	0.21	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
13A-080	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-080	mg/L	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Benzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,3-Dichloropropene	Dibromochloromethane
Concrete, continued													
13A-082	ug/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
13A-082	mg/L	<0.01	<0.01	<0.01	<0.01	0.039	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		NA	NA	NA	NA	>100%	NA	NA	NA	NA	NA	NA	NA
74T-003A	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
74T-003A	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Percent Leached		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Ethylbenzene	m,p-Xylene	Methylene chloride	o-Xylene	Styrene	Tetrachloroethene	Toluene	trans-1,3-Dichloropropene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride	Xylenes, Total
		Volatile Contaminant											
Acid Brick													
13A-042	µg/kg	5	14	9	4	<10	5	<10	<10	<10		<10	18
13A-042	mg/L	<0.012	NA	<0.041	NA	<0.012	<0.012	<0.012	<0.012	<0.012		<0.012	<0.012
Percent Leached		>100%	NA	>100%	NA	NA	>100%	NA	NA	NA		NA	>100%
13A-068	µg/kg	<420	<420	58	<420	<420	<420	<420	<420	<420			
13A-068R	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Percent Leached		NA	NA	>100%	NA	NA	NA	NA	NA	NA			
Concrete													
5A-027	µg/kg	610		<60		<50	<50	<50	<50	<50		<50	2600
5A-027	mg/L	0.098		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	0.47
Percent Leached		>100%		>100%		NA	NA	NA	NA	NA		NA	>100%
5A-058	ug/kg	220000		<49000		<49000	<49000	<49000	<49000	<49000		<49000	1300000
5A-058	mg/L	0.57		<0.05		<0.05	<0.05	0.01	<0.05	<0.05		<0.05	2.6
Percent Leached		5.2%		NA		NA	NA	>0.4%	NA	NA		NA	4.0%
5A-059	ug/kg	44000		<12000		<12000	<12000	<12000	<12000	<12000		<12000	260000
5A-059	mg/L	0.21		<0.025		<0.025	<0.025	0.004	<0.025	<0.025		<0.025	0.99
Percent Leached		9.5%		NA		NA	NA	>0.7%	NA	NA		NA	7.6%
5A-060	ug/kg	35000		<12000		<12000	<12000	<12000	<12000	<12000		<12000	200000
5A-060	mg/L	0.2		<0.02		<0.02	<0.02	0.003	<0.02	<0.02		<0.02	0.89
Percent Leached		11.4%		NA		NA	NA	>0.5%	NA	NA		NA	8.9%

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Ethylbenzene	m,p-Xylene	Methylene chloride	o-Xylene	Styrene	Tetrachloroethene	Toluene	trans-1,3-Dichloropropene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride	Xylenes, Total
		Volatile Contaminant											
Concrete, continued													
5A-061	ug/kg	<10		<10		<10	<10	3	<10	<10		<10	<10
5A-061	mg/L	<0.05		<0.05		<0.05	<0.05	0.054	<0.05	<0.05		<0.05	<0.05
Percent Leached		NA		NA		NA	NA	>100%	NA	NA		NA	NA
5A-062	ug/kg	<10		<10		<10	<10	2	<10	<10		<10	<10
5A-062	mg/L	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
Percent Leached		NA		NA		NA	NA	>100%	NA	NA		NA	NA
5A-063	ug/kg	<10		<10		<10	<10	<10	<10	<10		<10	<10
5A-063	mg/L	<0.01		<0.012		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
Percent Leached		NA		NA		NA	NA	NA	NA	NA		NA	NA
5A-064	µg/L	<10		<10		<10	<10	<10	<10	<10		<10	<10
5A-064	µg/L	<10		<10		<10	<10	<10	<10	<10		<10	<10
Percent Leached		NA		NA		NA	NA	NA	NA	NA		NA	NA
5A-065	ug/kg	<10		<10		<10	<10	<10	<10	<10		<10	<10
5A-065	mg/L	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
Percent Leached		NA		NA		NA	NA	NA	NA	NA		NA	NA
9A-048	µg/kg	<1300		<1300		<1300	<1300	<1300	<1300	<1300		<1300	<1300
9A-048	mg/L	0.002		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	0.006
Percent Leached		>3.1%		NA		NA	NA	NA	NA	NA		NA	>9.2%

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Ethylbenzene	m,p-Xylene	Methylene chloride	o-Xylene	Styrene	Tetrachloroethene	Toluene	trans-1,3-Dichloropropene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride	Xylenes, Total
Concrete, continued													
13A-044	µg/kg	16000	68000	R	40000	<5000	<5000	<5000	<5000	<5000		<5000	110000
13A-044	mg/L	0.096	NA	<0.025	NA	<0.025	<0.025	<0.025	<0.025	<0.025		<0.025	0.52
Percent Leached		12.0%	NA	NA	NA	NA	NA	NA	NA	NA		NA	9.5%
13A-069	µg/kg	3		<10		<10	3	<10	<10	<10	<10	<10	10
13A-069	mg/L	<0.01		<0.016		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Percent Leached		>100%		NA		NA	>100%	NA	NA	NA	NA	NA	>100%
13A-077	ug/kg	240		<51		<51	10	9	<51	<51		<51	1300
13A-077	mg/L	0.054		<0.01		<0.01	<0.01	0.002	<0.01	<0.01		<0.01	0.3
Percent Leached		>100%		NA		NA	>100%	>100%	NA	NA		NA	>100%
13A-078	ug/kg	92		<10		<10	23	8	<10	<10		<10	410
13A-078	mg/L	0.008		<0.01		<0.01	0.002	0.002	<0.01	<0.01		<0.01	0.041
Percent Leached		>100%		NA		NA	>100%	>100%	NA	NA		NA	>100%
13A-079	ug/kg	3		<10		<10	4	<10	<10	<10		<10	<24
13A-079	mg/L	<0.025		<0.025		<0.025	<0.025	<0.025	<0.025	<0.025		<0.025	<0.025
Percent Leached		>100%		NA		NA	>100%	NA	>100%	NA		NA	NA
13A-080	ug/kg	<10		<10		<10	<10	1	<10	<10		<10	<10
13A-080	mg/L	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
Percent Leached		NA		NA		NA	NA	>100%	NA	NA		NA	NA

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TABLE A.II-6
COMPARISON OF TOTAL AND TCLP RESULTS
VOLATILES

Material/Sample Number	Units	Volatile Contaminant											
		Ethylbenzene	m,p-Xylene	Methylene chloride	o-Xylene	Styrene	Tetrachloroethene	Toluene	trans-1,3-Dichloropropene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride	Xylenes, Total
Concrete, continued													
13A-082	ug/kg	1		<10		<10	8	2	<10	<10		<10	<10
13A-082	mg/L	<0.01		<0.012		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01
Percent Leached		>100%		NA		NA	>100%	>100%	NA	NA		NA	NA
74T-003A	µg/kg	<10		<10		<10	<10	19	<10	<10		<10	<10
74T-003A	mg/L	<0.05		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05
Percent Leached		NA		NA		NA	NA	>100%	NA	NA		NA	NA

000393

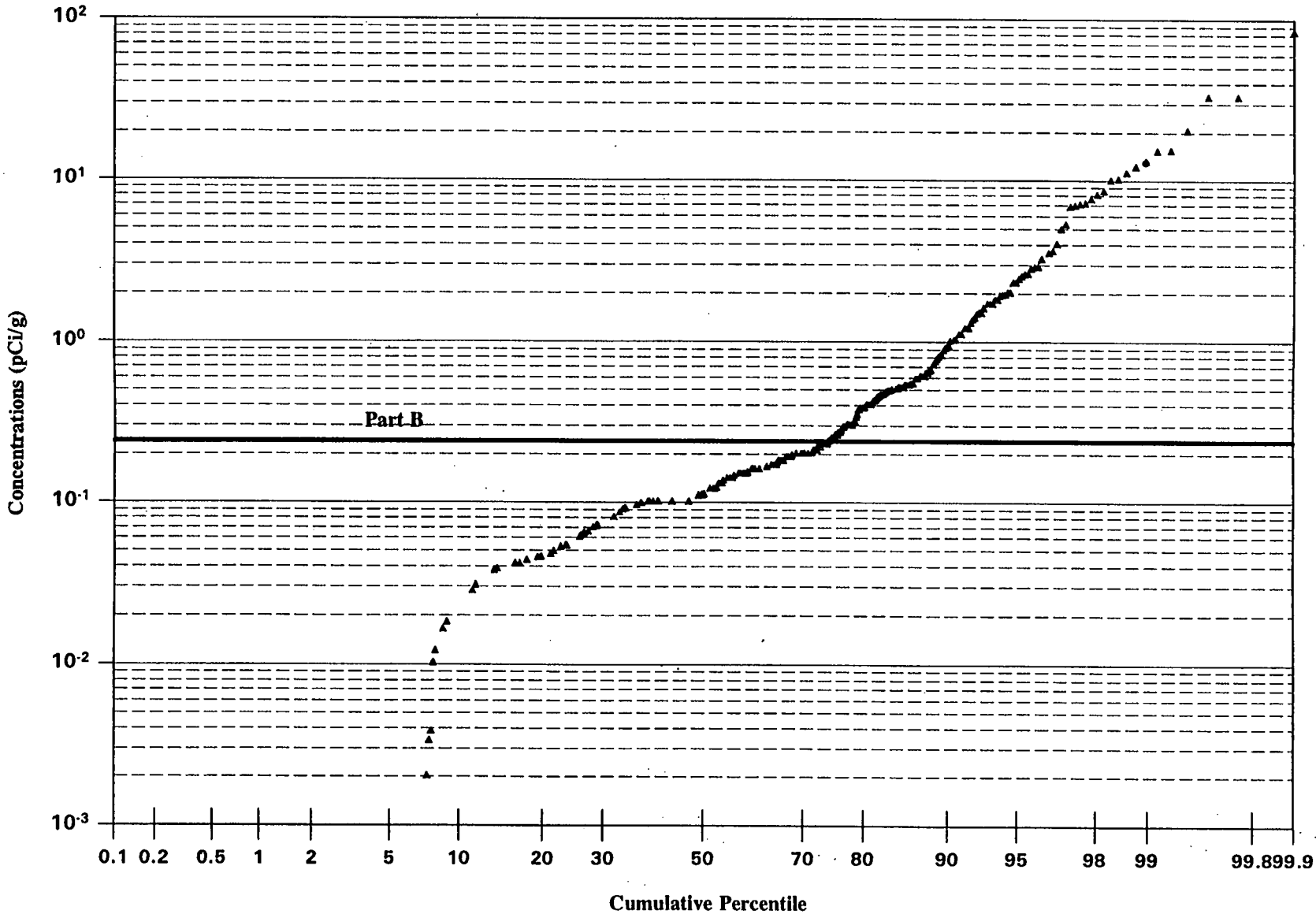

FIGURE A.II-1
CUMULATIVE PROBABILITY PLOT OF AMERICIUM-241 CONCENTRATIONS IN SOLID MEDIA

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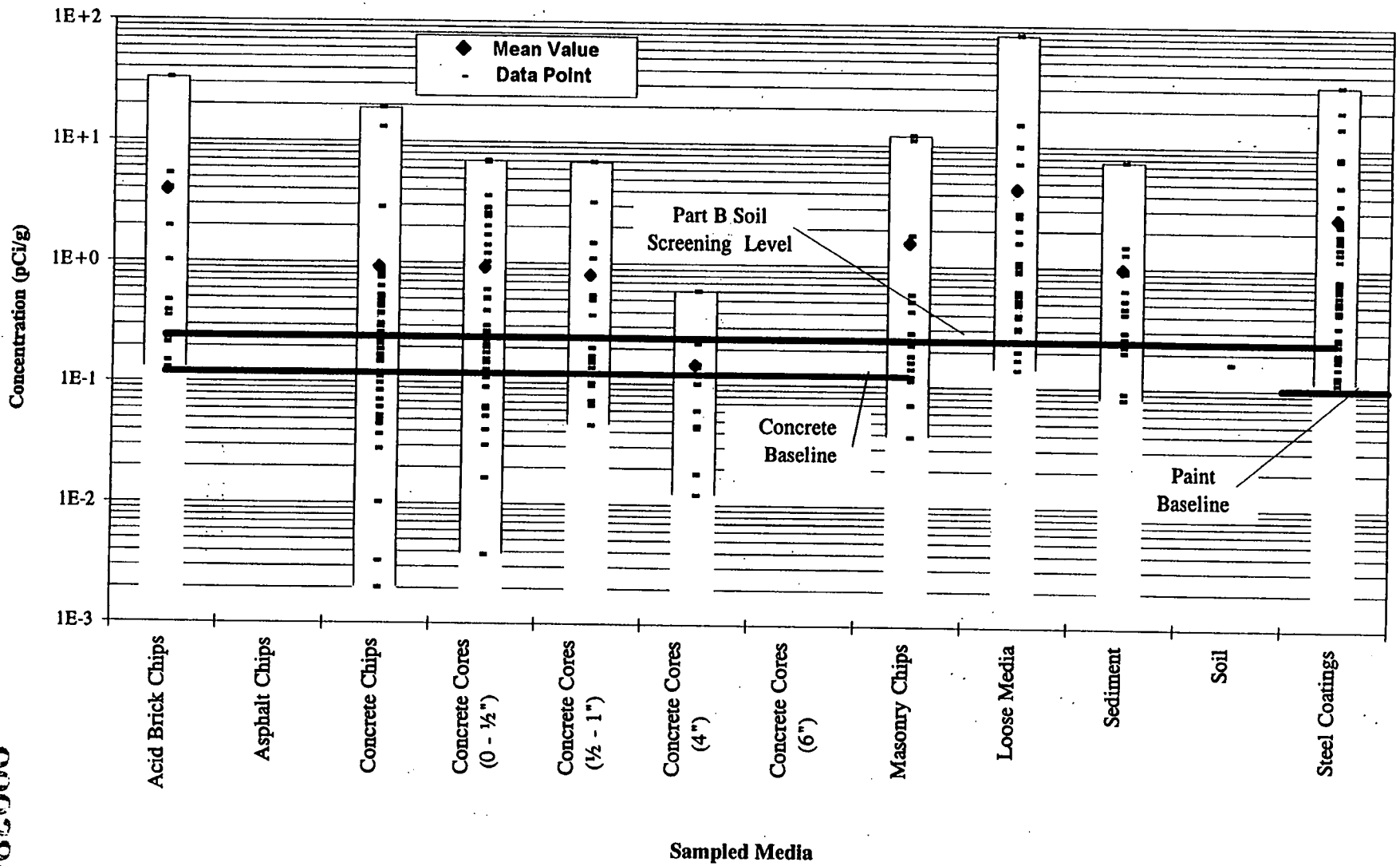

FIGURE A.II-2
SUMMARY OF AMERICIUM-241 RESULTS GROUPED BY SOLID MEDIA

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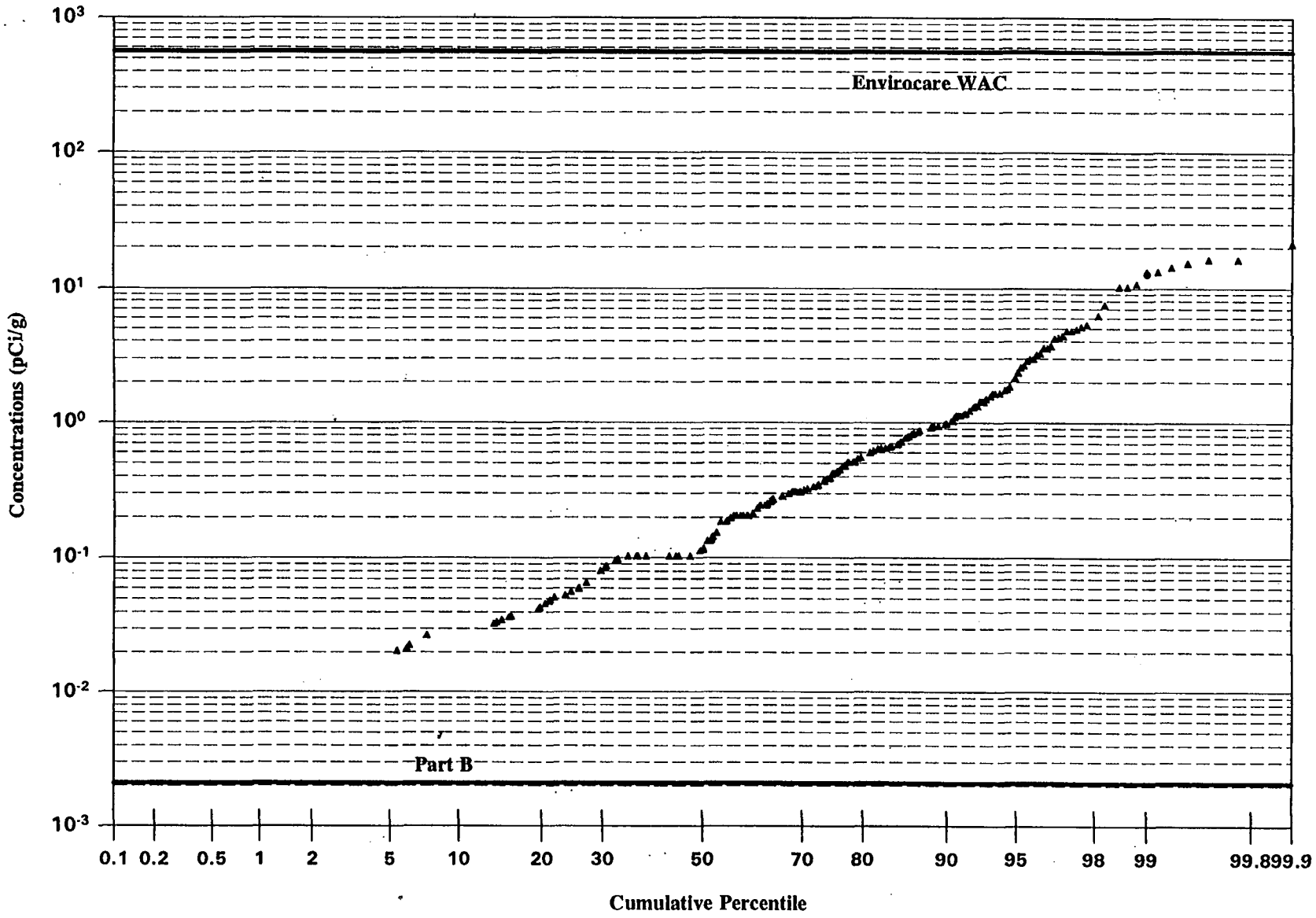

FIGURE A.II-3
CUMULATIVE PROBABILITY PLOT OF CESIUM-137 CONCENTRATIONS IN SOLID MEDIA

000396

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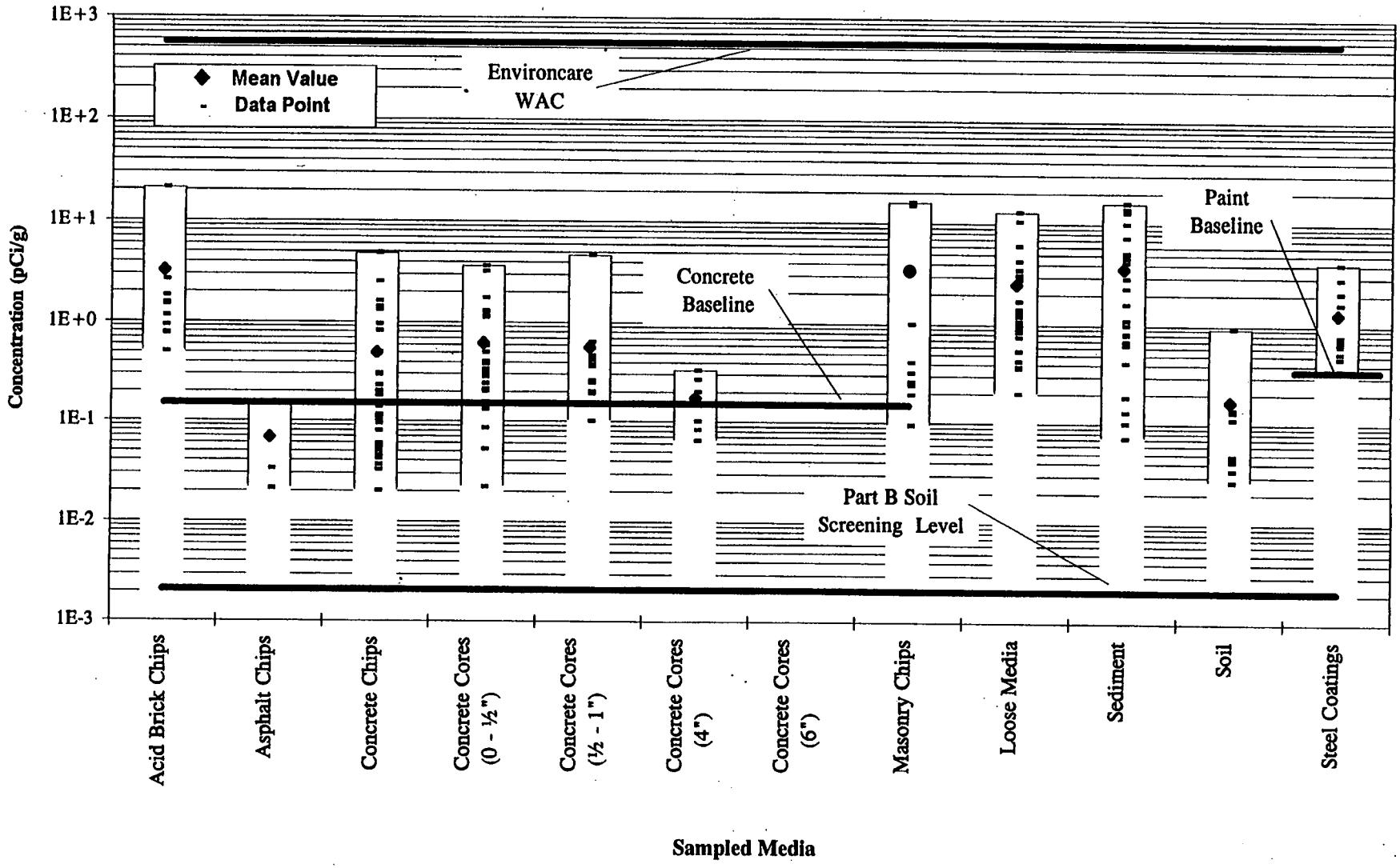

FIGURE A.II-4
SUMMARY OF CESIUM-137 RESULTS GROUPED BY SOLID MEDIA

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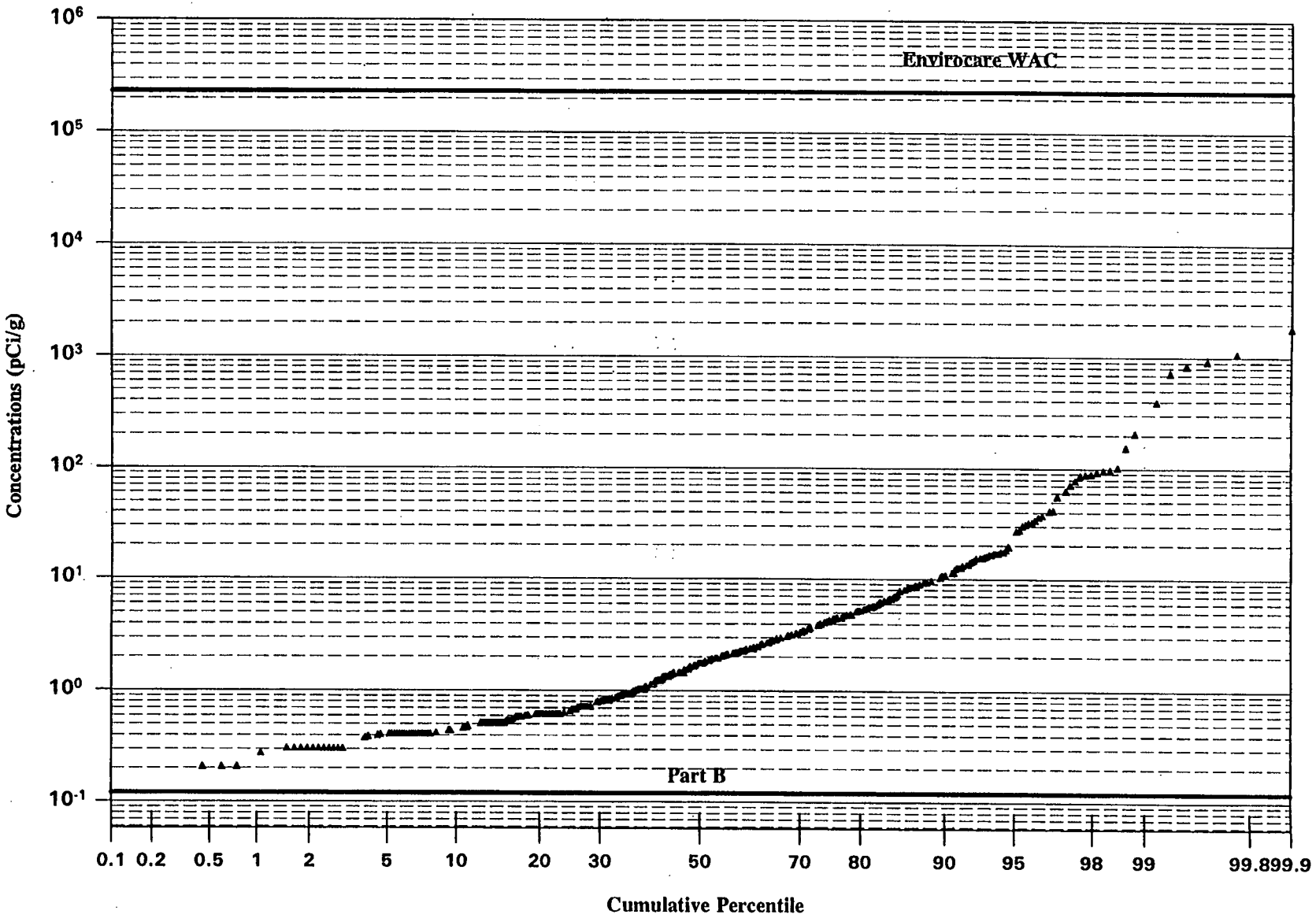

FIGURE A.II-5
CUMULATIVE PROBABILITY PLOT OF LEAD-210 CONCENTRATIONS IN SOLID MEDIA

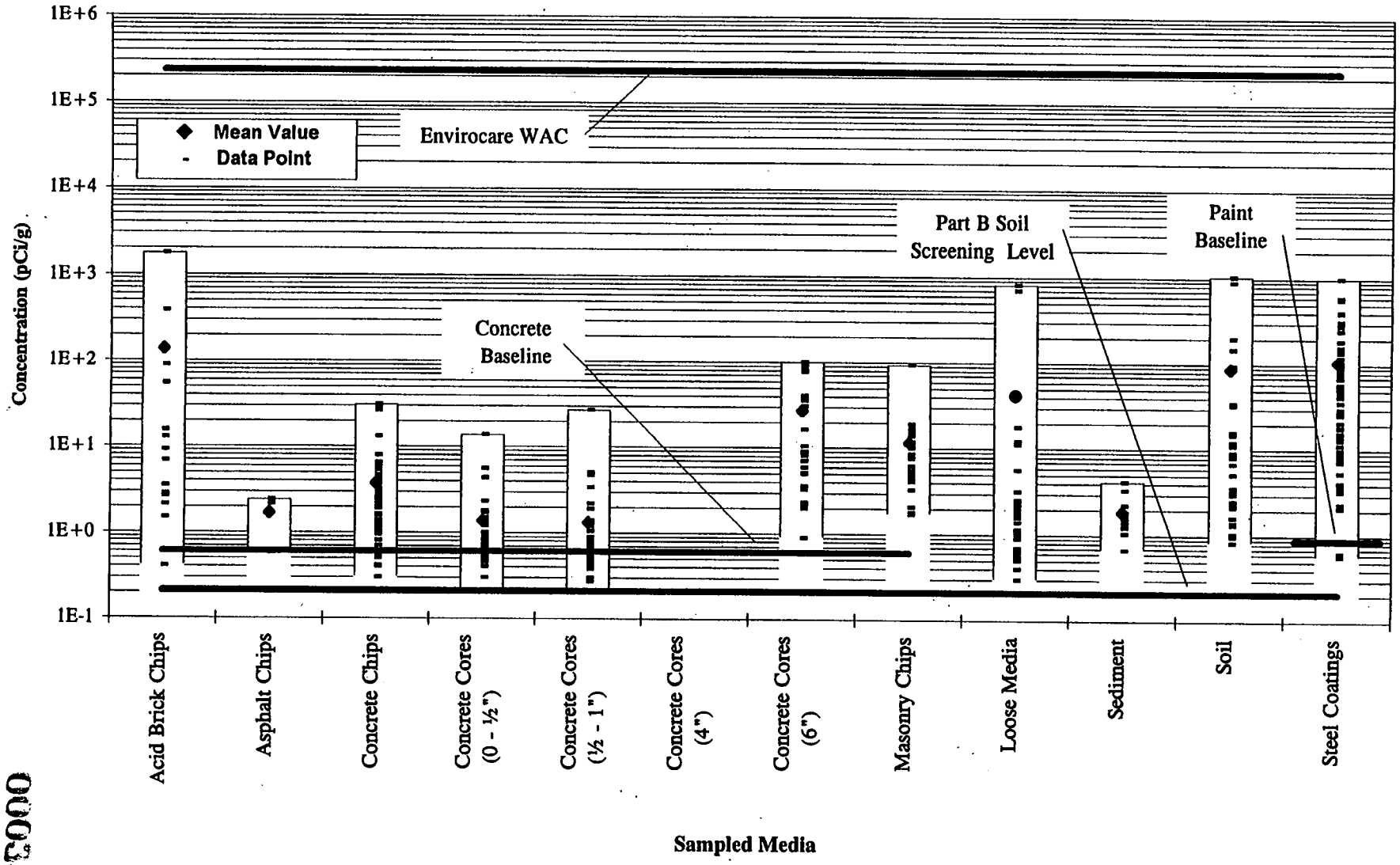

FIGURE A.II.2-6
SUMMARY OF LEAD-210 RESULTS GROUPED BY SOLID MEDIA

000339

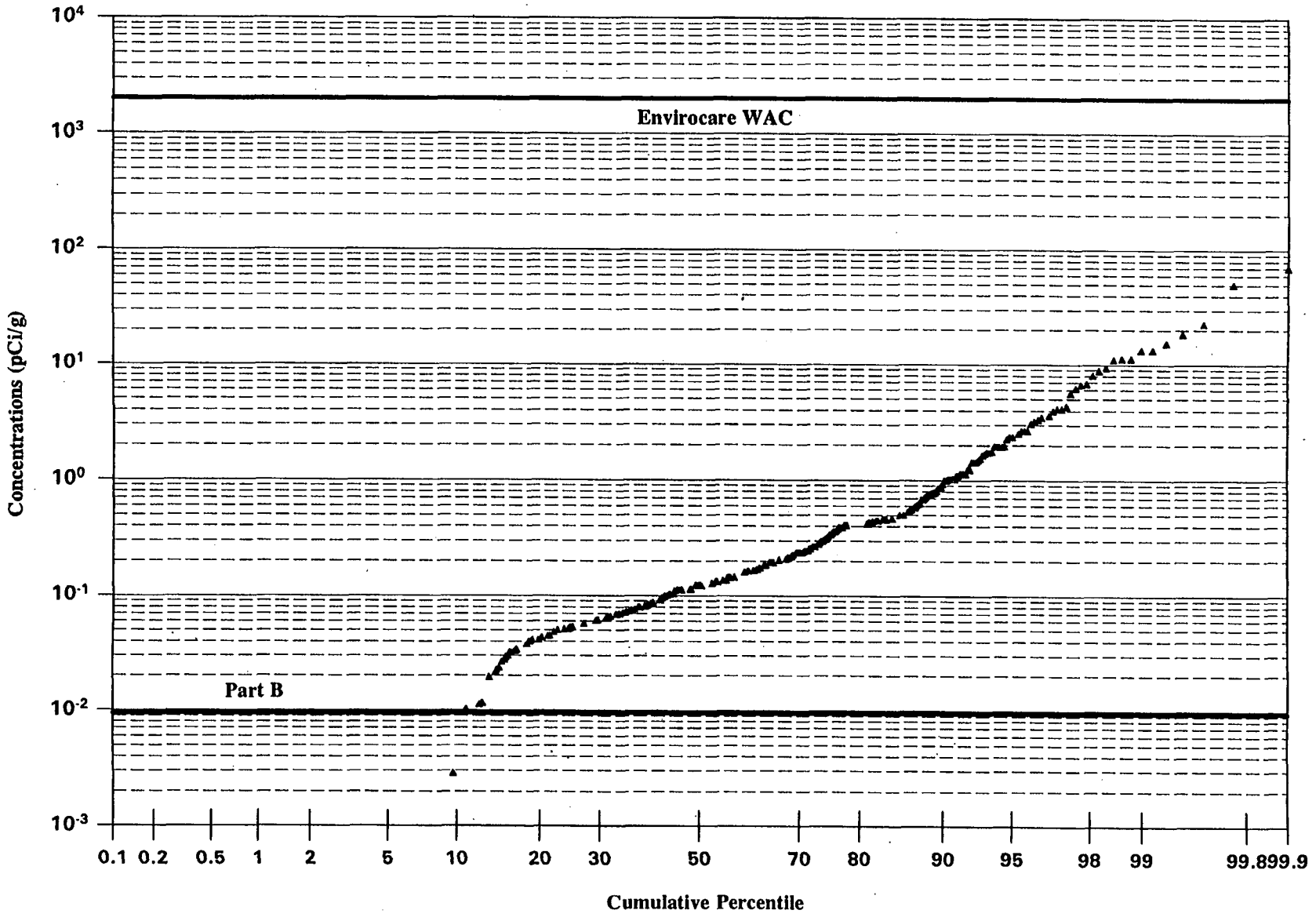

FIGURE A.II-7
CUMULATIVE PROBABILITY PLOT OF NEPTUNIUM-237 CONCENTRATIONS IN SOLID MEDIA

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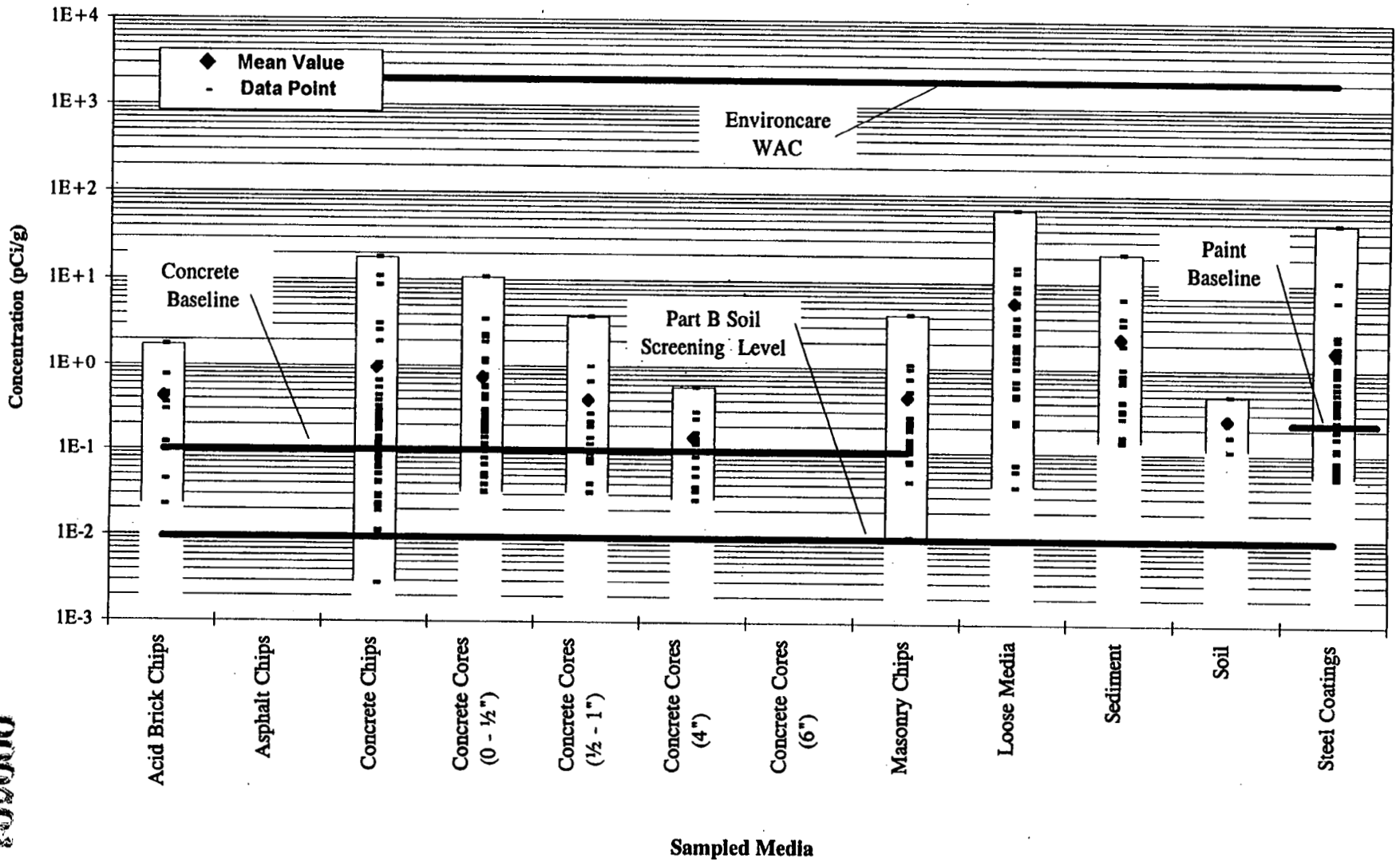

FIGURE A.II-8
SUMMARY OF NEPTUNIUM-237 RESULTS GROUPED BY SOLID MEDIA

100401

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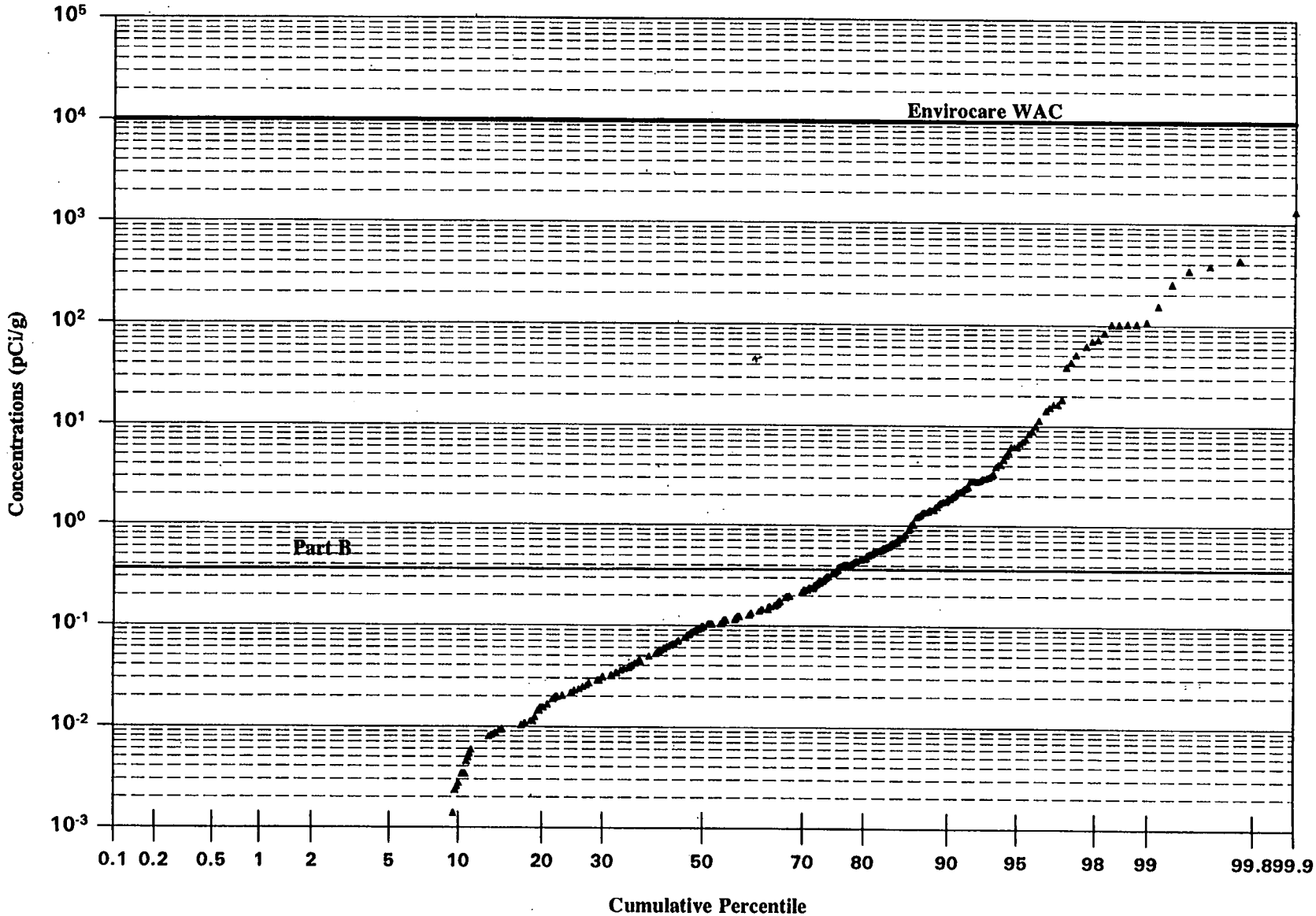

FIGURE A.II-9
CUMULATIVE PROBABILITY PLOT OF PLUTONIUM-238 CONCENTRATIONS IN SOLID MEDIA

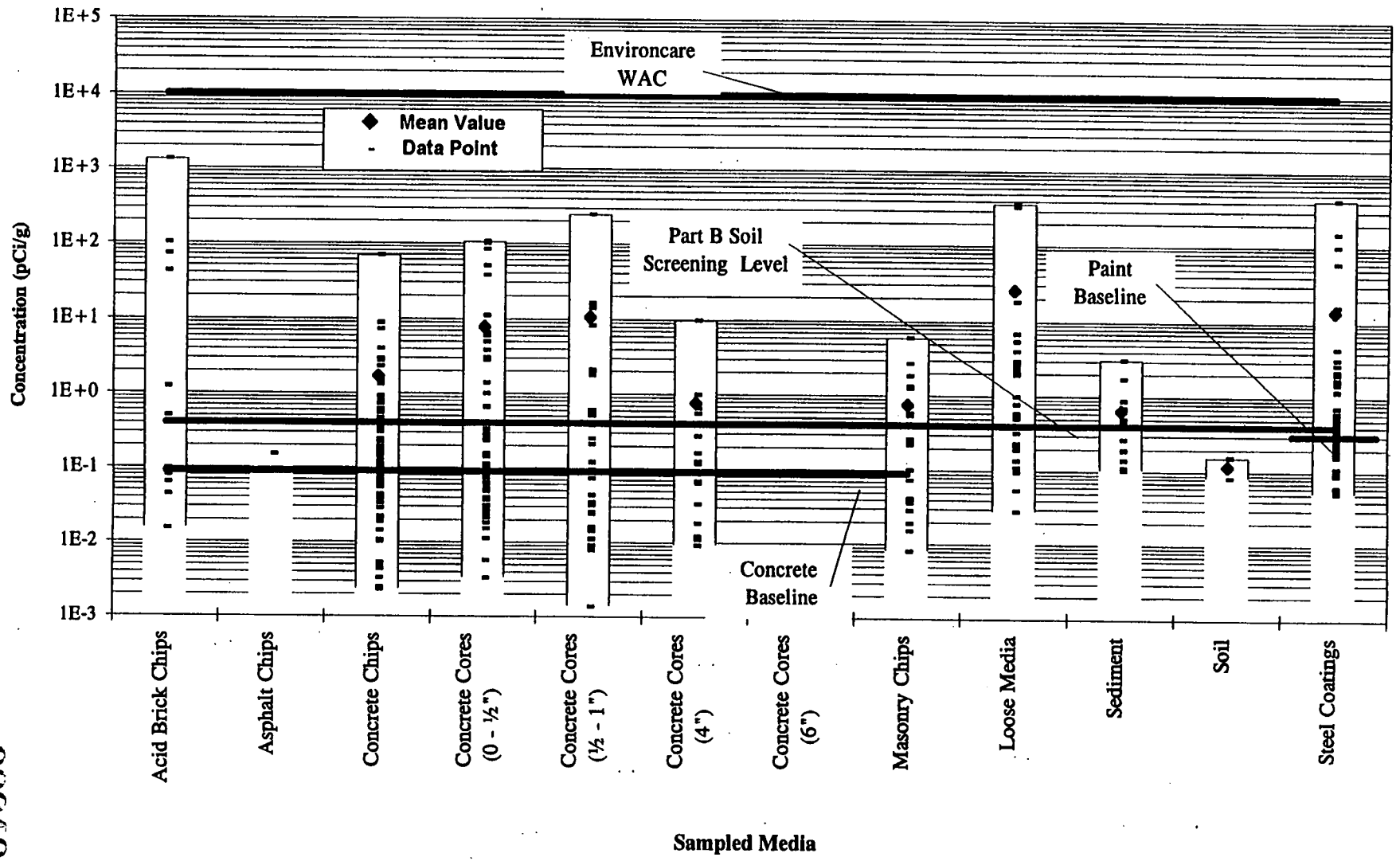

FIGURE A.II-10
SUMMARY OF PLUTONIUM-238 RESULTS GROUPED BY SOLID MEDIA

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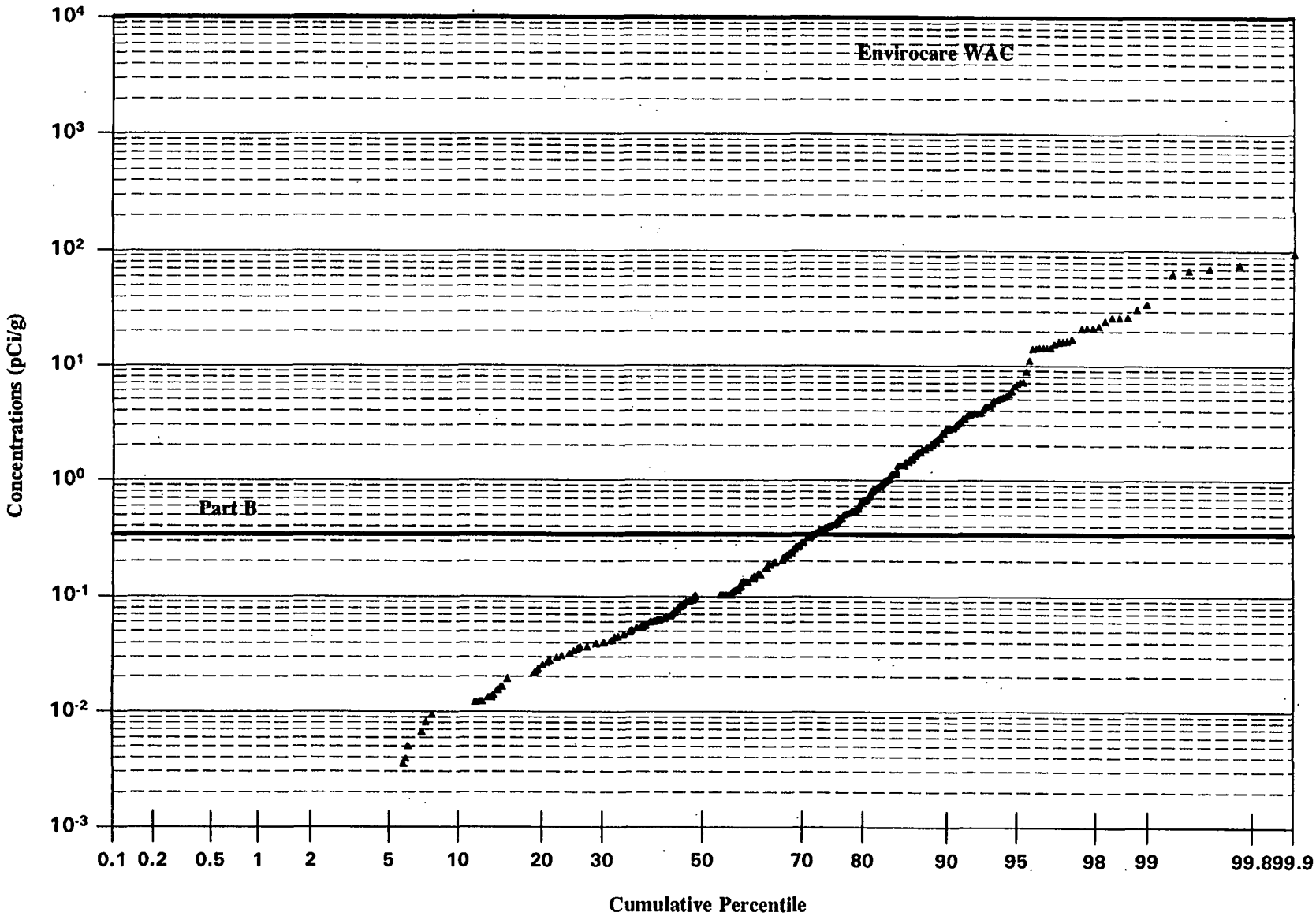

FIGURE A.II-11
CUMULATIVE PROBABILITY PLOT OF PLUTONIUM-239/240 CONCENTRATIONS IN SOLID MEDIA

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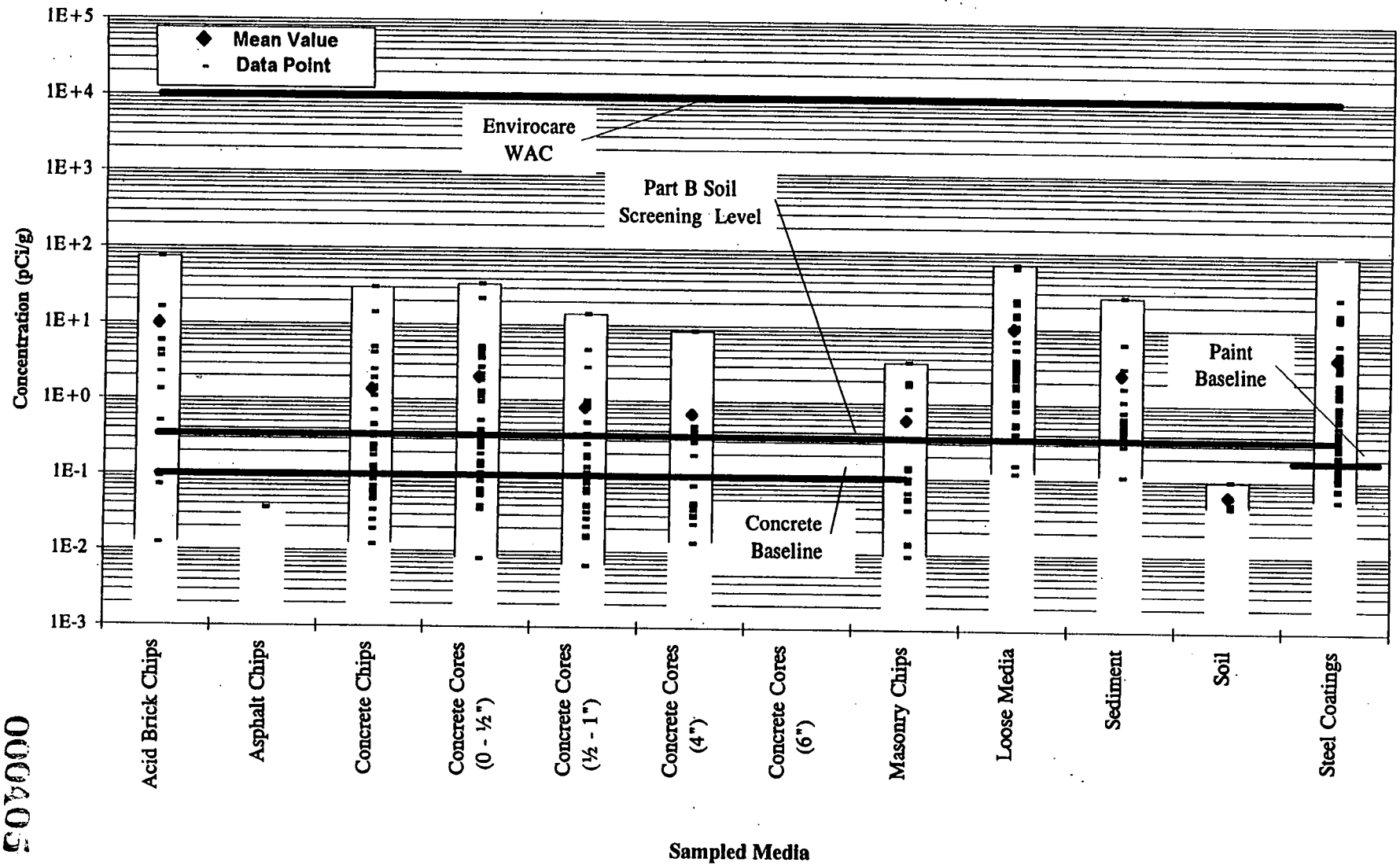

FIGURE A.II-12
SUMMARY OF PLUTONIUM-239/240 RESULTS GROUPED BY SOLID MEDIA

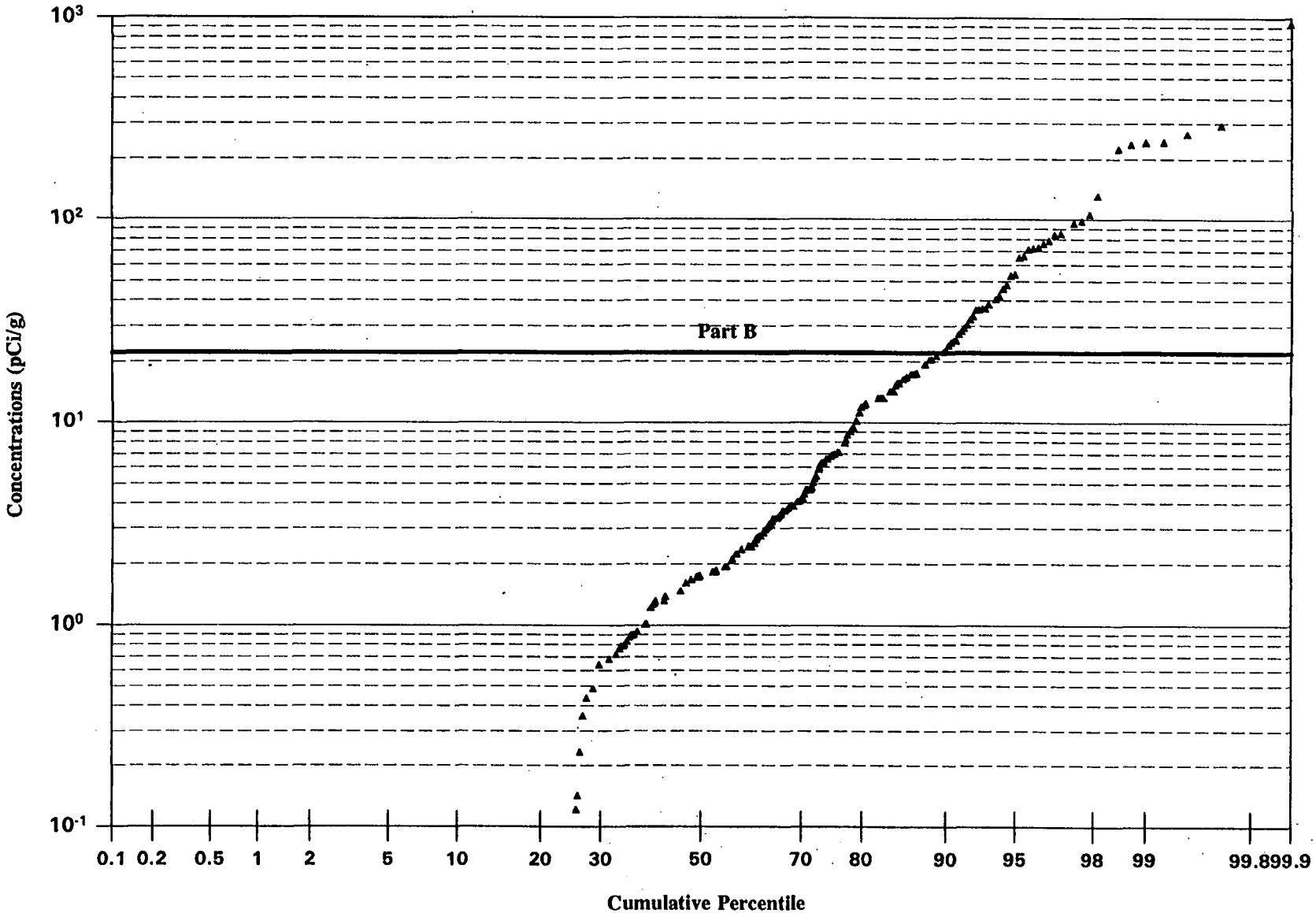

FIGURE A.II-13
CUMULATIVE PROBABILITY PLOT OF PLUTONIUM-241 CONCENTRATIONS IN SOLID MEDIA

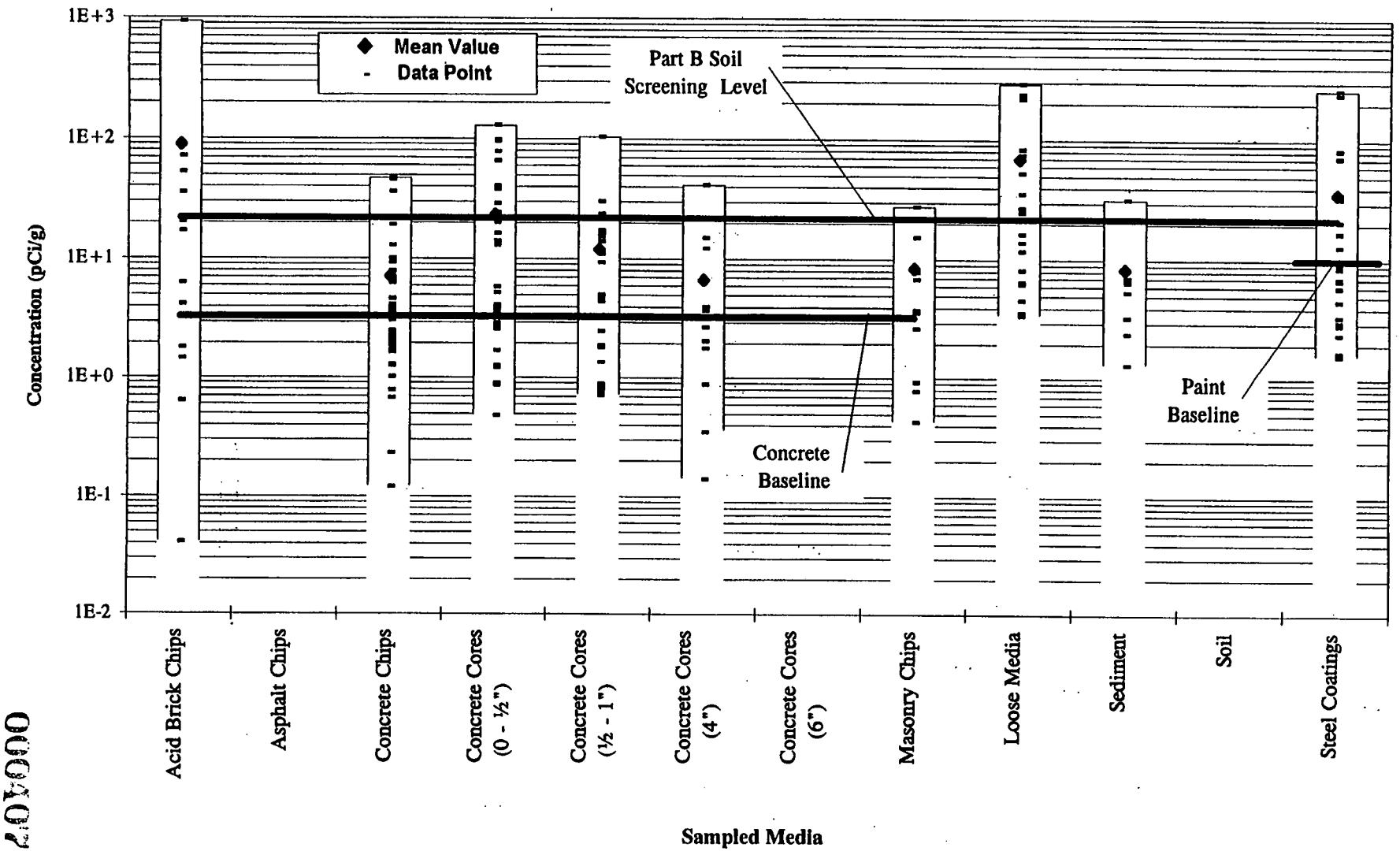

FIGURE A.II-14
SUMMARY OF PLUTONIUM-241 RESULTS GROUPED BY SOLID MEDIA

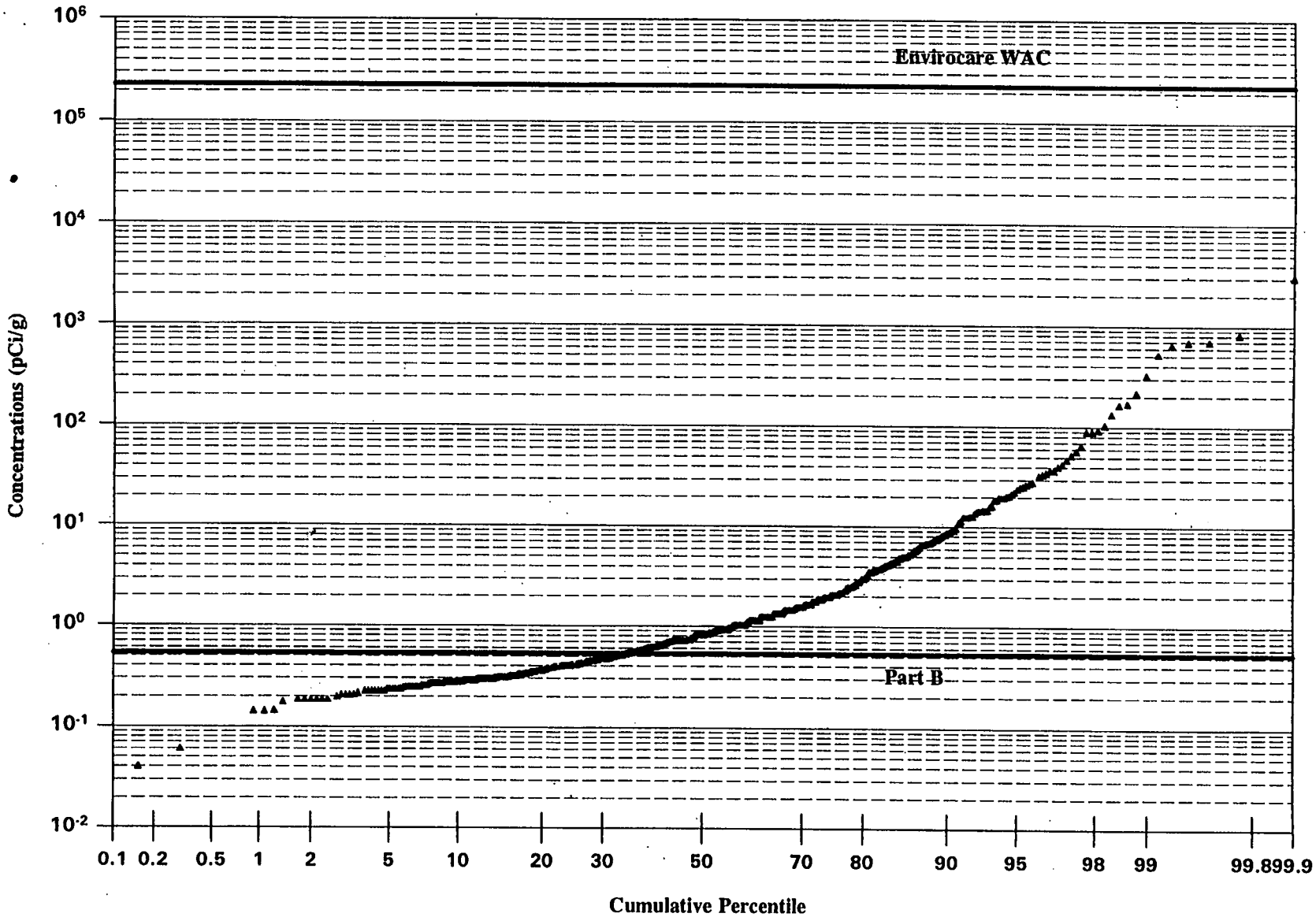

FIGURE A.II-15
CUMULATIVE PROBABILITY PLOT OF POLONIUM-210 CONCENTRATIONS IN SOLID MEDIA

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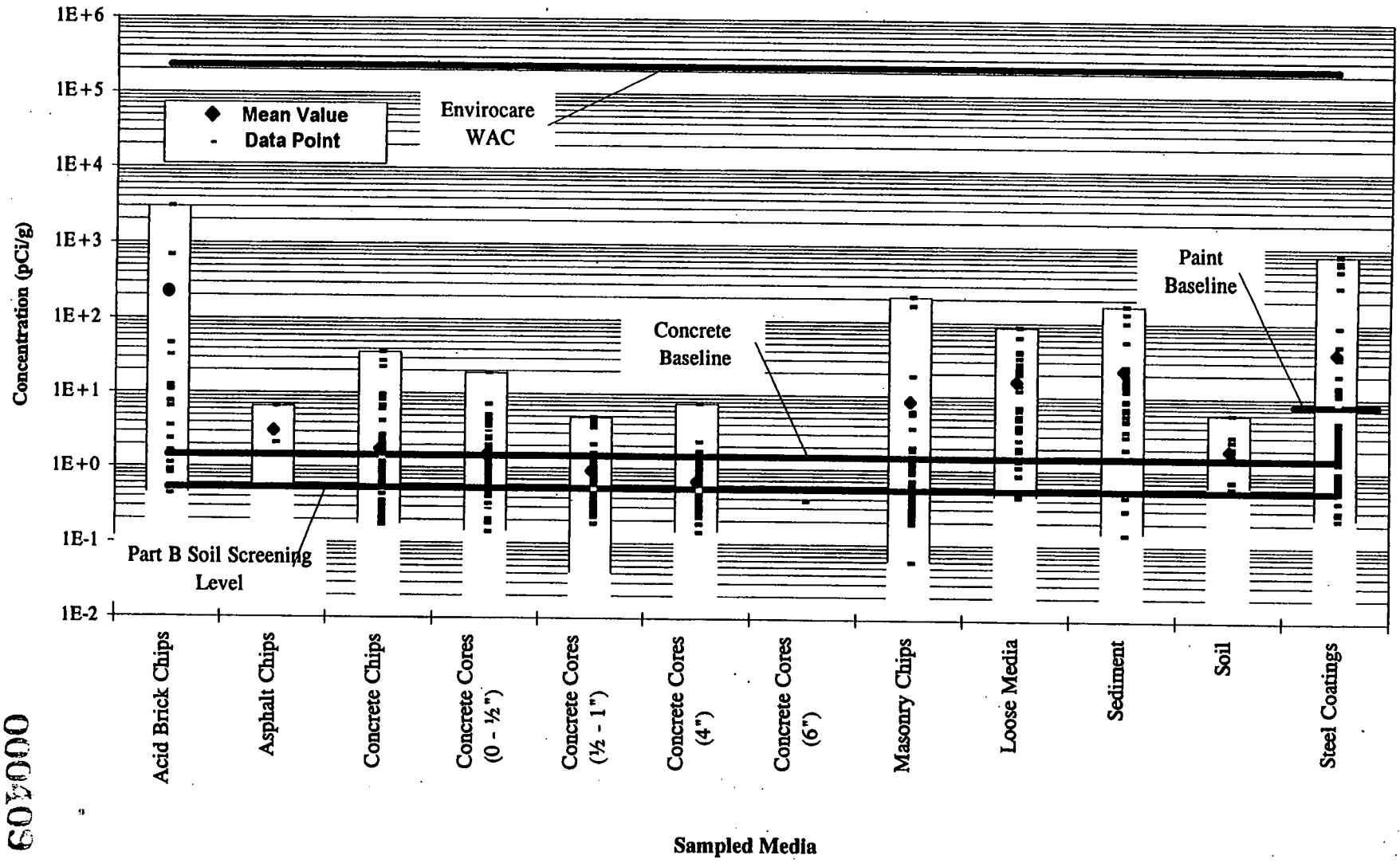

FIGURE A.II-16
SUMMARY OF POLONIUM-210 RESULTS GROUPED BY SOLID MEDIA

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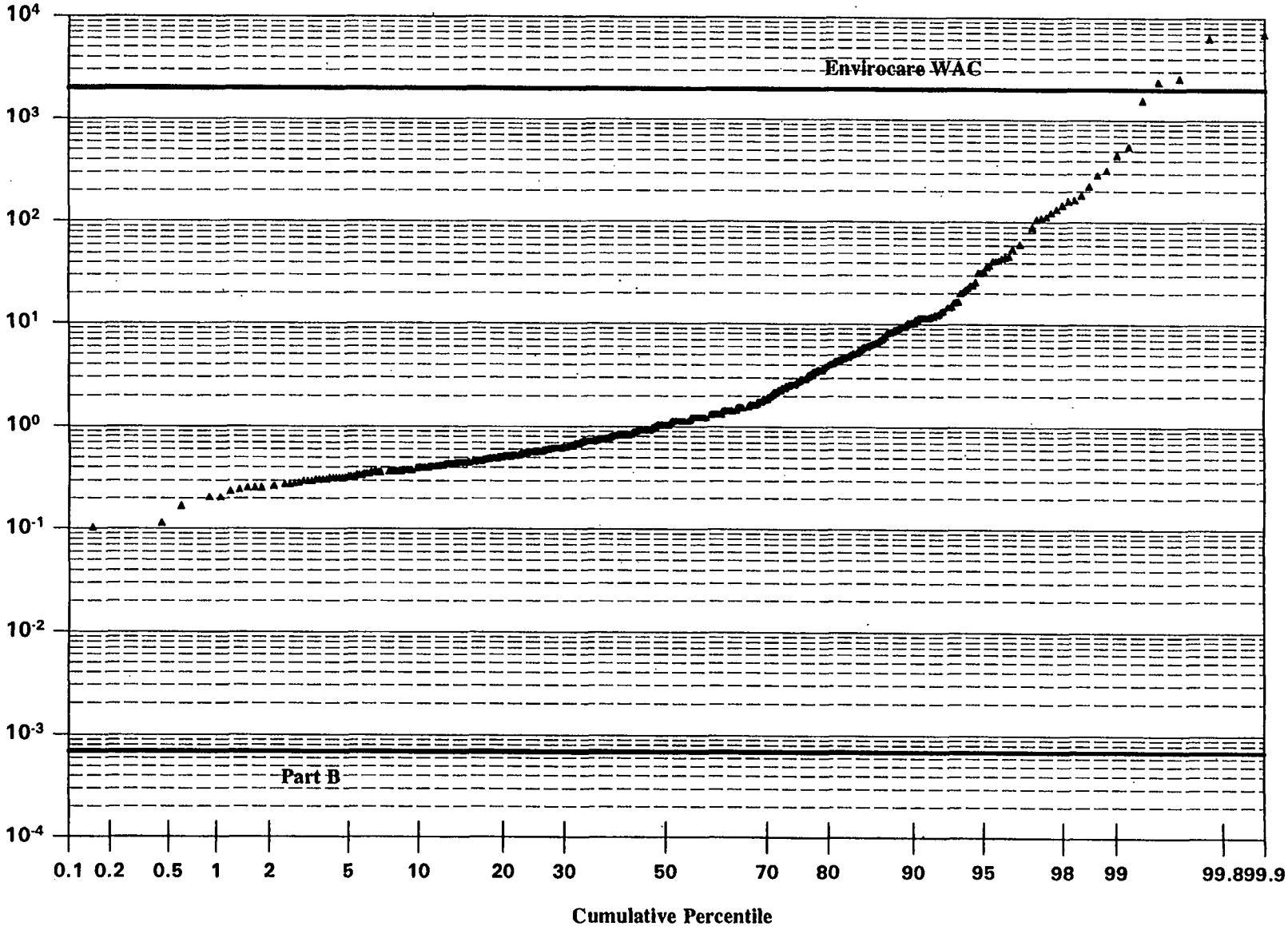

FIGURE A.II-17
CUMULATIVE PROBABILITY PLOT OF RADIUM-226 CONCENTRATIONS IN SOLID MEDIA

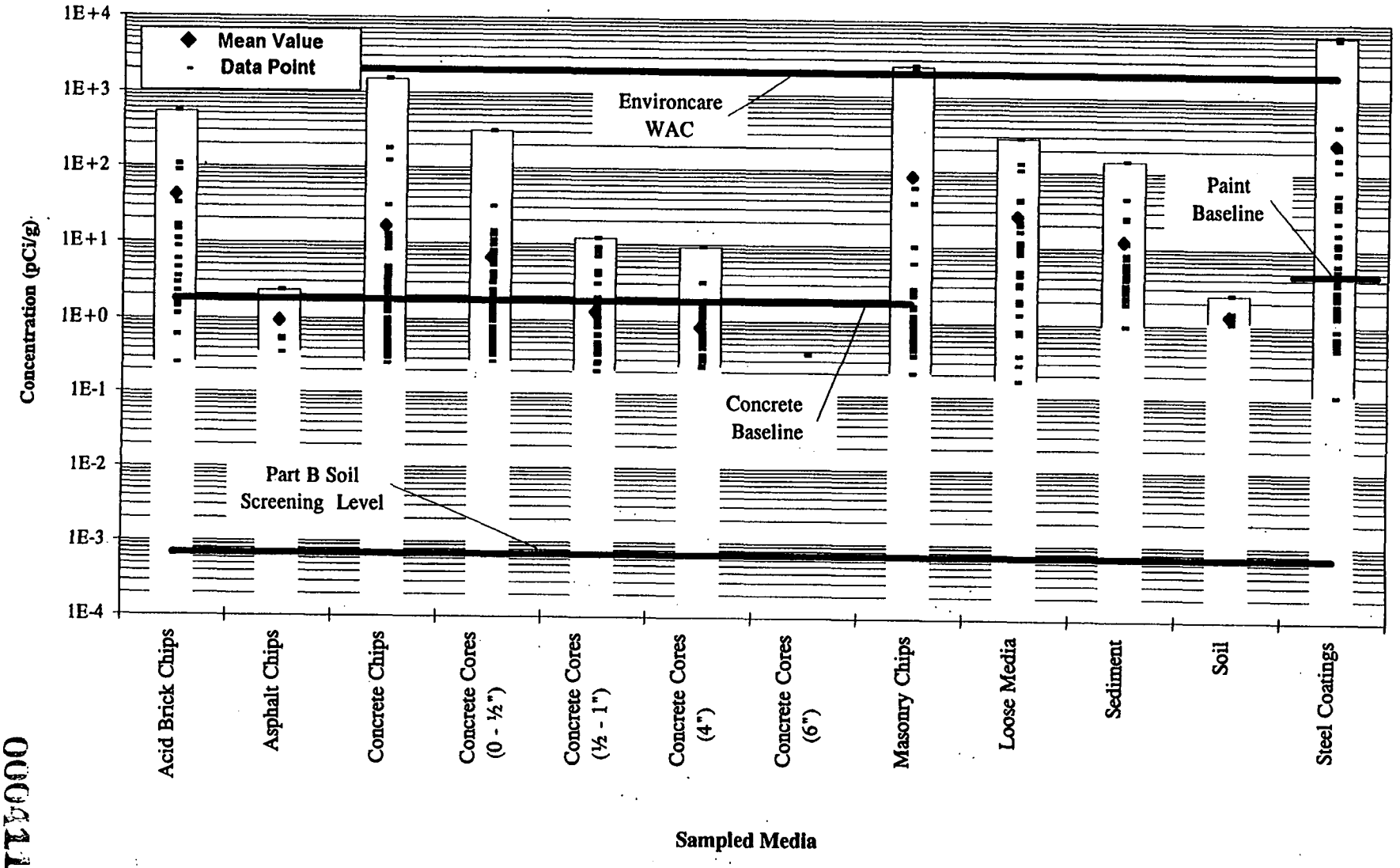

FIGURE A.II-18
SUMMARY OF RADIUM-226 RESULTS GROUPED BY SOLID MEDIA

000411

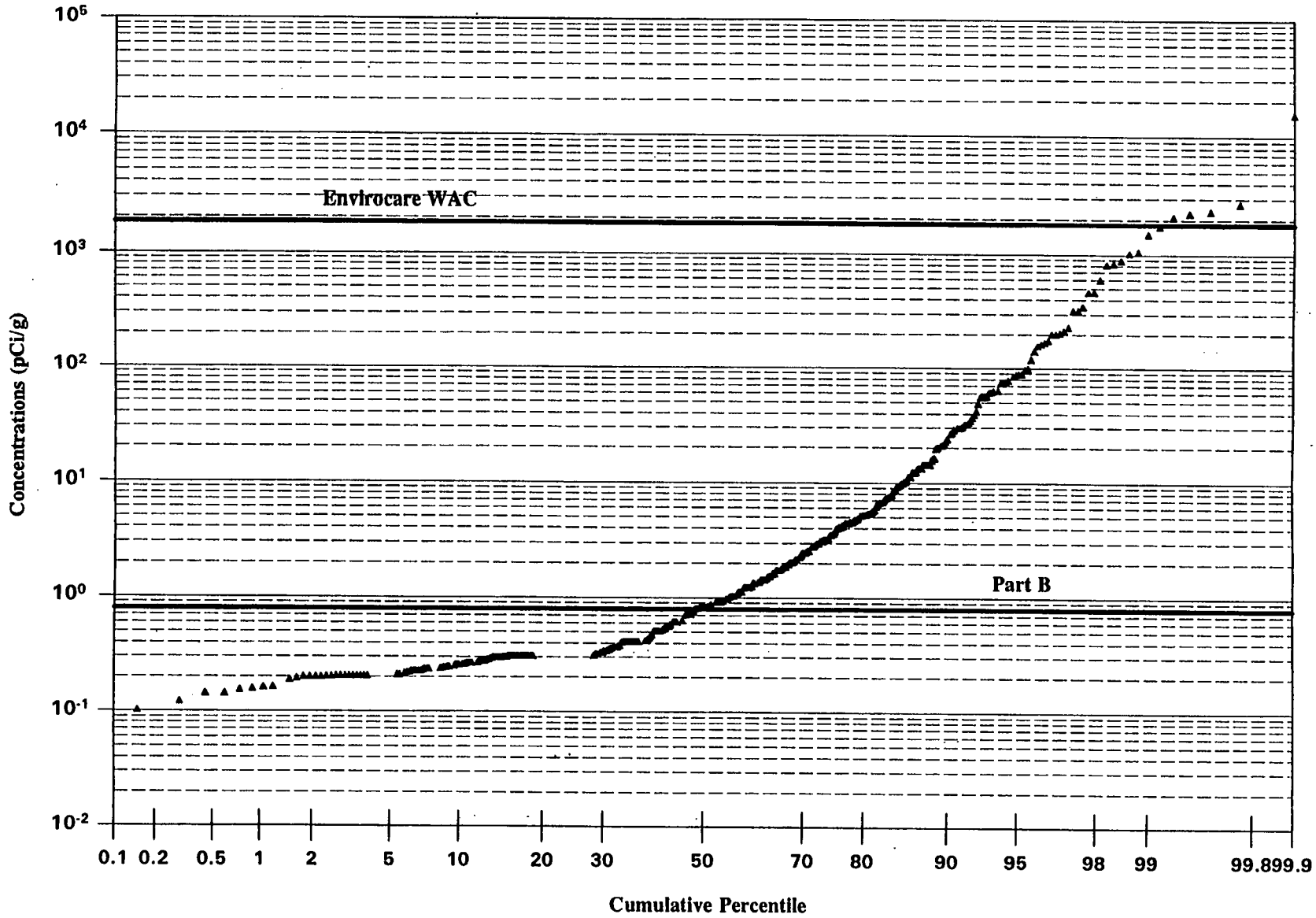

FIGURE A.II-19
CUMULATIVE PROBABILITY PLOT OF RADIUM-228 CONCENTRATIONS IN SOLID MEDIA

000412

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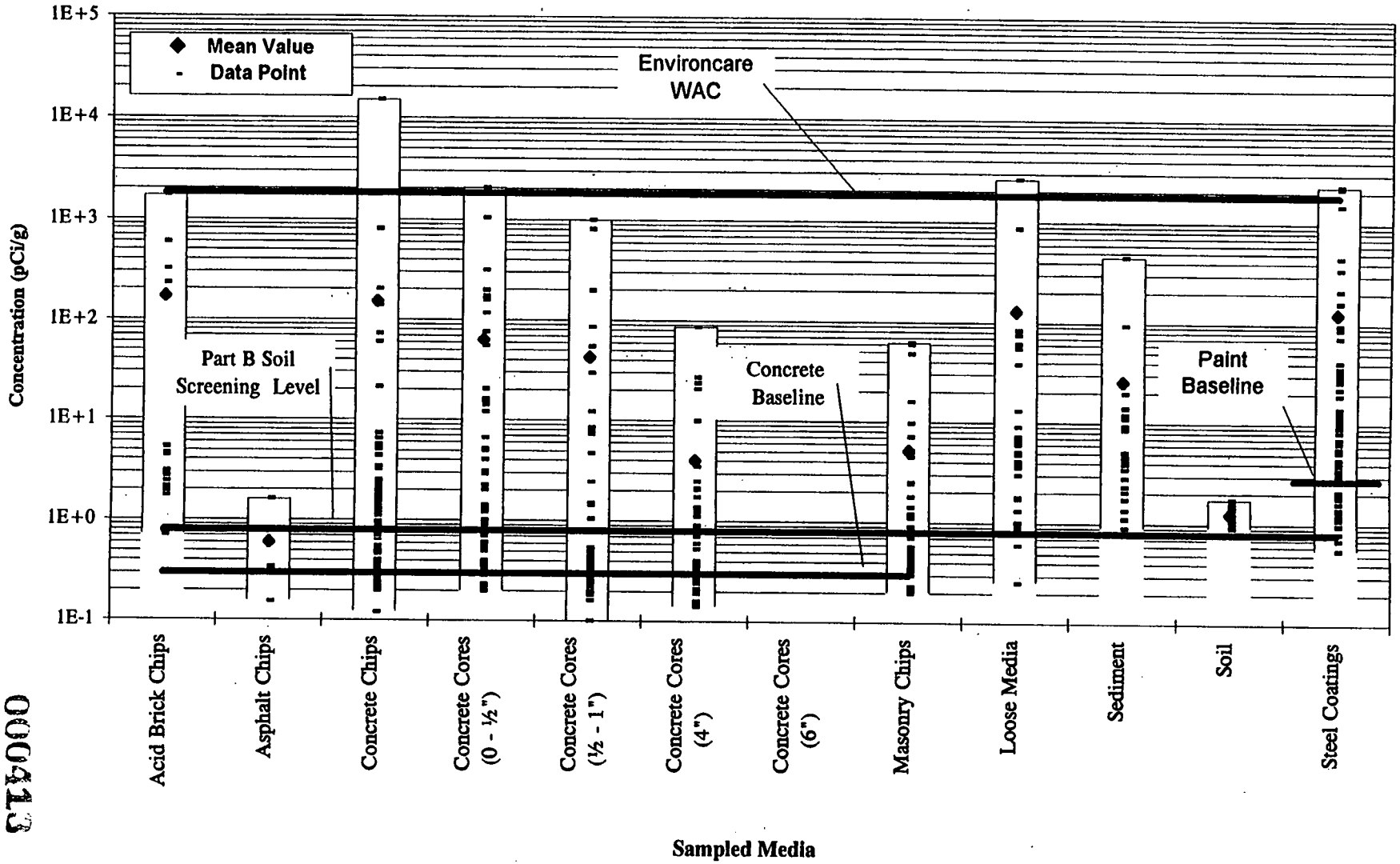

FIGURE A.II-20
SUMMARY OF RADIUM-228 RESULTS GROUPED BY MAJOR MEDIA

000413

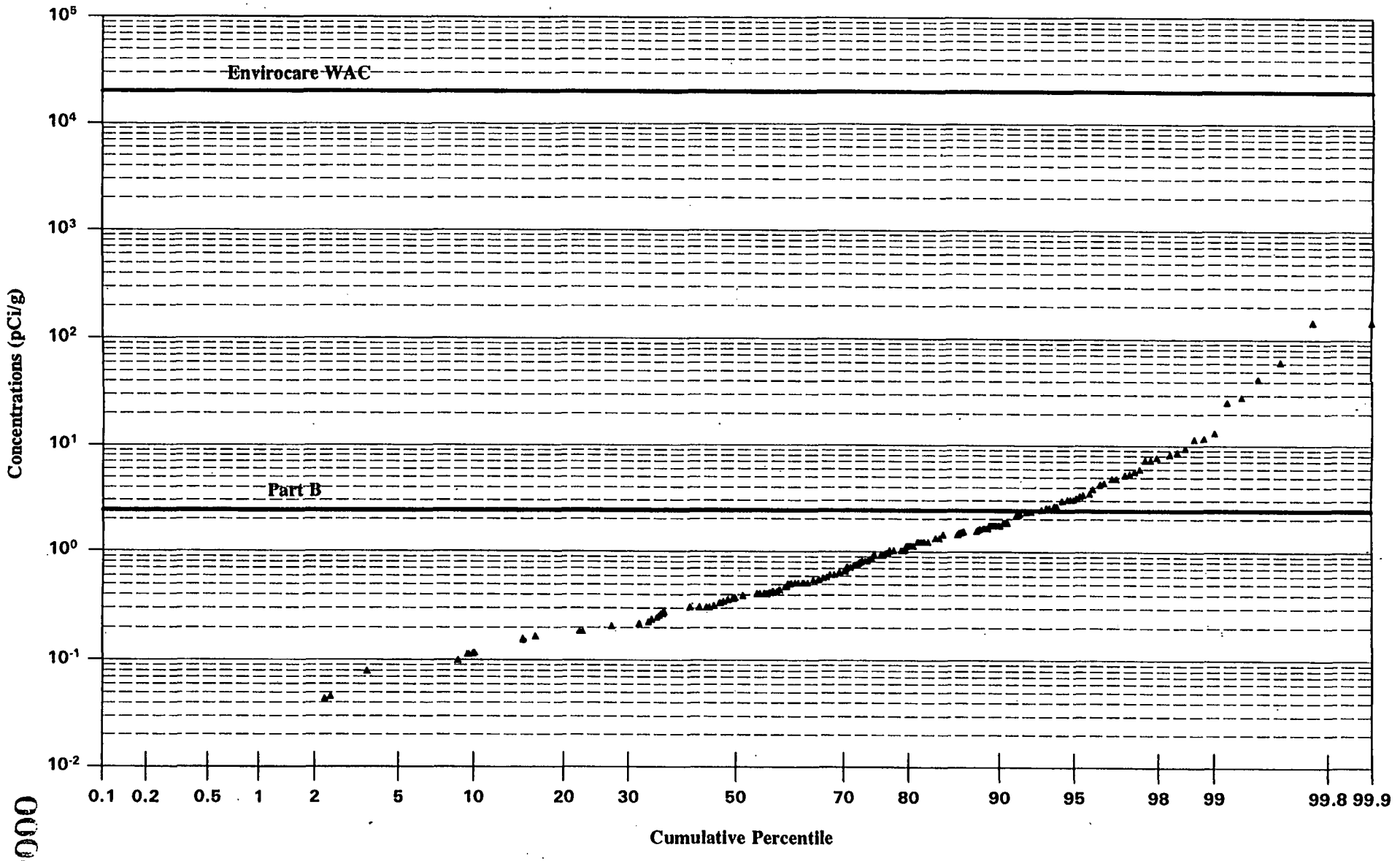

FIGURE A.II-21
CUMULATIVE PROBABILITY PLOT OF STRONTIUM-90 CONCENTRATIONS IN SOLID MEDIA

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000414

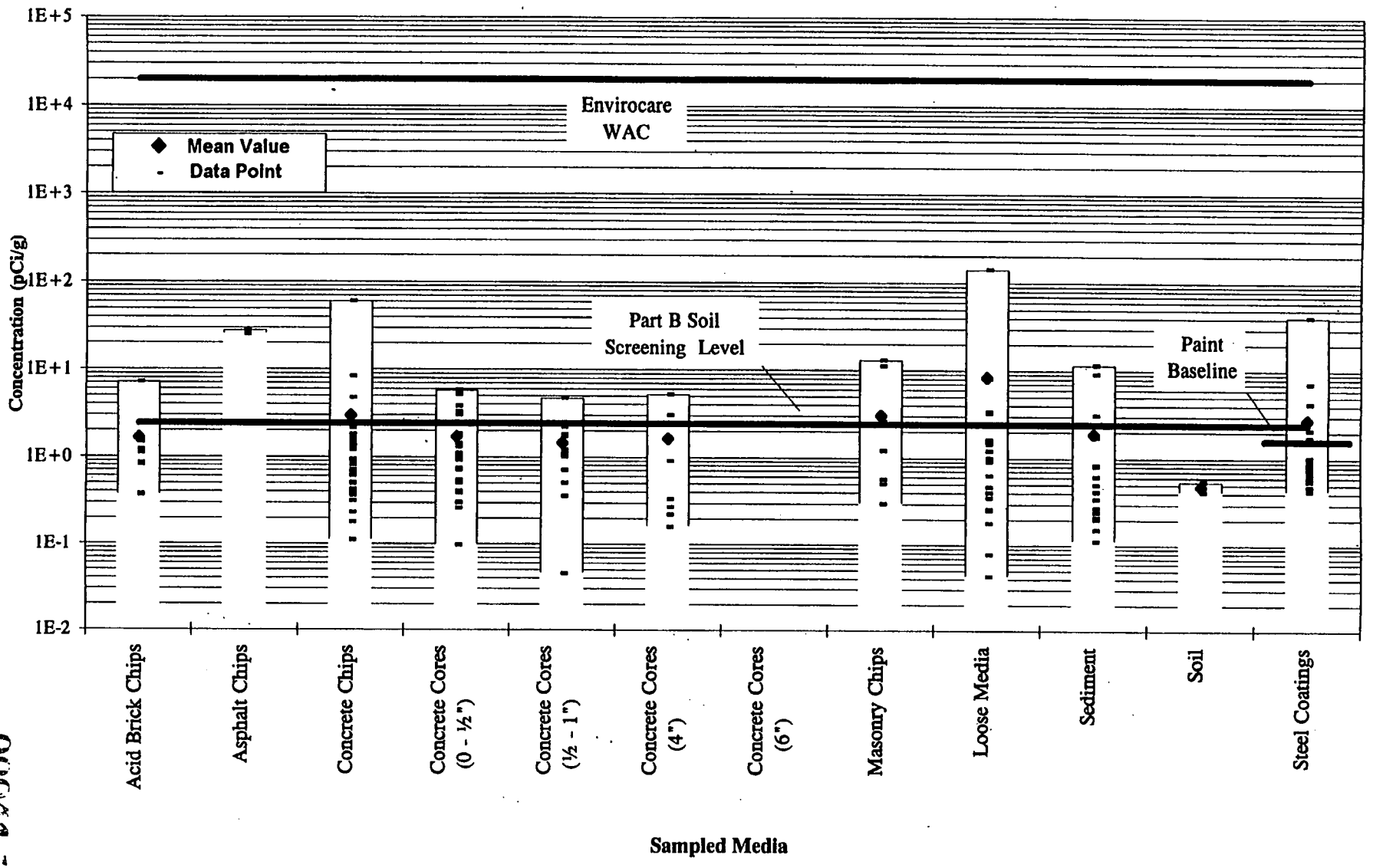

FIGURE A.II-22
SUMMARY OF STRONTIUM-90 RESULTS GROUPED BY SOLID MEDIA

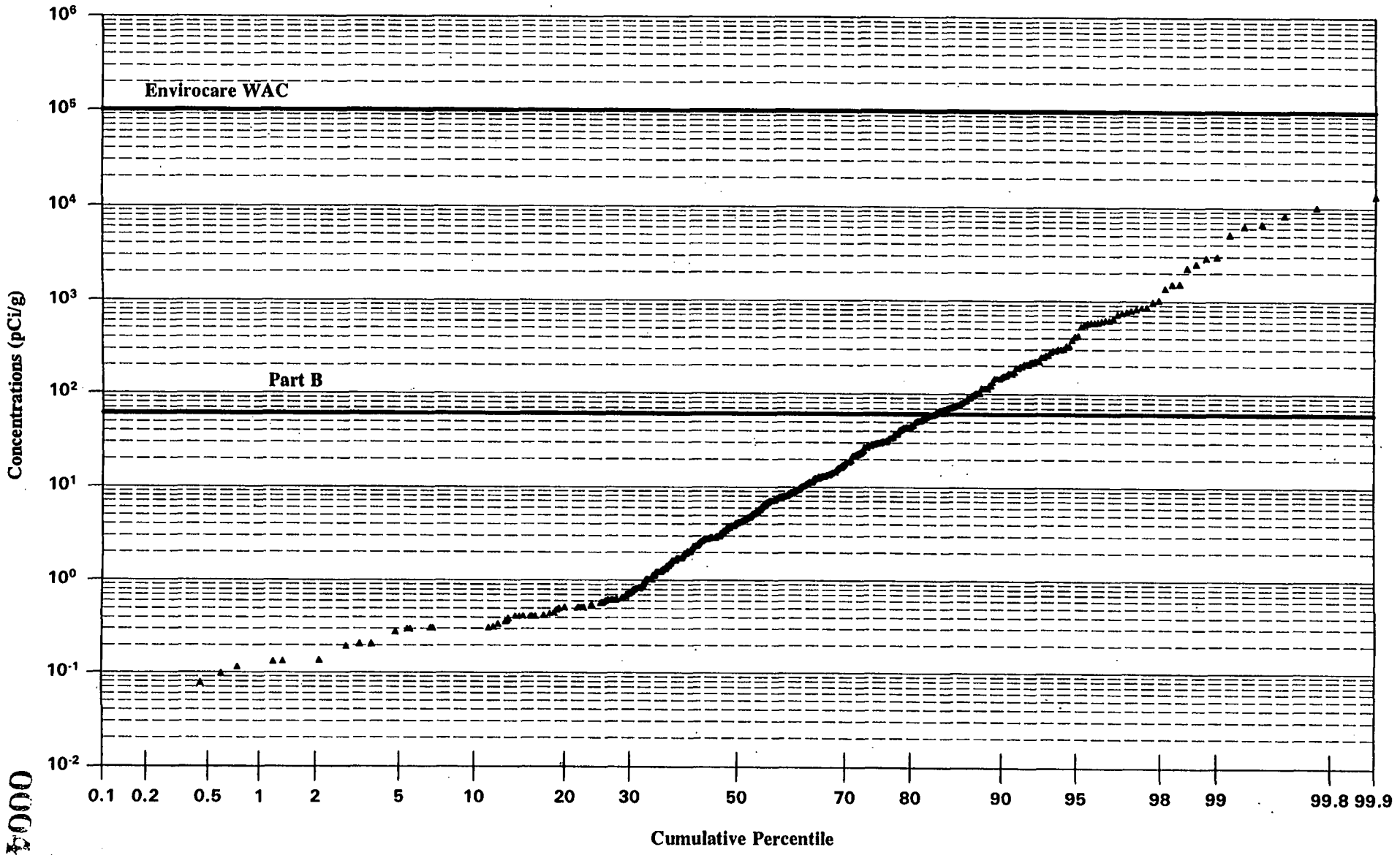

FIGURE A.II-23
CUMULATIVE PROBABILITY PLOT OF TECHNETIUM-99 CONCENTRATIONS IN SOLID MEDIA

000746

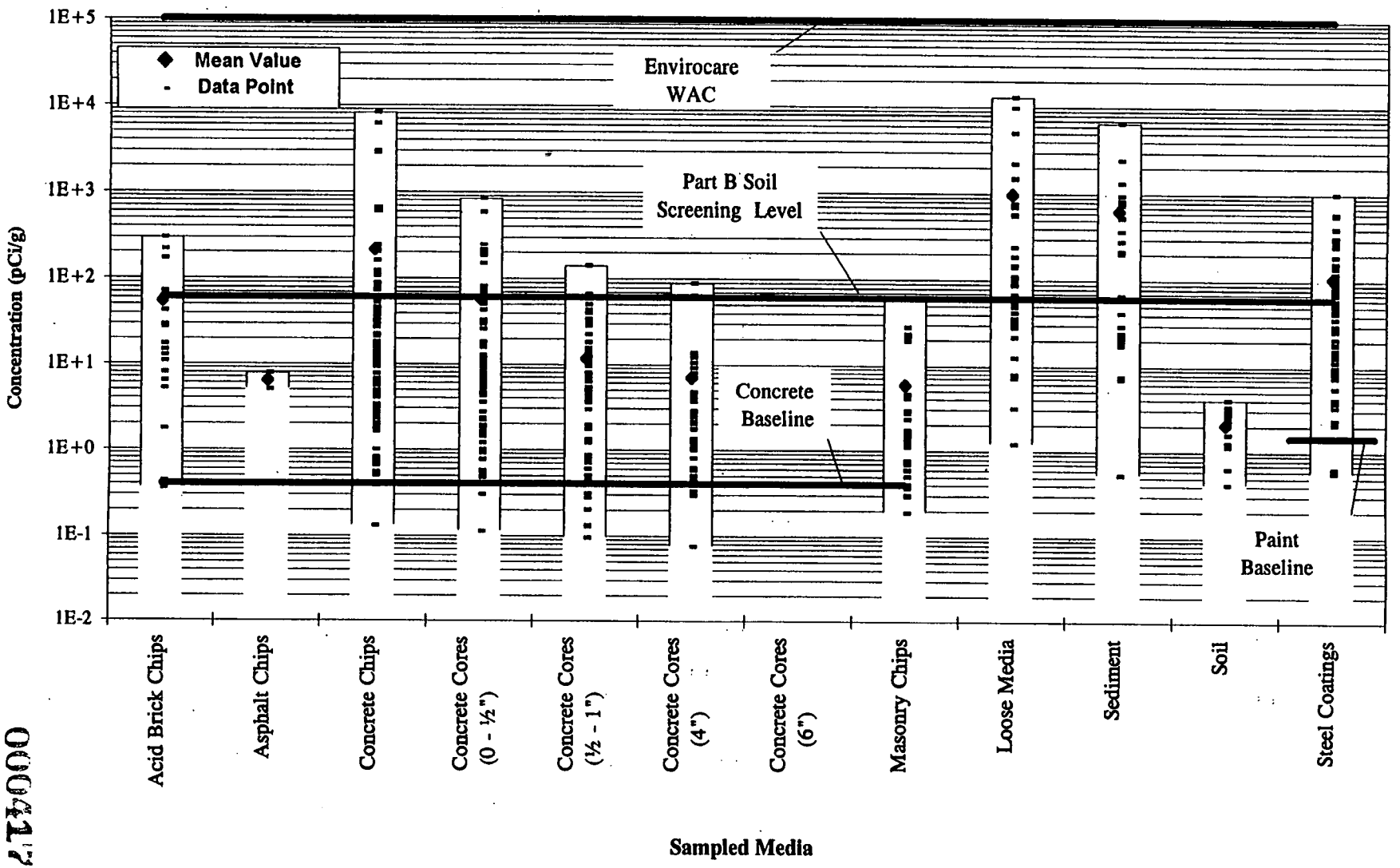

FIGURE A.II-24
SUMMARY OF TECHNETIUM-99 RESULTS GROUPED BY SOLID MEDIA

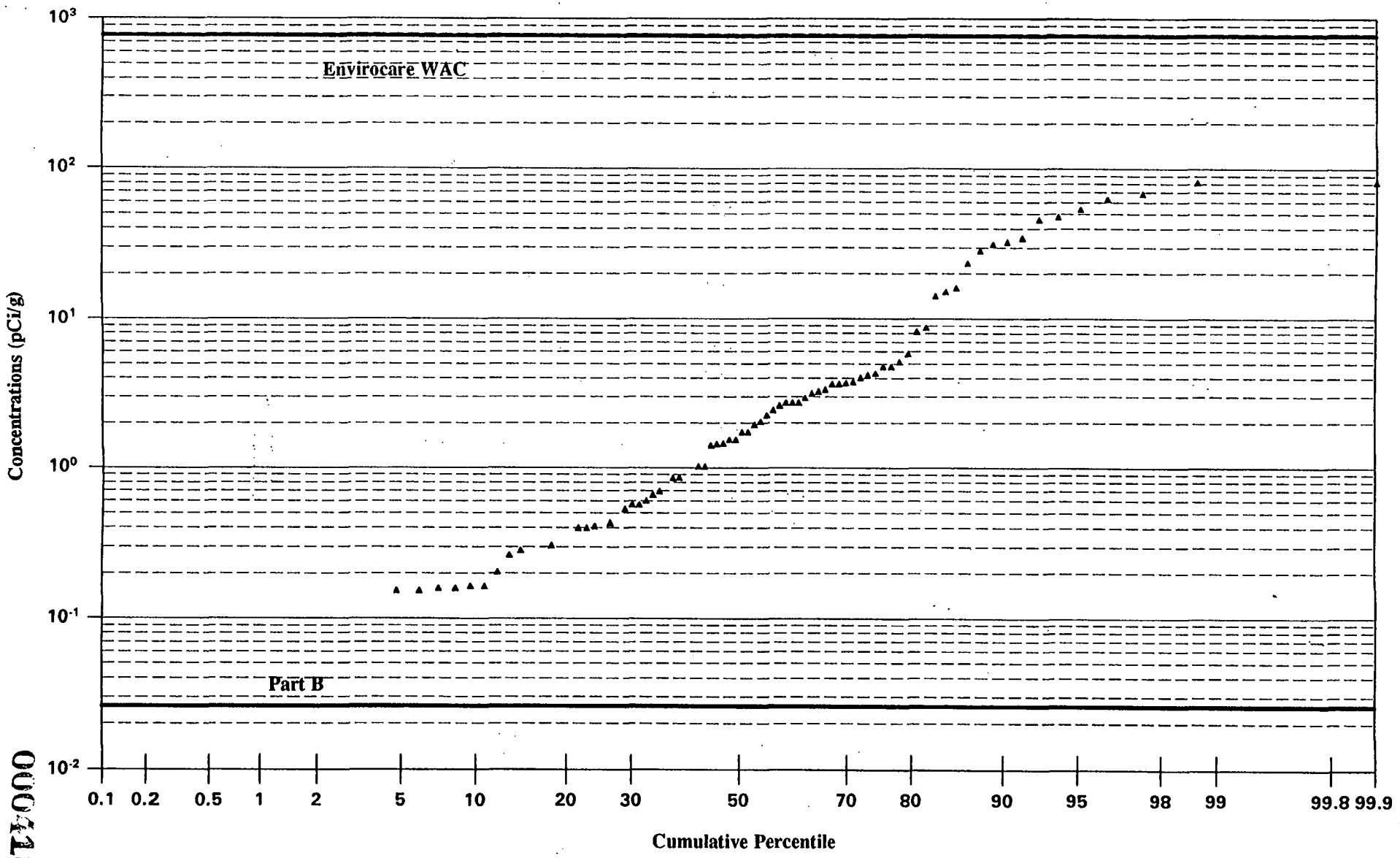

FIGURE A.II-25
CUMULATIVE PROBABILITY PLOT OF THORIUM-227 CONCENTRATIONS IN SOLID MEDIA

000478

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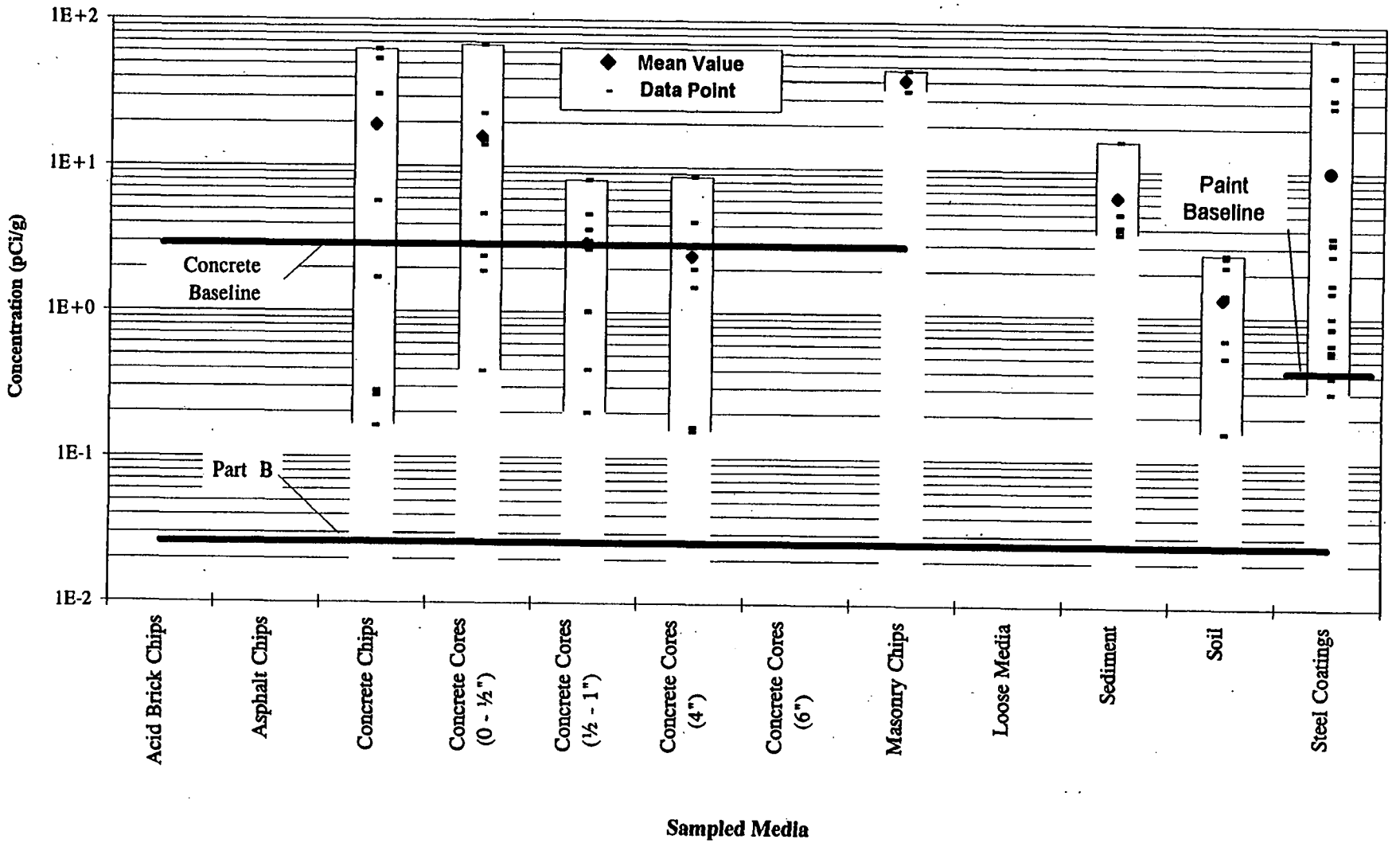

FIGURE A.II-26
SUMMARY OF THORIUM-227 RESULTS GROUPED BY SOLID MEDIA

000419

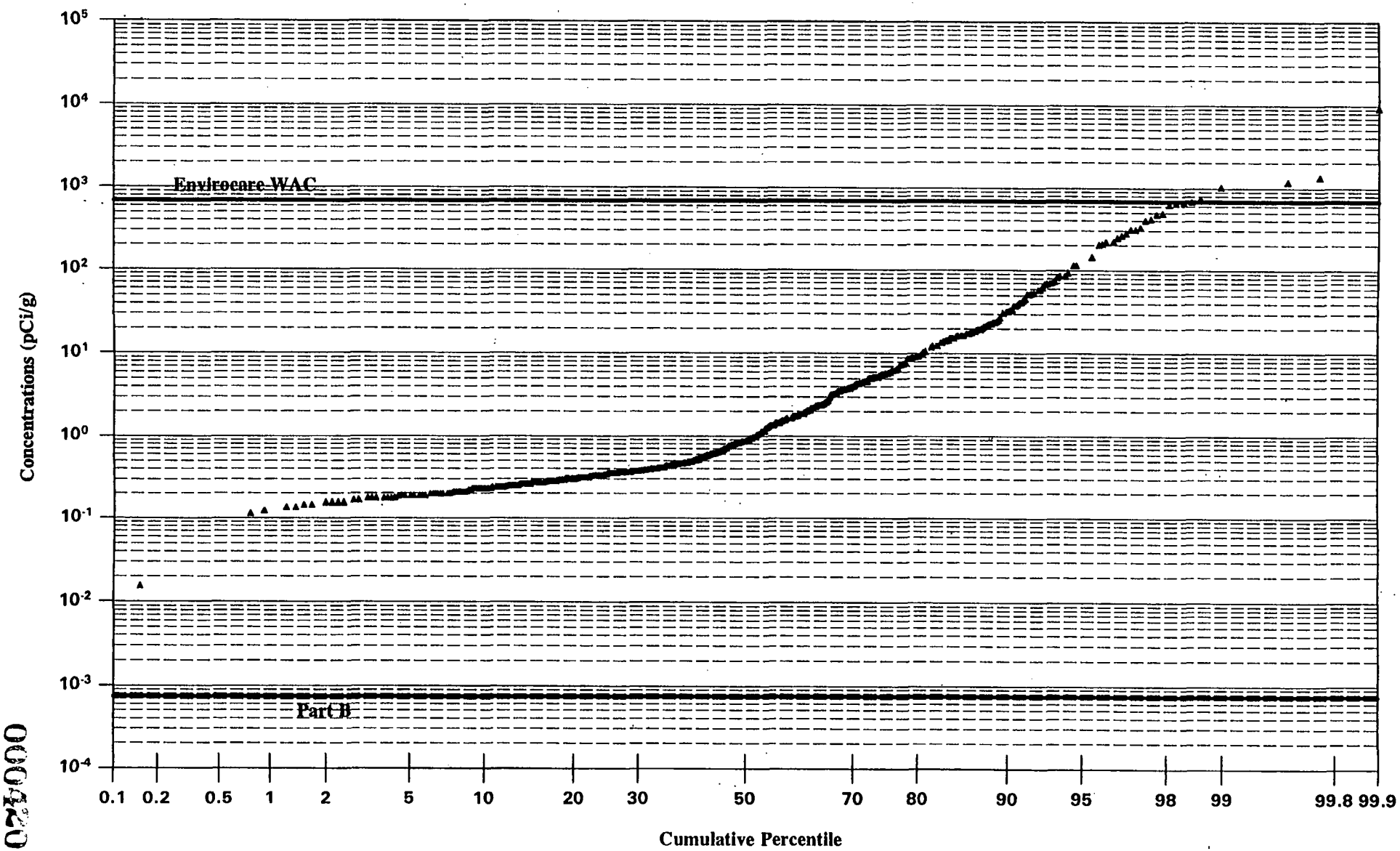

FIGURE A.II-27
CUMULATIVE PROBABILITY PLOT OF THORIUM-228 CONCENTRATIONS IN SOLID MEDIA

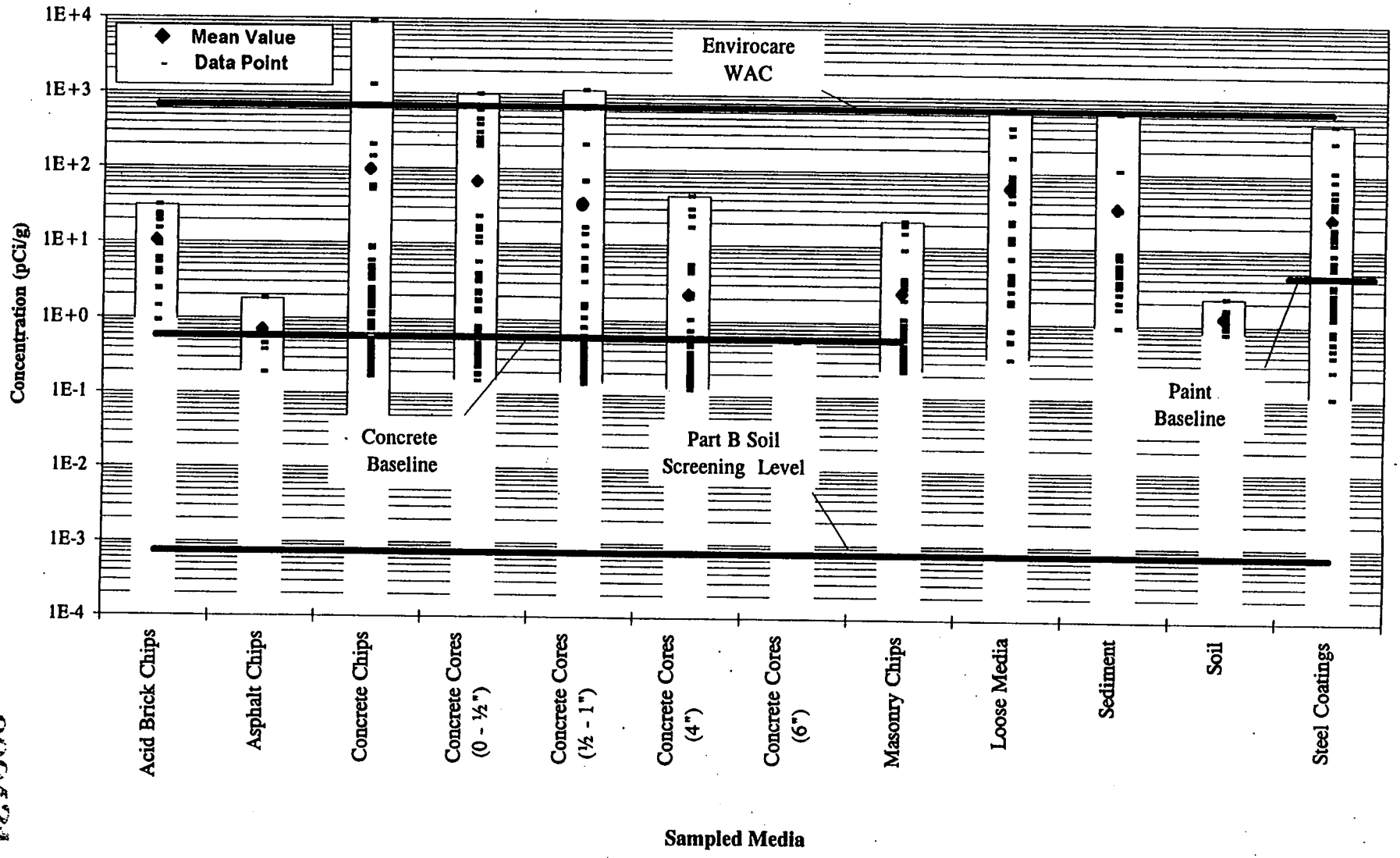

FIGURE A.II-28
SUMMARY OF THORIUM-228 RESULTS GROUPED BY SOLID MEDIA

000421

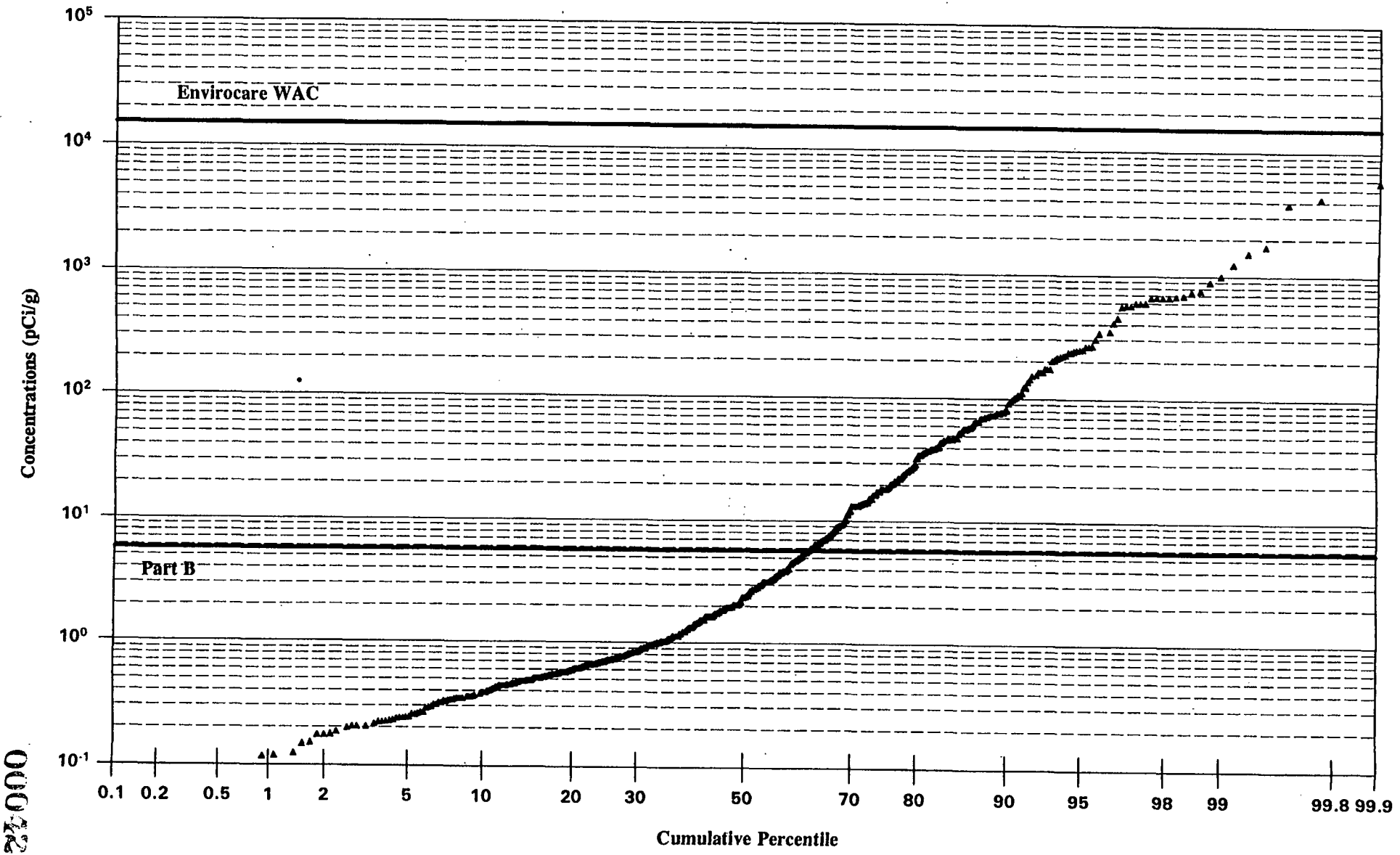

FIGURE A.II-29
CUMULATIVE PROBABILITY PLOT OF THORIUM-230 CONCENTRATIONS IN SOLID MEDIA

000422

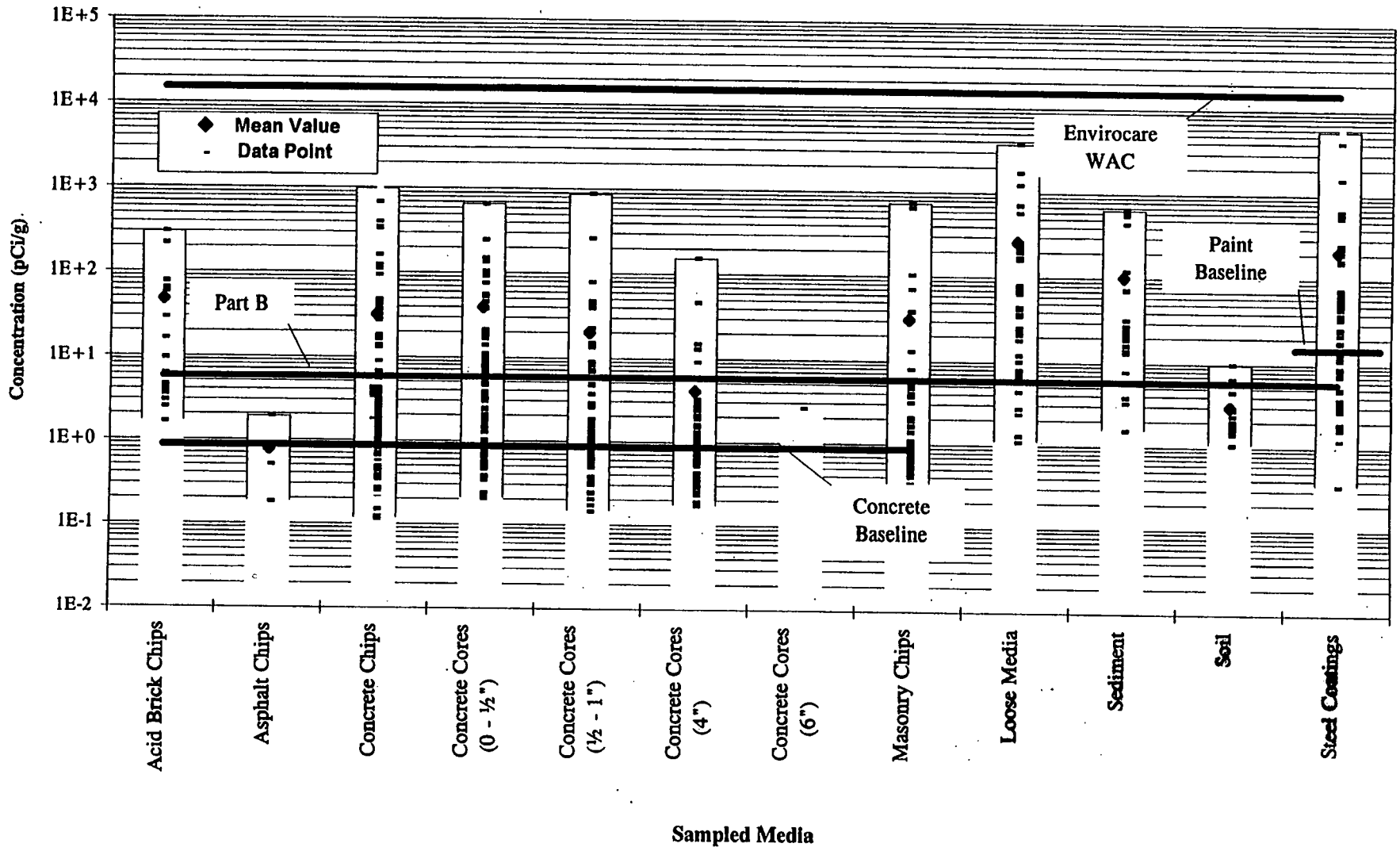

FIGURE A.II-30
SUMMARY OF THORIUM-230 RESULTS GROUPED BY SOLID MEDIA

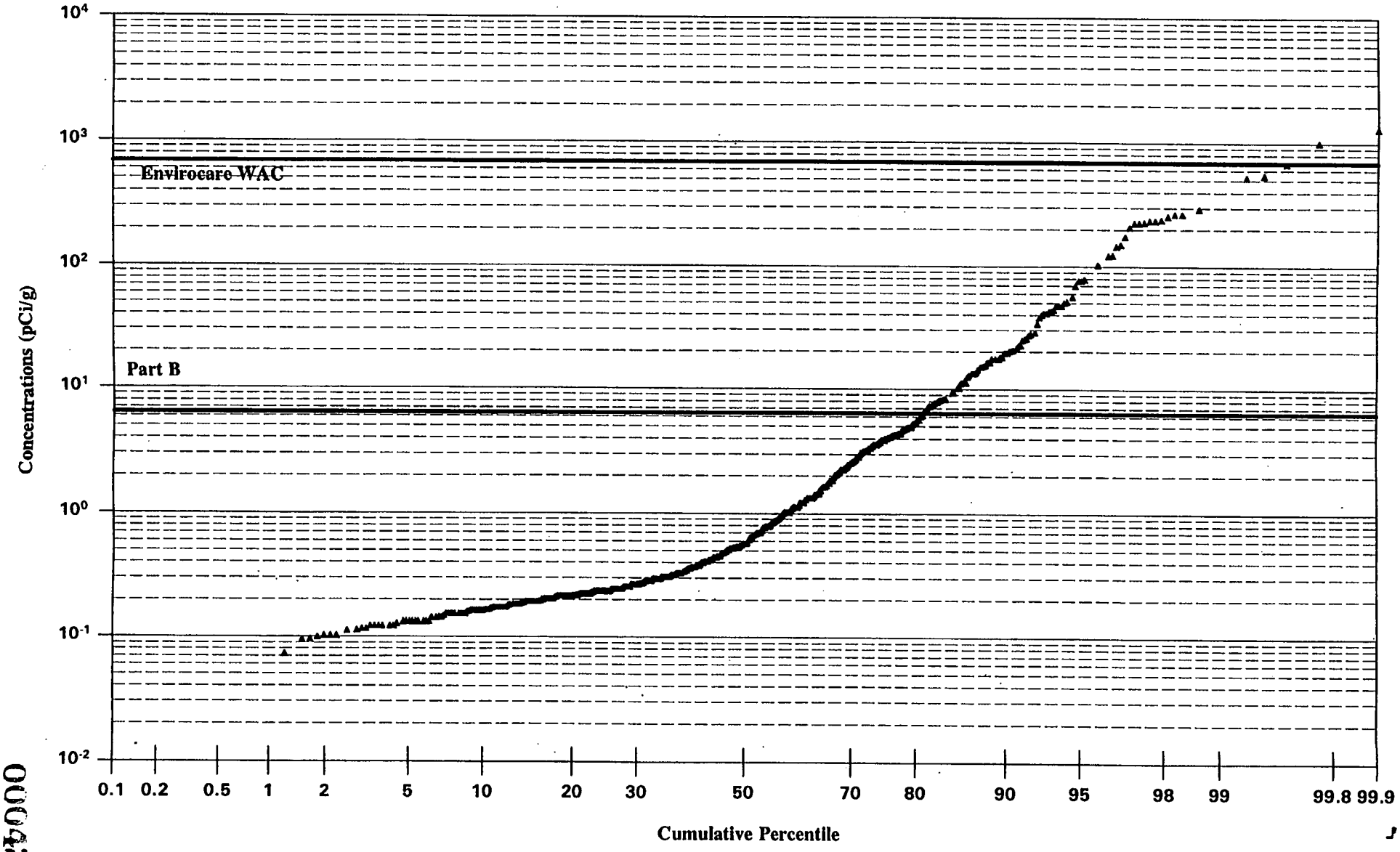

FIGURE A.II-31
CUMULATIVE PROBABILITY PLOT OF THORIUM-232 CONCENTRATIONS IN SOLID MEDIA

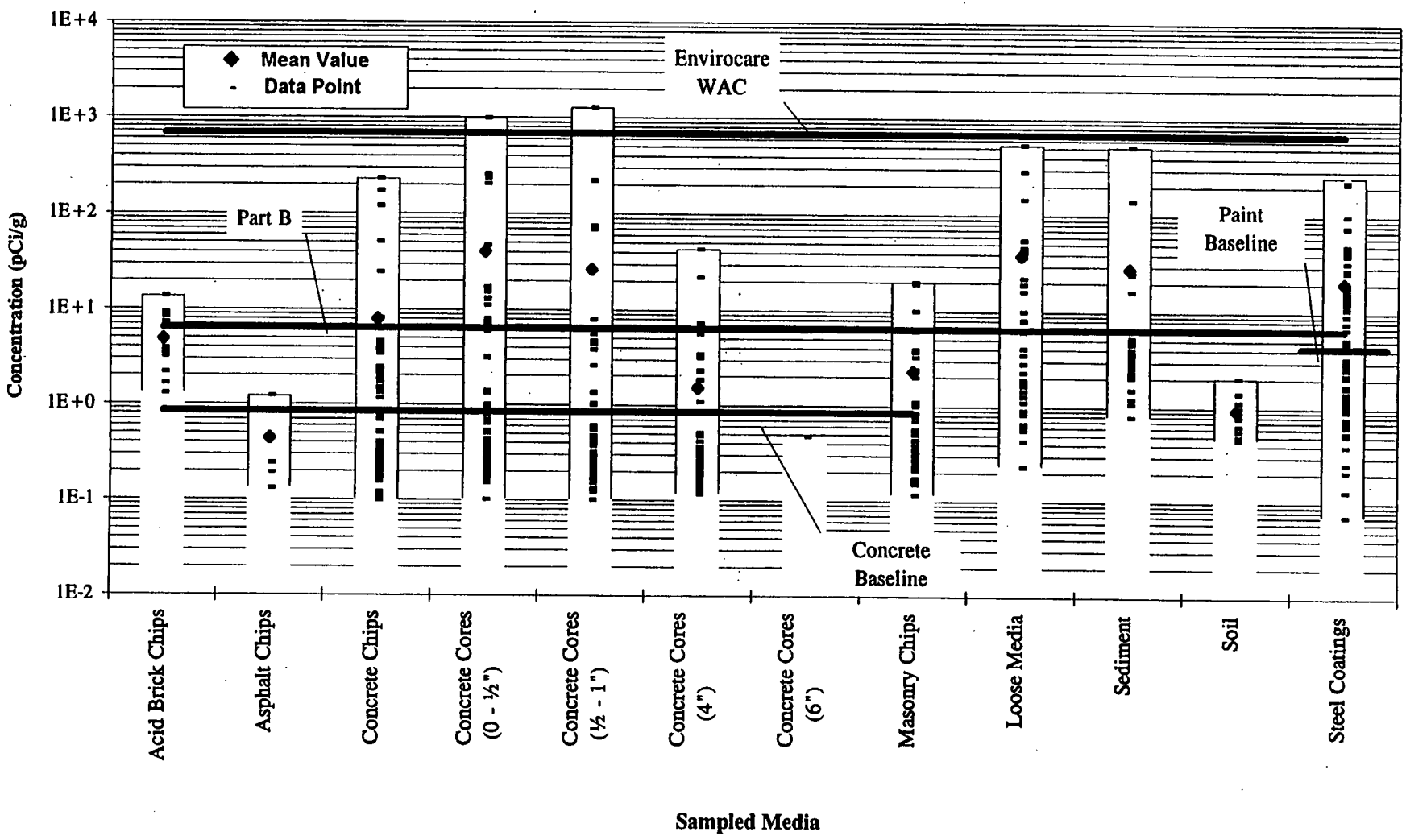

FIGURE A.II-32
SUMMARY OF THORIUM-232 RESULTS GROUPED BY SOLID MEDIA

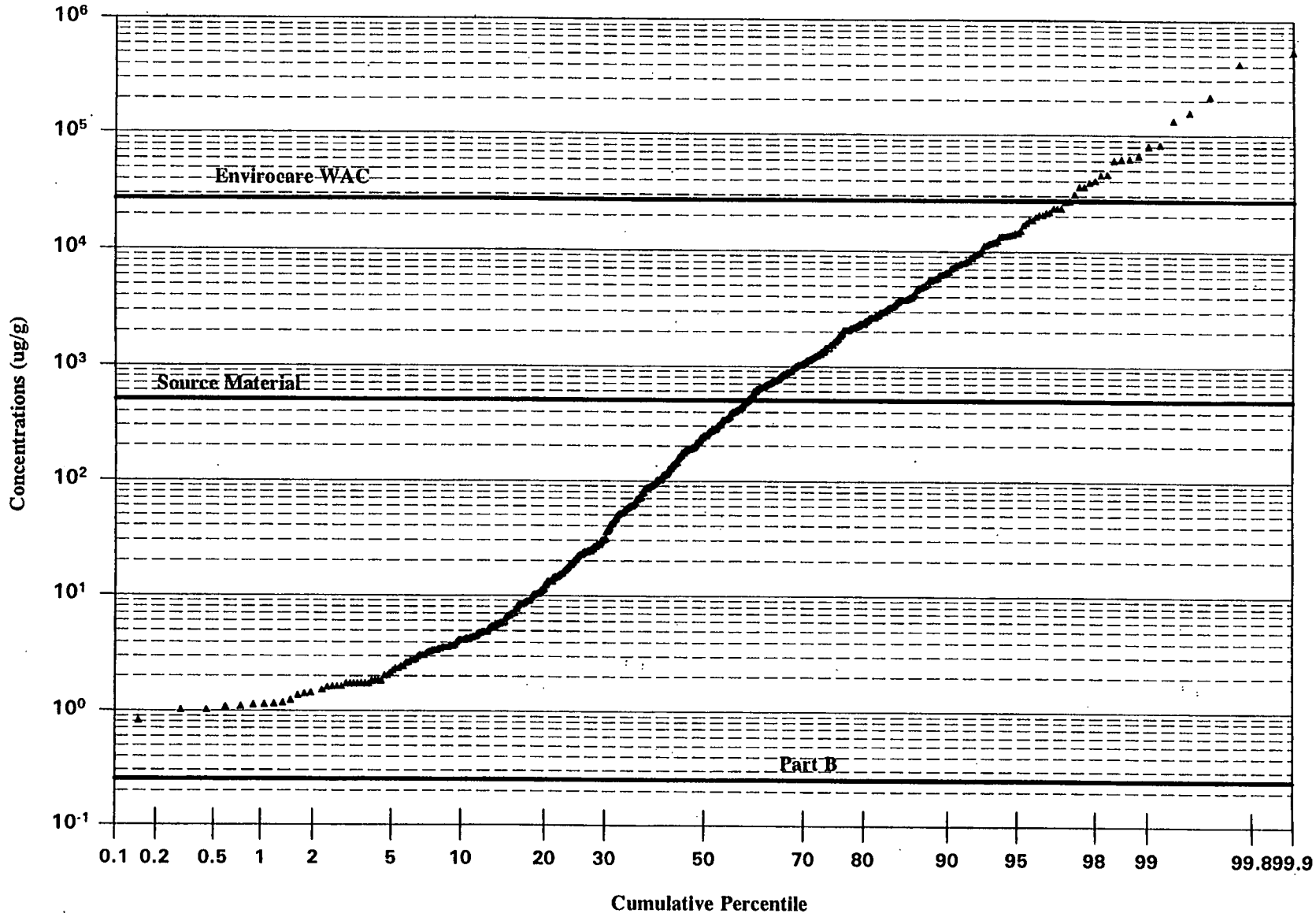

FIGURE A.II-33
CUMULATIVE PROBABILITY PLOT OF ELEMENTAL URANIUM CONCENTRATIONS IN SOLID MEDIA

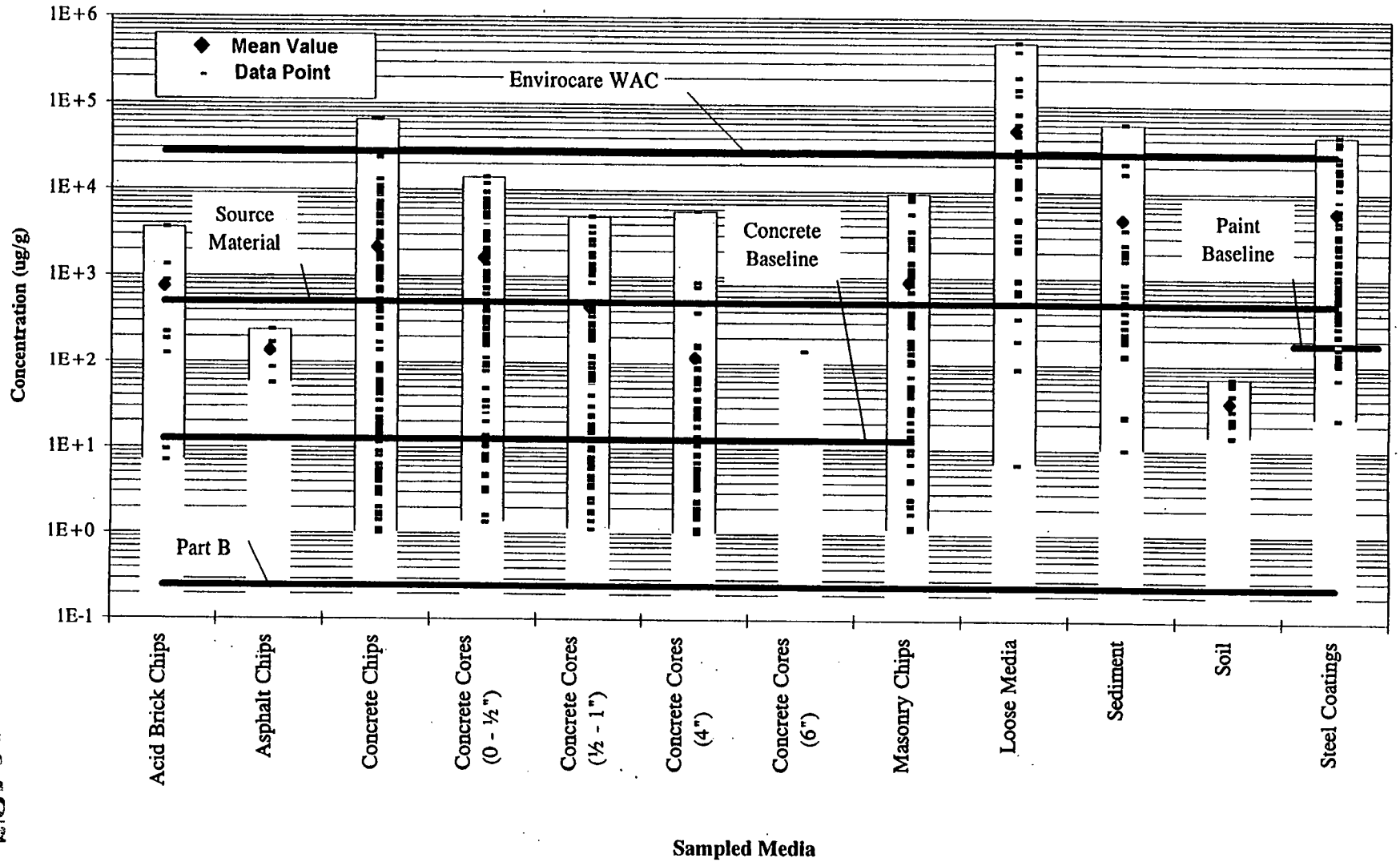

FIGURE A.II-34
SUMMARY OF ELEMENTAL URANIUM RESULTS GROUPED BY SOLID MEDIA

000427

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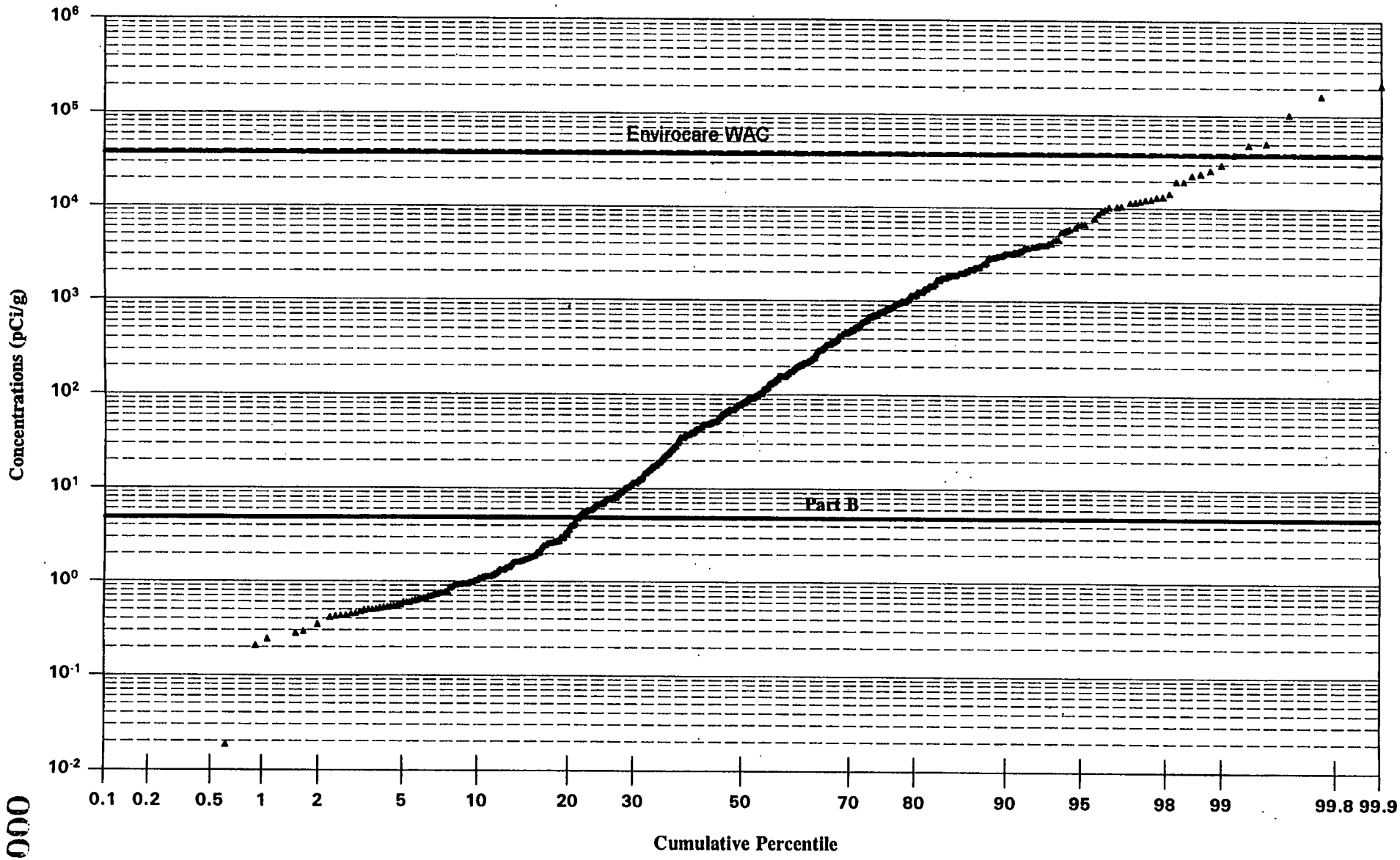

FIGURE A.II-35
CUMULATIVE PROBABILITY PLOT OF URANIUM-234 CONCENTRATIONS IN SOLID MEDIA

000428

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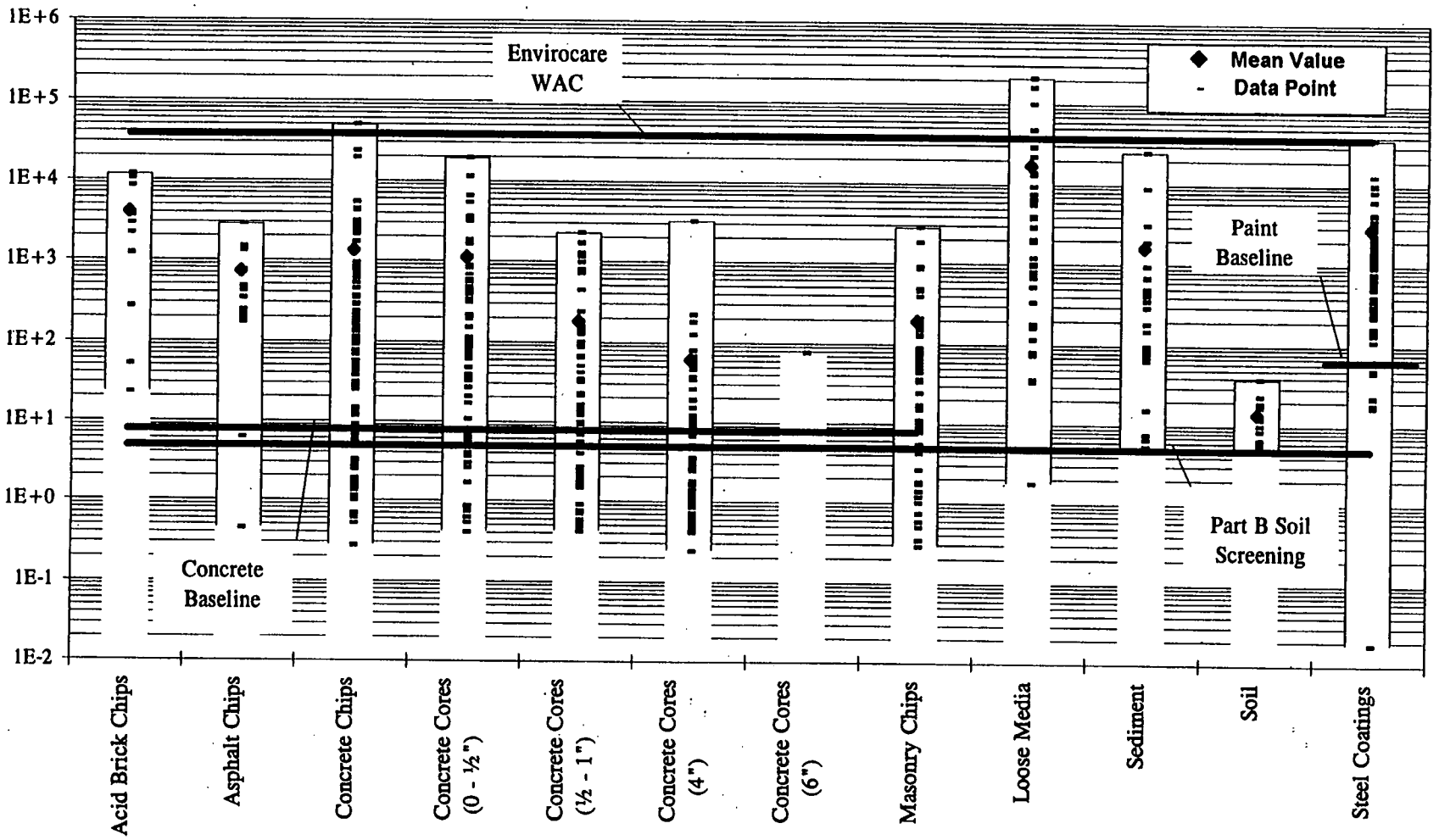

FIGURE A.II -36
SUMMARY OF URANIUM-234 RESULTS GROUPED BY SOLID MEDIA

000429

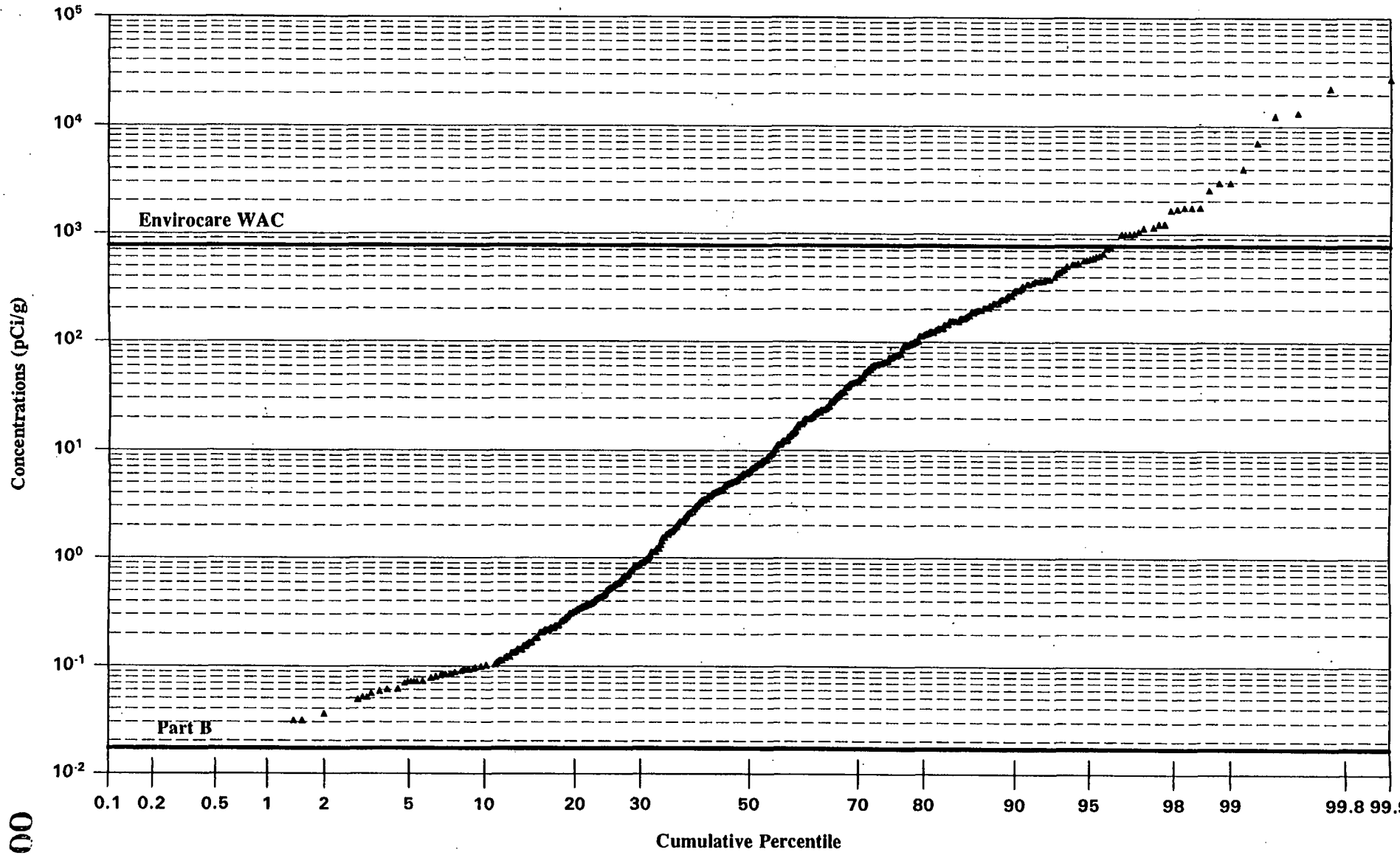

FIGURE A.II-37
CUMULATIVE PROBABILITY PLOT OF URANIUM-235/236 CONCENTRATIONS IN SOLID MEDIA

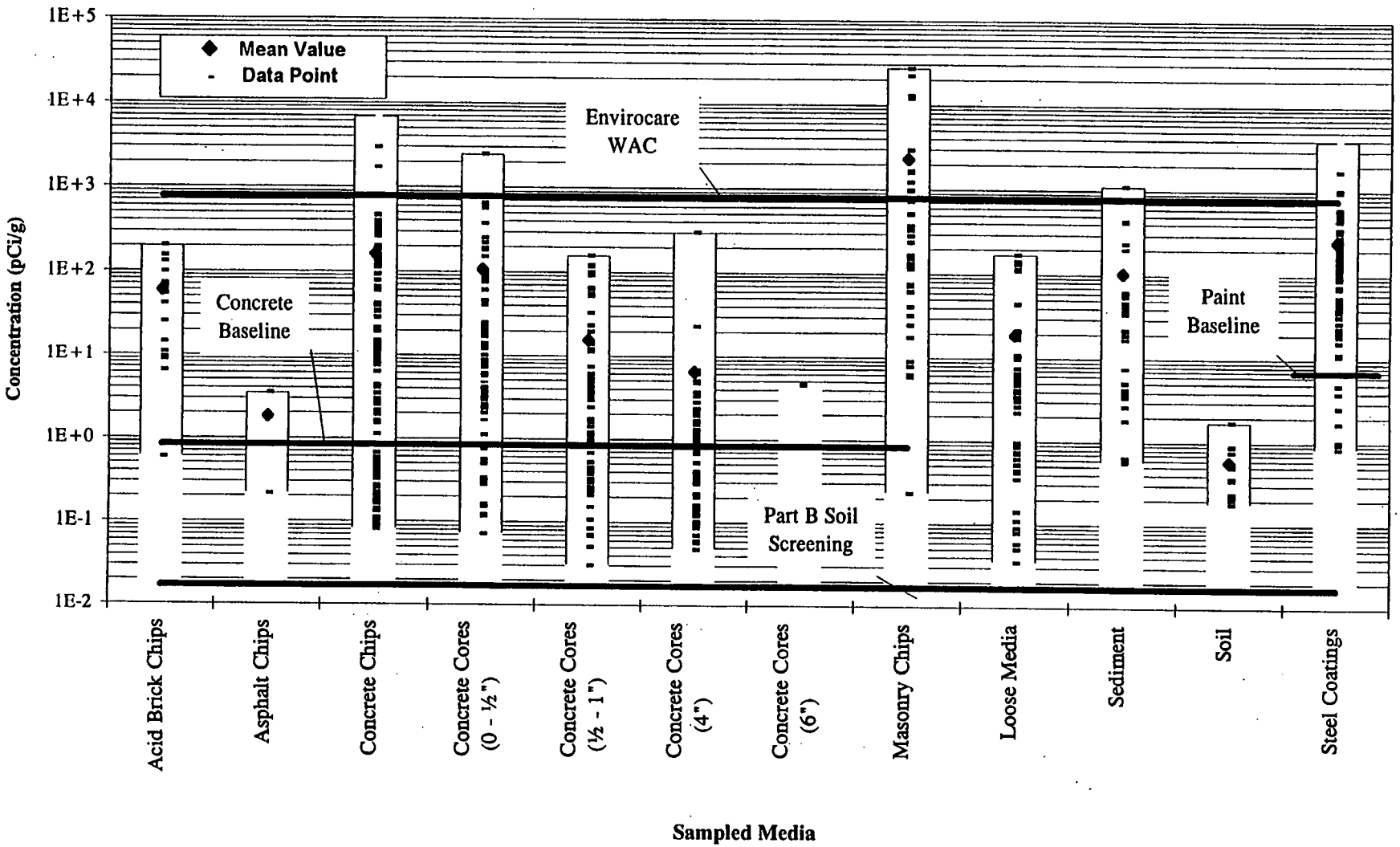

FIGURE A.II-38
SUMMARY OF URANIUM-235/236 RESULTS GROUPED BY SOLID MEDIA

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000431

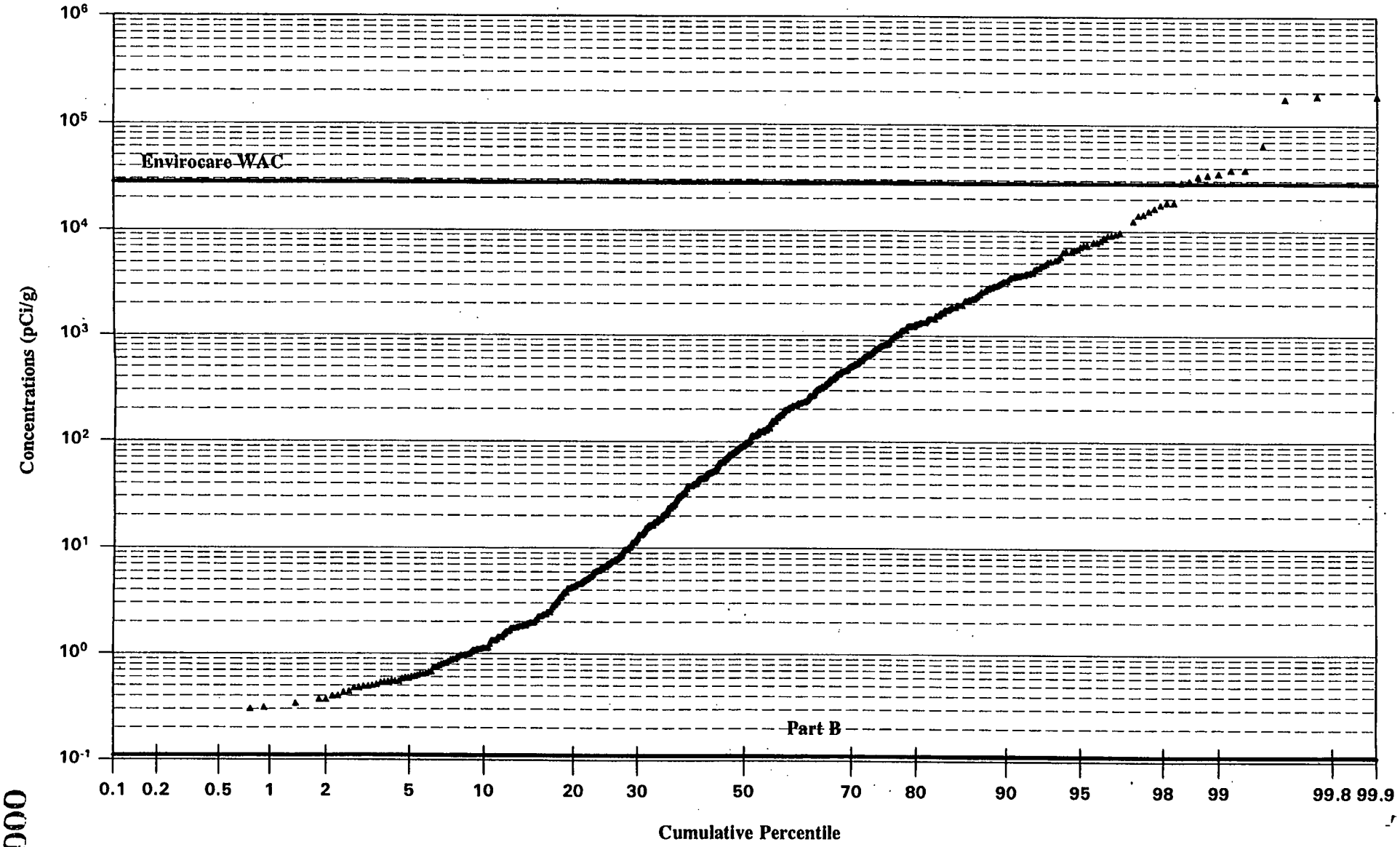

FIGURE A.II-39
CUMULATIVE PROBABILITY PLOT OF URANIUM-238 CONCENTRATIONS IN SOLID MEDIA

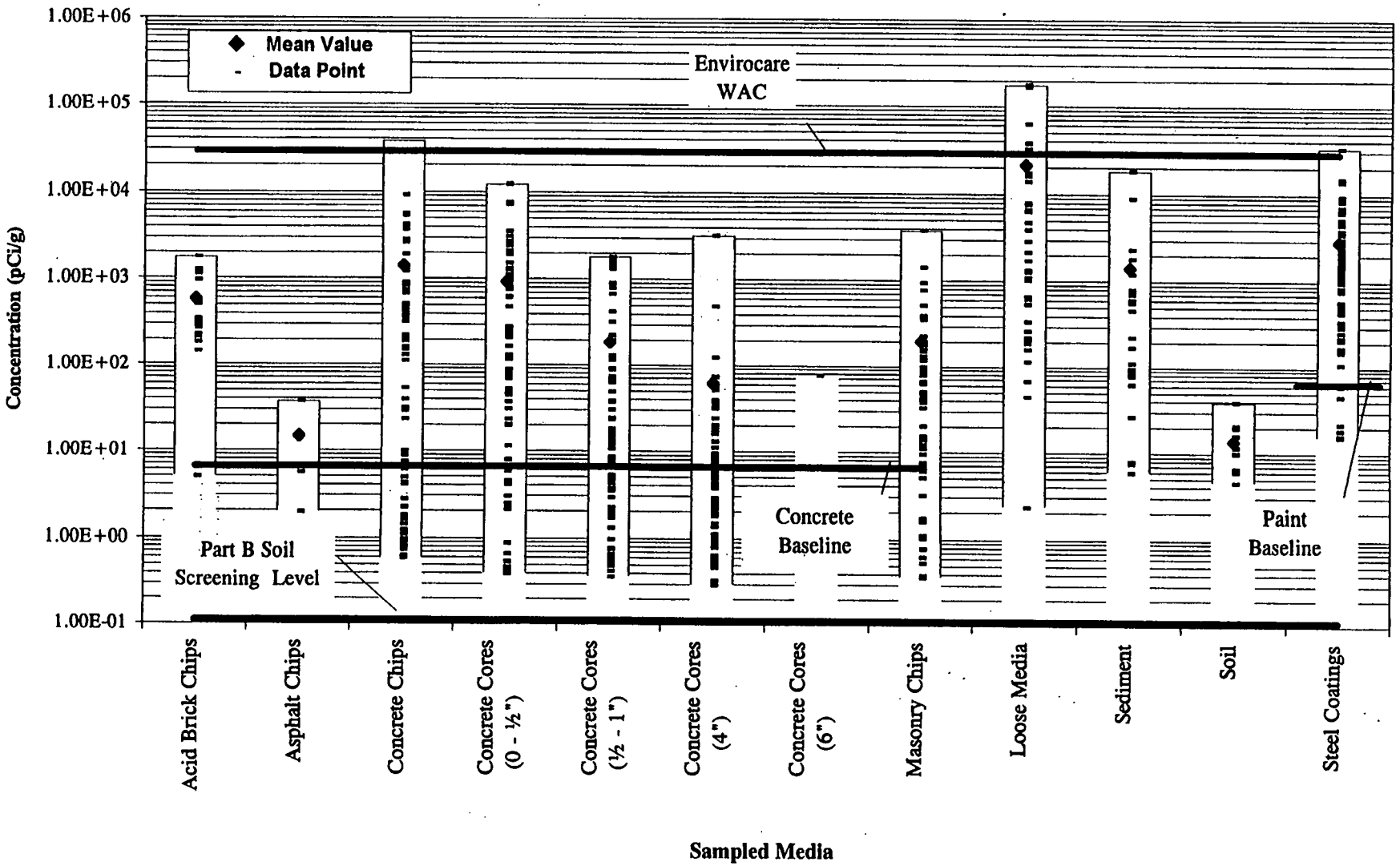

FIGURE A.II-40
SUMMARY OF URANIUM-238 RESULTS FROM SOLID MEDIA

000433

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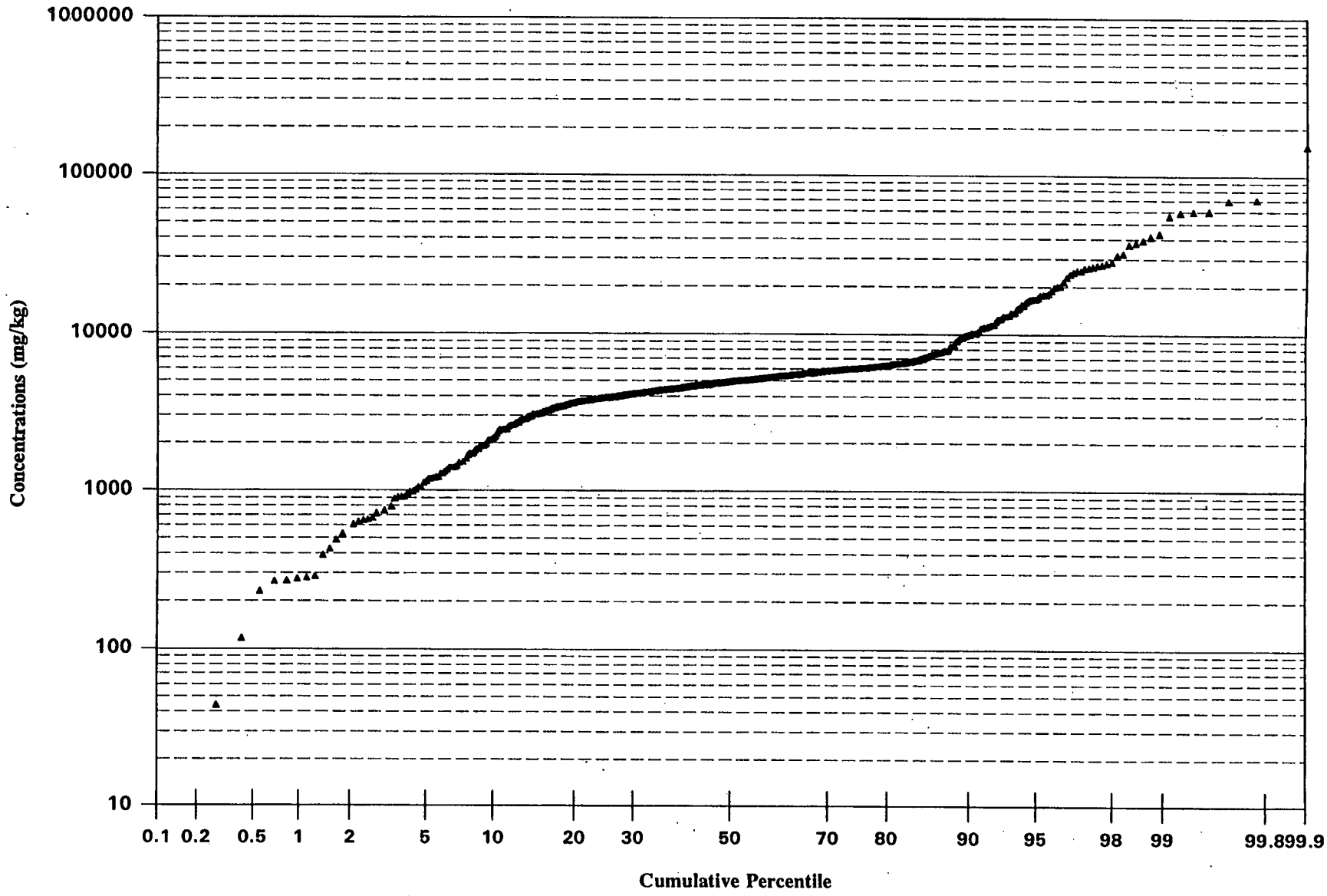

FIGURE A.II-41
CUMULATIVE PROBABILITY PLOT OF ALUMINUM CONCENTATIONS IN SOLID MEDIA

000434

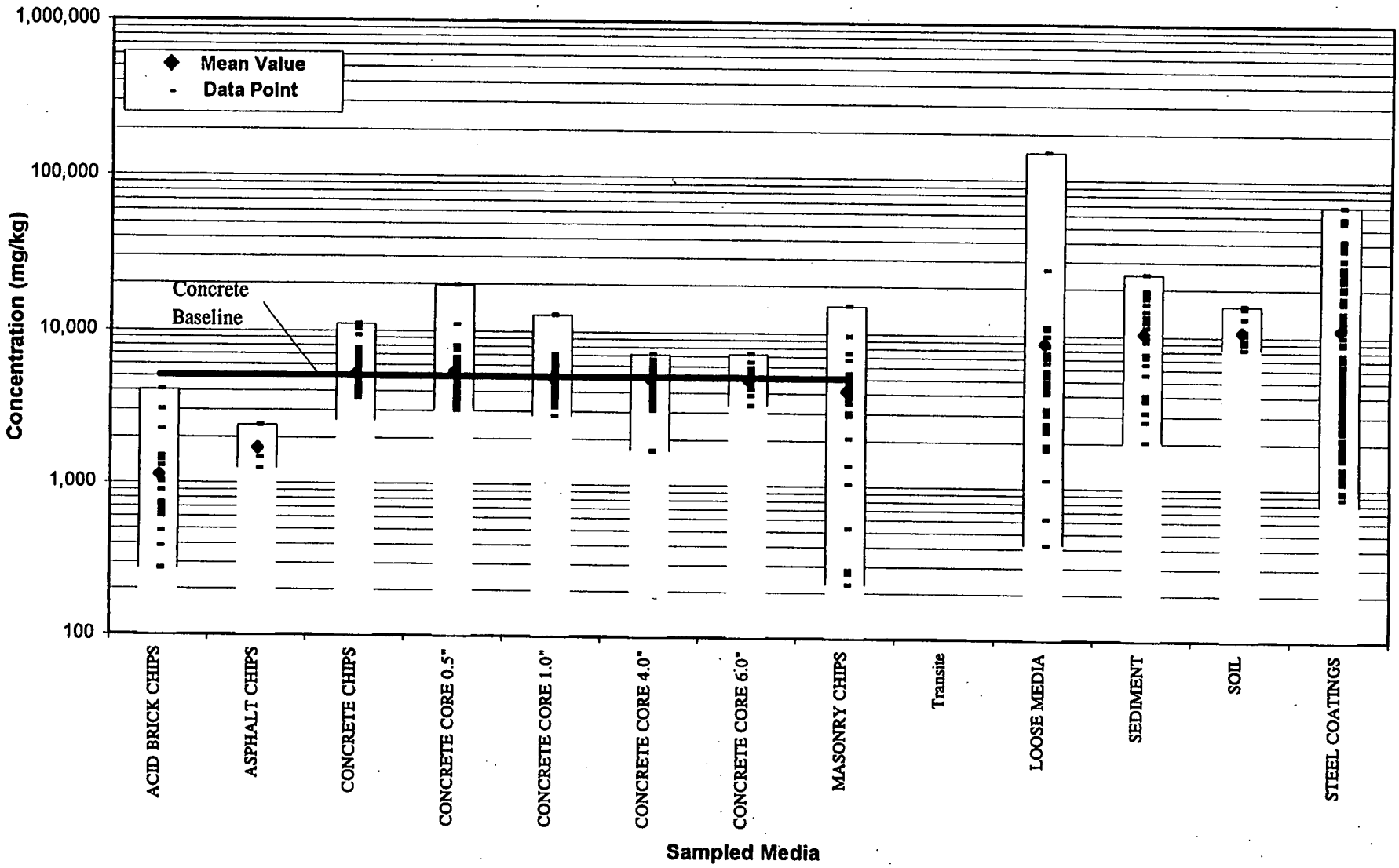

FIGURE A.II-42
SUMMARY OF ALUMIUM RESULTS GROUPED BY SOLID MEDIA

000435

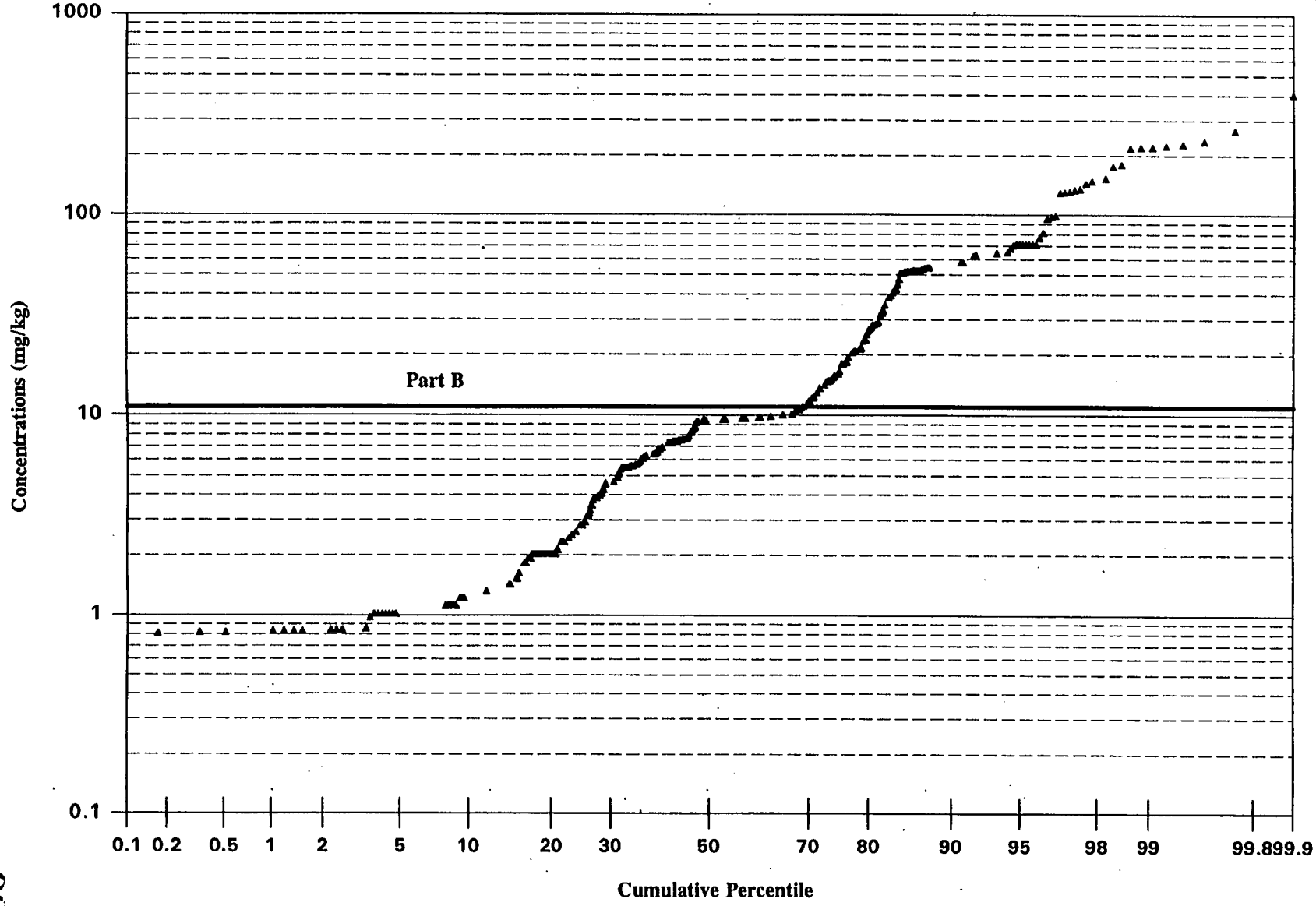

FIGURE A.II-43
CUMULATIVE PROBABILITY PLOT OF ANTIMONY CONCENTRATIONS IN SOLID MEDIA

000436

DRAFT

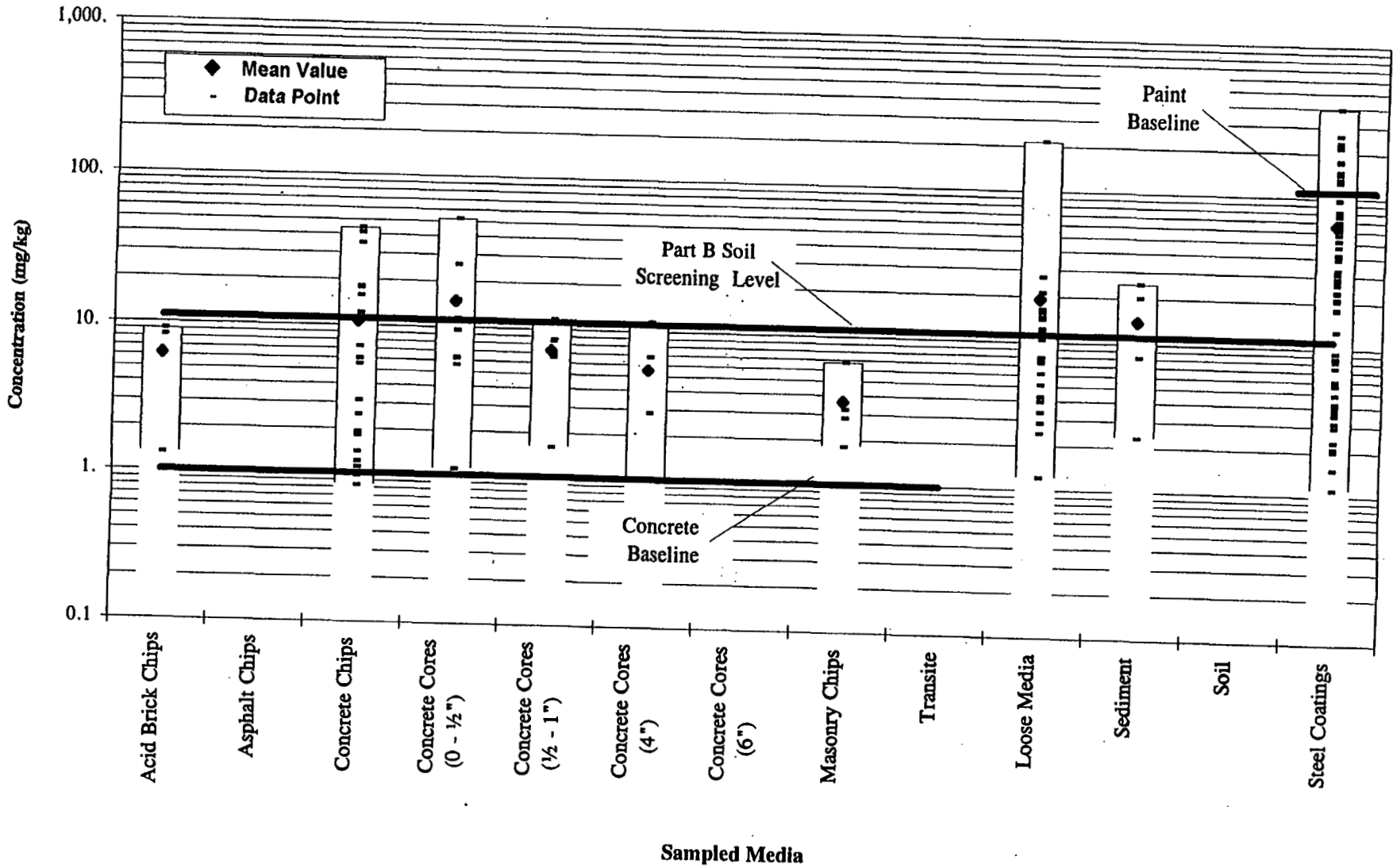

FIGURE A.II-44
SUMMARY OF ANTIMONY RESULTS GROUPED BY SOLID MEDIA

000437

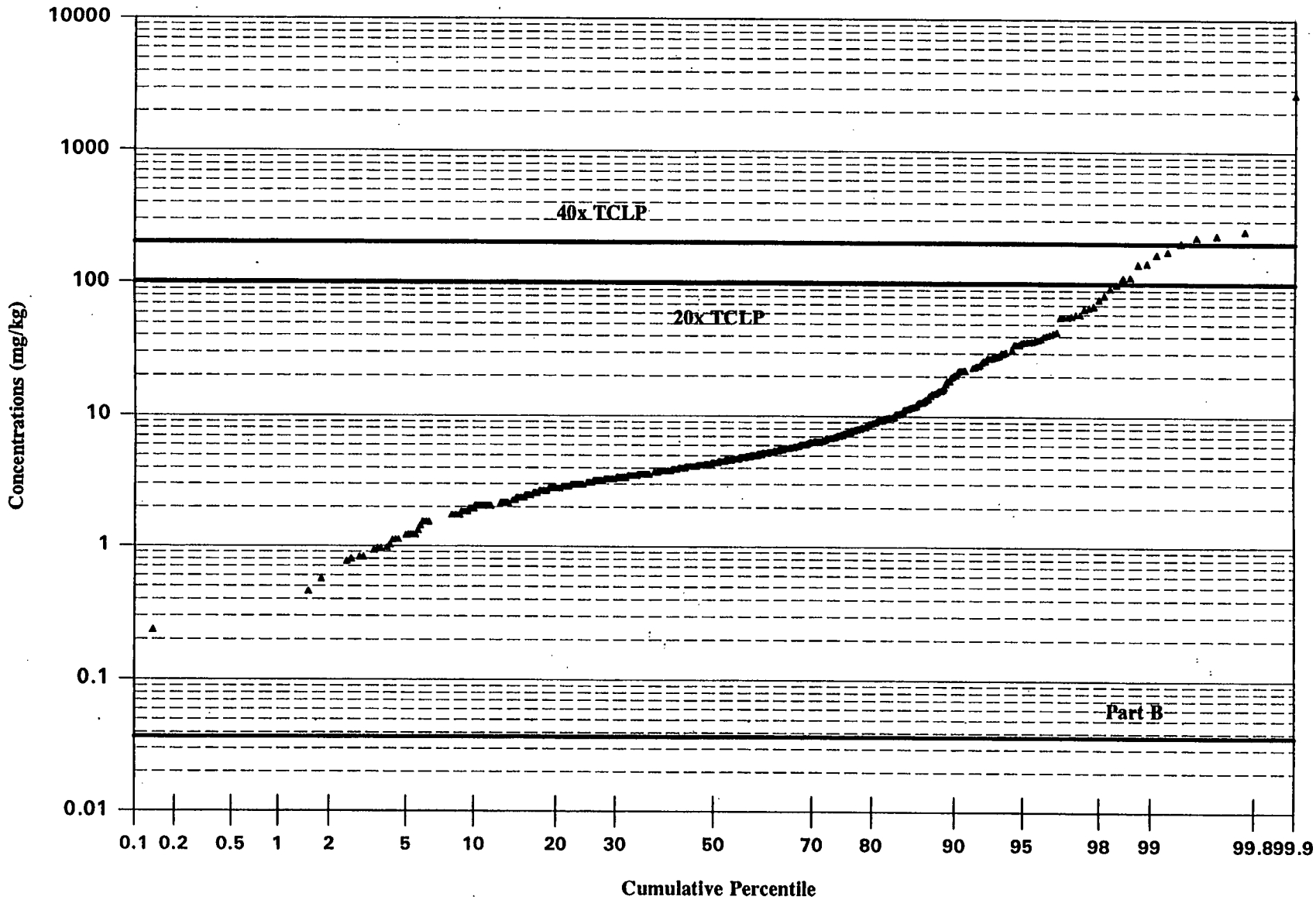

FIGURE A.II-45
CUMULATIVE PROBABILITY PLOT OF ARSENIC CONCENTRATIONS IN SOLID MEDIA

0004338

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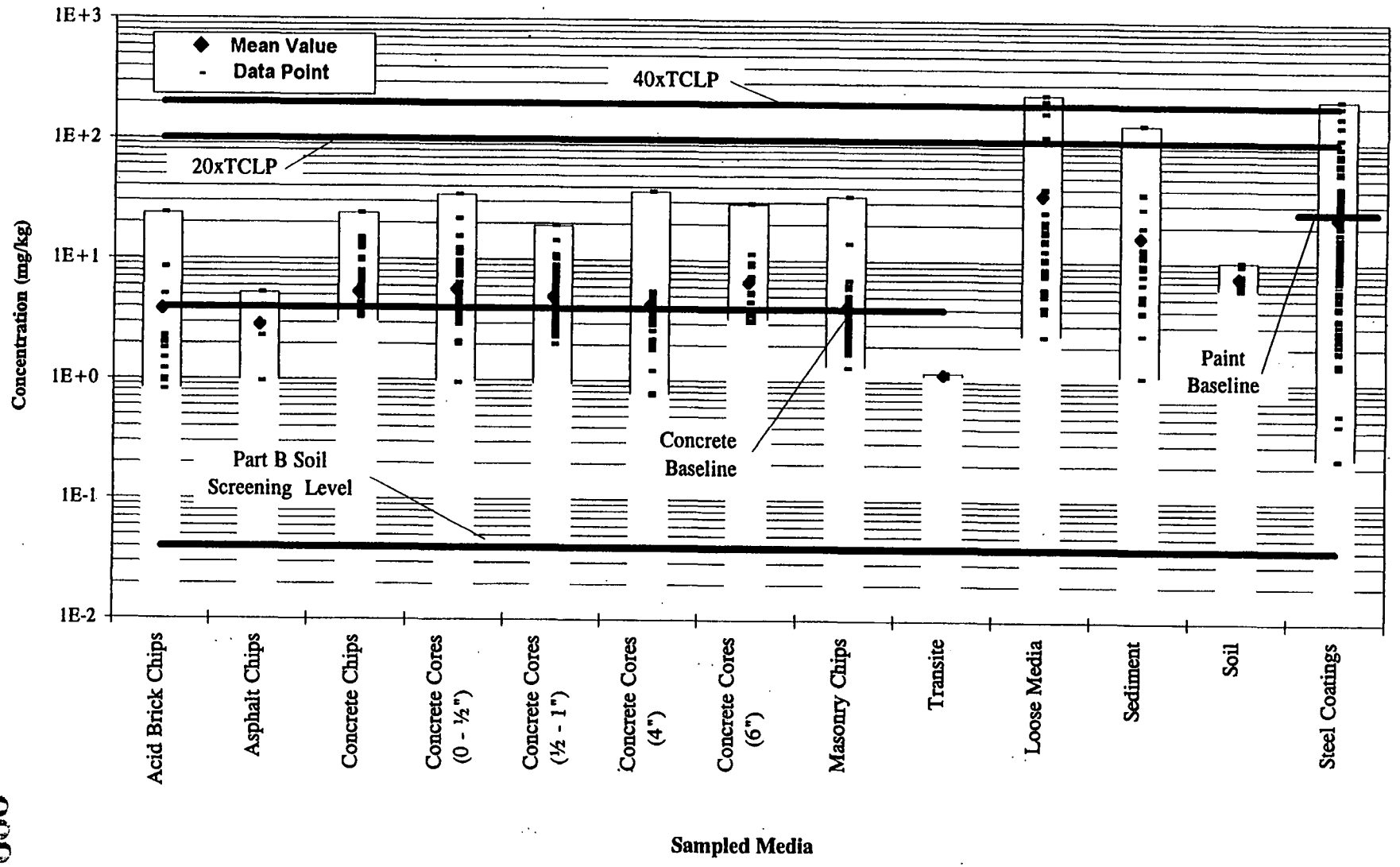

FIGURE A.II-46
SUMMARY OF ARSENIC RESULTS GROUPED BY SOLID MEDIA

004439

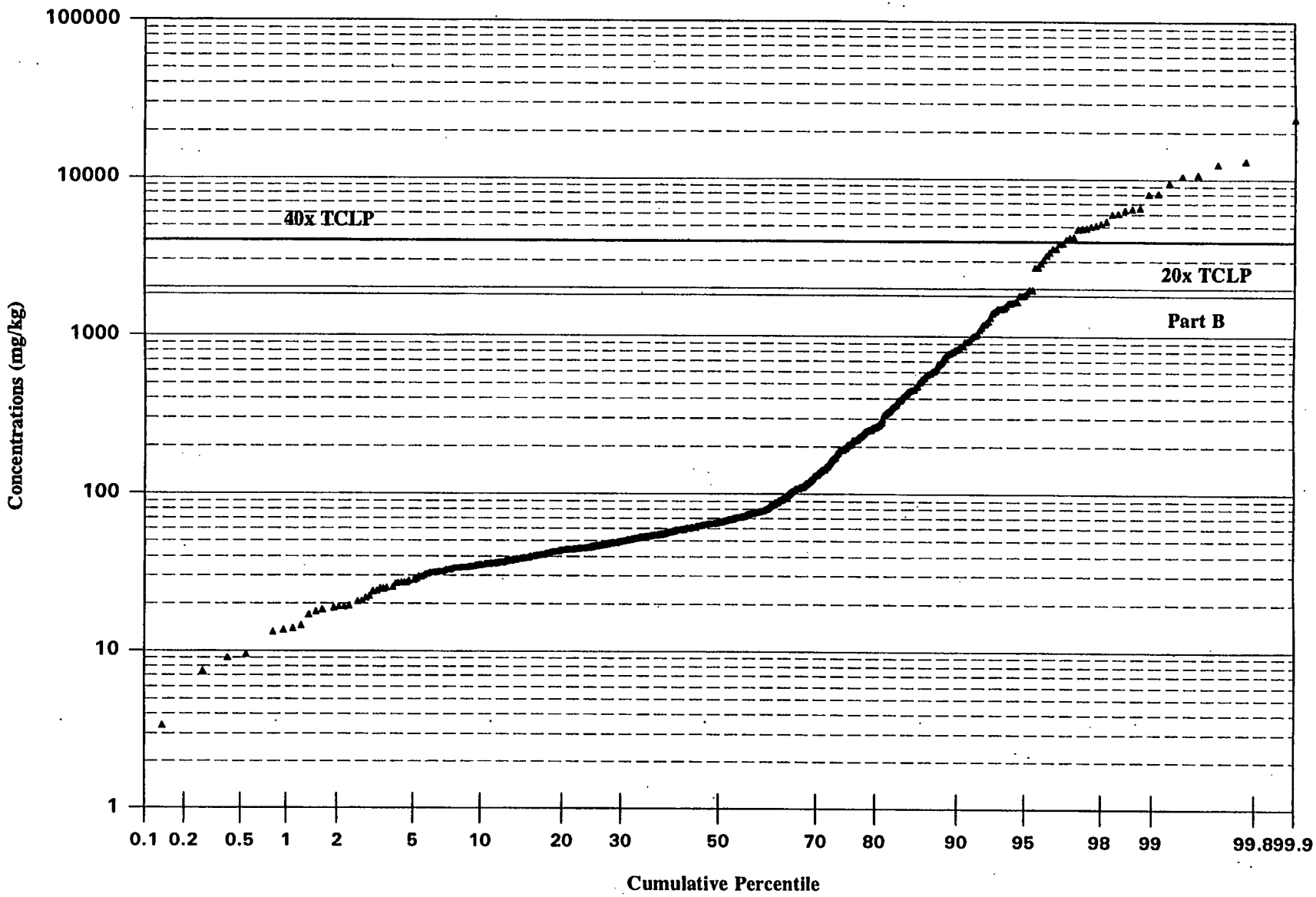

FIGURE A.II-47
CUMULATIVE PROBABILITY PLOT OF BARIUM CONCENTRATIONS IN SOLID MEDIA

000440

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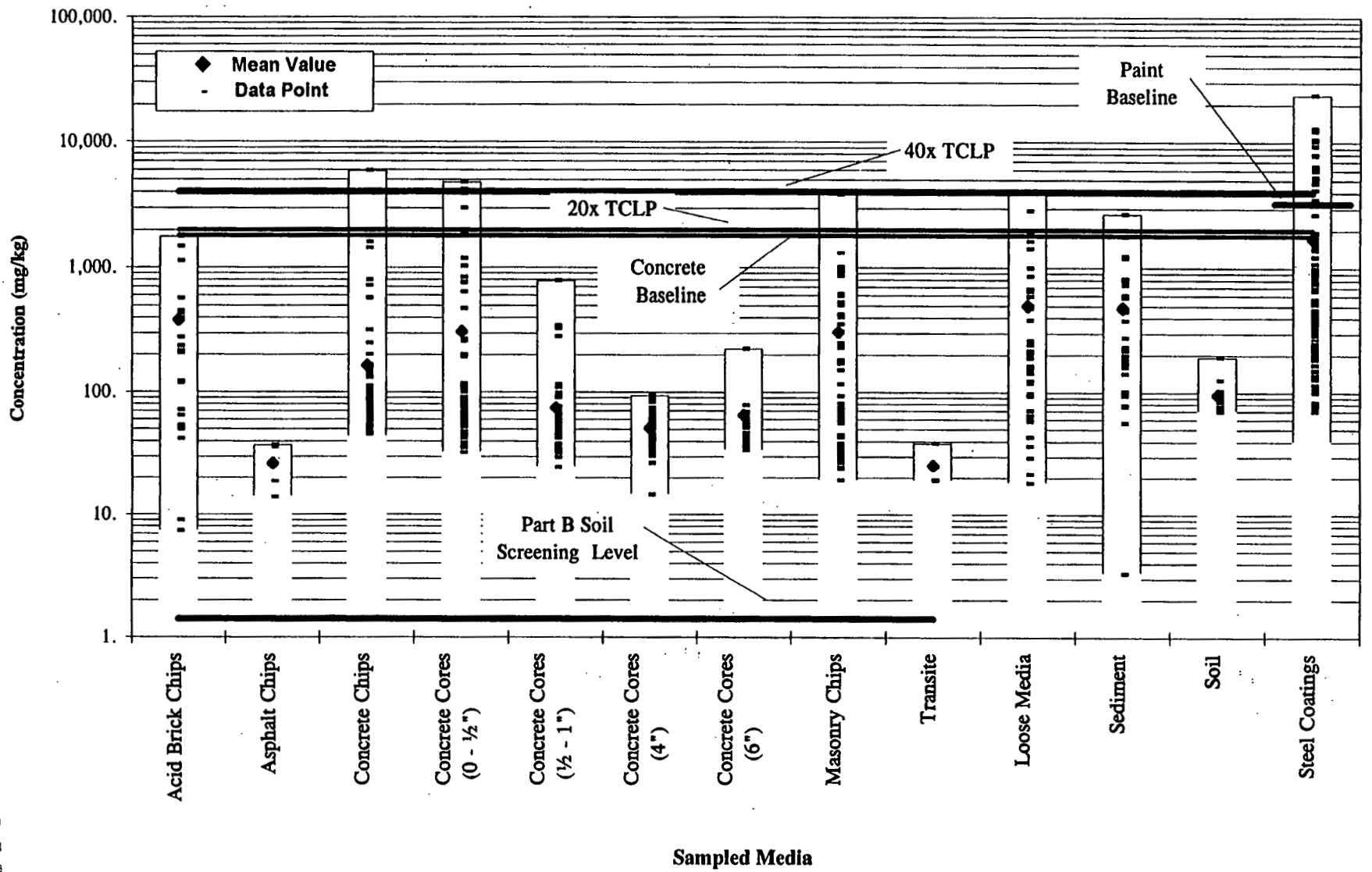

FIGURE A.II-48
SUMMARY OF BARIUM RESULTS GROUPED BY SOLID MEDIA

000441

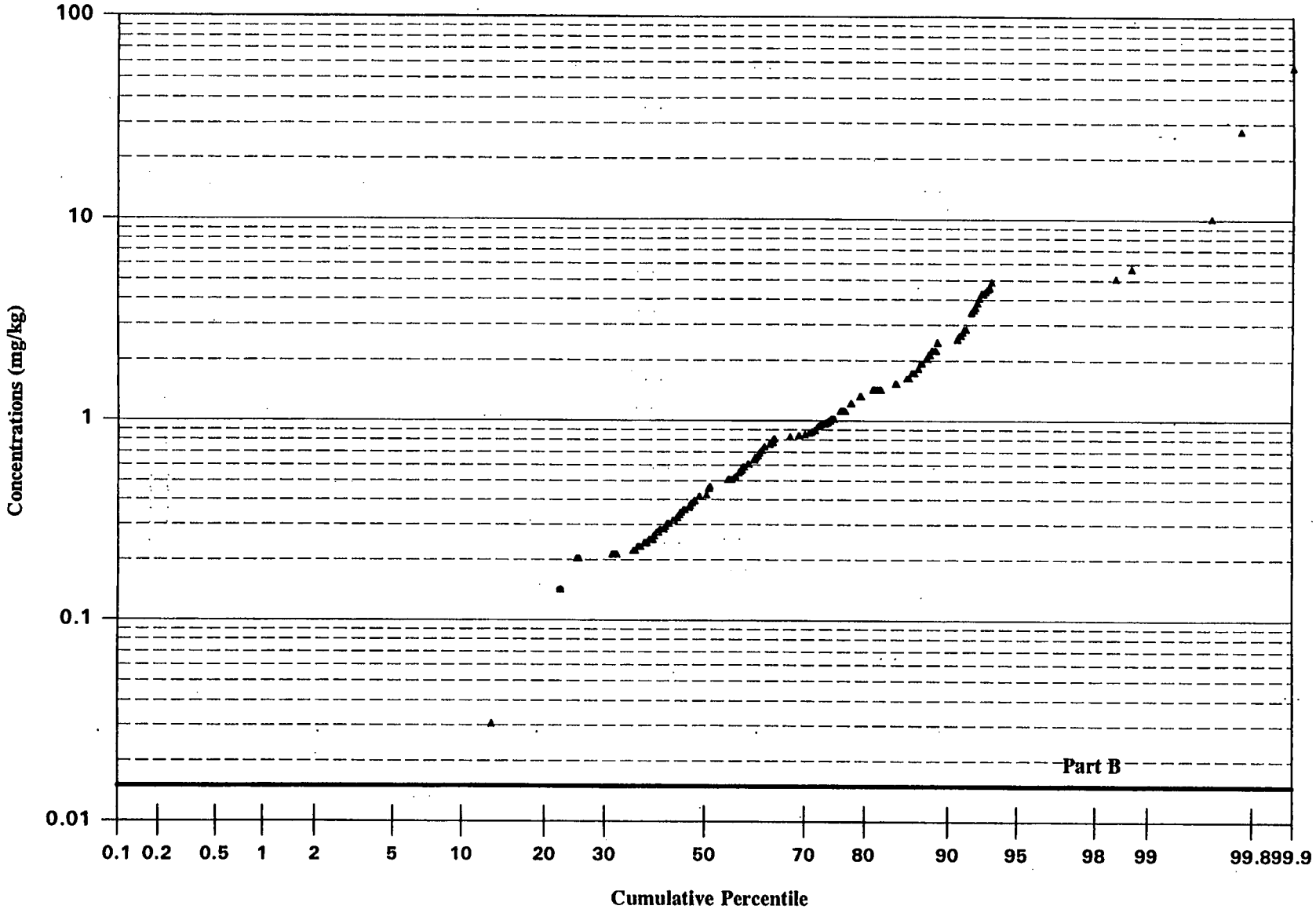

FIGURE A.II-49
CUMULATIVE PROBABILITY PLOT OF BERYLLIUM CONCENTRATIONS IN SOLID MEDIA

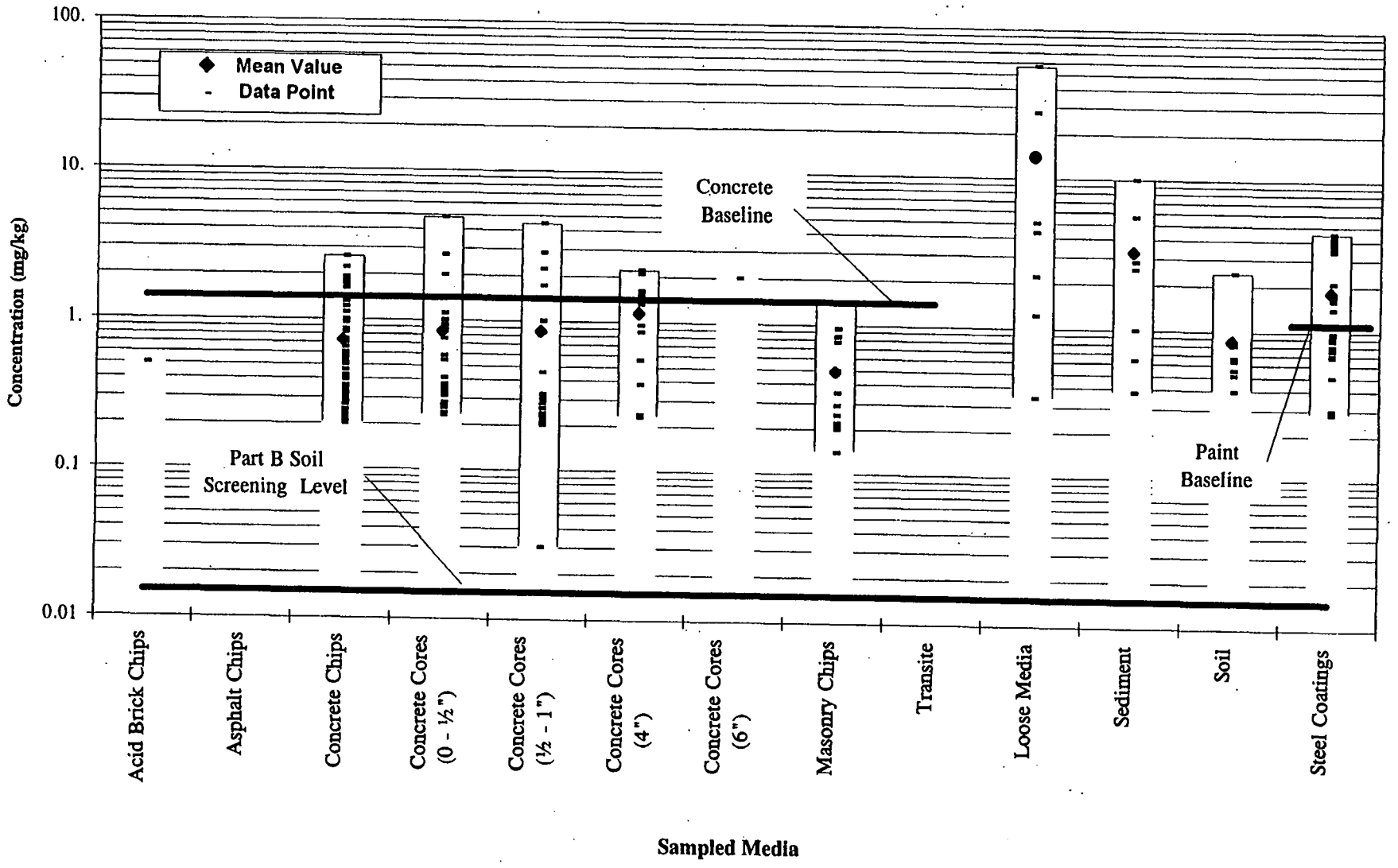

FIGURE A.II-50
SUMMARY OF BERYLLIUM RESULTS GROUPED BY SOLID MEDIA

000443

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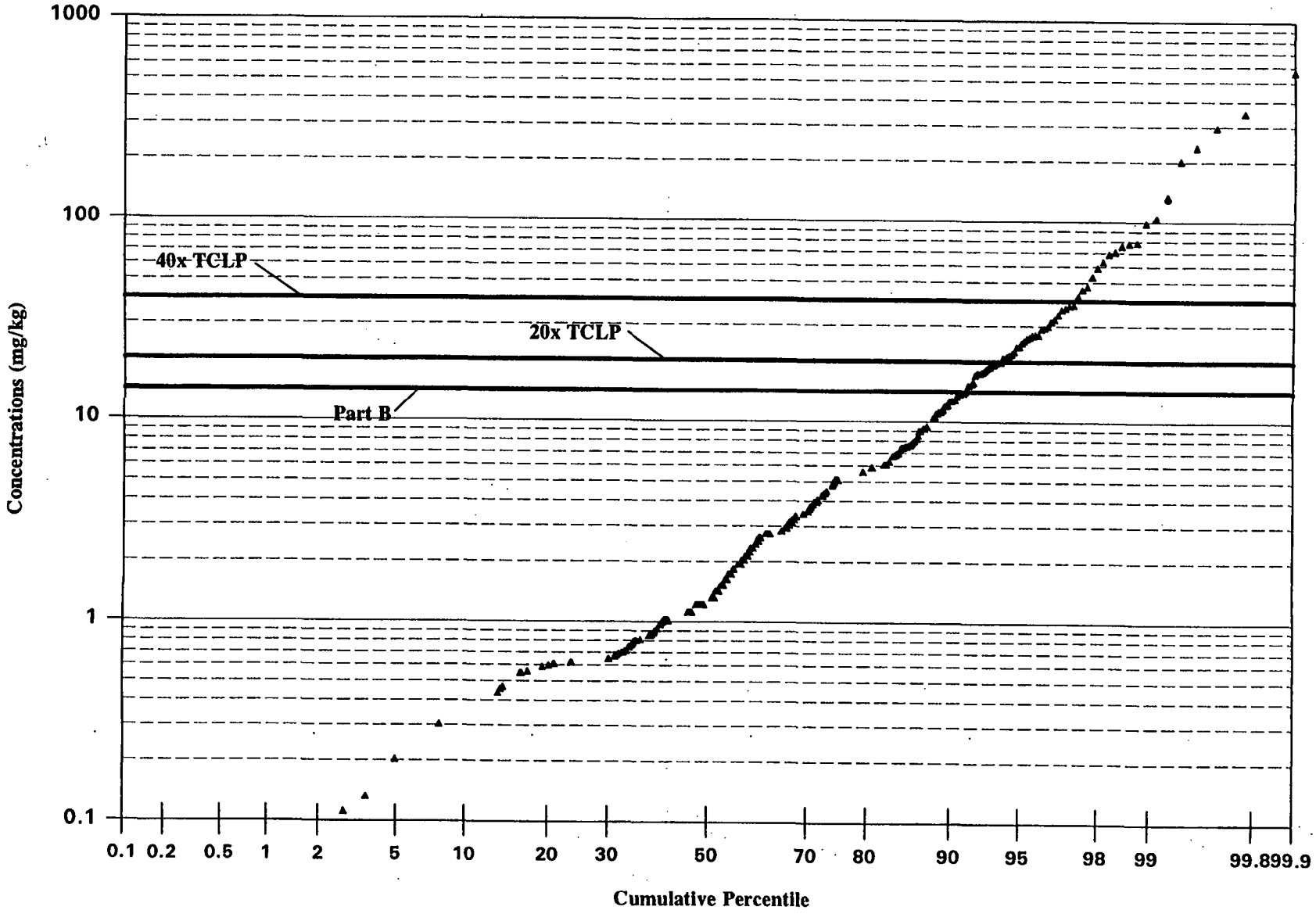

FIGURE A.II-51
CUMULATIVE PROBABILITY PLOT OF CADMIUM CONCENTRATIONS IN SOLID MEDIA

000144

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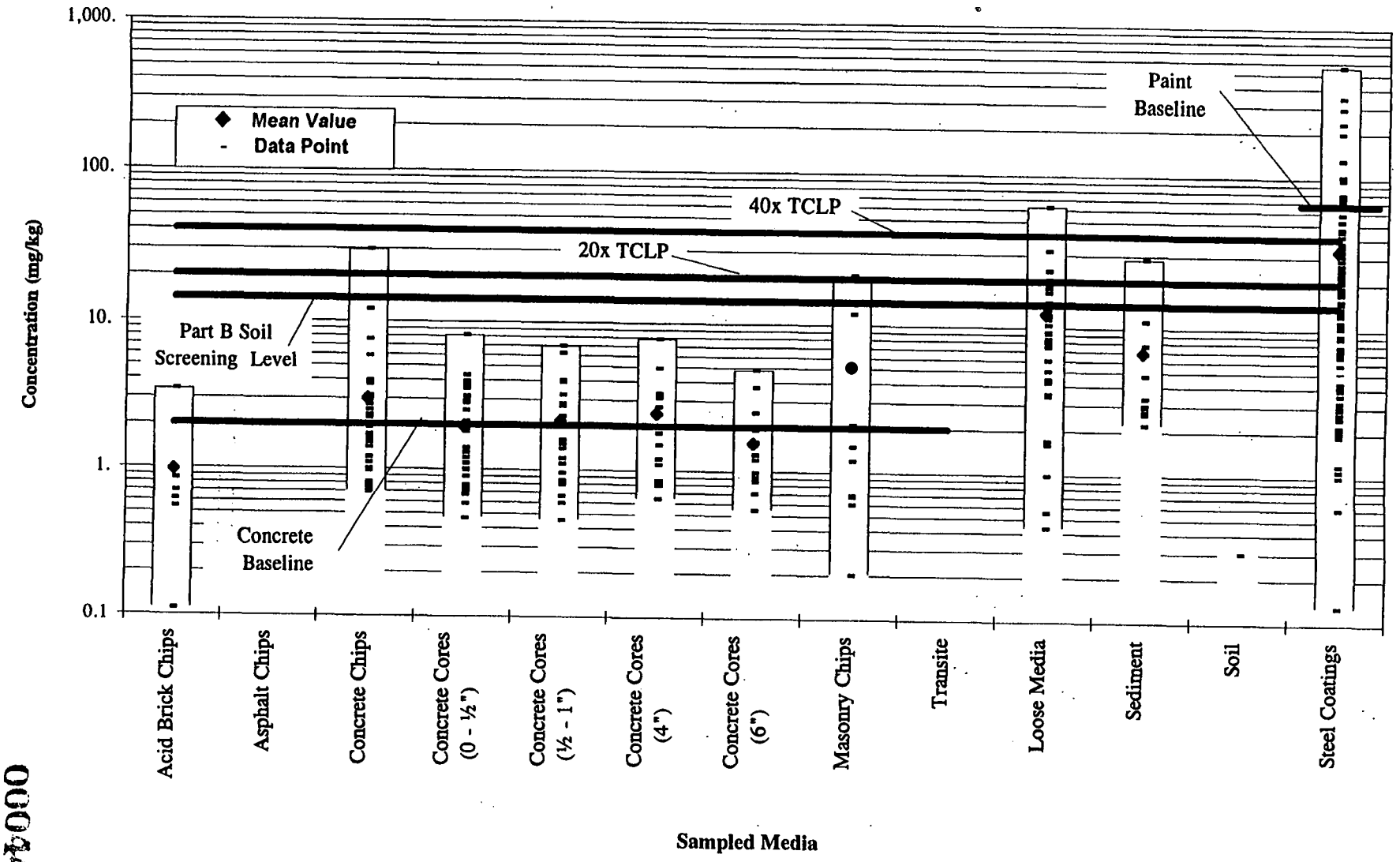

FIGURE A.II-52
SUMMARY OF CADMIUM RESULTS GROUPED BY SOLID MEDIA

000463

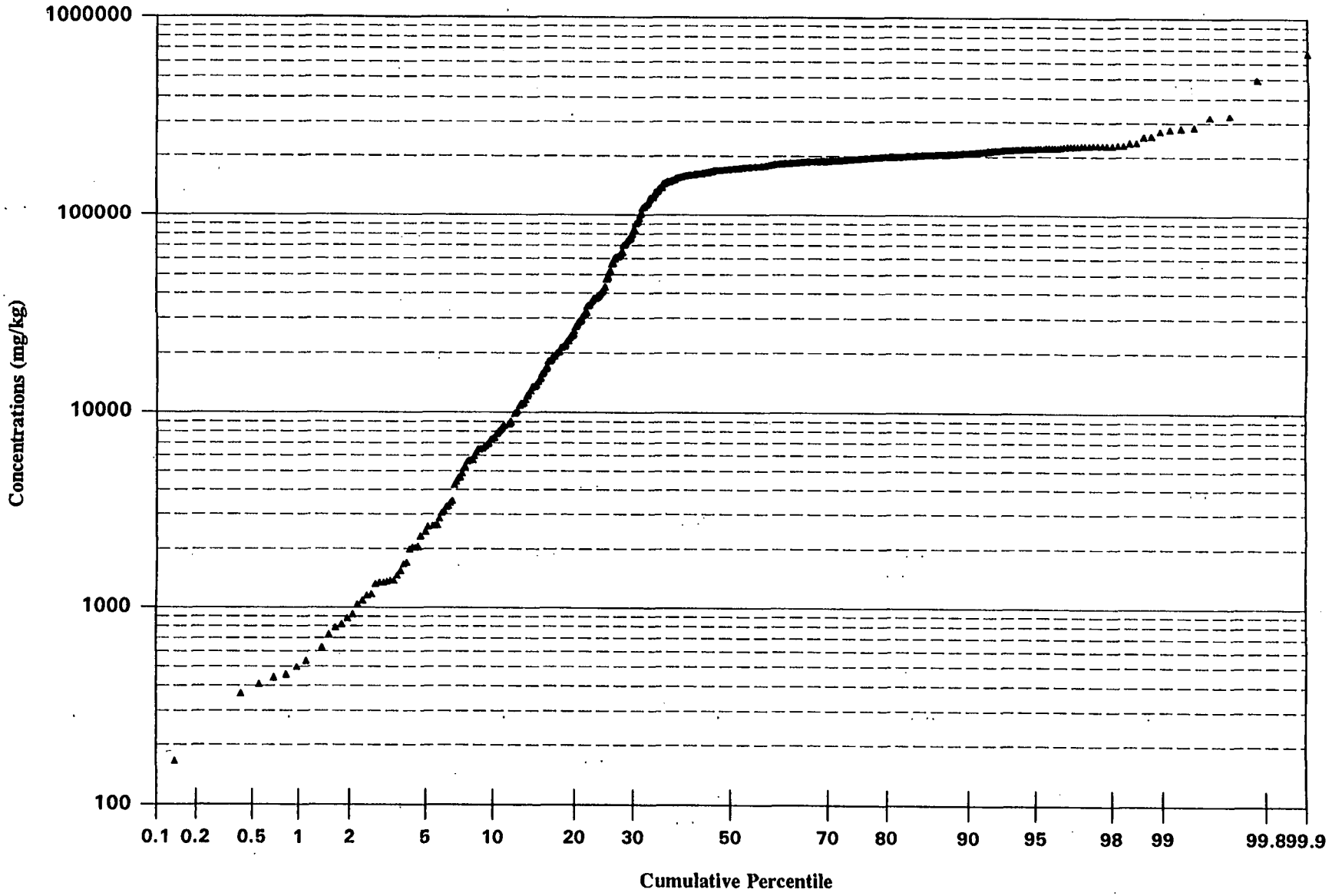

FIGURE A.II-53
CUMULATIVE PROBABILITY PLOT OF CALCIUM CONCENTRATIONS IN SOLID MEDIA

DRAFT

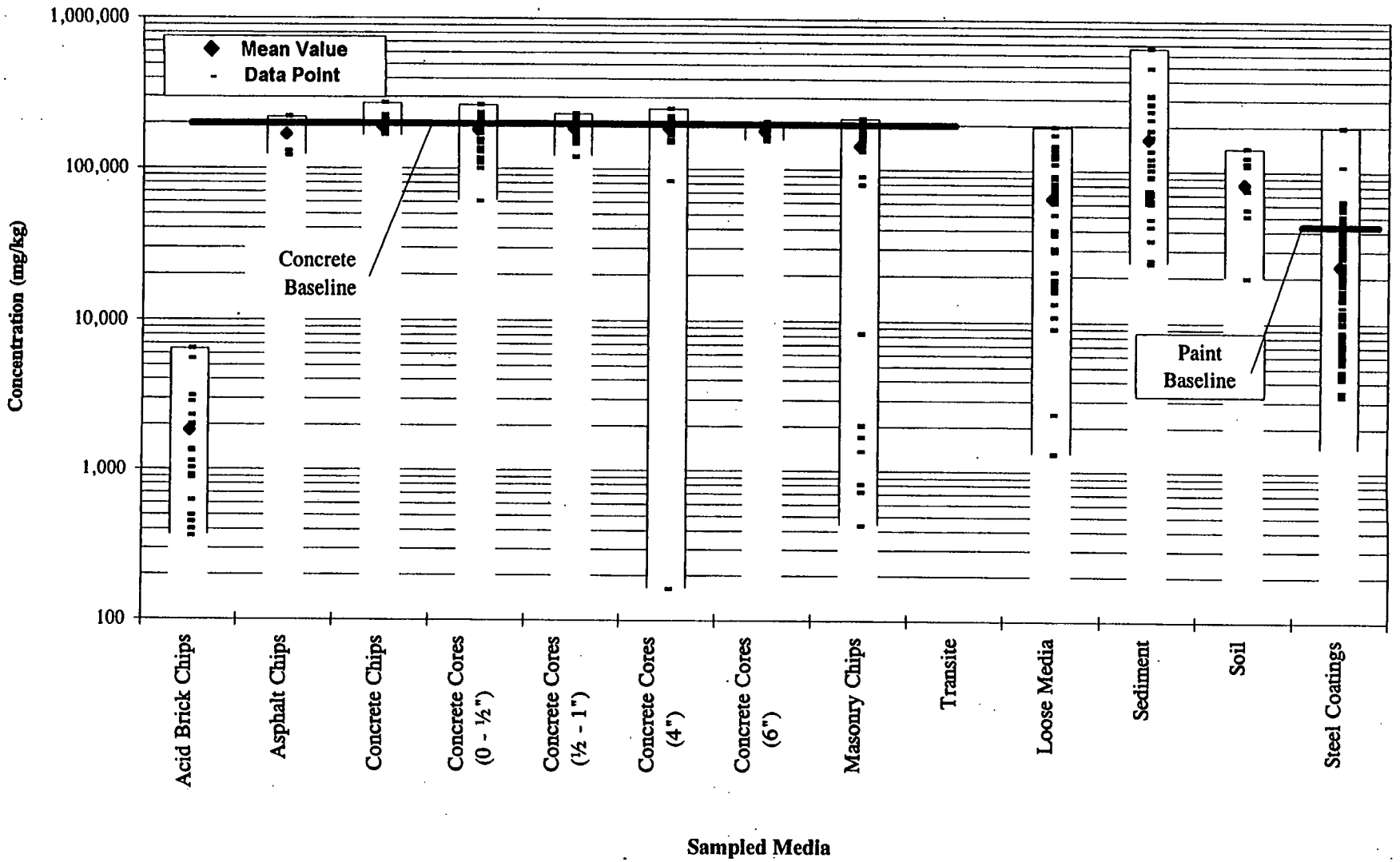

FIGURE A.II-54
SUMMARY OF CALCIUM RESULTS GROUPED BY SOLID MEDIA

000447

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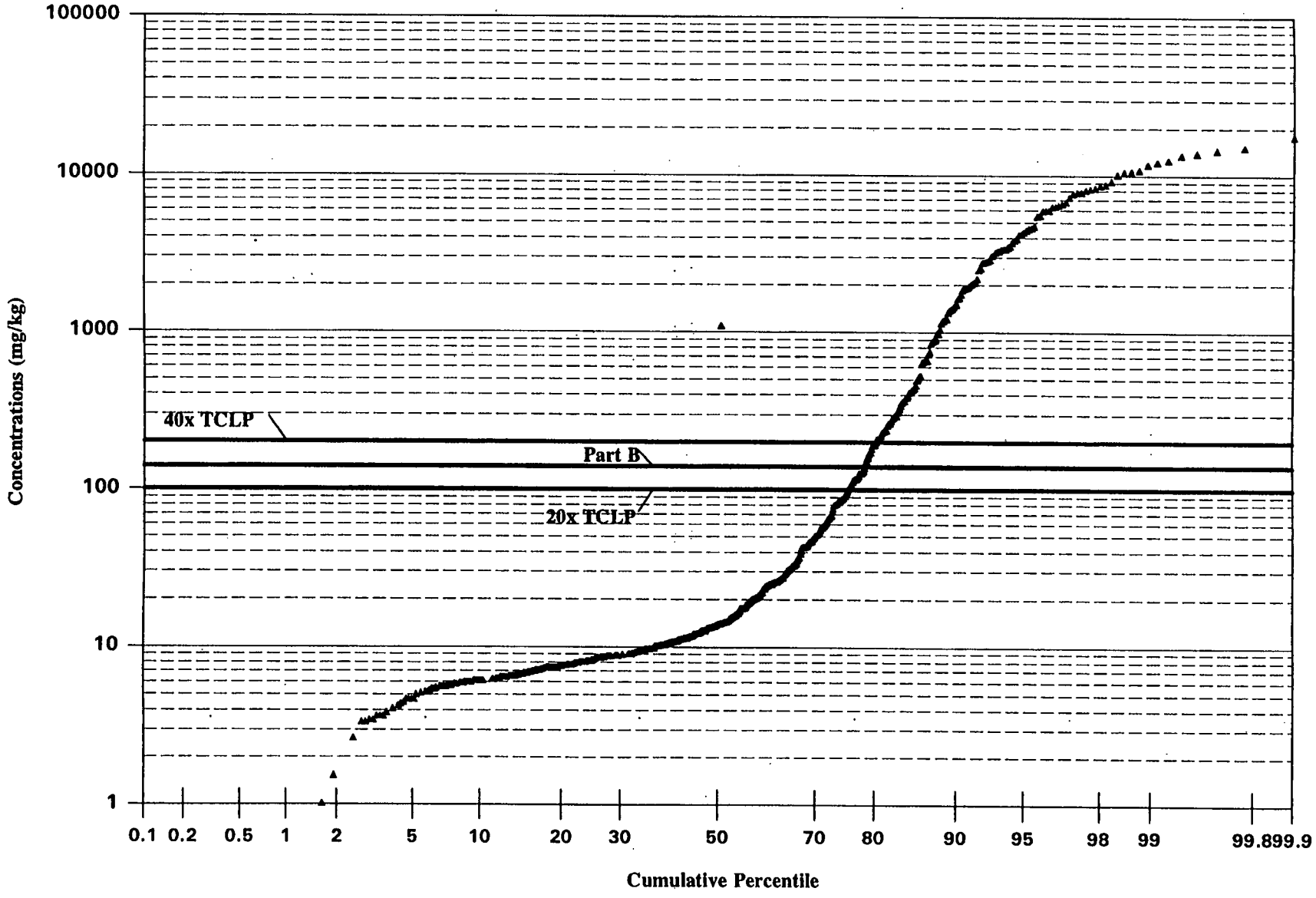

FIGURE A.II-55
CUMULATIVE PROBABILITY PLOT OF CHROMIUM CONCENTRATIONS IN SOLID MEDIA

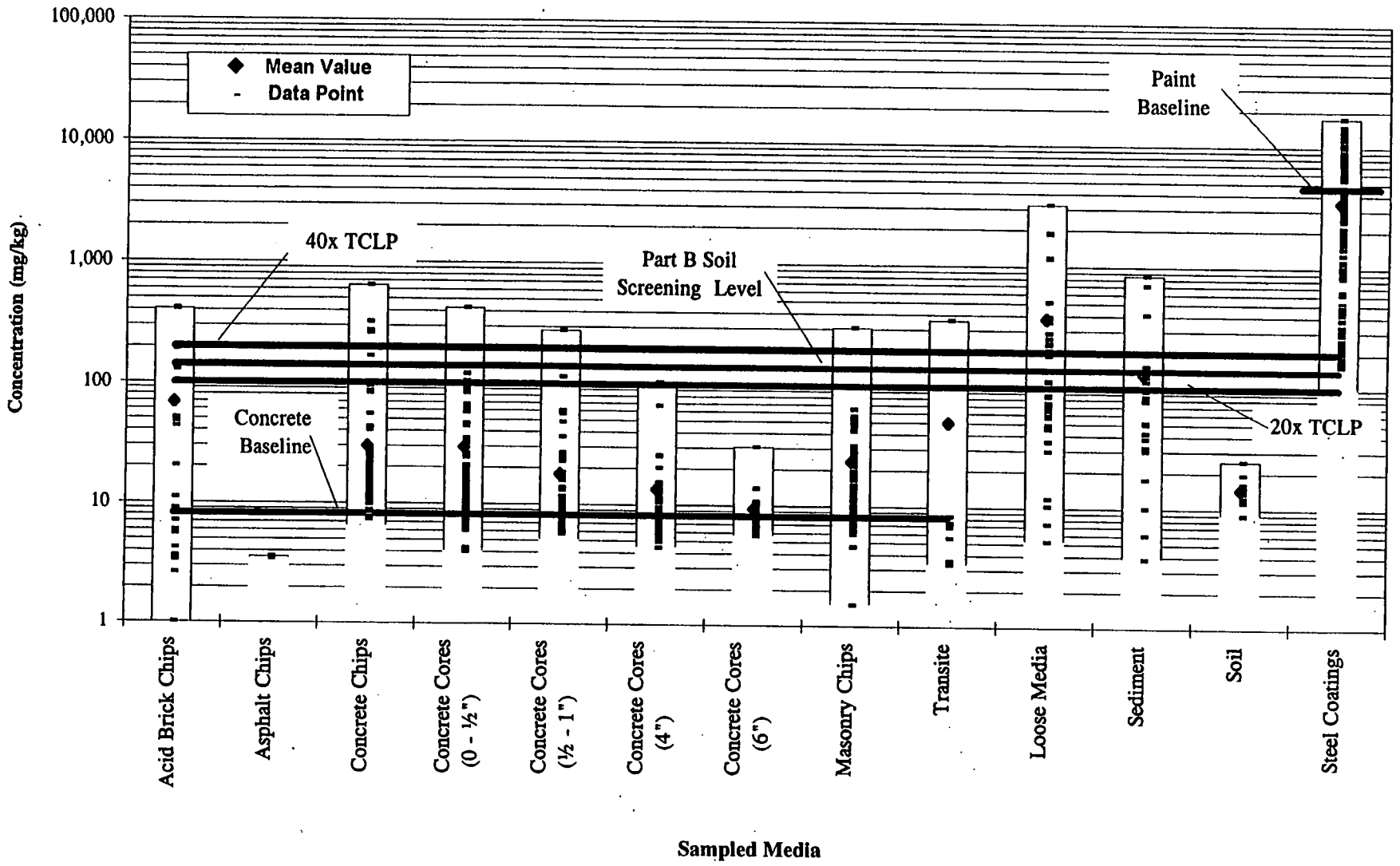

FIGURE A.II-56
SUMMARY OF CHROMIUM RESULTS GROUPED BY SOLID MEDIA

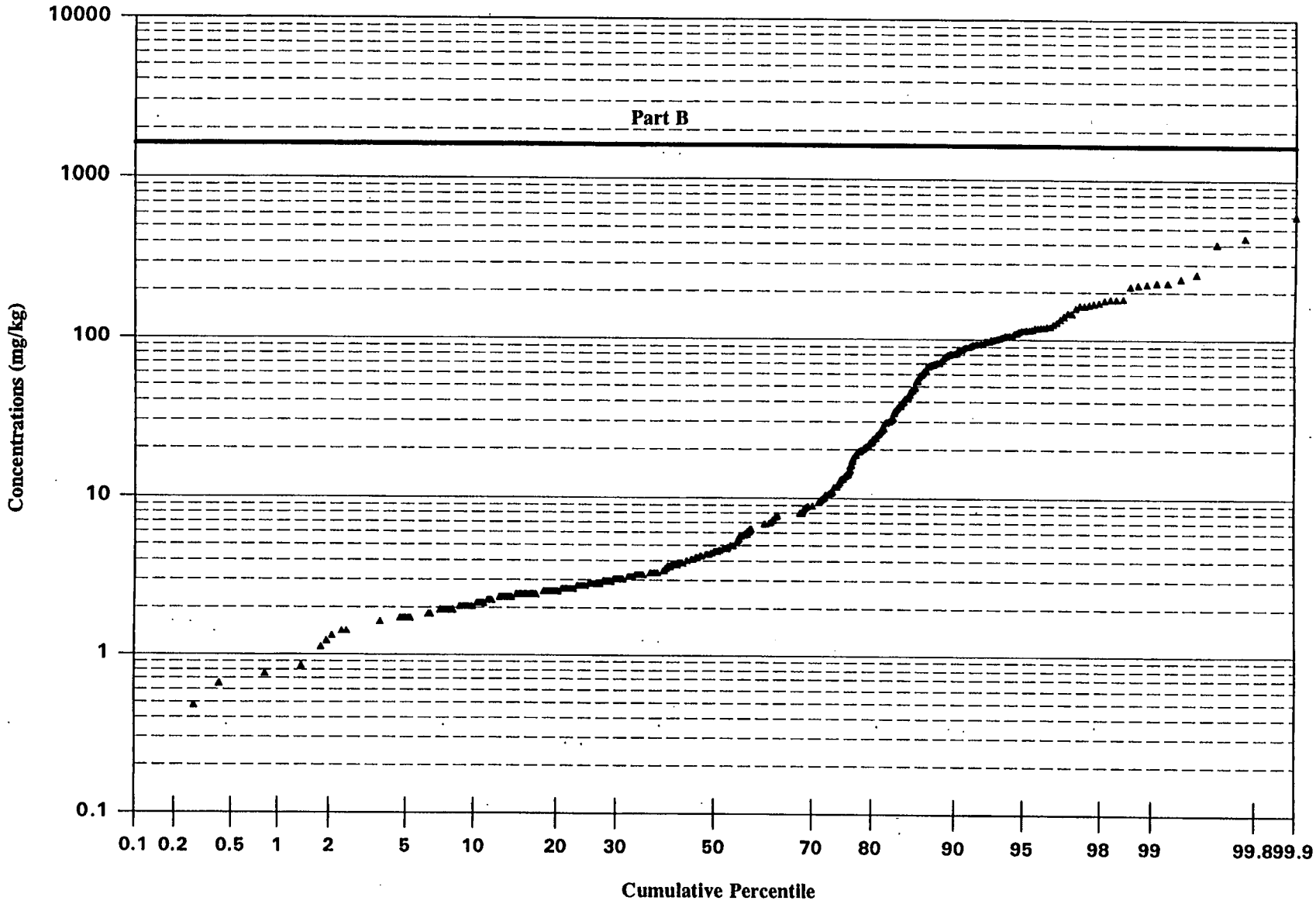

FIGURE A.II-57
CUMULATIVE PROBABILITY PLOT OF COBALT CONCENTRATIONS IN SOLID MEDIA

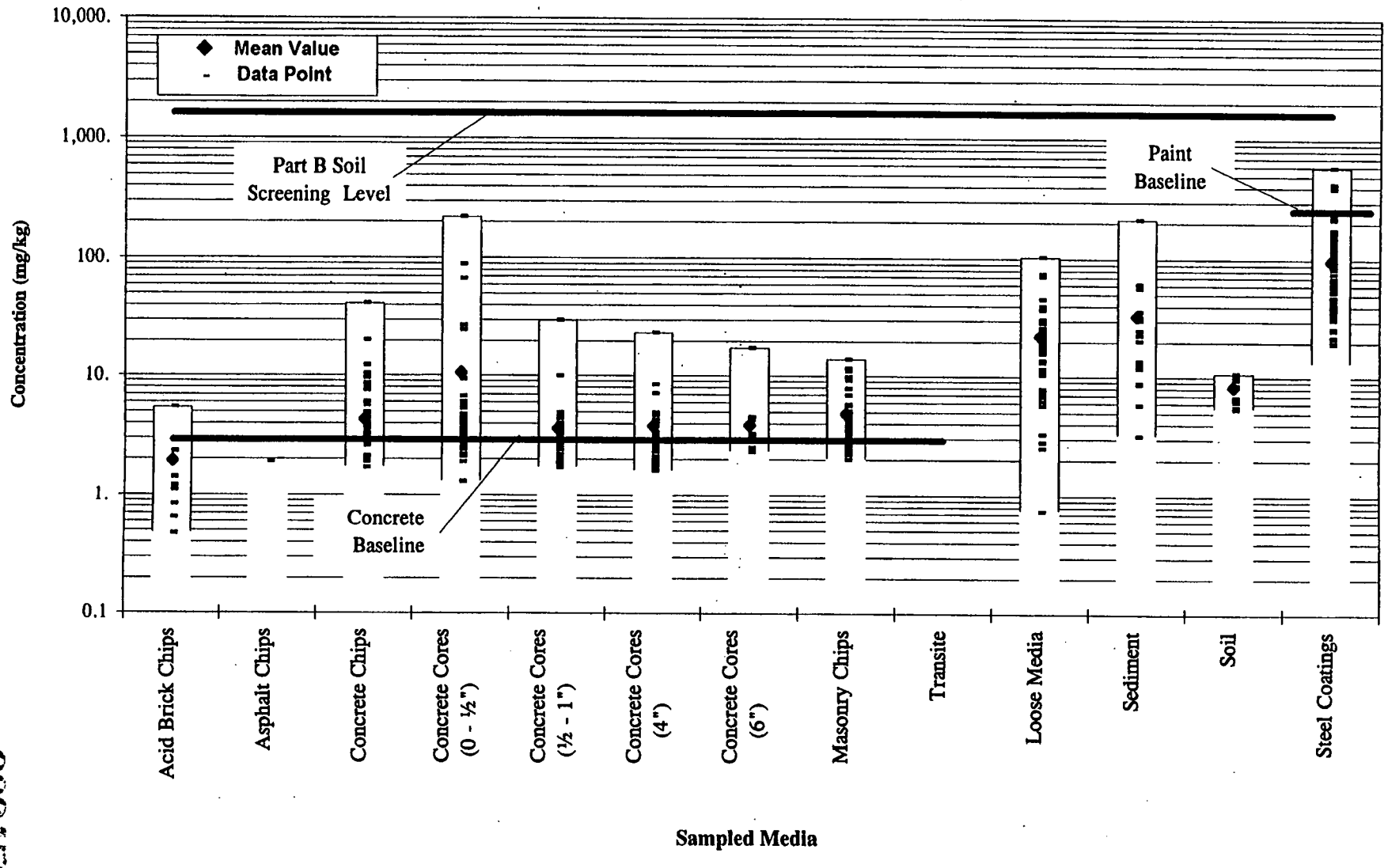

FIGURE A.II-58
SUMMARY OF COBALT RESULTS GROUPED BY SOLID MEDIA

000451

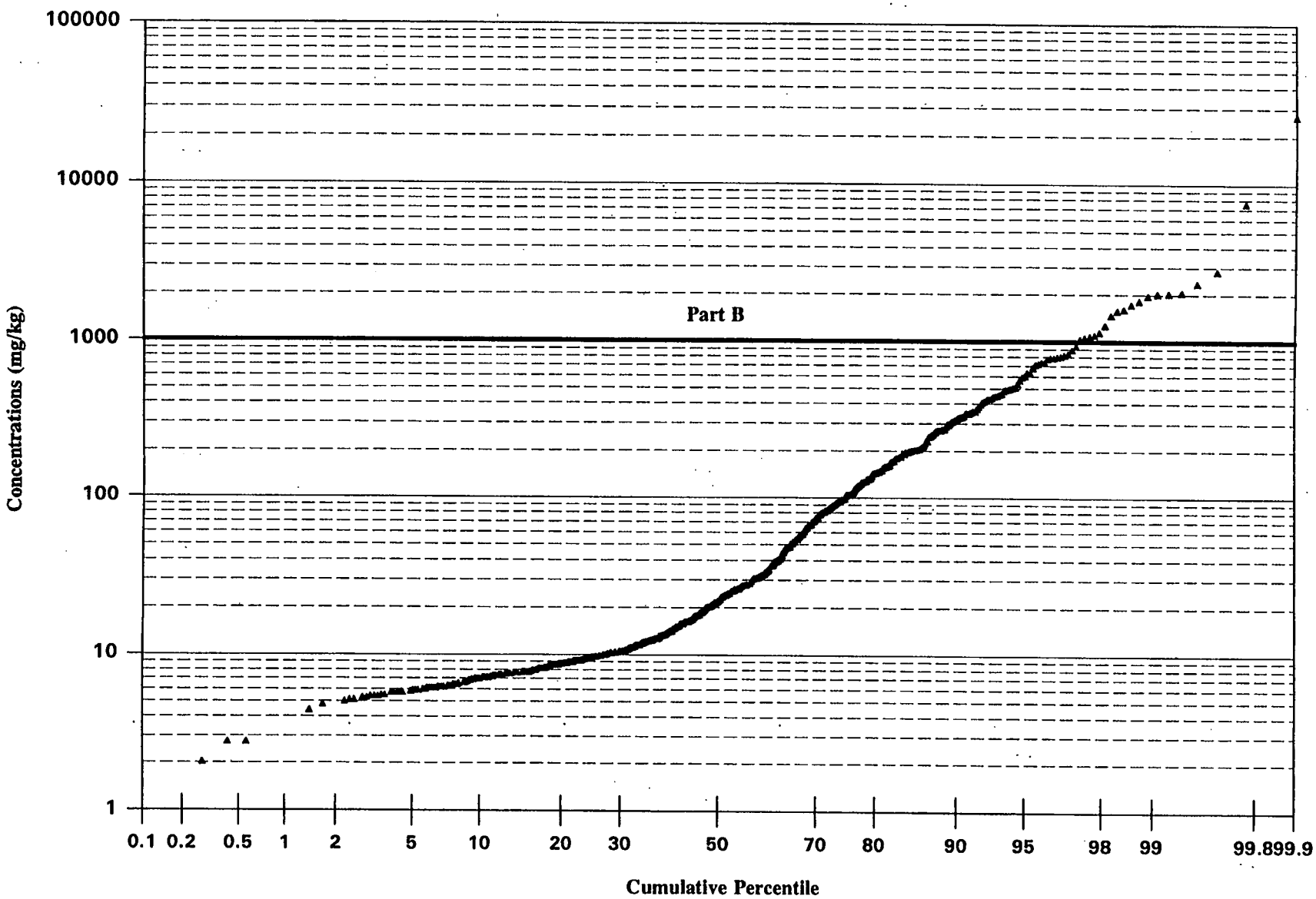

FIGURE A.II-59
CUMULATIVE PROBABILITY PLOT OF COPPER CONCENTRATIONS IN SOLID MEDIA

DRAFT

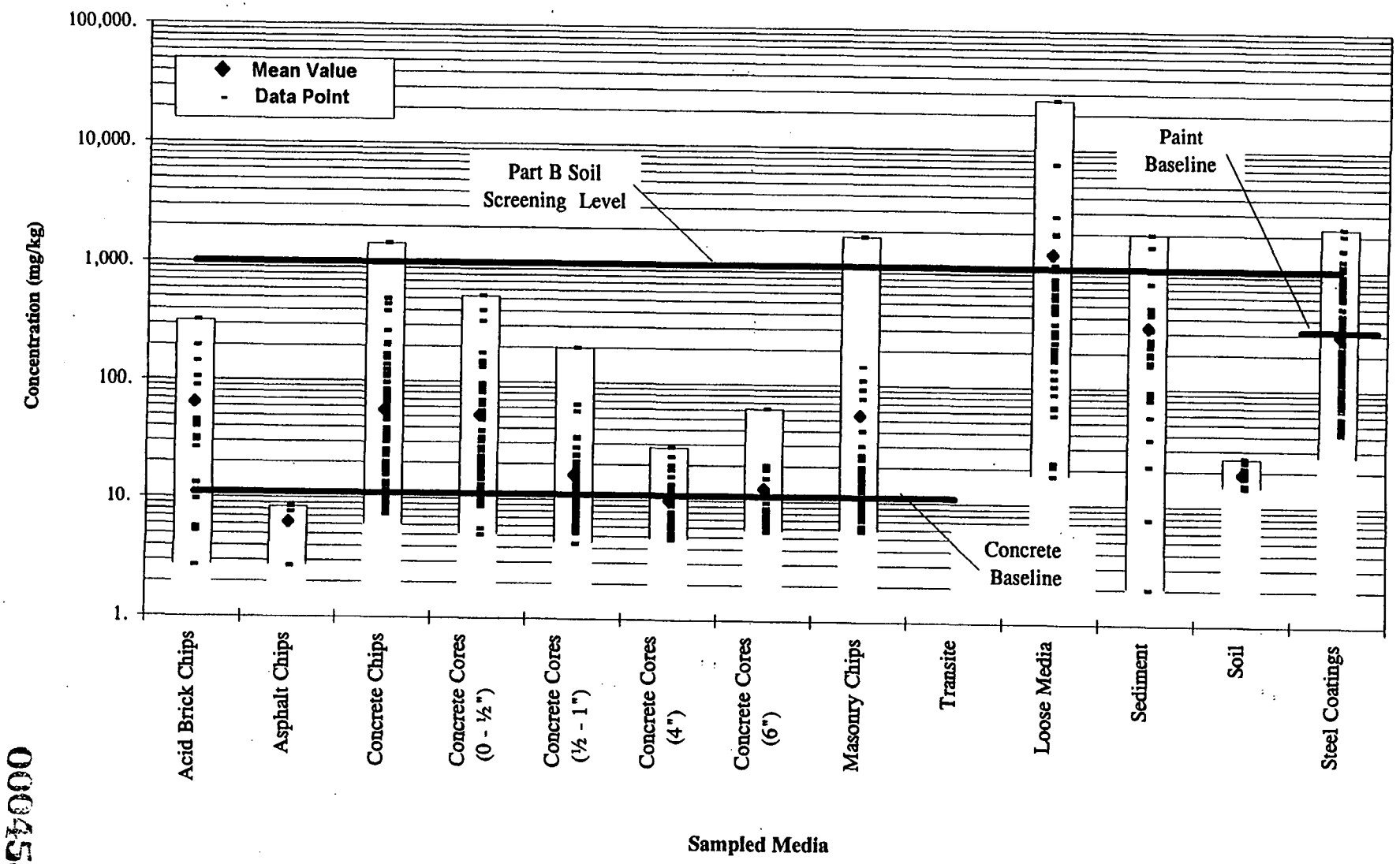

FIGURE A.II-60
SUMMARY OF COPPER RESULTS GROUPED BY SOLID MEDIA

000453

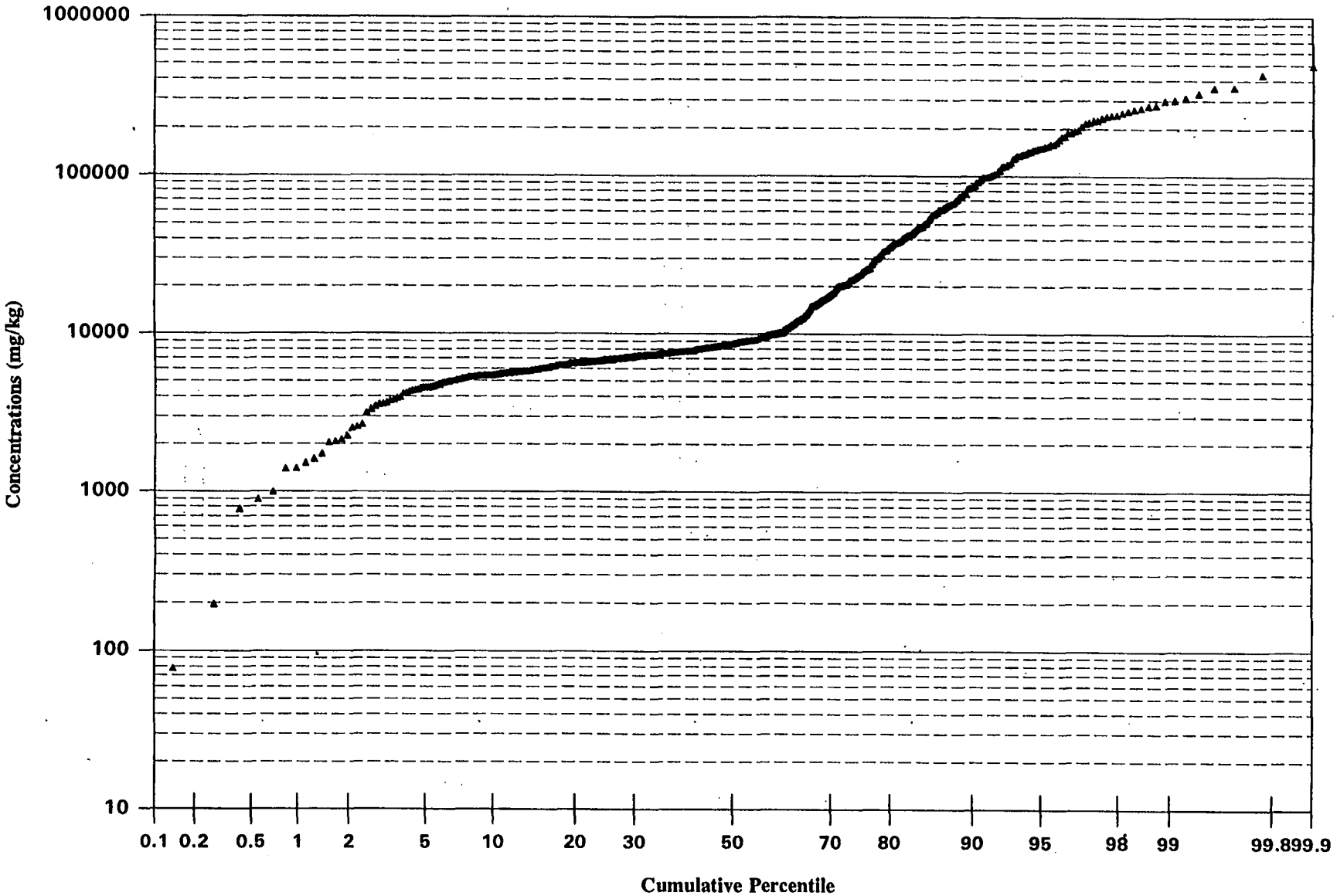

FIGURE A.II-61
CUMULATIVE PROBABILITY PLOT OF IRON CONCENTRATIONS IN ALL MEDIA

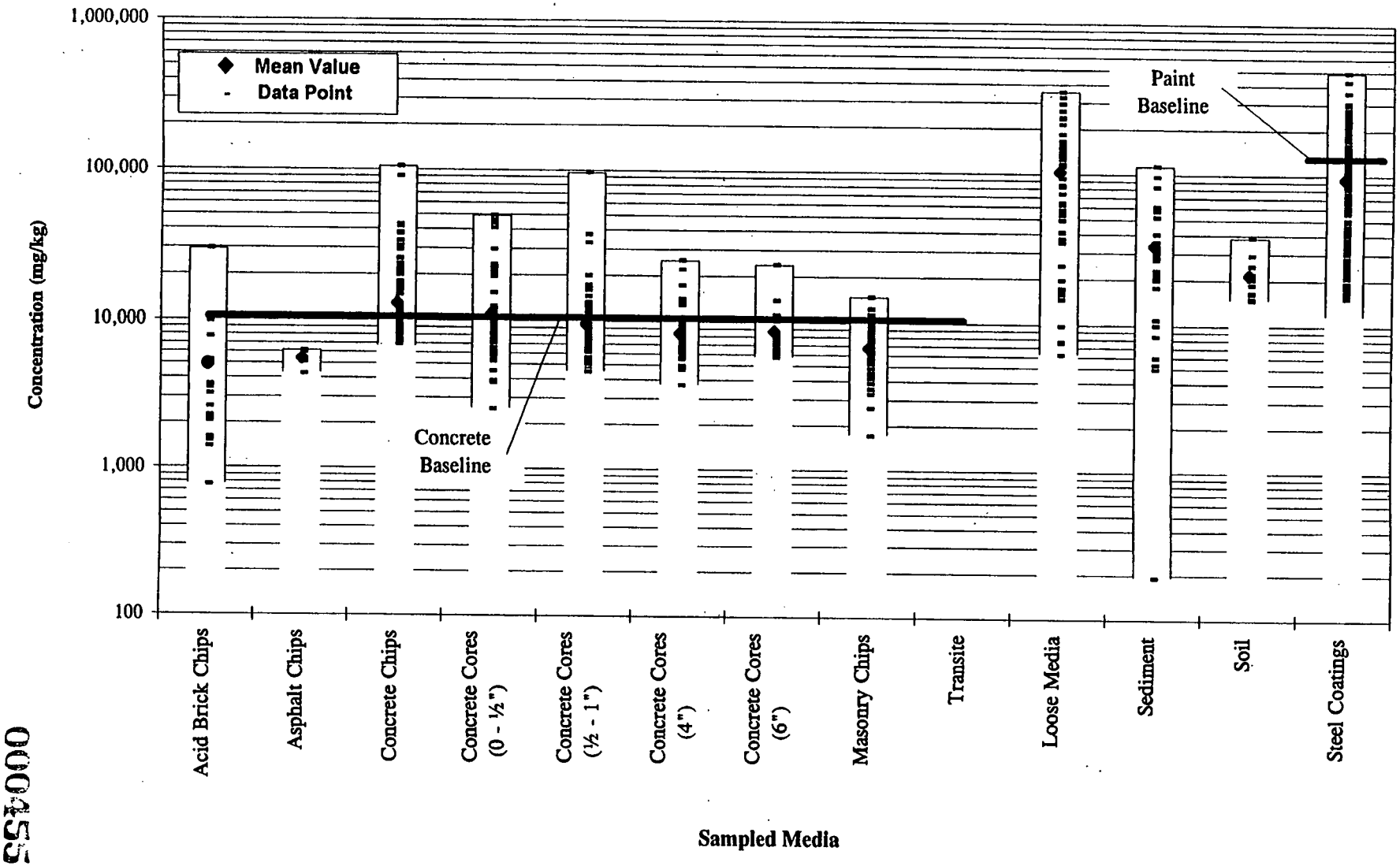

FIGURE A.II-62
SUMMARY OF IRON RESULTS GROUPED BY SOLID MEDIA

000455

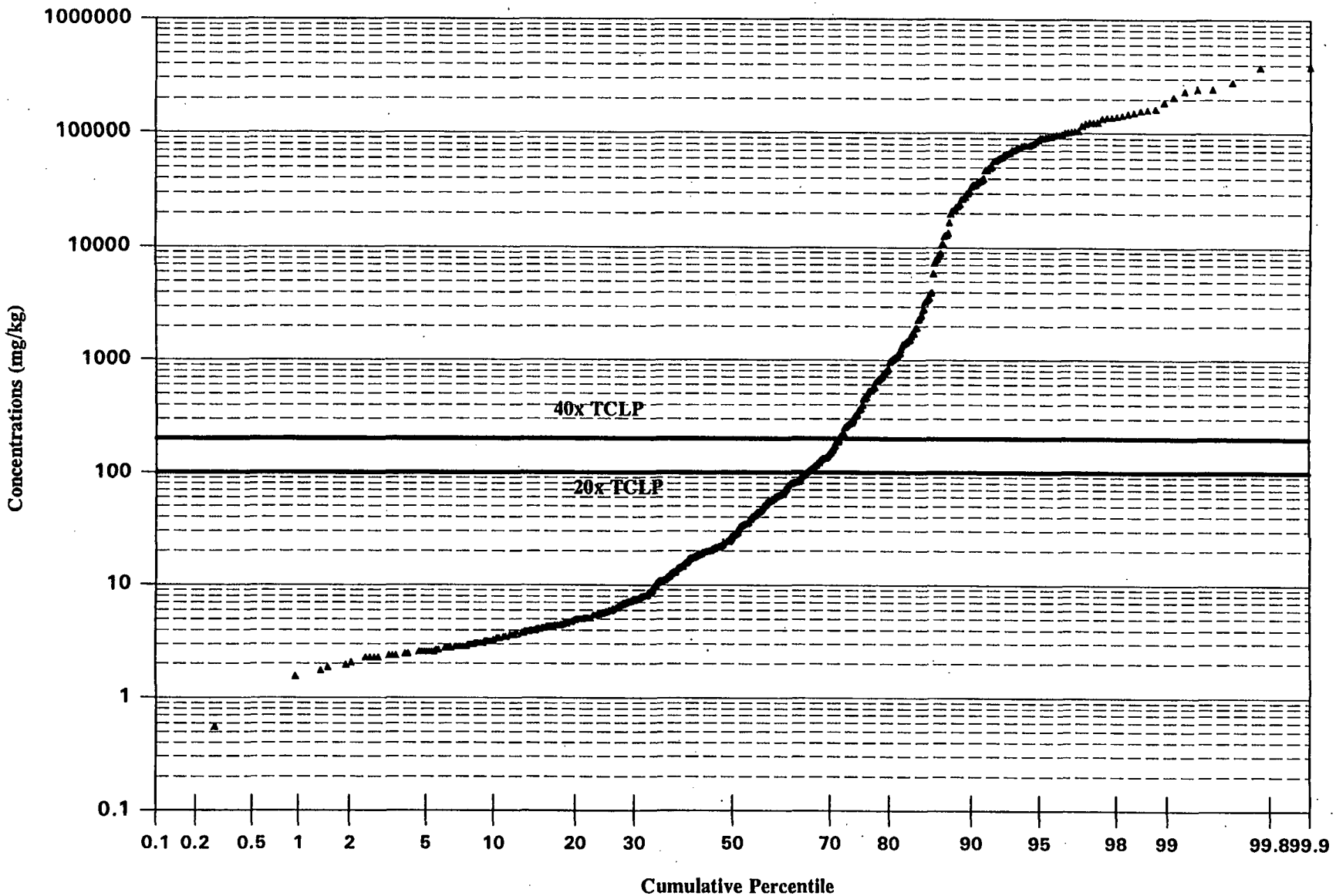

FIGURE A.II-63
CUMULATIVE PROBABILITY PLOT OF LEAD CONCENTRATIONS IN SOLID MEDIA

0004156

2121

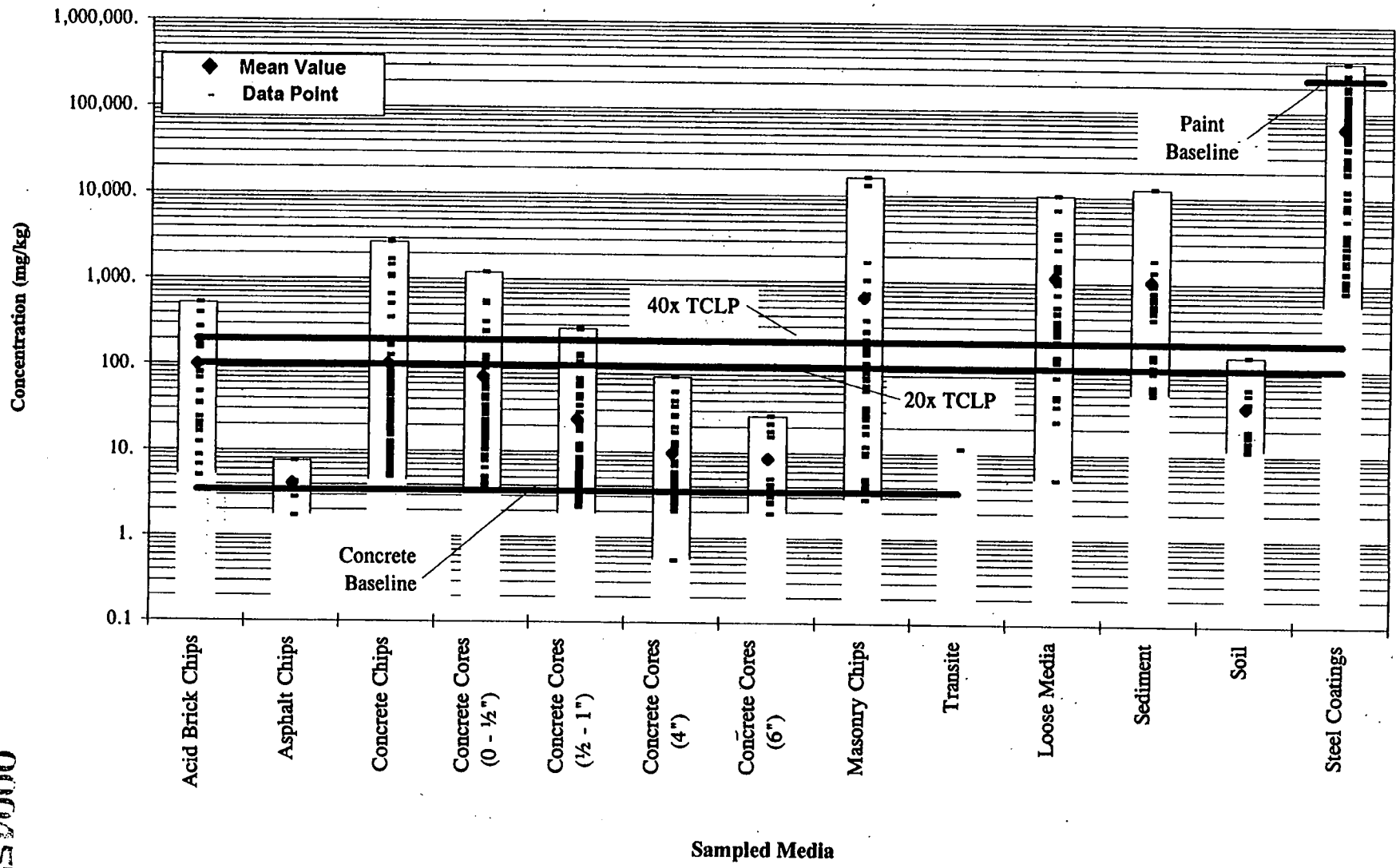

FIGURE A.II-64
SUMMARY OF LEAD RESULTS GROUPED BY SOLID MEDIA

000457

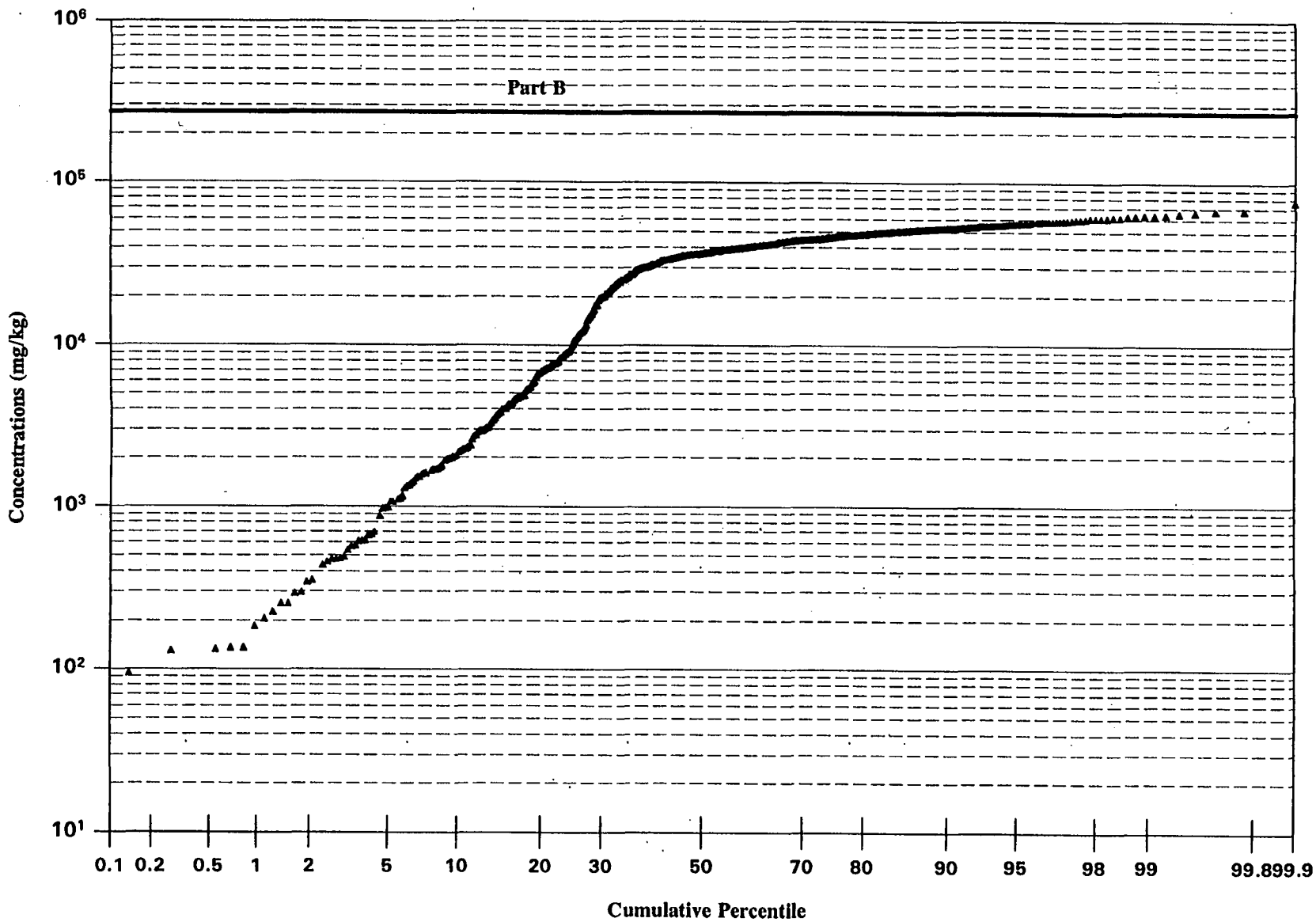

FIGURE A.II-65
CUMULATIVE PROBABILITY PLOT OF MAGNESIUM CONCENTRATIONS IN SOLID MEDIA

000458

7121

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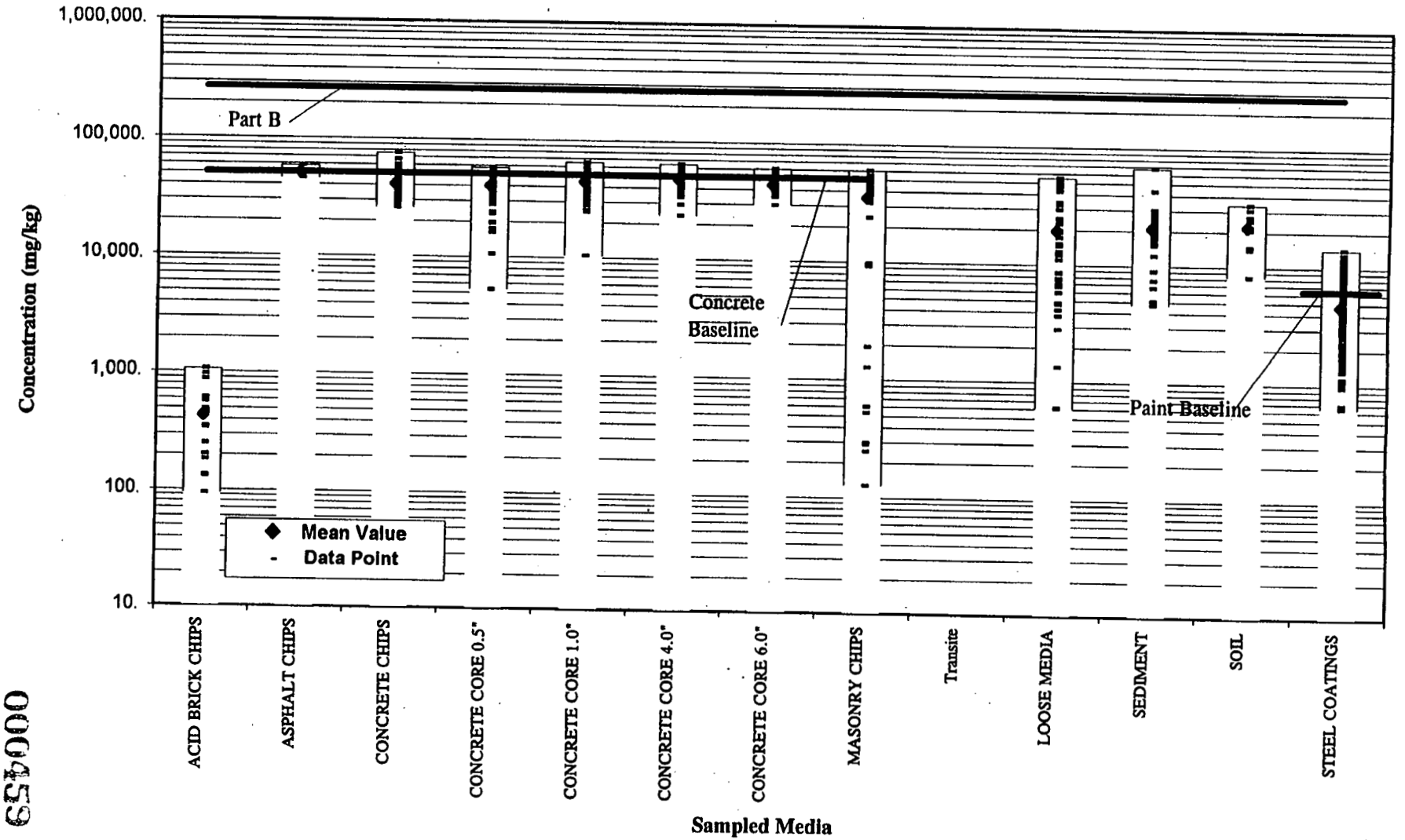

FIGURE A.II-66
SUMMARY OF MEDIA MAGNESIUM RESULTS GROUPED BY SOLID MEDIA

000459

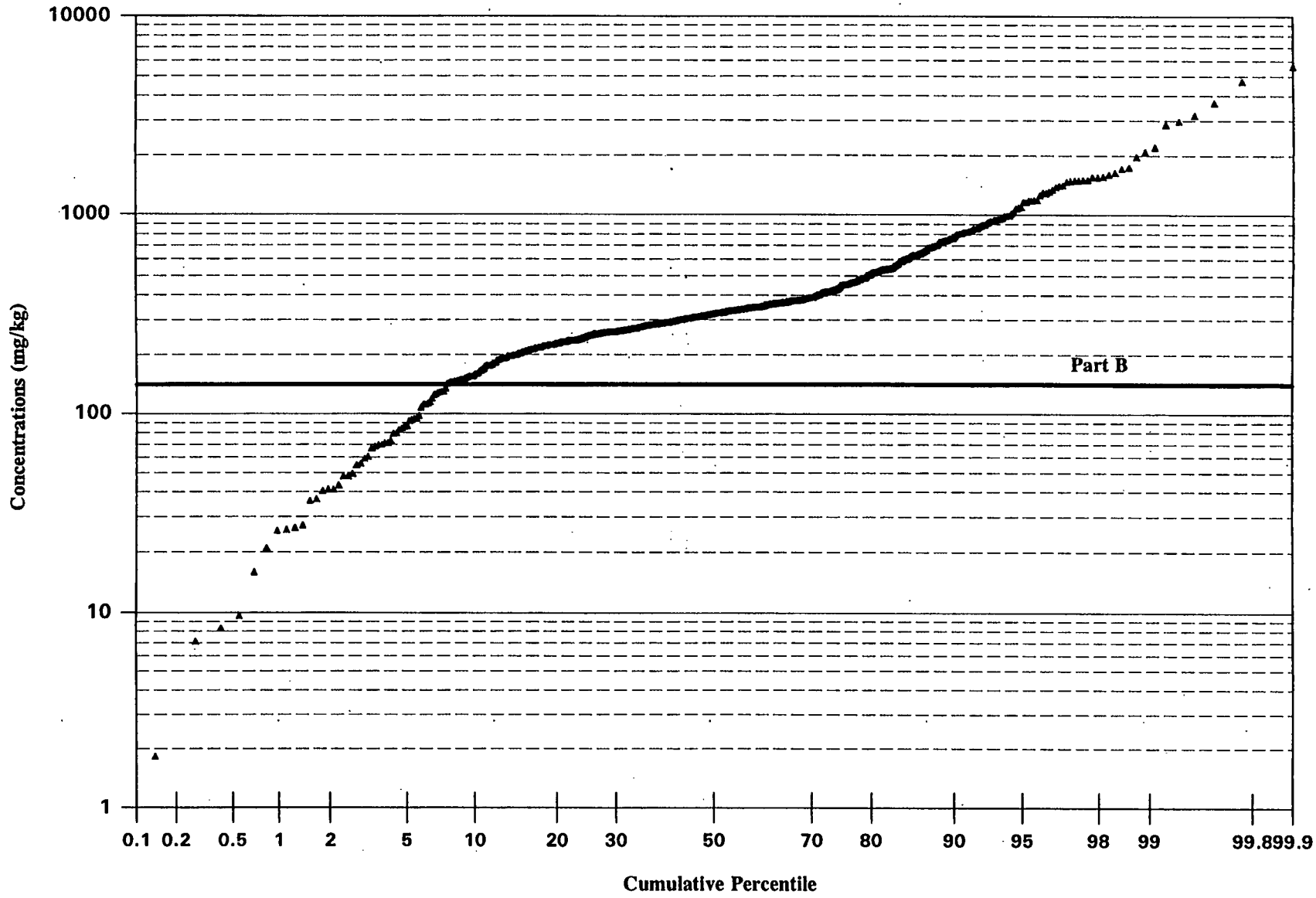

FIGURE A.II-67
CUMULATIVE PROBABILITY PLOT OF MANGANESE CONCENTRATIONS IN SOLID MEDIA

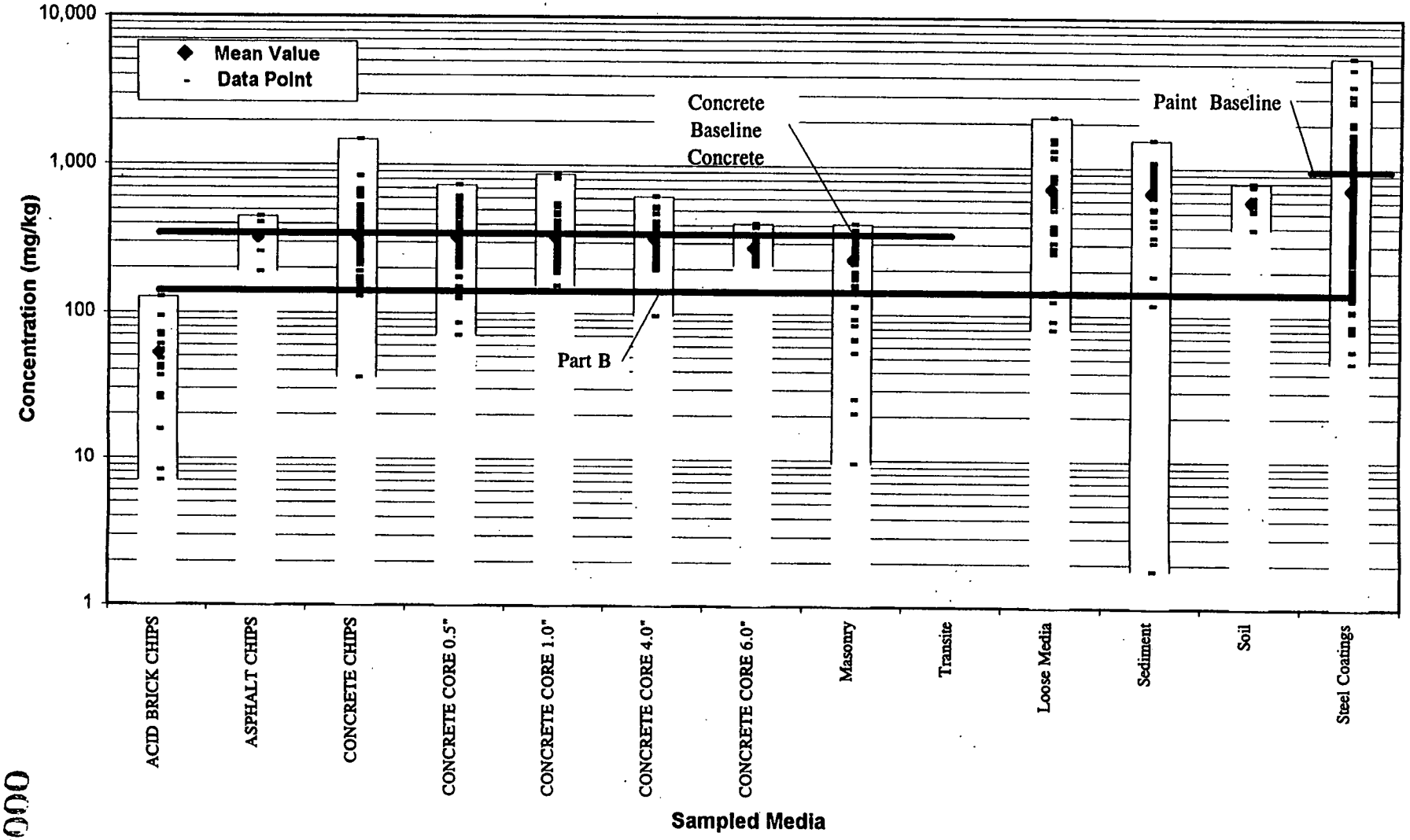

FIGURE A.II-68
SUMMARY OF MANGANESE RESULTS GROUPED BY SOLID MEDIA

194000

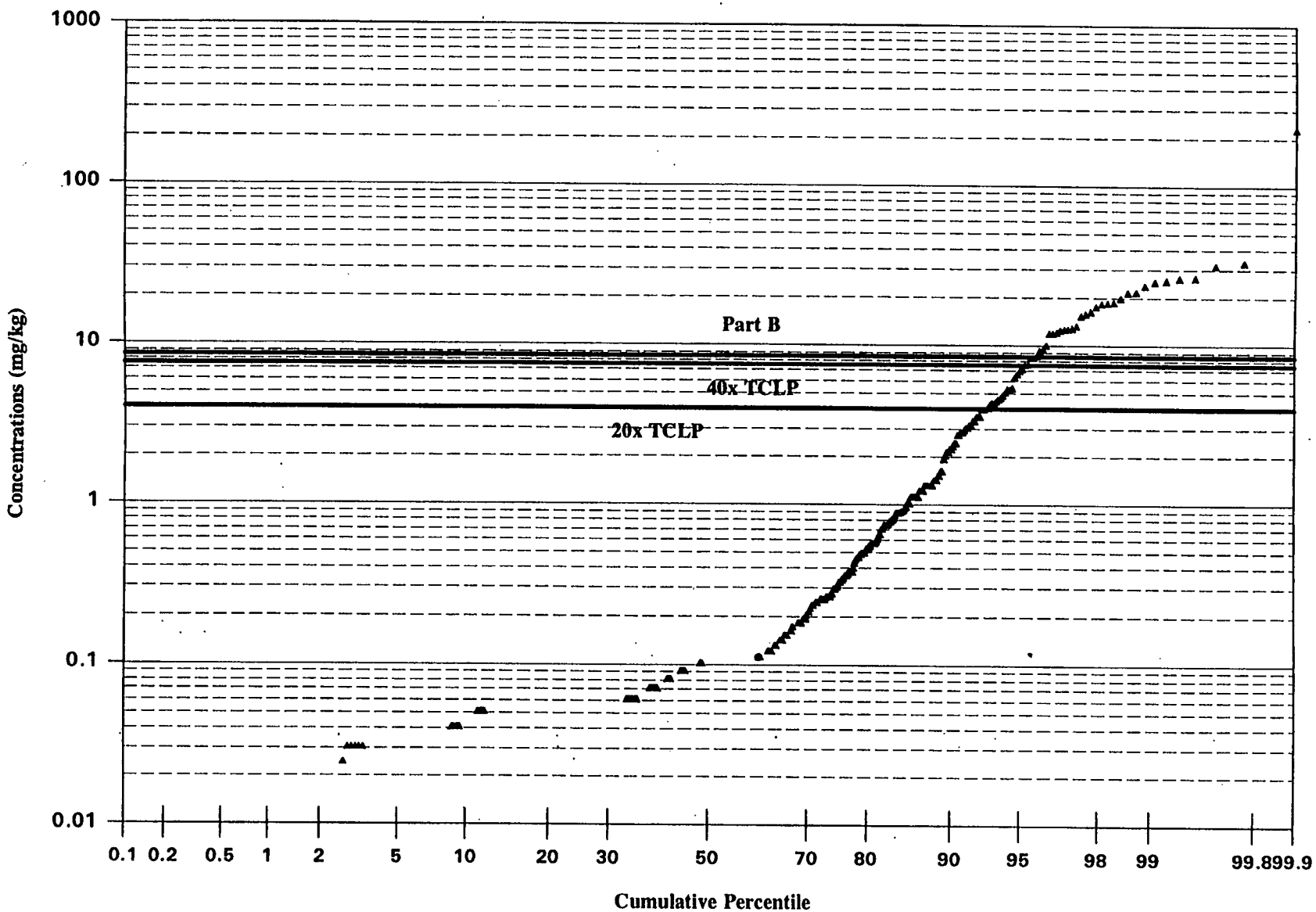

FIGURE A.II-69
CUMULATIVE PROBABILITY PLOT OF MERCURY CONCENTRATIONS IN SOLID MEDIA

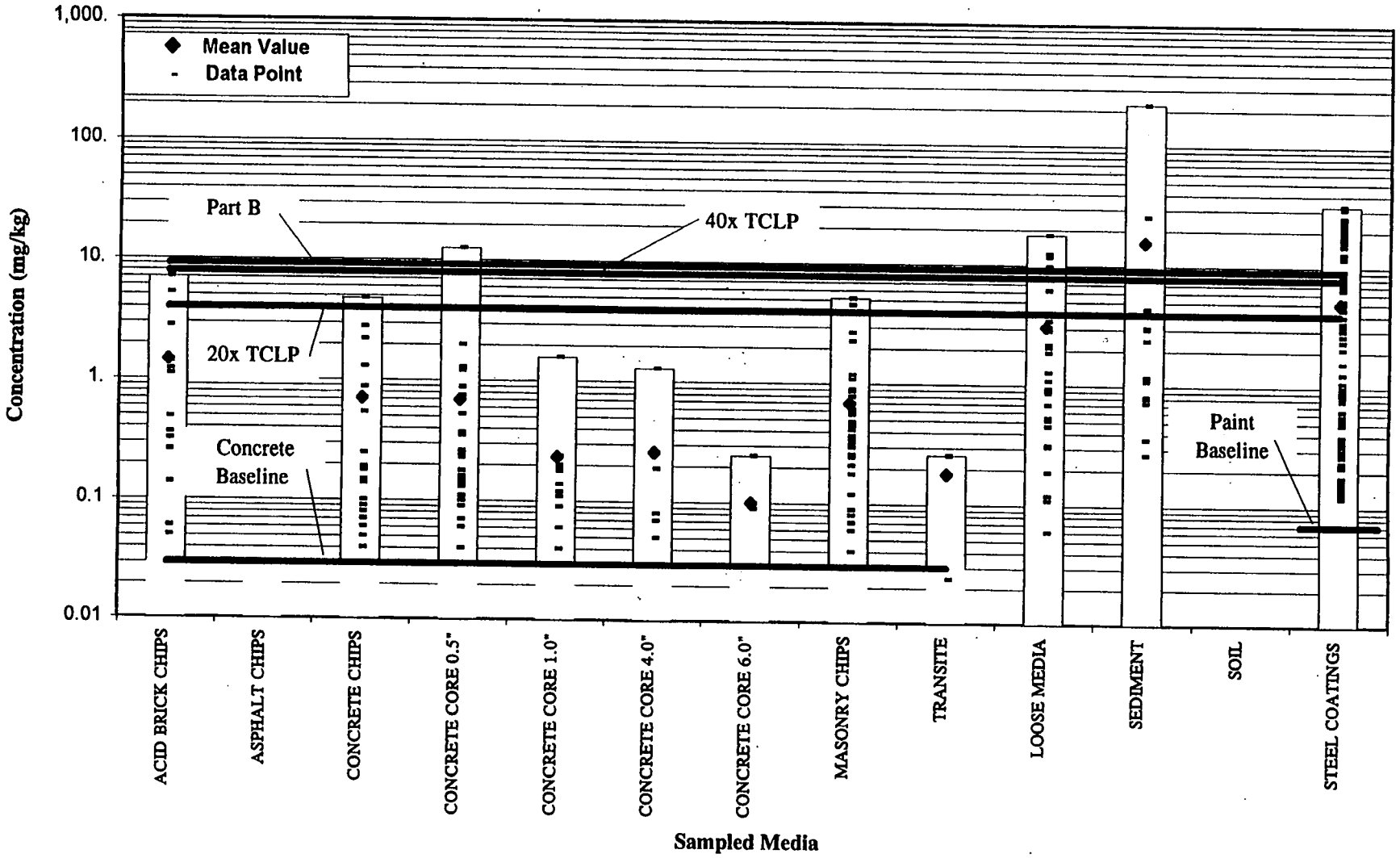

FIGURE A.II-70
SUMMARY OF MERCURY RESULTS GROUPED BY SOLID MEDIA

000463

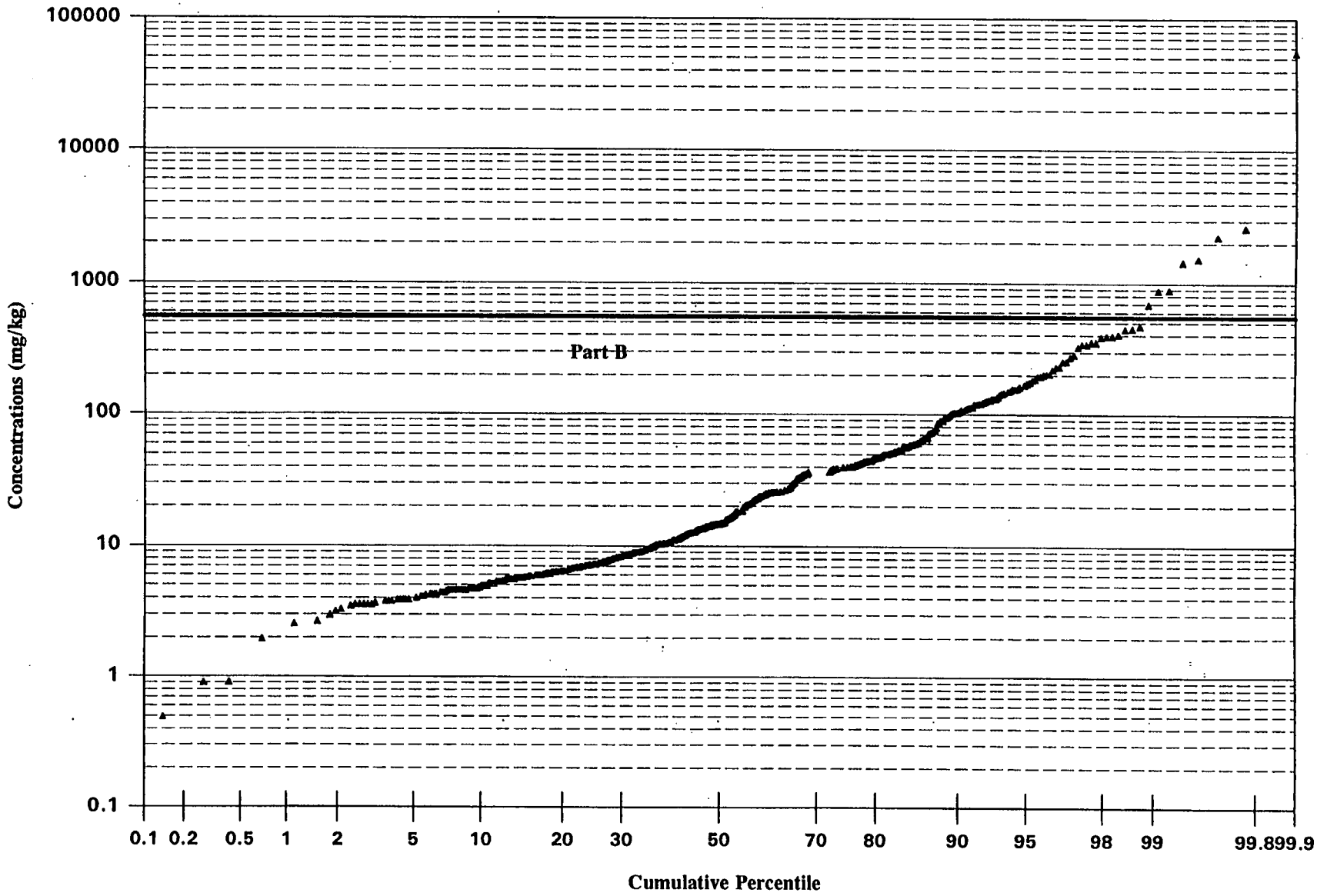

FIGURE A.II-71
CUMULATIVE PROBABILITY PLOT OF NICKEL CONCENTRATIONS IN SOLID MEDIA

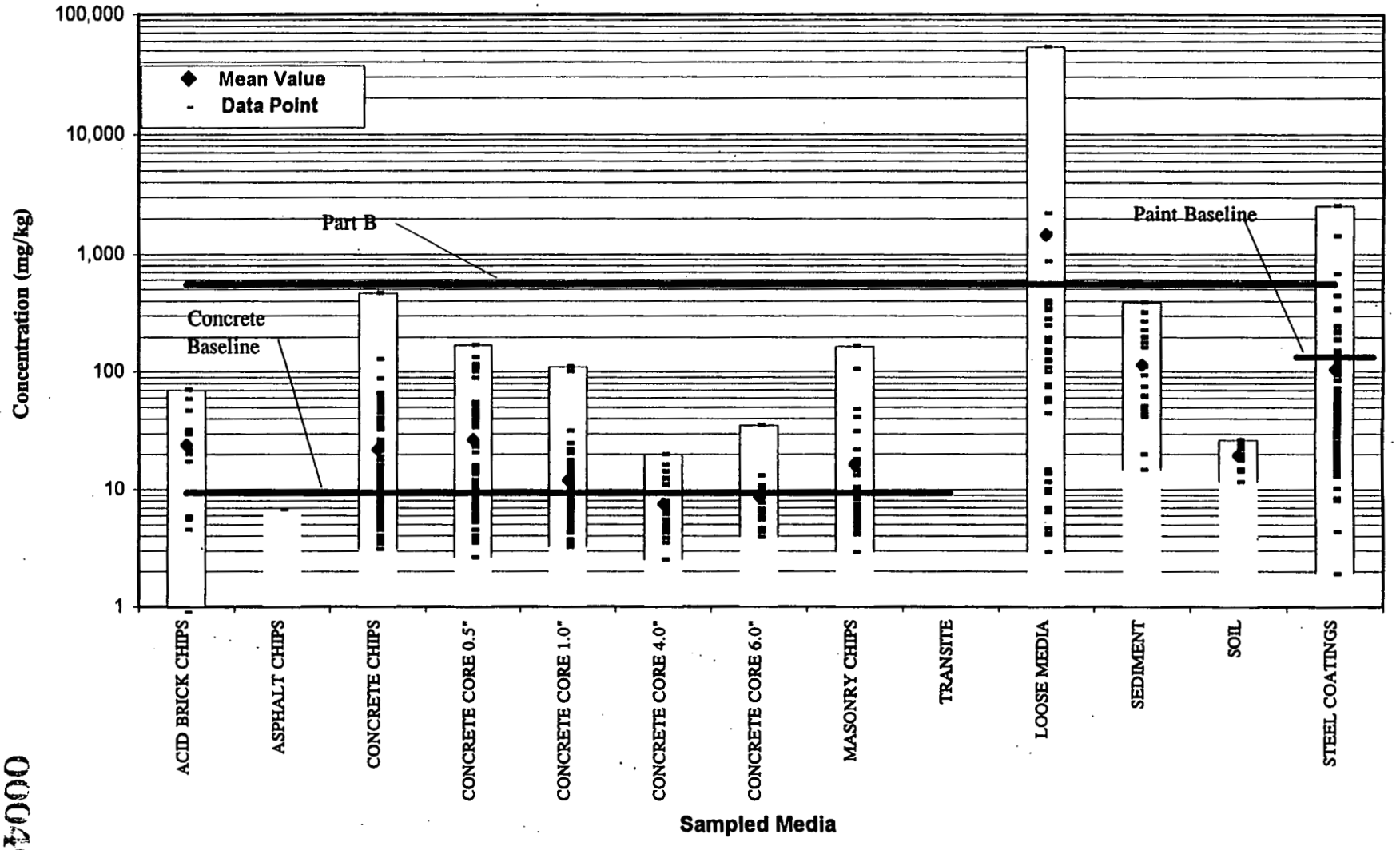

FIGURE A.II-72
SUMMARY OF NICKEL RESULTS GROUPED BY SOLID MEDIA

000465

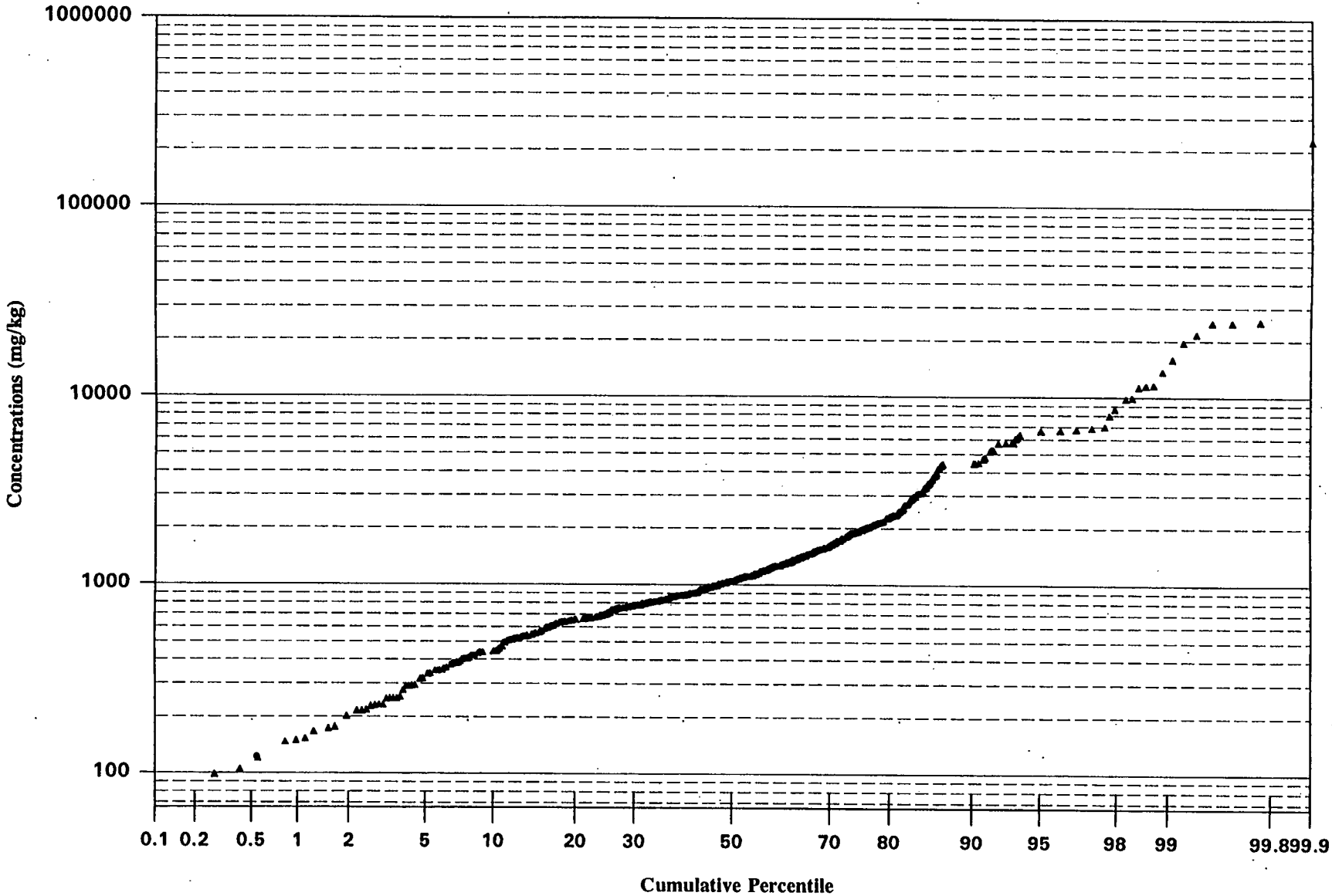

FIGURE A.II-73
CUMULATIVE PROBABILITY PLOT OF POTASSIUM CONCENTRATIONS IN ALL MEDIA

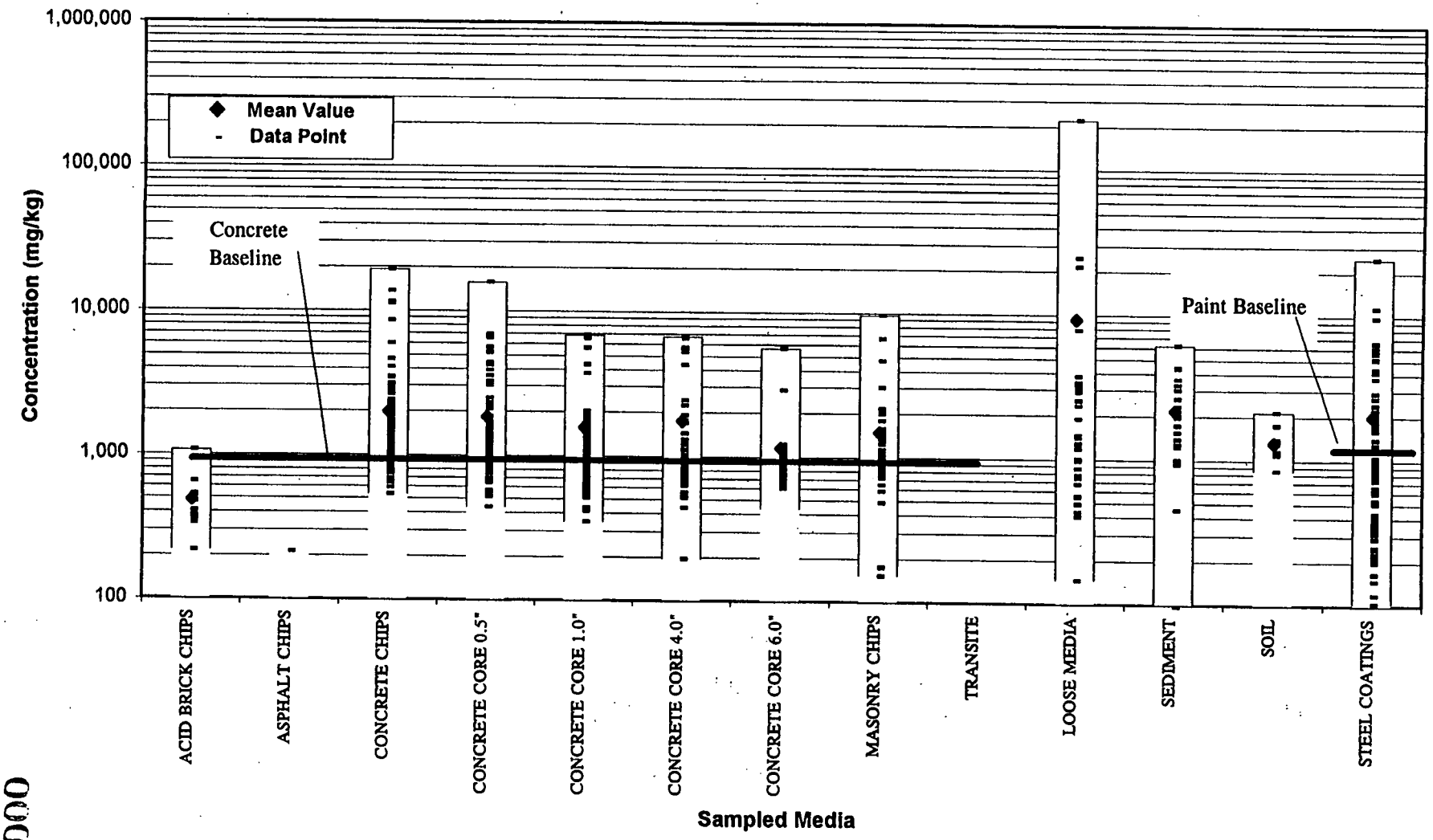

FIGURE A.II-74
SUMMARY OF POTASSIUM RESULTS GROUPED BY MEDIA

000487

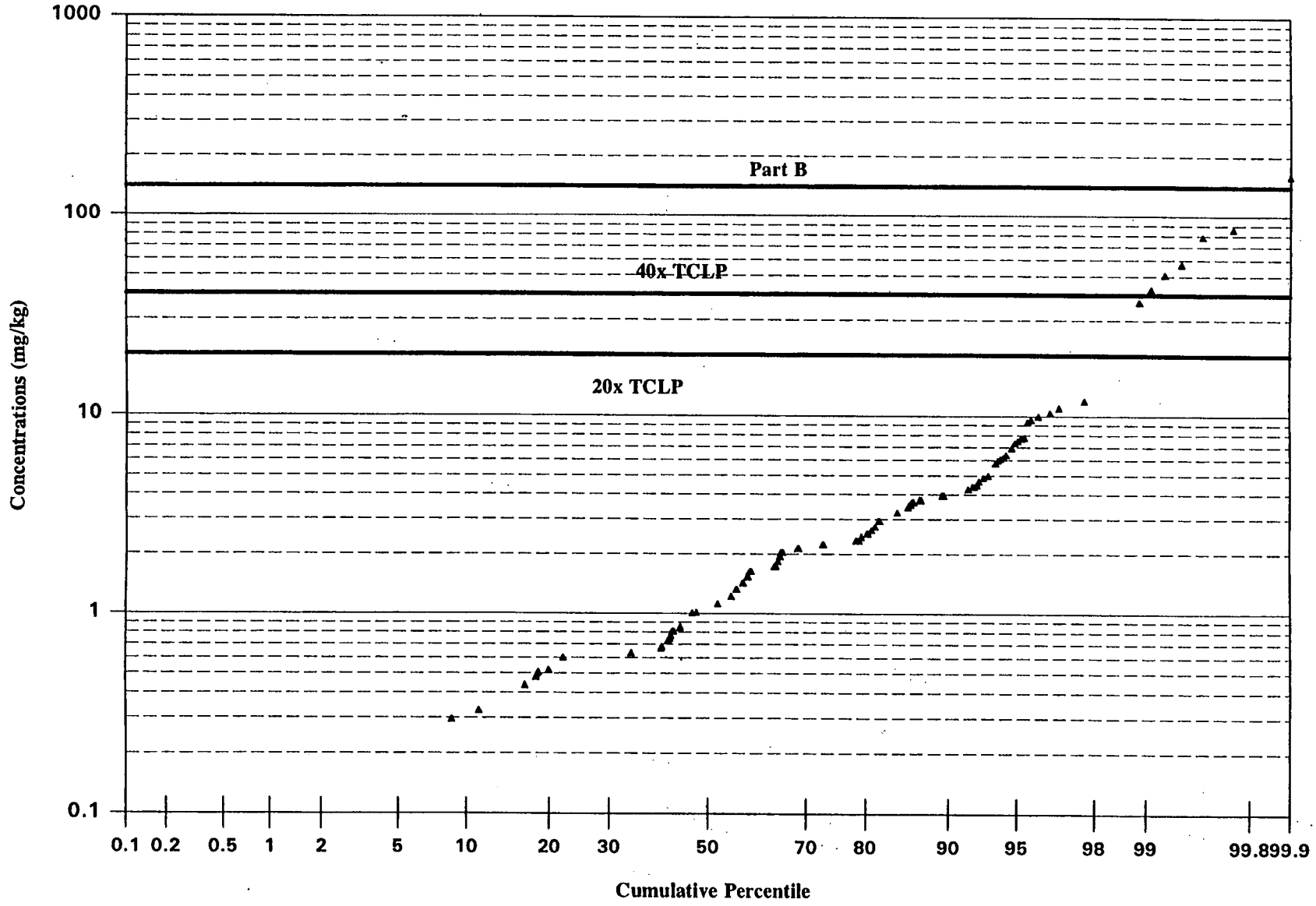

FIGURE A.II-75
CUMULATIVE PROBABILITY PLOT OF SELENIUM CONCENTRATIONS IN SOLID MEDIA

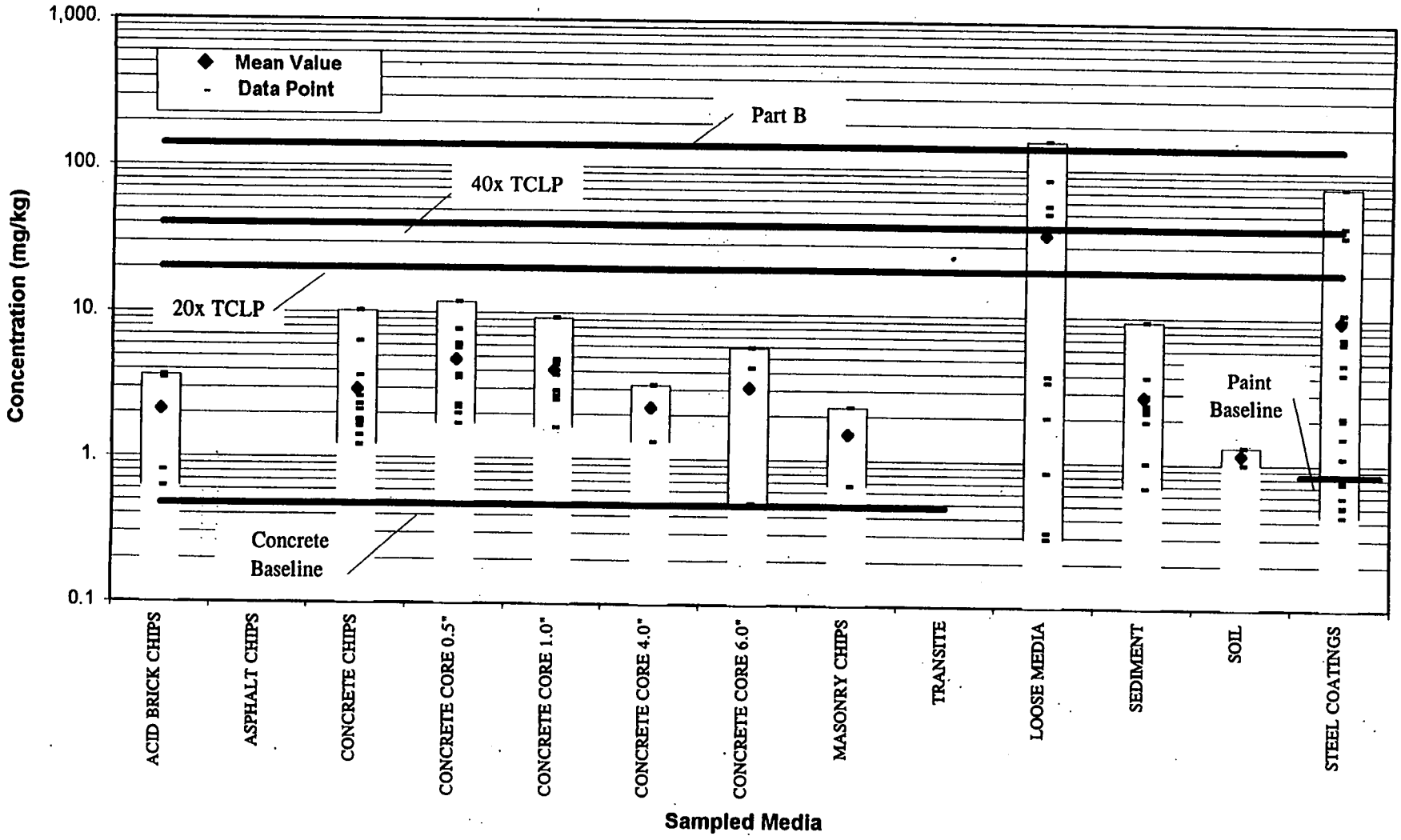

FIGURE A.II-76
SUMMARY OF SELENIUM RESULTS GROUPED BY MEDIA

000465

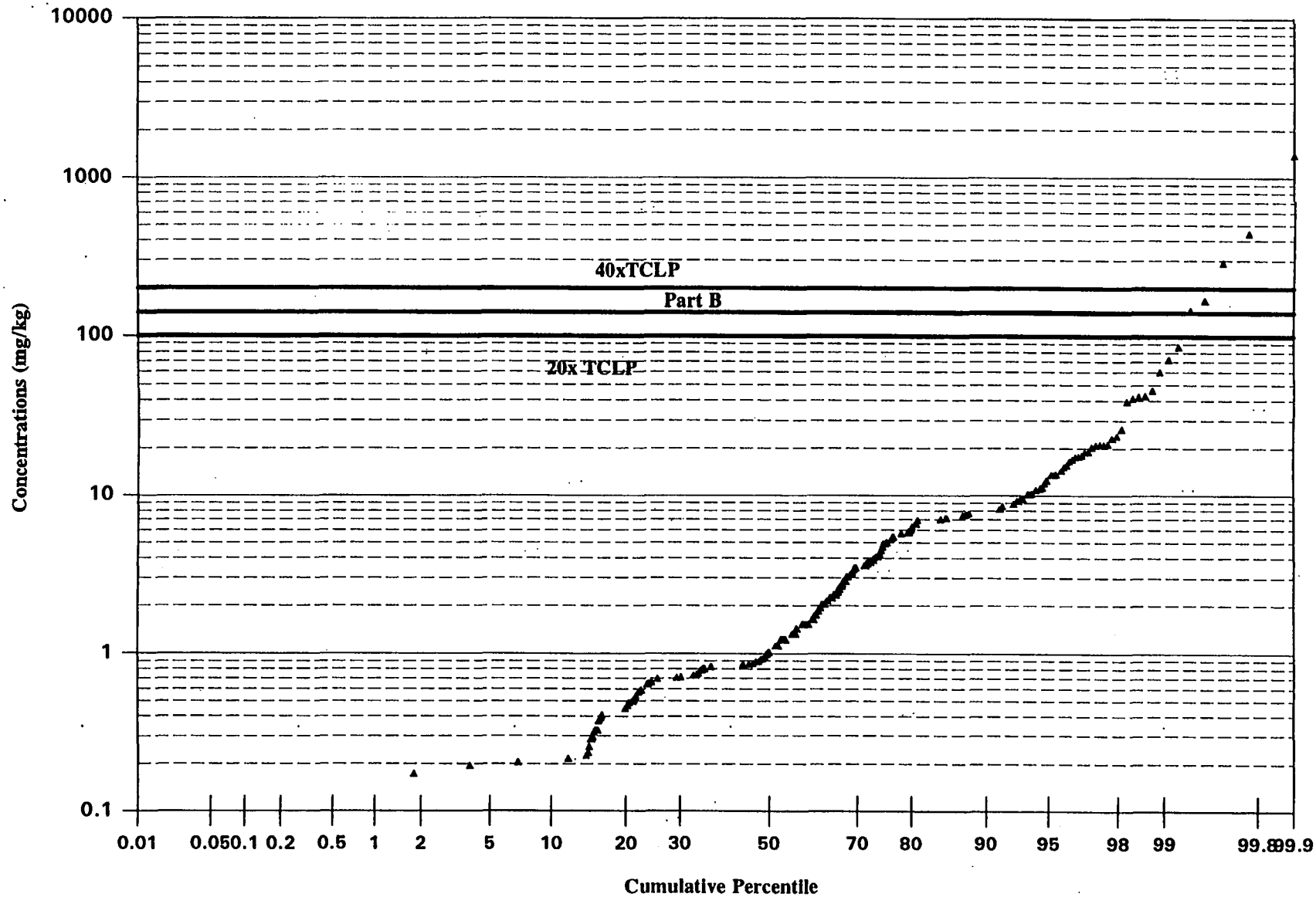

FIGURE A.II-77
CUMULATIVE PROBABILITY PLOT OF SILVER CONCENTRATIONS IN SOLID MEDIA

002420

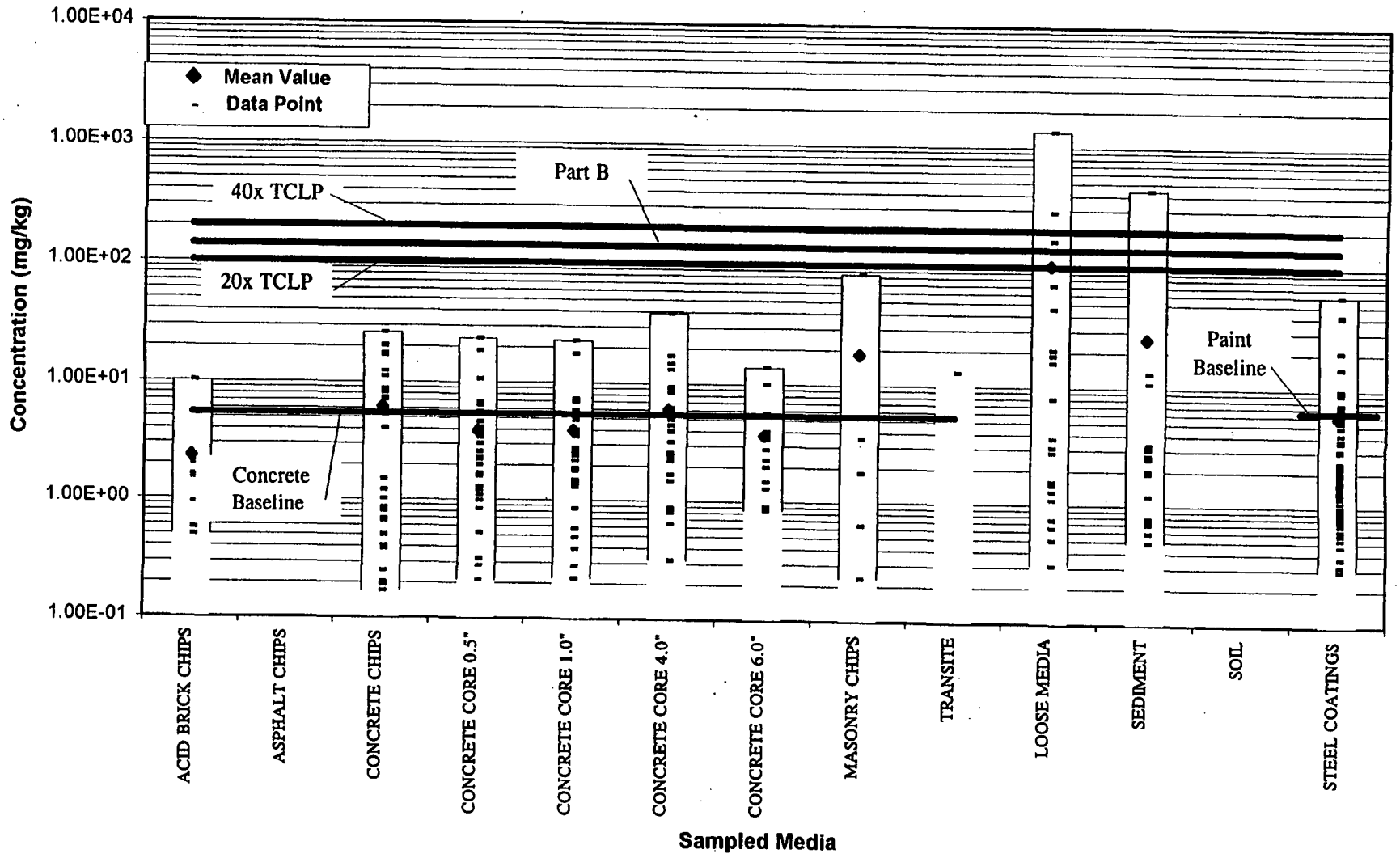

FIGURE A.II-78
SUMMARY OF SILVER RESULTS GROUPED BY SOLID MEDIA

125000

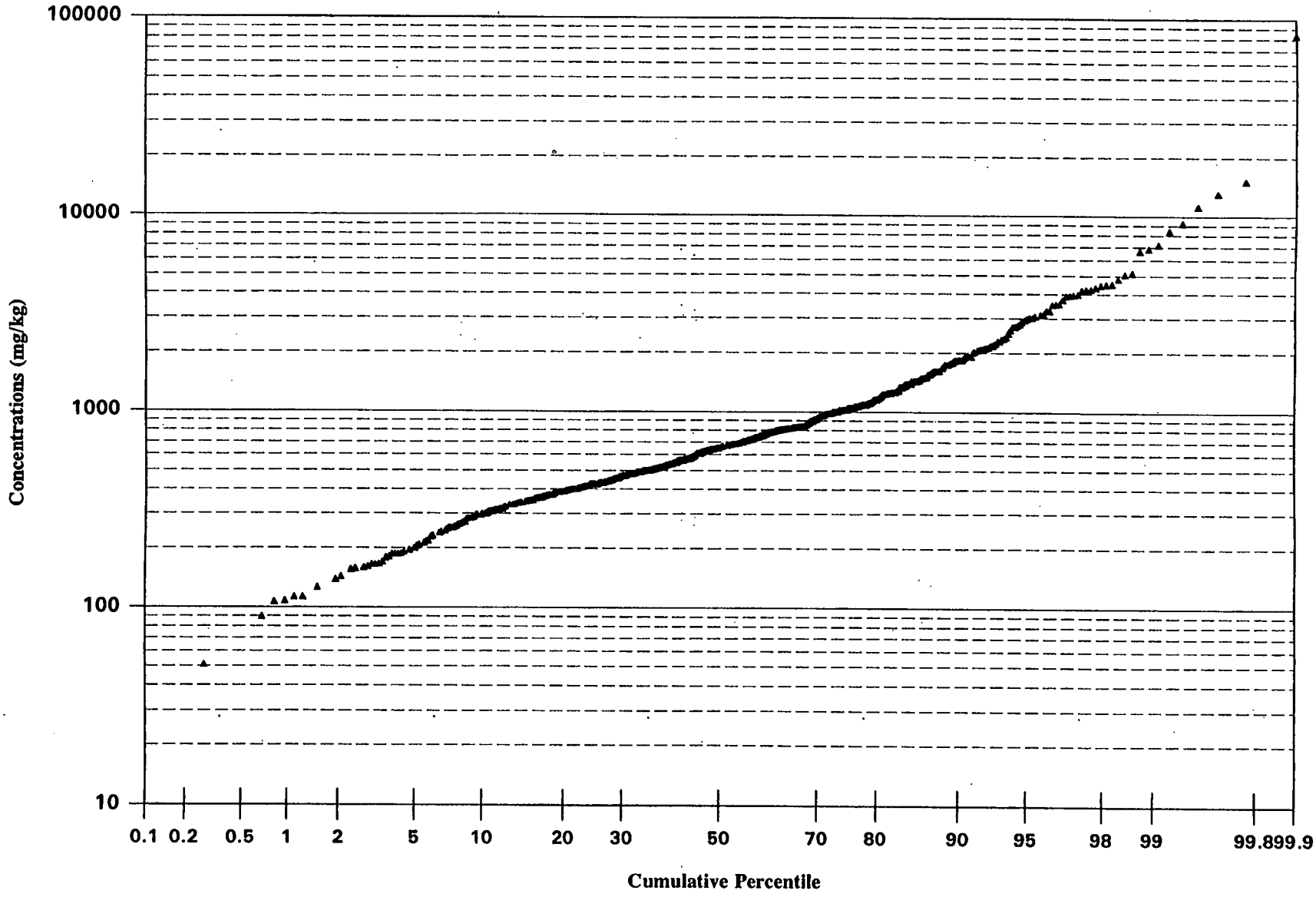

FIGURE A.II-79
CUMULATIVE PROBABILITY PLOT OF SODIUM CONCENTRATIONS IN SOLID MEDIA

000472

12 I 2

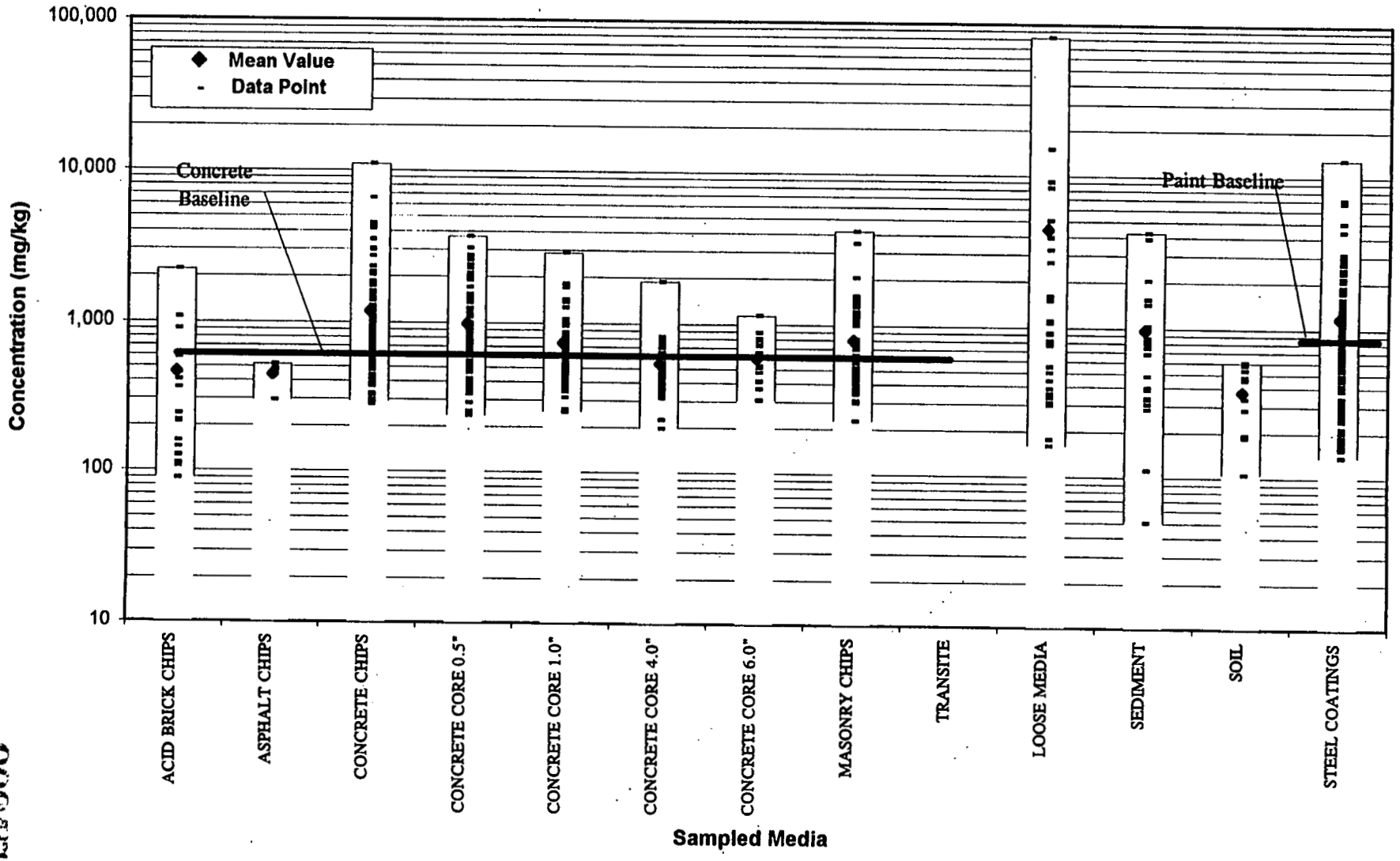

FIGURE A.II-80
SUMMARY OF SODIUM RESULTS GROUPED BY SOLID MEDIA

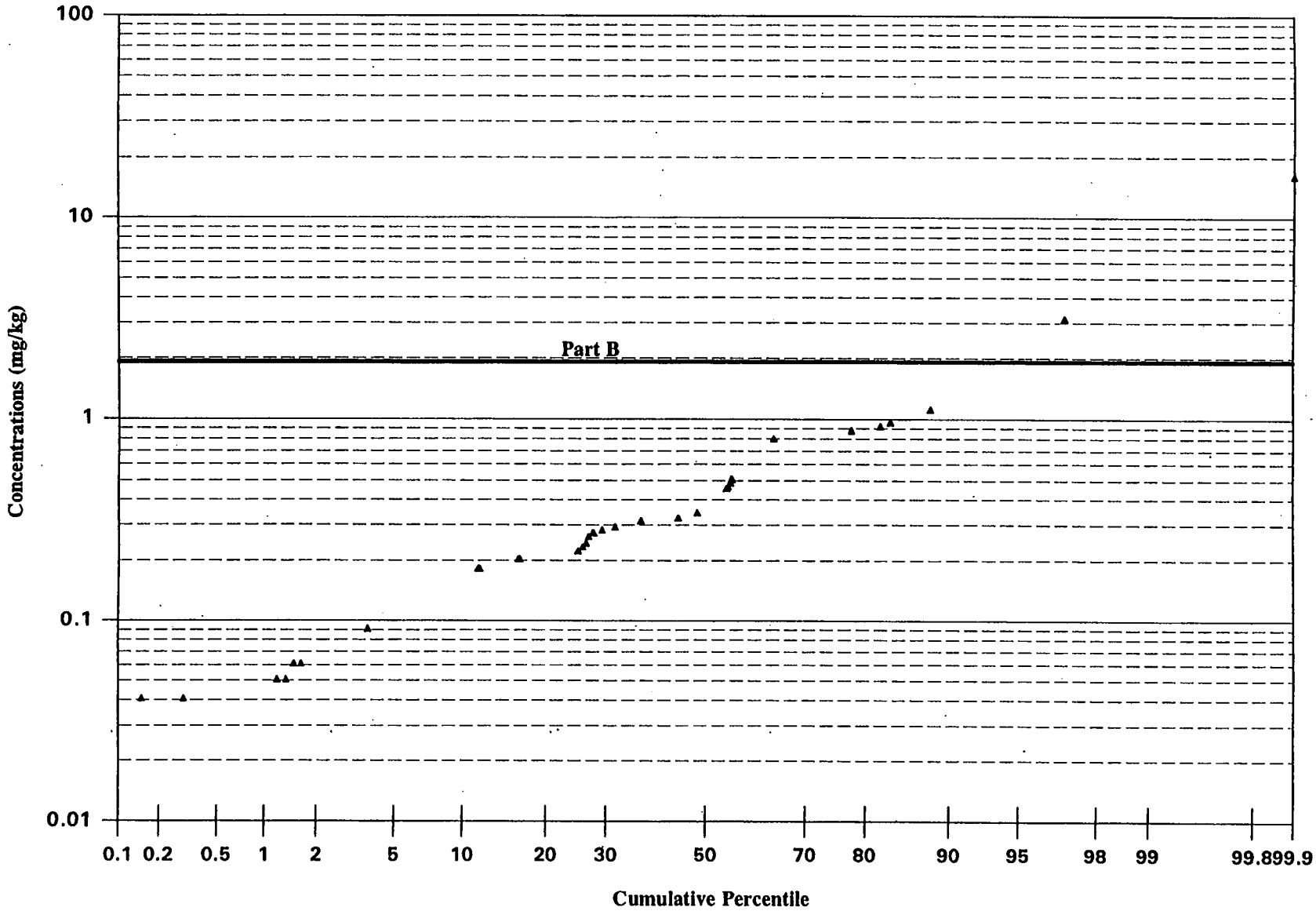

FIGURE A.II-81
CUMULATIVE PROBABILITY PLOT OF THALLIUM CONCENTRATIONS IN SOLID MEDIA

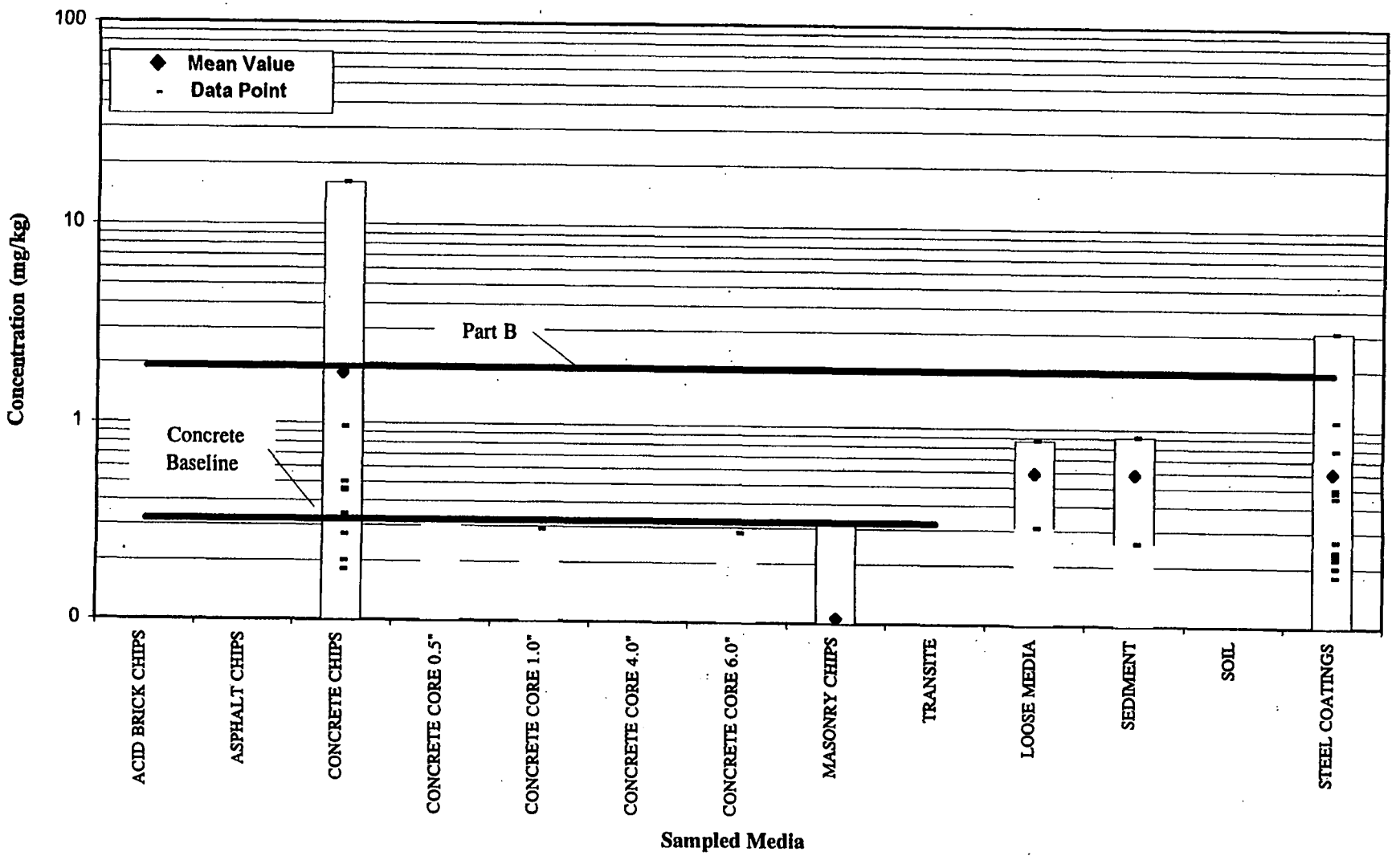

FIGURE A.II-82
SUMMARY OF THALLIUM RESULTS GROUPED BY SOLID MEDIA

000473

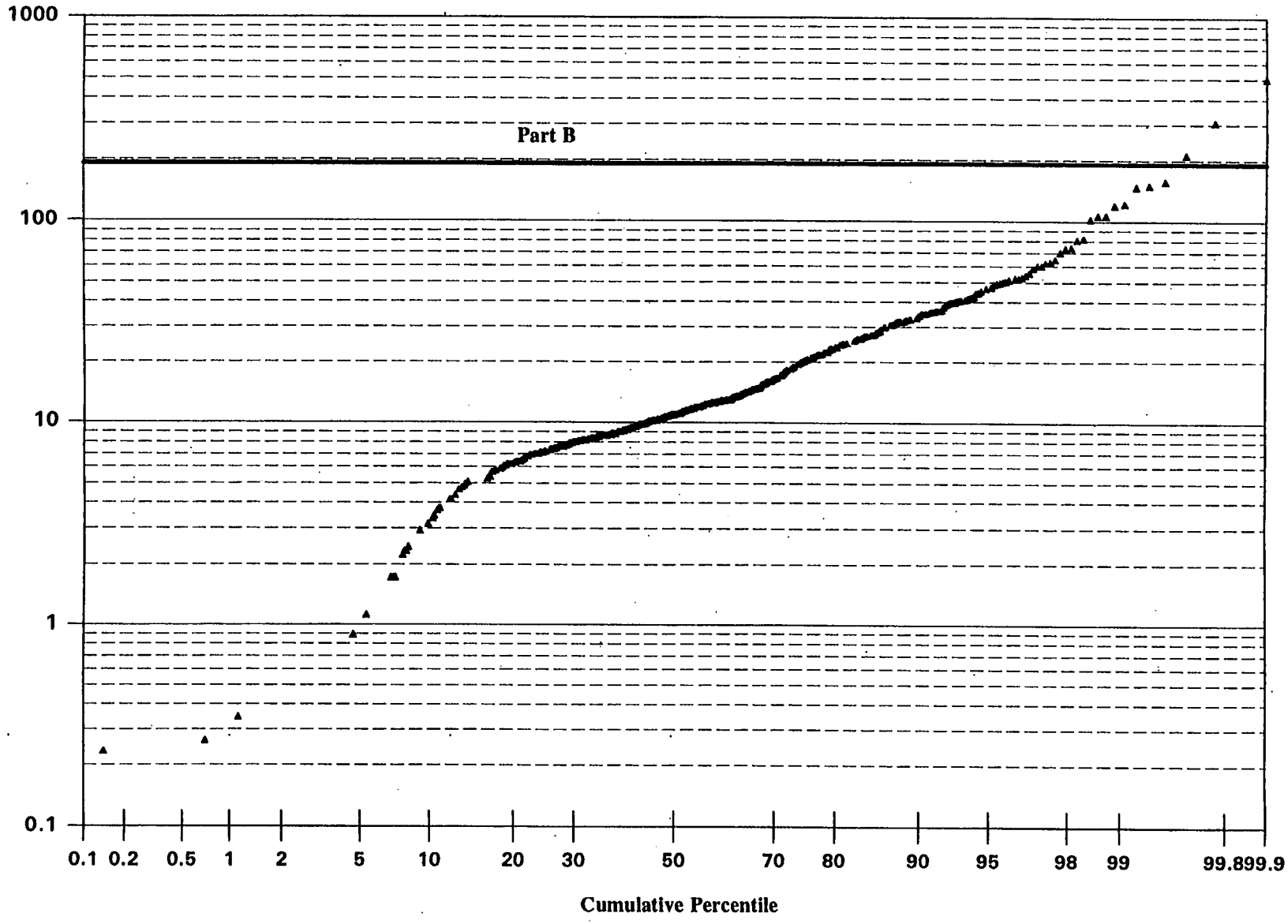

FIGURE A.II-83
CUMULATIVE PROBABILITY PLOT OF VANADIUM CONCENTRATIONS IN SOLID MEDIA

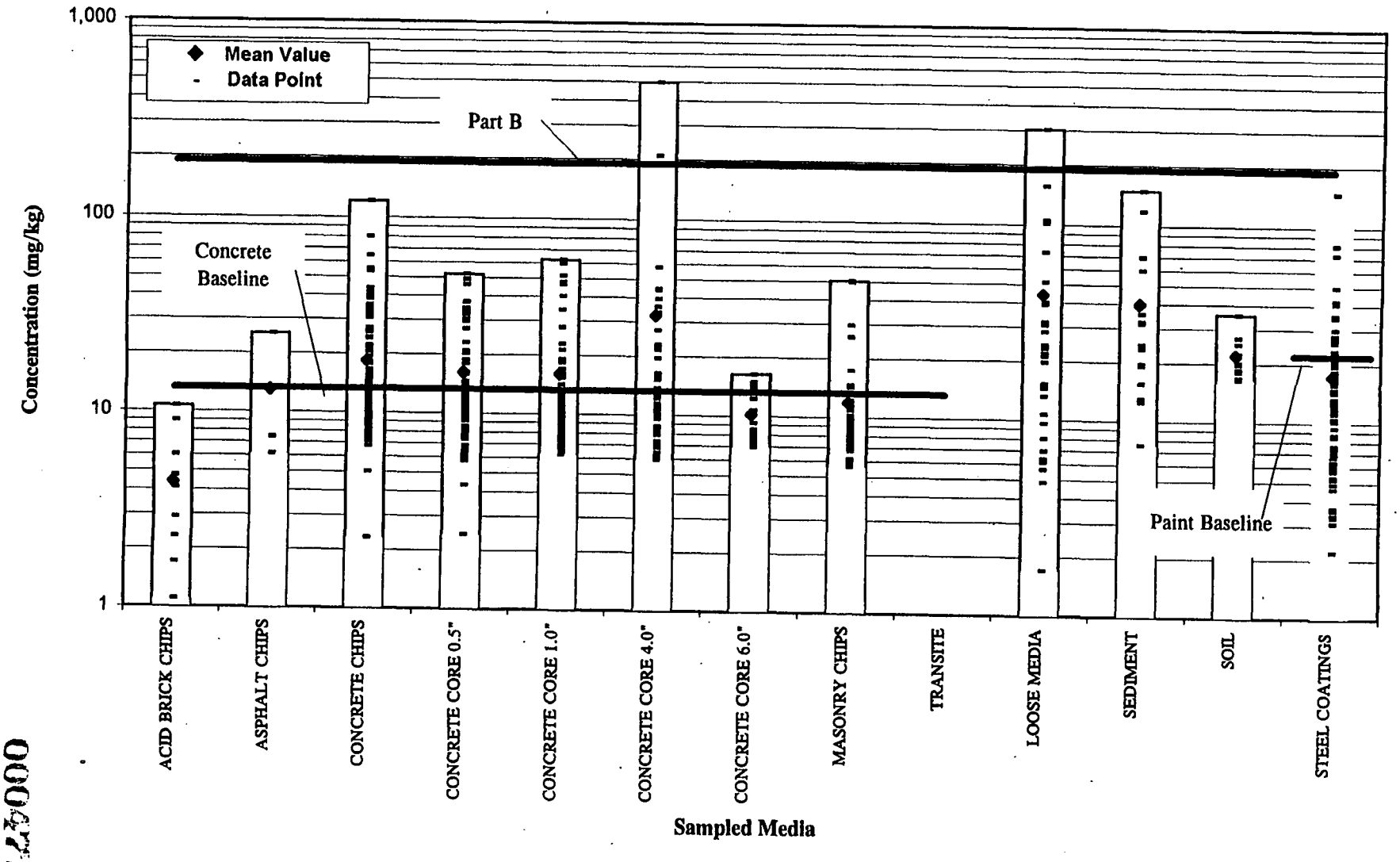

FIGURE A.II-84
SUMMARY OF VANADIUM RESULTS GROUPED BY SOLID MEDIA

000277

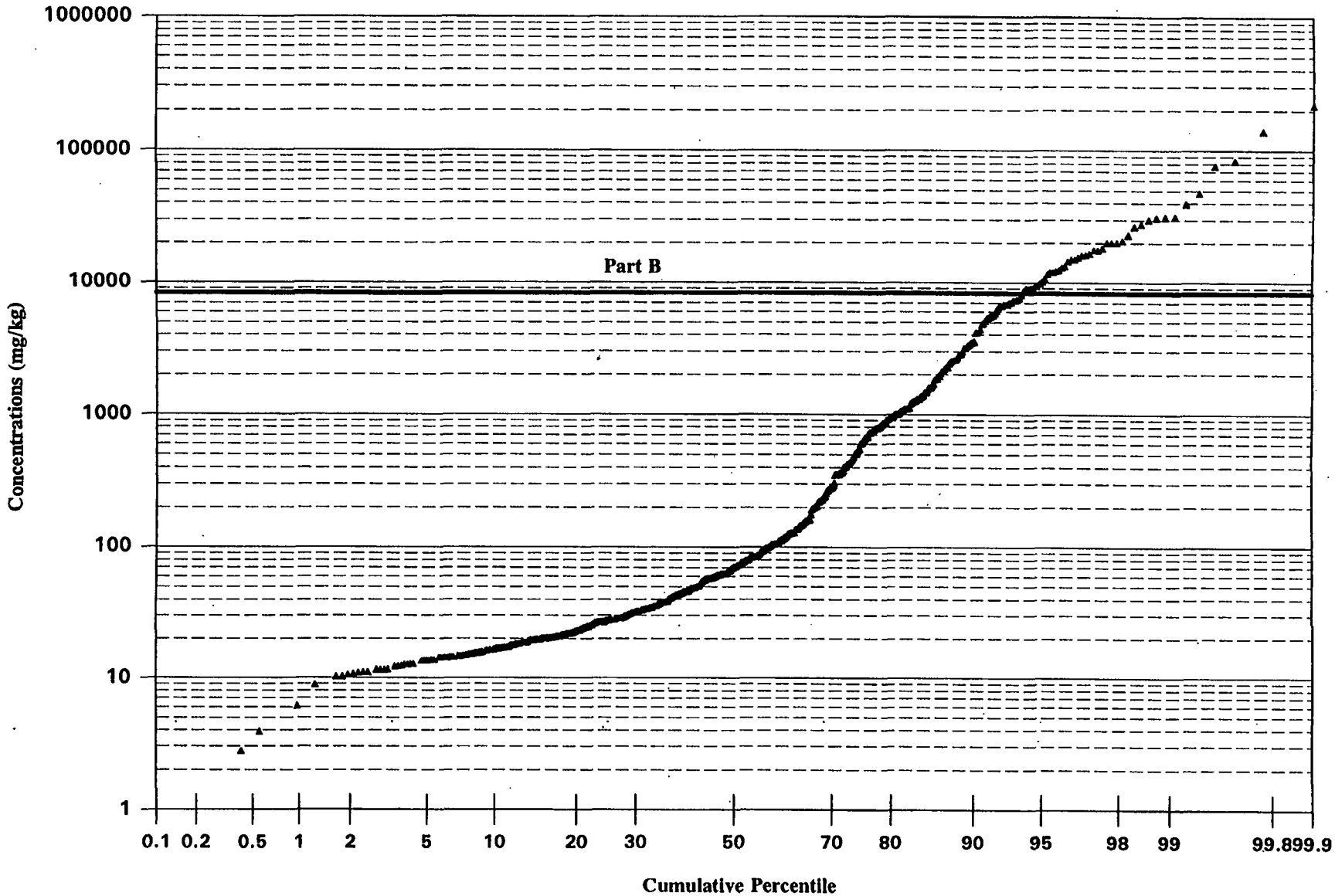

FIGURE A.II-85
CUMULATIVE PROBABILITY PLOT OF ZINC CONCENTRATIONS IN SOLID MEDIA

000478

2121

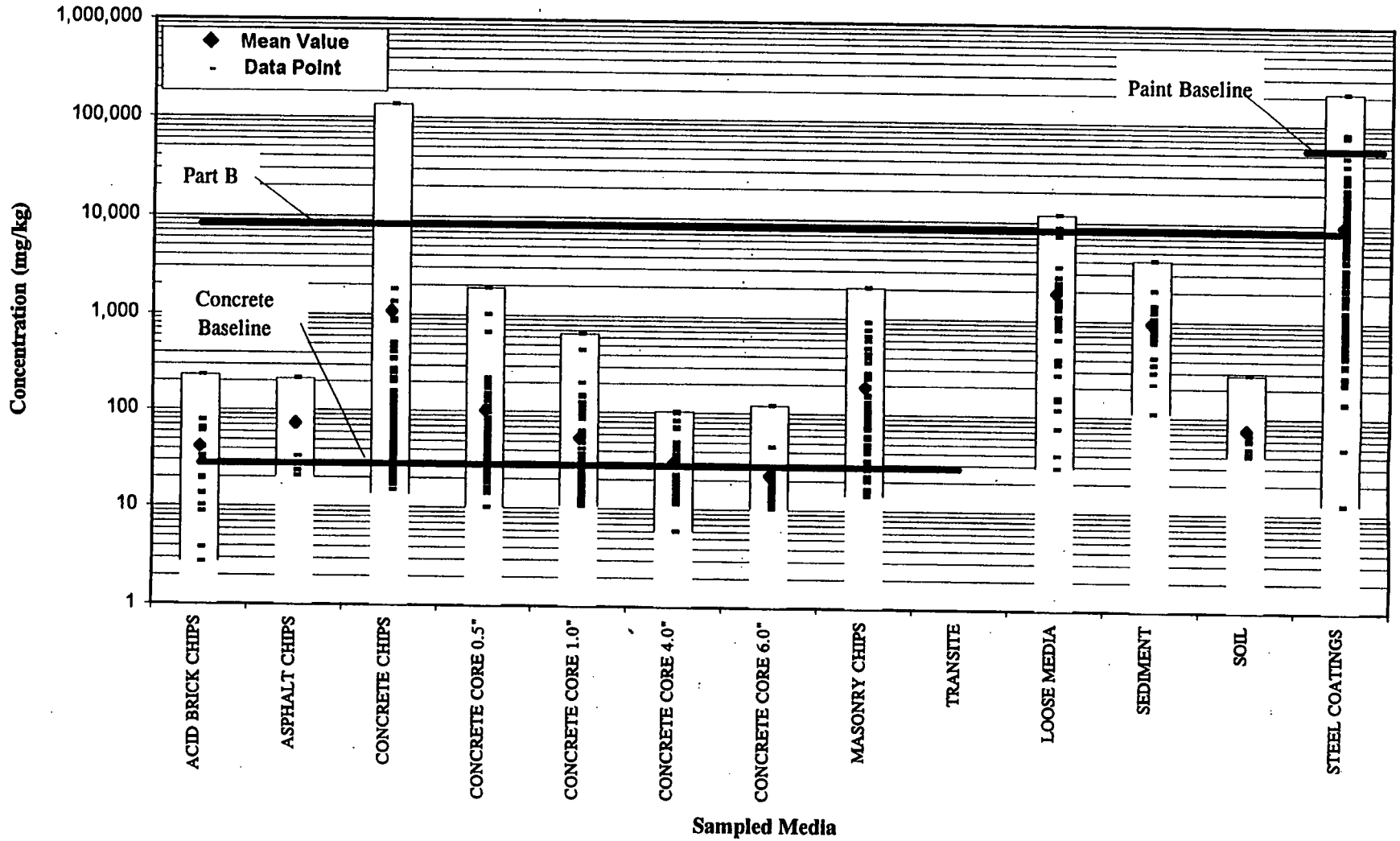

FIGURE A.II-86
SUMMARY OF ZINC RESULTS GROUPED BY MEDIA

000475

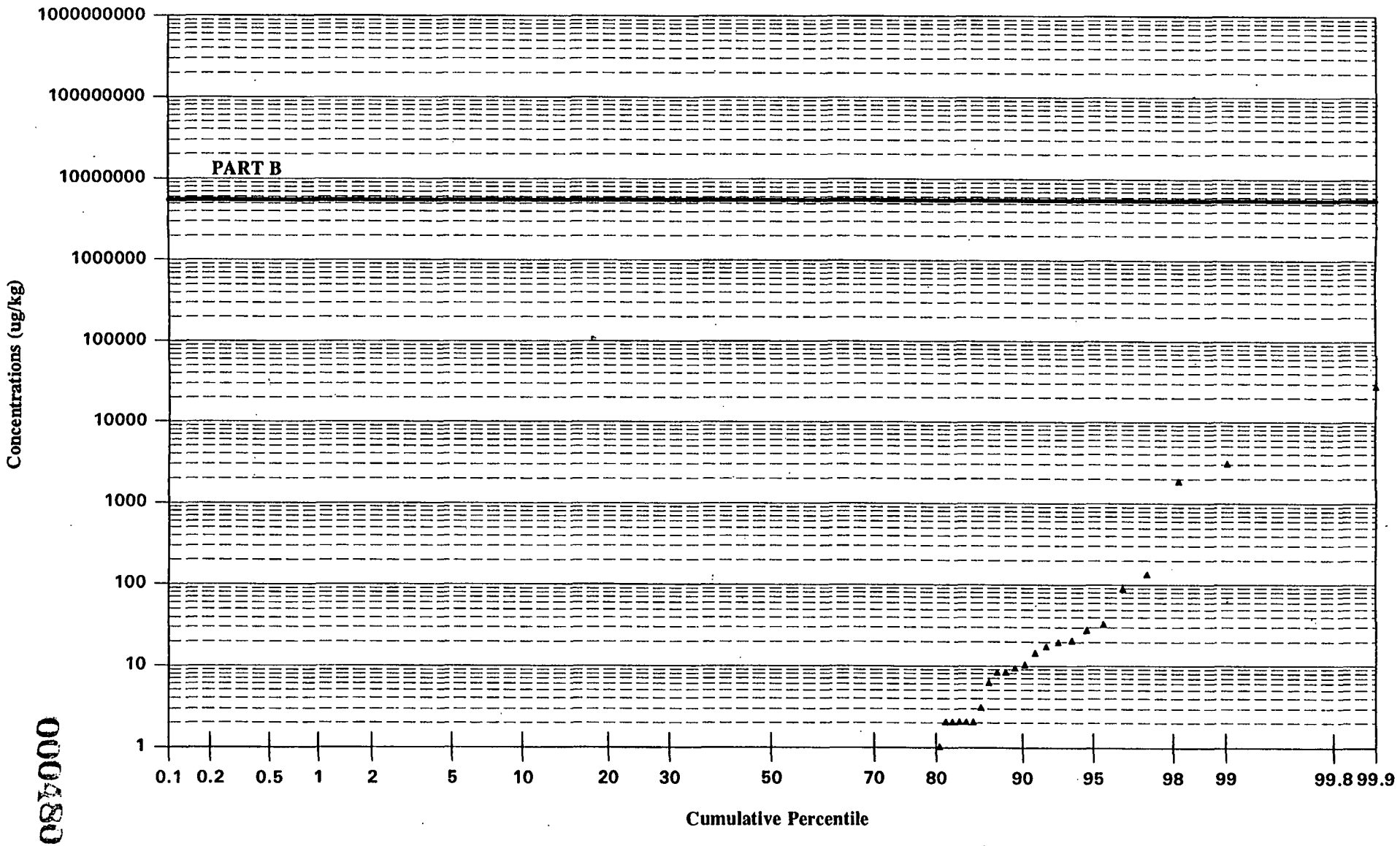

FIGURE A.II-87
CUMULATIVE PROBABILITY PLOT OF TOLUENE CONCENTRATIONS IN SOLID MEDIA

000480

2121

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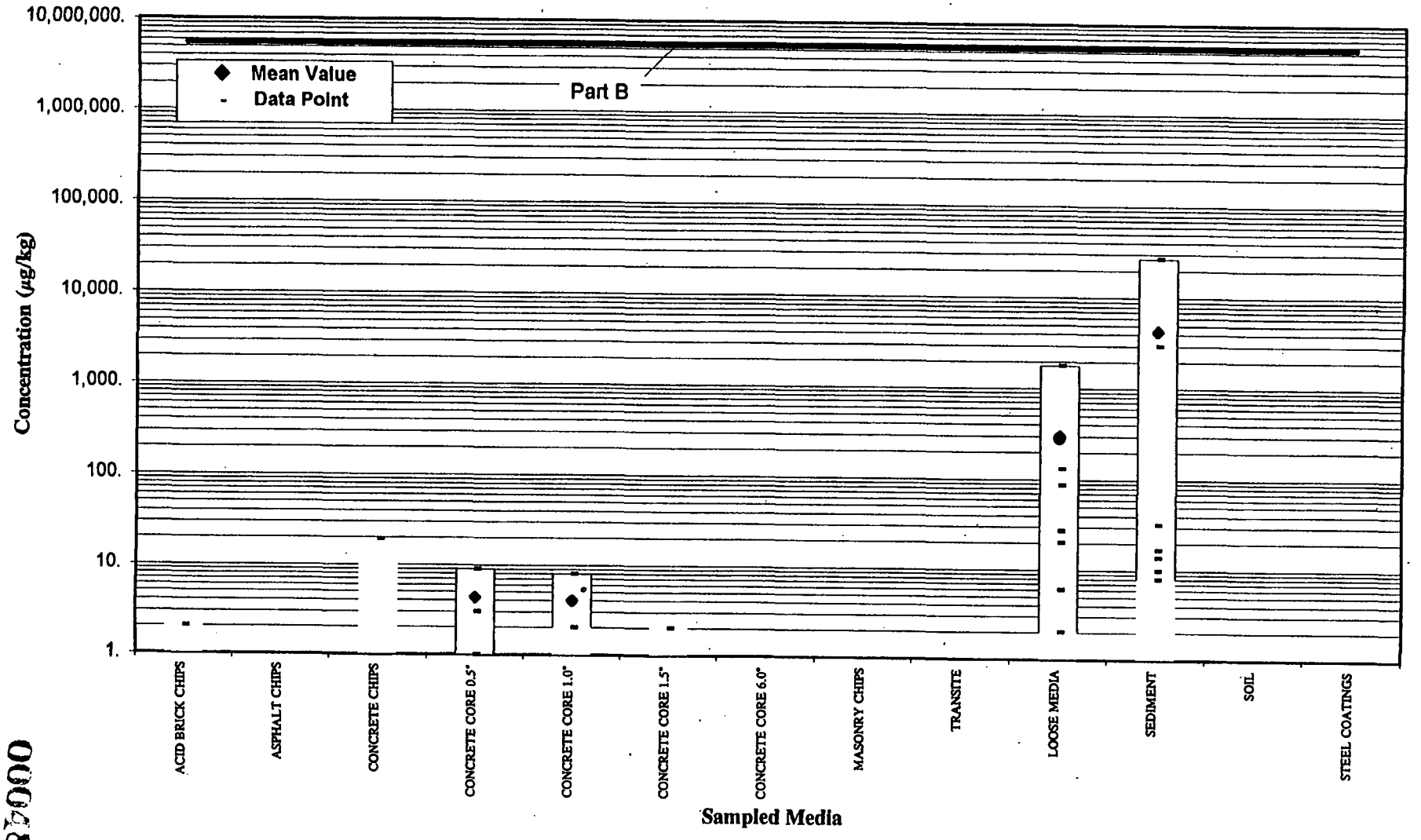

FIGURE A.II-88
SUMMARY OF TOLUENE RESULTS GROUPED BY SOLID MEDIA

000581

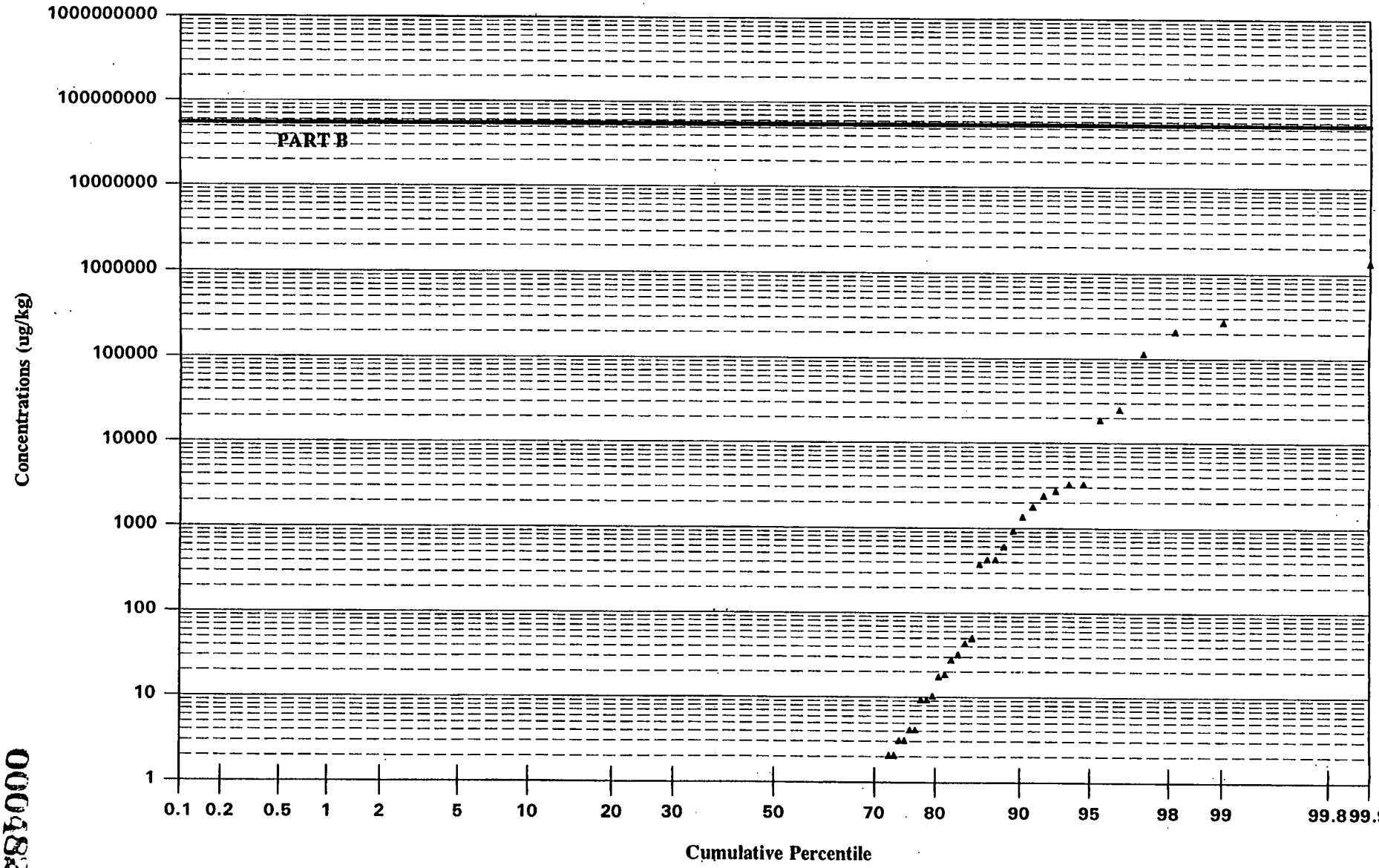

FIGURE A.II-89
CUMULATIVE PROBABILITY PLOT OF TOTAL XYLENES CONCENTRATIONS IN SOLID MEDIA

000482

1212

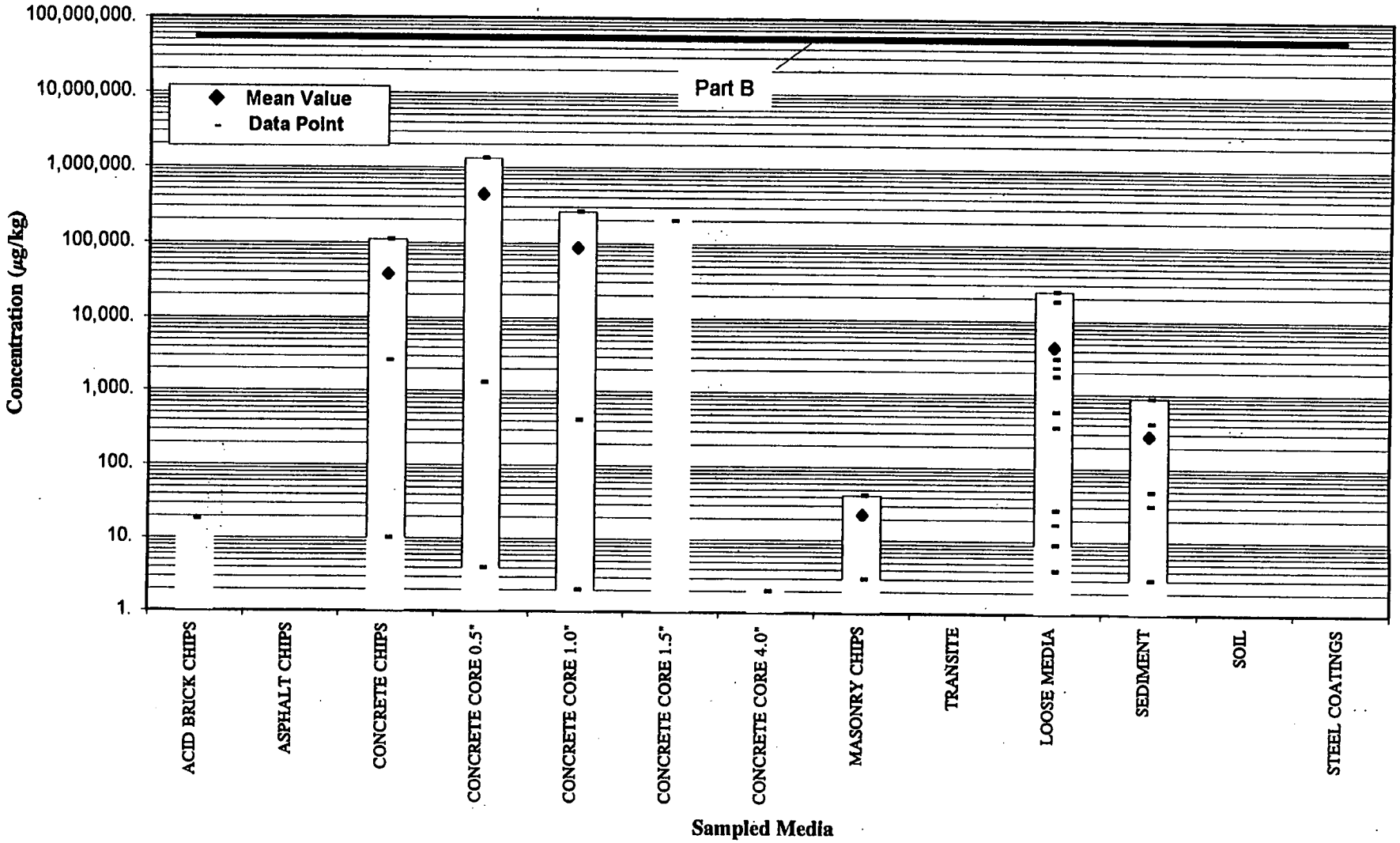

FIGURE A.II-90
SUMMARY OF (TOTAL) XYLENES RESULTS GROUPED BY SOLID MEDIA

000483

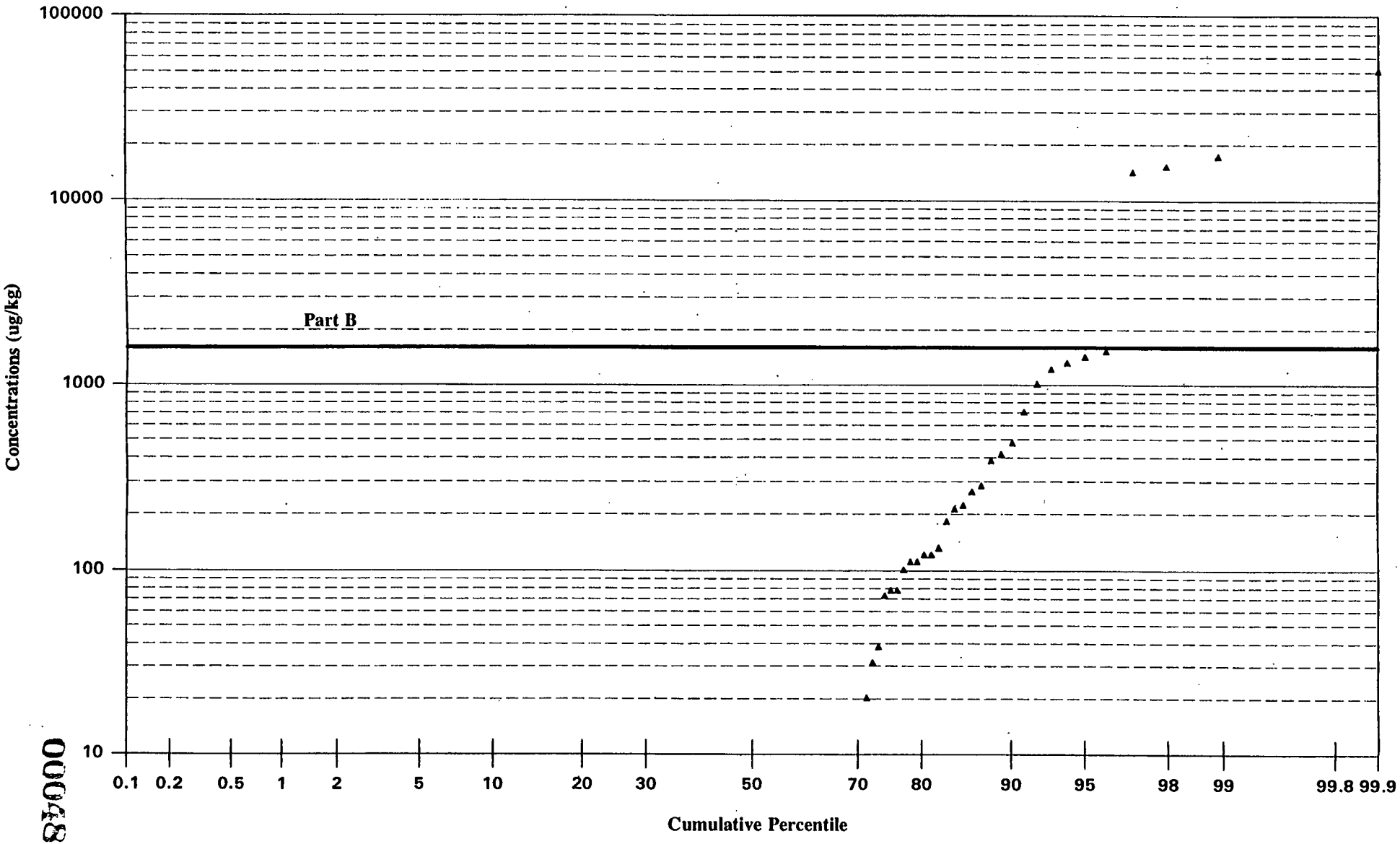

FIGURE A.II-91
CUMULATIVE PROBABILITY PLOT OF ACENAPHTHENE CONCENTRATIONS IN SOLID MEDIA

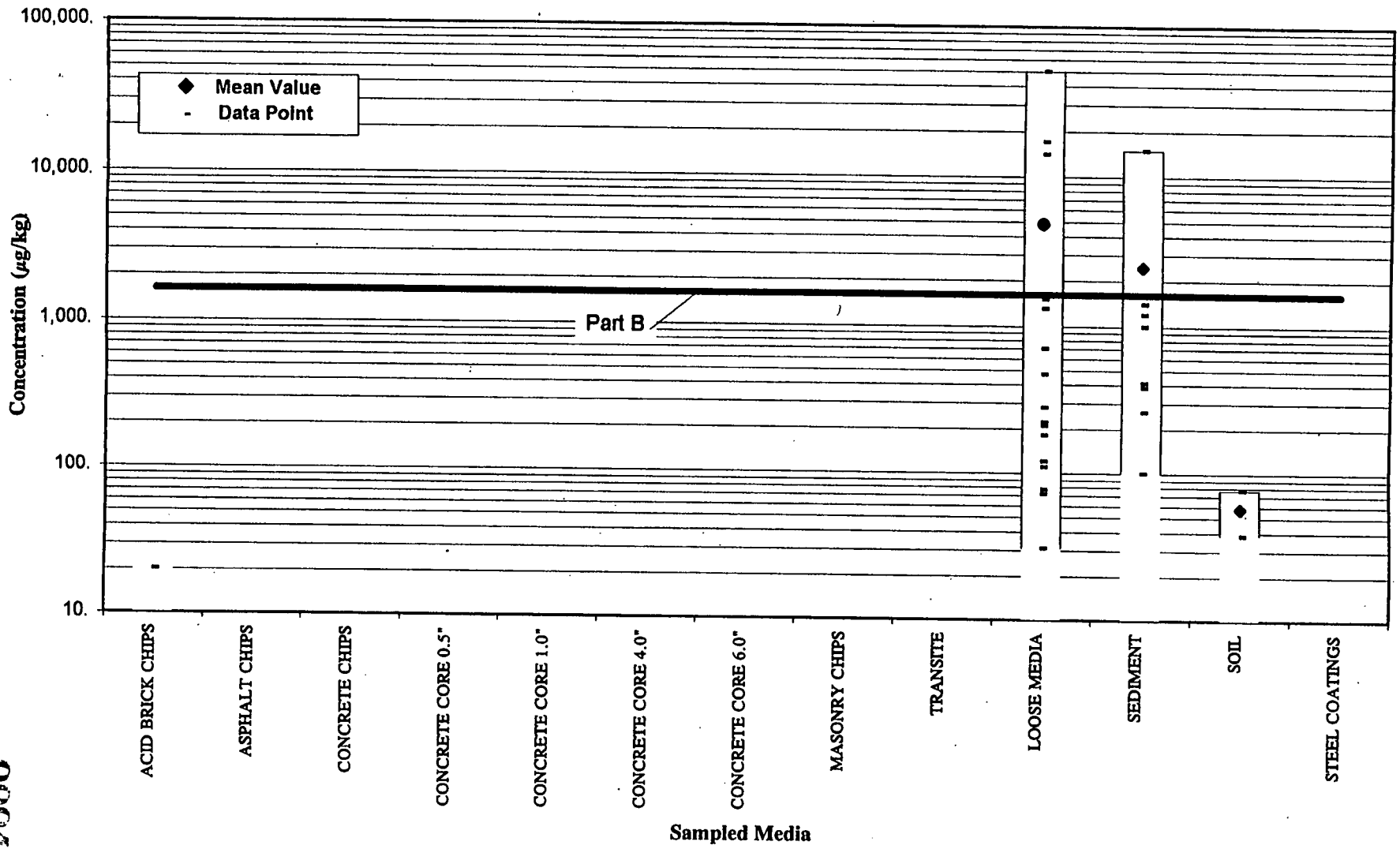

FIGURE A.II-92
SUMMARY OF ACENAPHTHENE RESULTS GROUPED BY SOLID MEDIA

000483

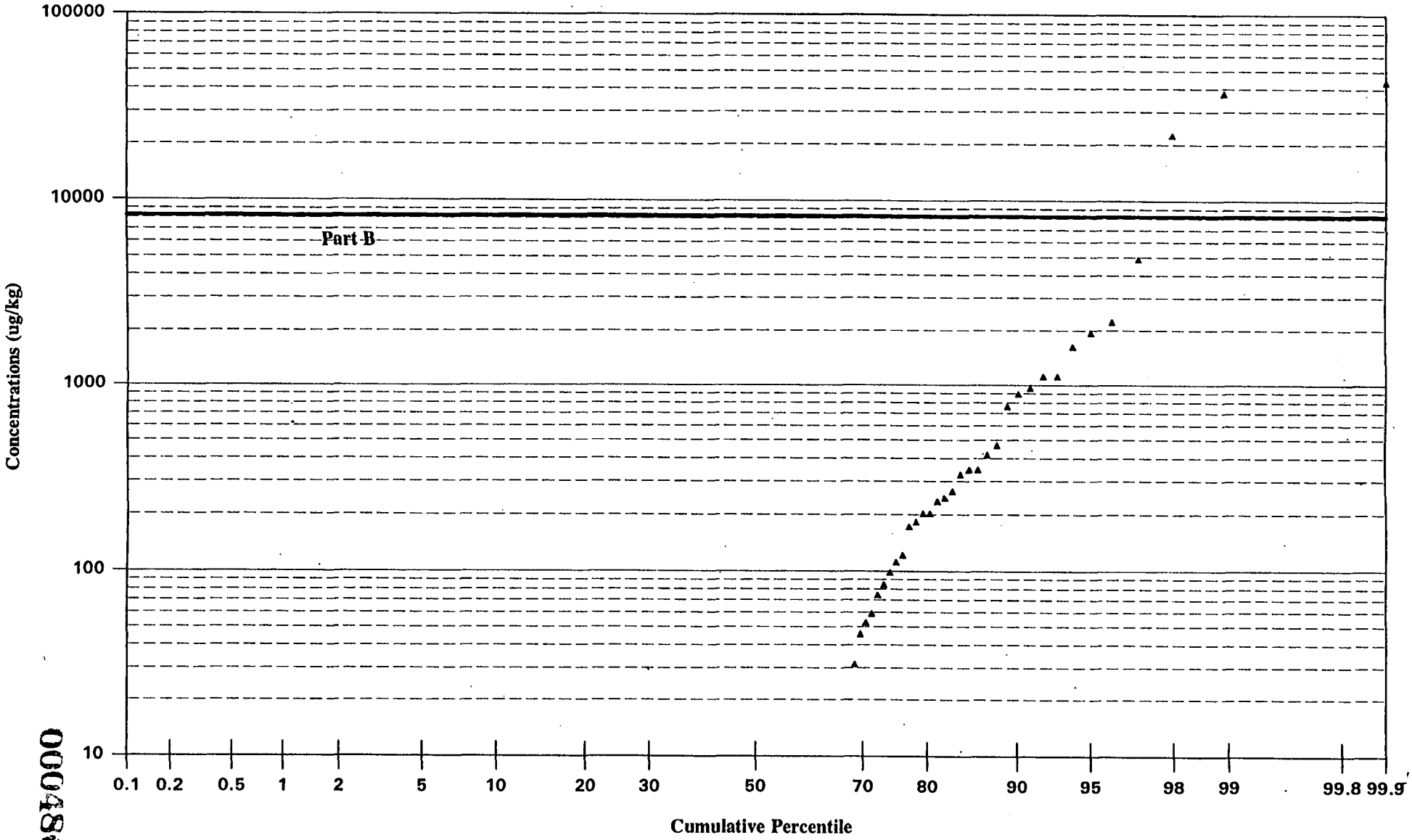

FIGURE A.II-93
CUMULATIVE PROBABILITY PLOT OF ANTHRACENE CONCENTRATIONS IN SOLID MEDIA

000486

7171

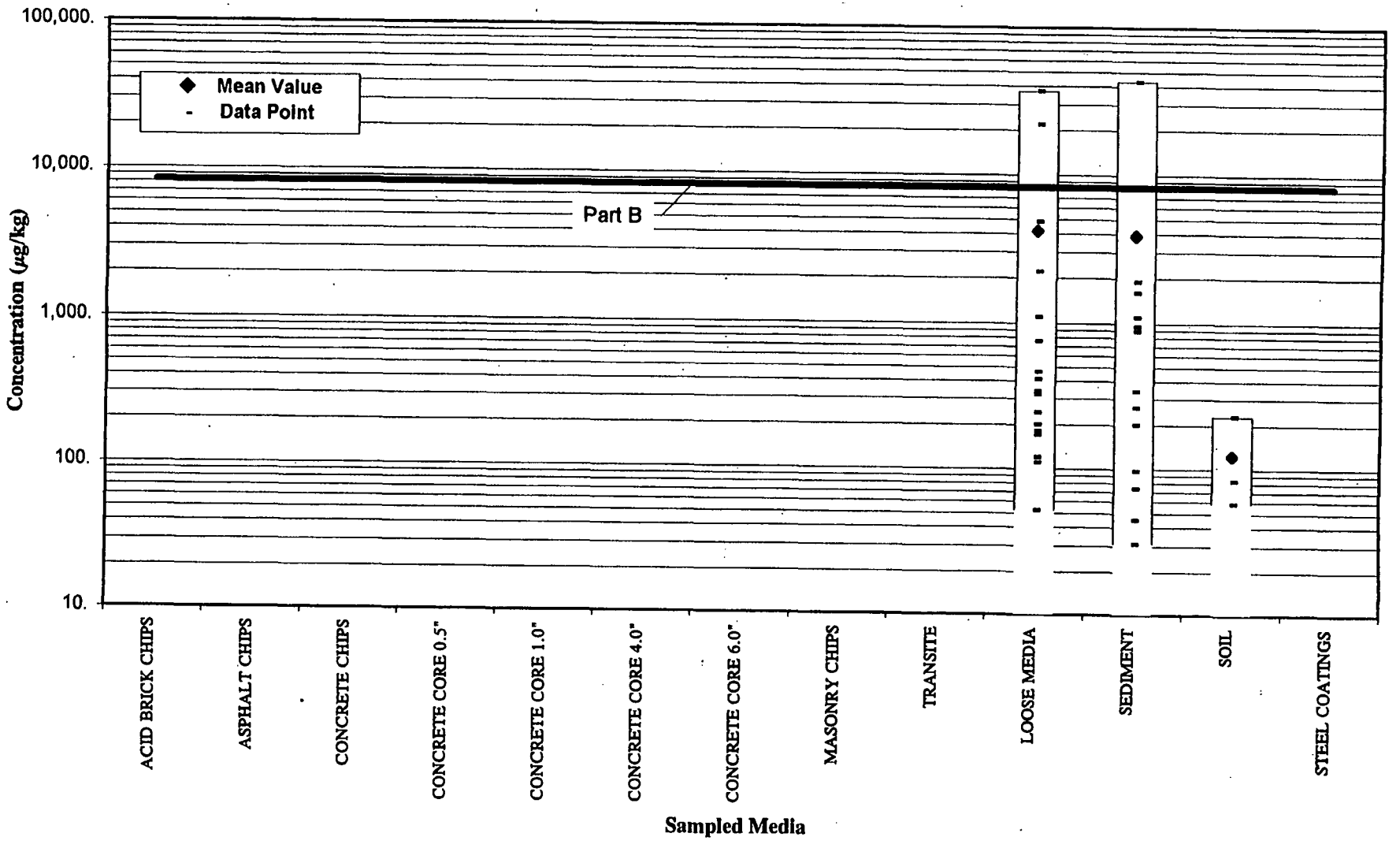

FIGURE A.II-94
SUMMARY OF ANTHRACENE RESULTS GROUPED BY SOLID MEDIA

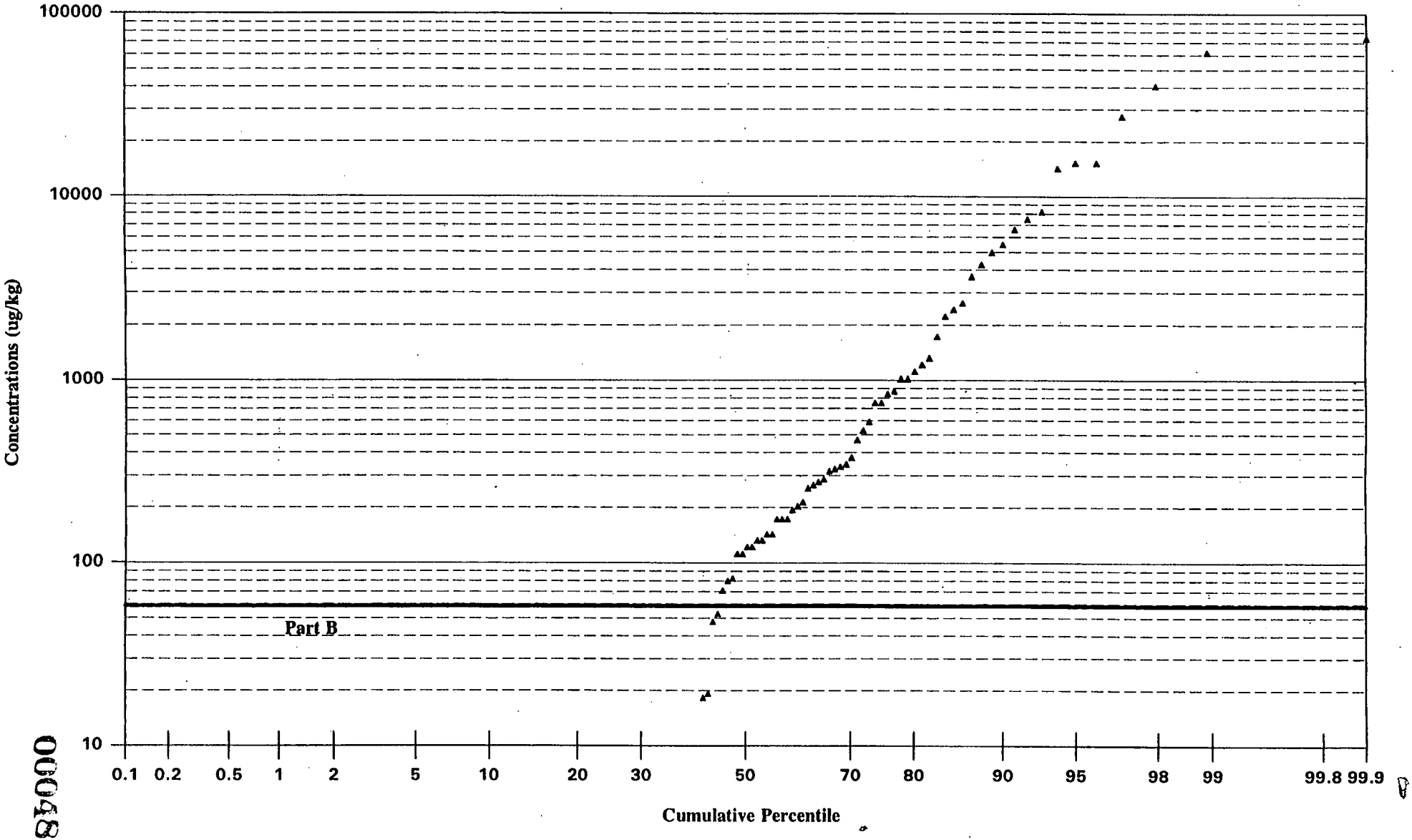

FIGURE A.II-95
CUMULATIVE PROBABILITY PLOT OF BENZO(A)ANTHRACENE CONCENTRATIONS IN SOLID MEDIA

000488

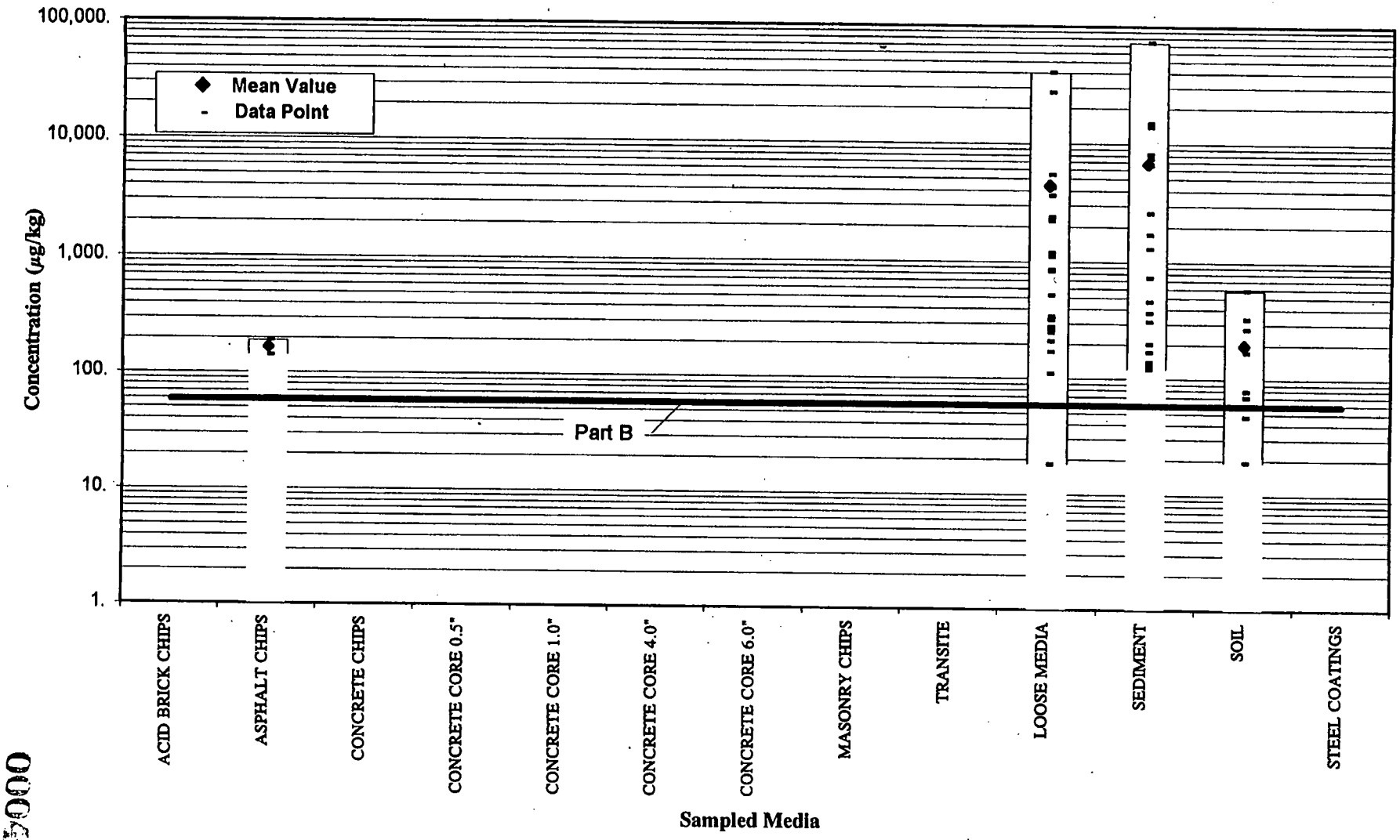

FIGURE A.II-96
SUMMARY OF BENZO(a)ANTHRACENE RESULTS GROUPED BY SOLID MEDIA

000589

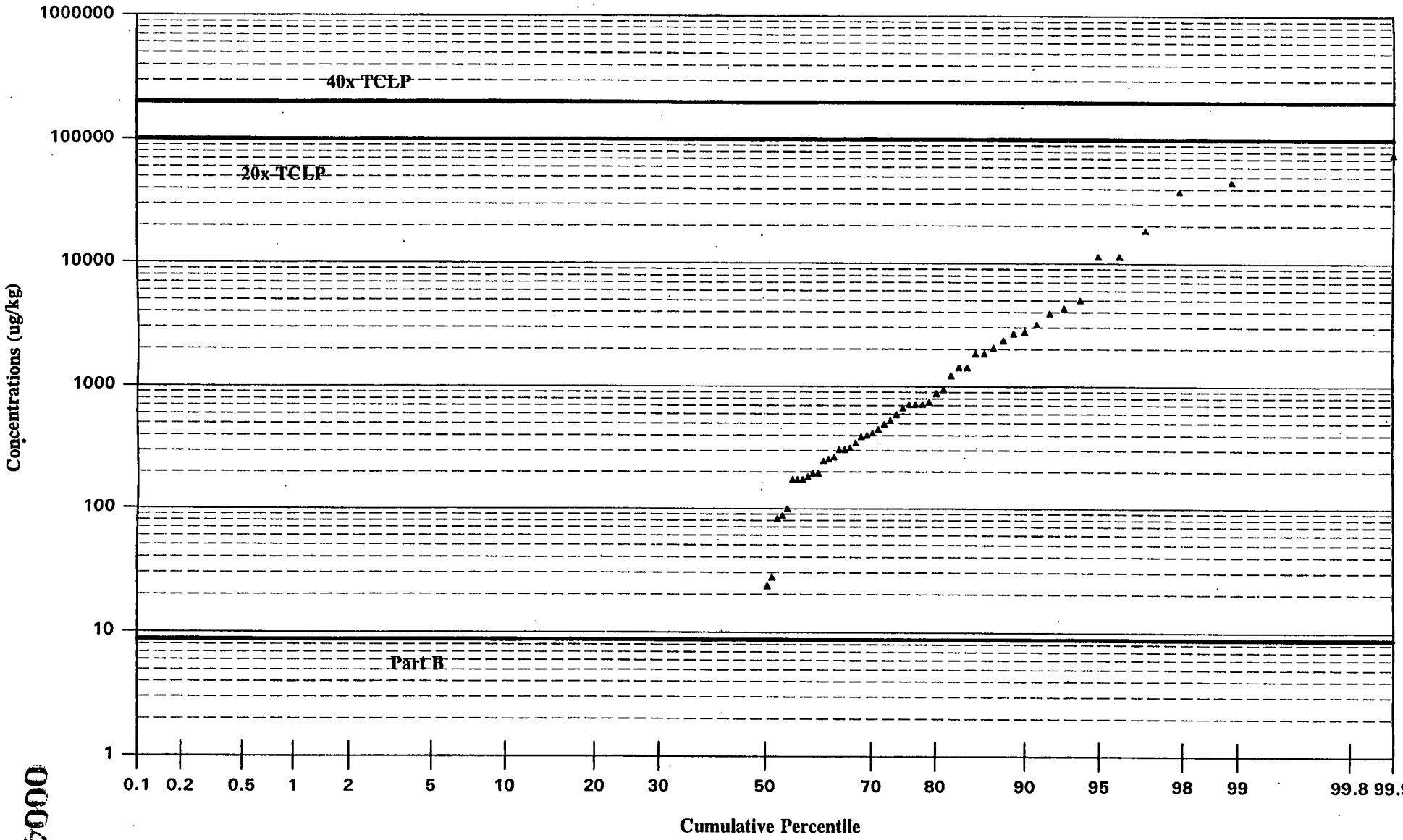

FIGURE A.II-97
CUMULATIVE PROBABILITY PLOT OF BENZO(A)PYRENE CONCENTRATIONS IN SOLID MEDIA

000490

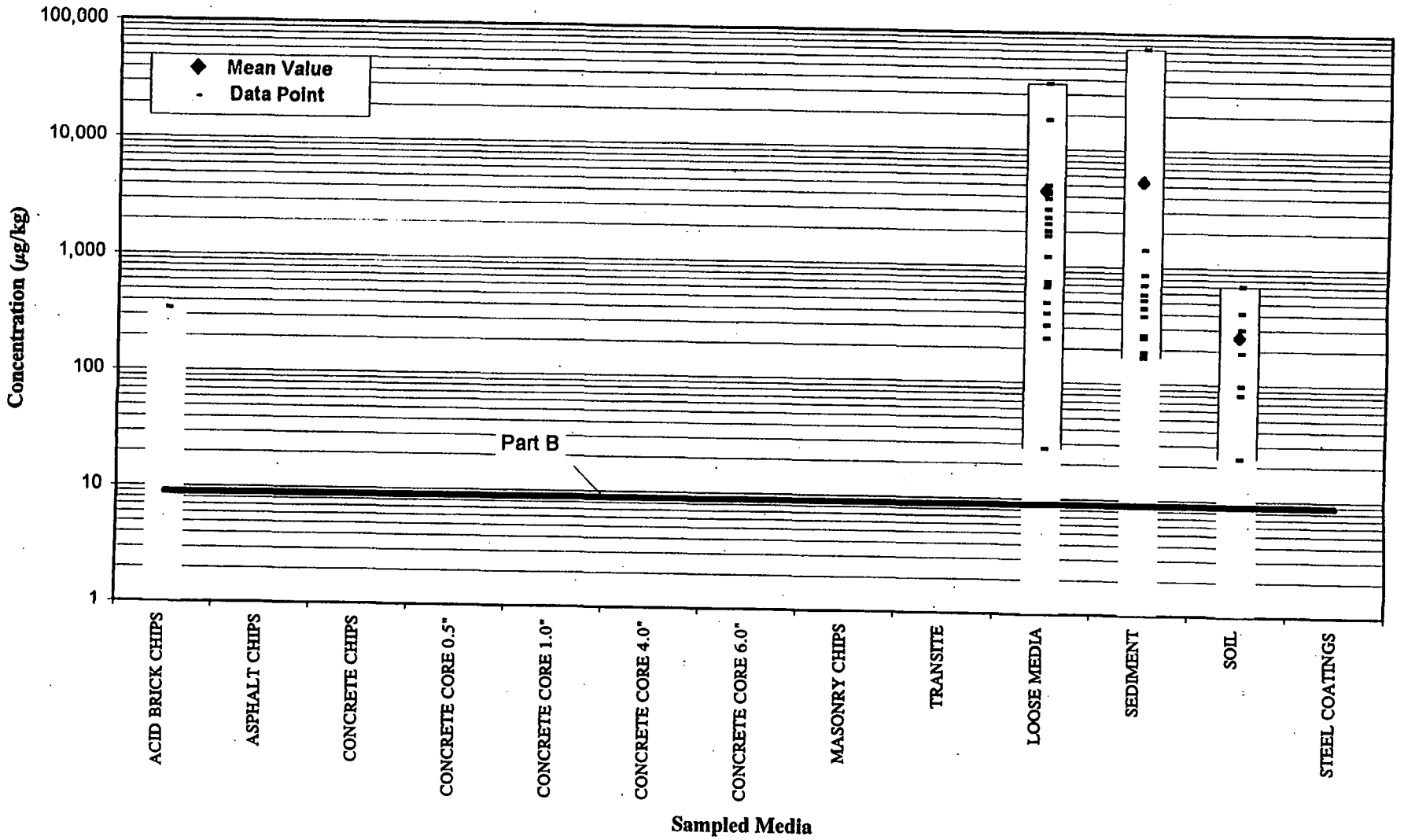

FIGURE A.II-98
SUMMARY OF BENZO(a)PYRENE RESULTS GROUPED BY SOLID MEDIA

000491

DRAFT

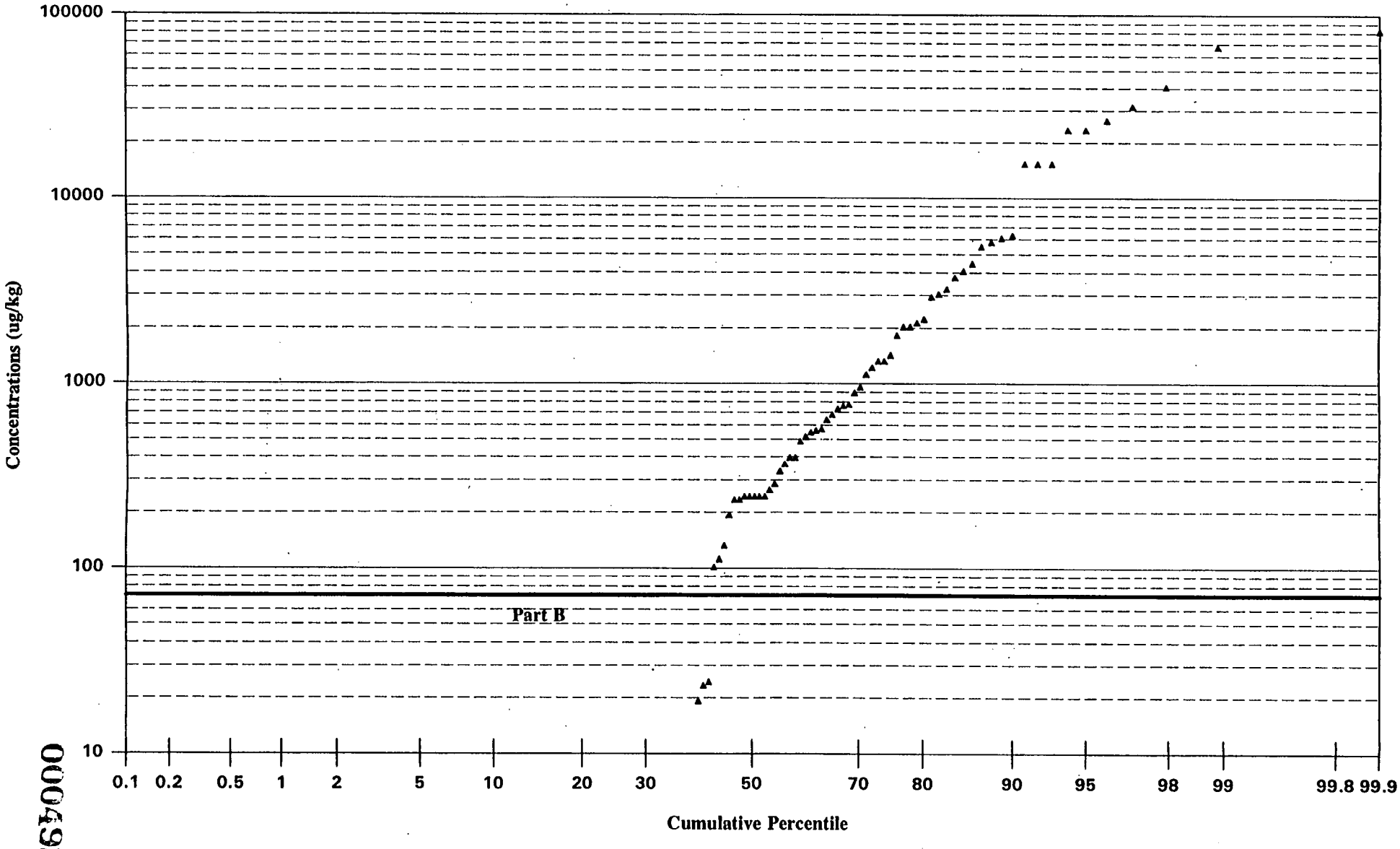

FIGURE A.II-99
CUMULATIVE PROBABILITY PLOT OF BENZO(B)FLUORANTHENE CONCENTRATIONS IN SOLID MEDIA

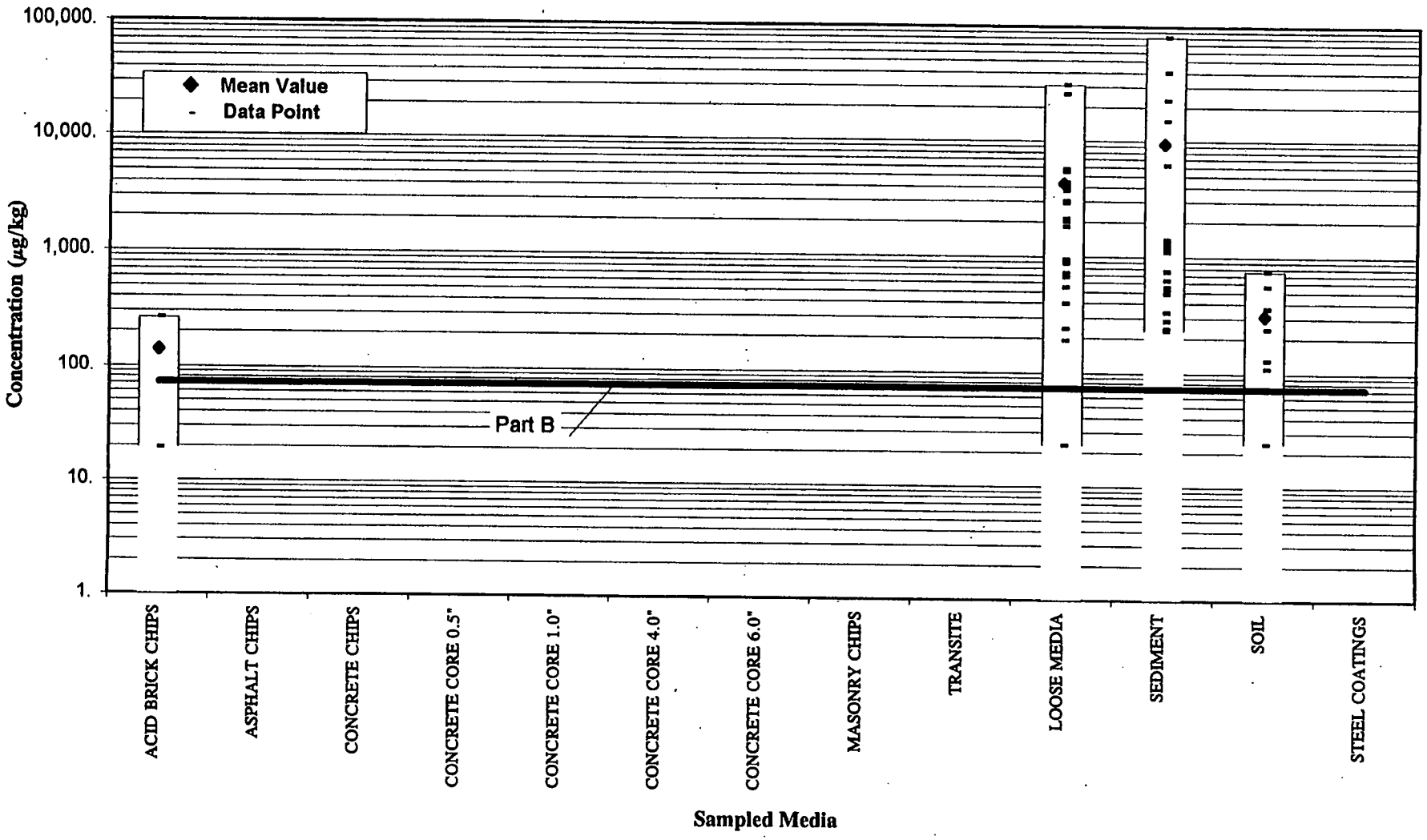

FIGURE A.II-100
SUMMARY OF BENZO(b)FLUORANTHENE RESULTS GROUPED BY SOLID MEDIA

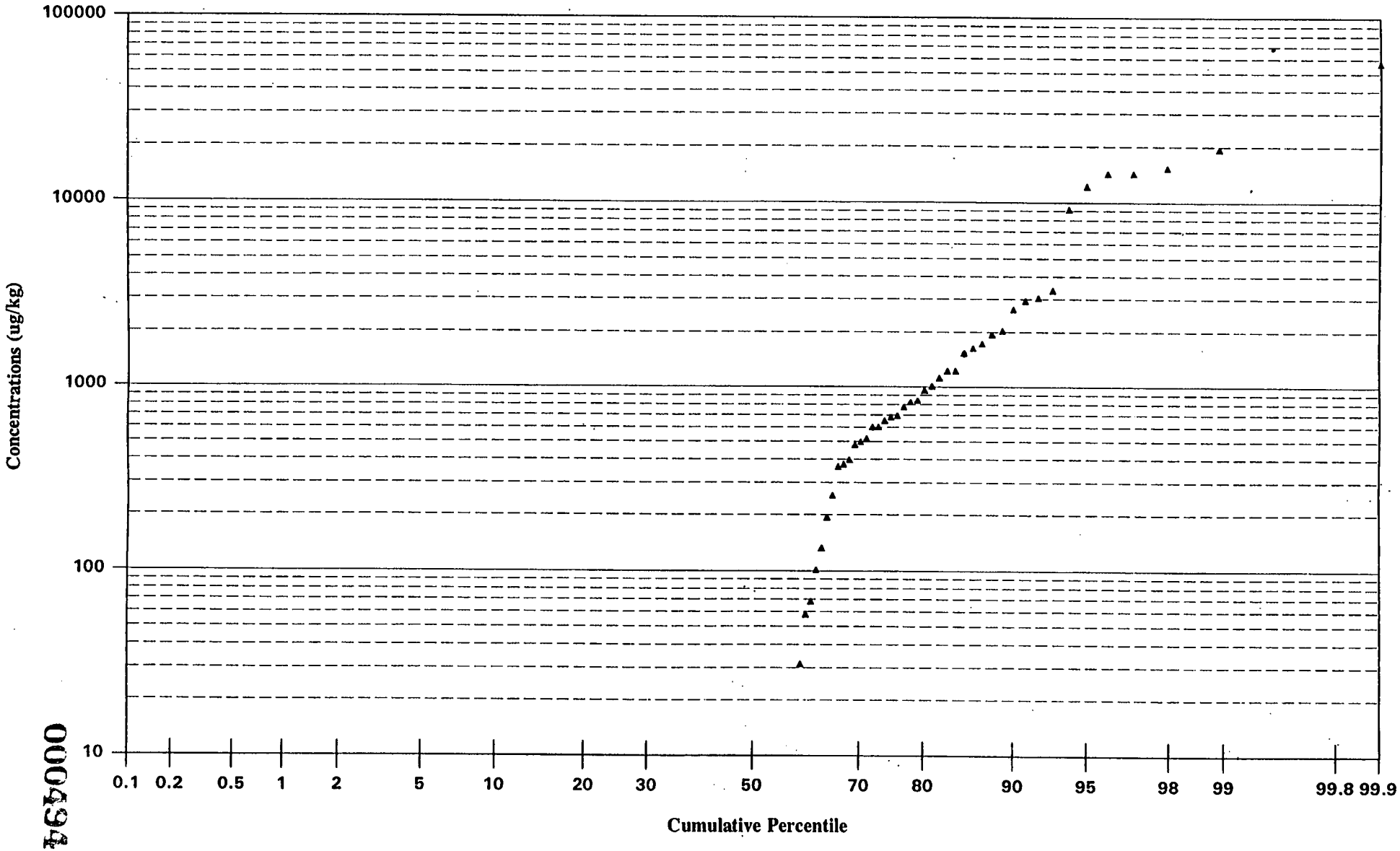

FIGURE A.II-101
CUMULATIVE PROBABILITY PLOT OF BENZO(G,H,I)PERYLENE CONCENTRATIONS IN SOLID MEDIA

DRAFT

000494

2121

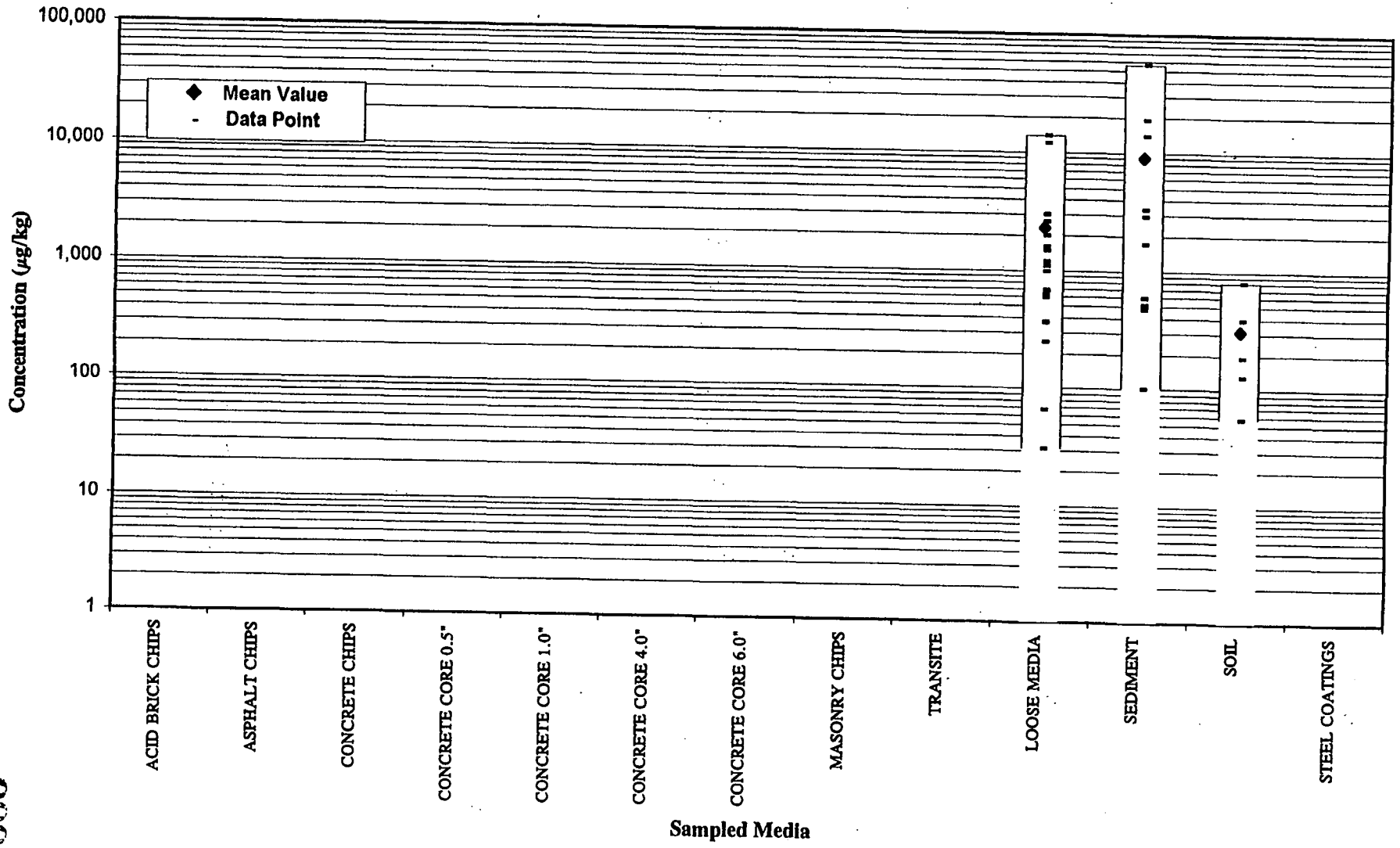

FIGURE A.II-102
SUMMARY OF BENZO(g,h,i)PERYLENE RESULTS GROUPED BY SOLID MEDIA

000495

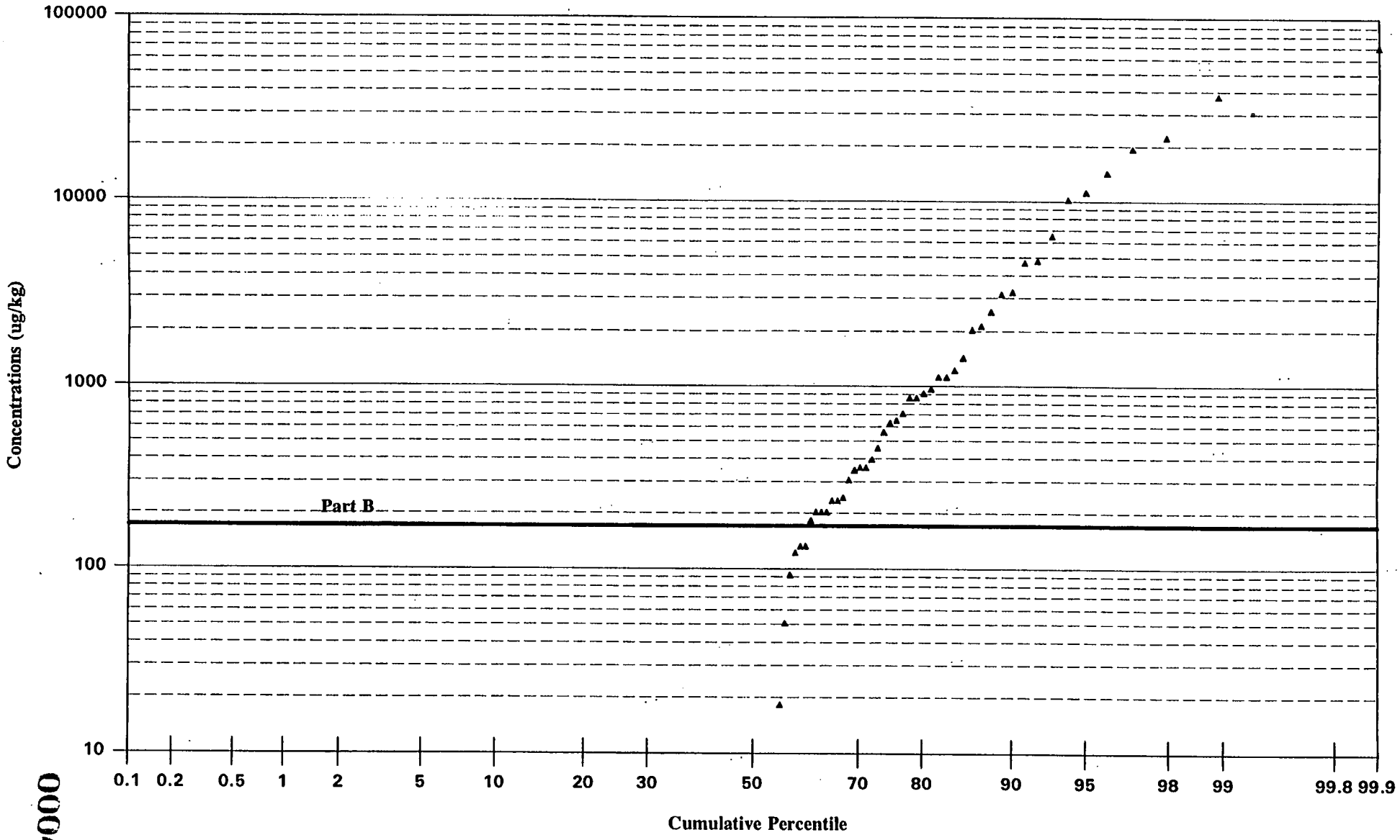

FIGURE A.II-103
CUMULATIVE PROBABILITY PLOT OF BENZO(K)FLUORATHENE CONCENTRATIONS IN SOLID MEDIA

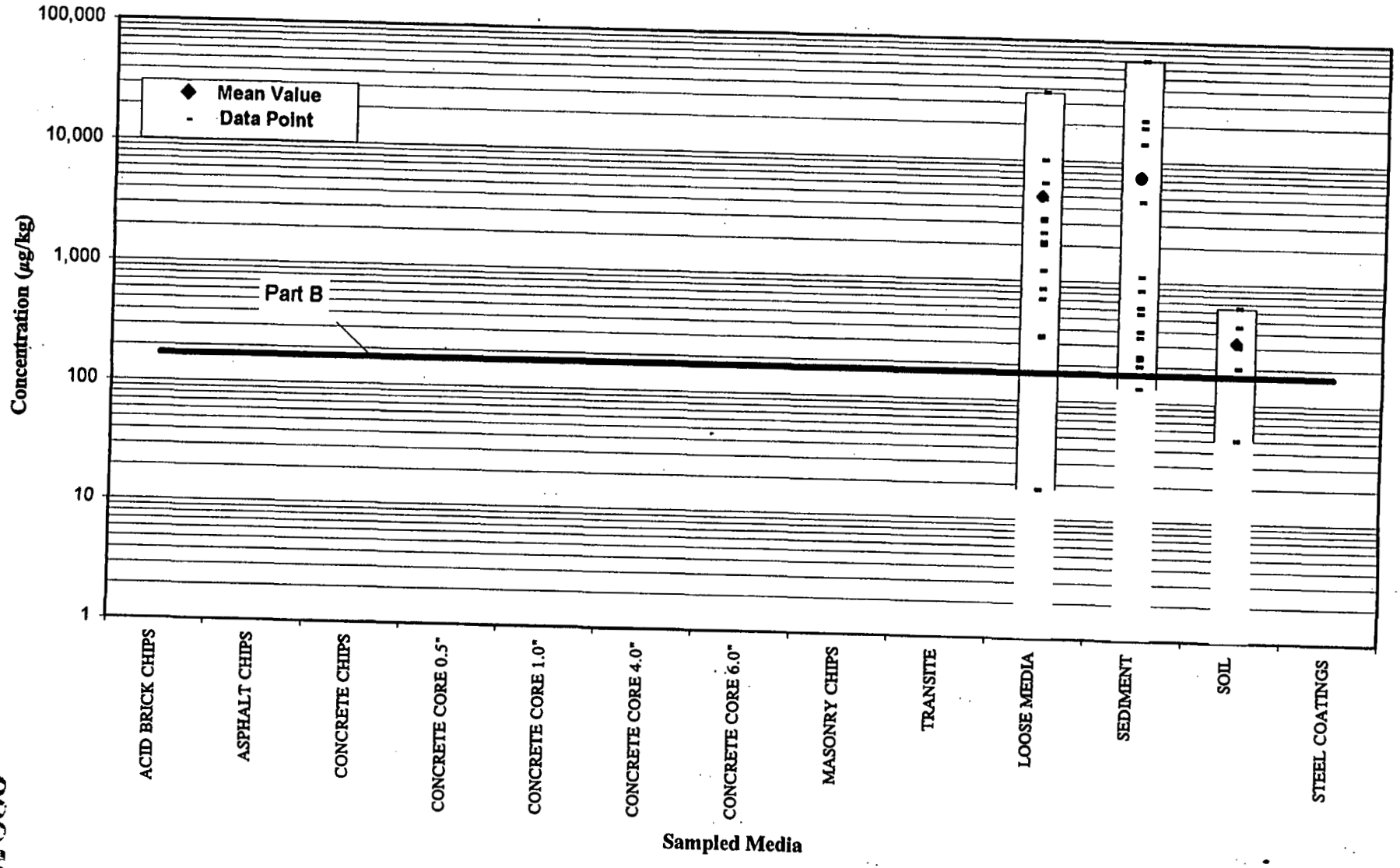

FIGURE A.II-104
SUMMARY OF BENZO(k)FLUORANTHENE RESULTS GROUPED BY MEDIA

000497

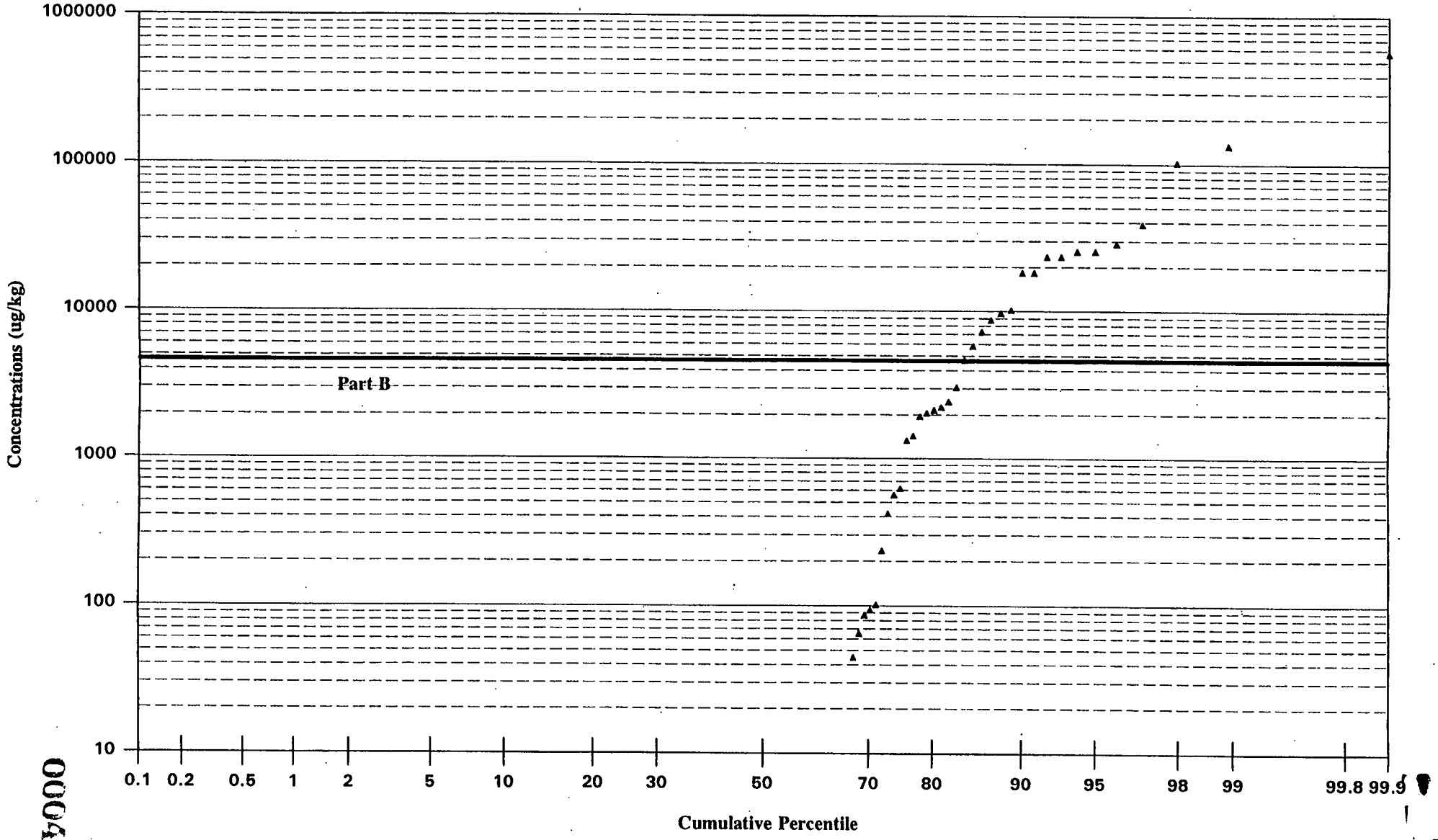

FIGURE A.II-105
CUMULATIVE PROBABILITY PLOT OF BIS(2-ETHYLHEXYL)PHTHALATE CONCENTRATIONS IN SOLID MEDIA

000458

1212

DRAFT

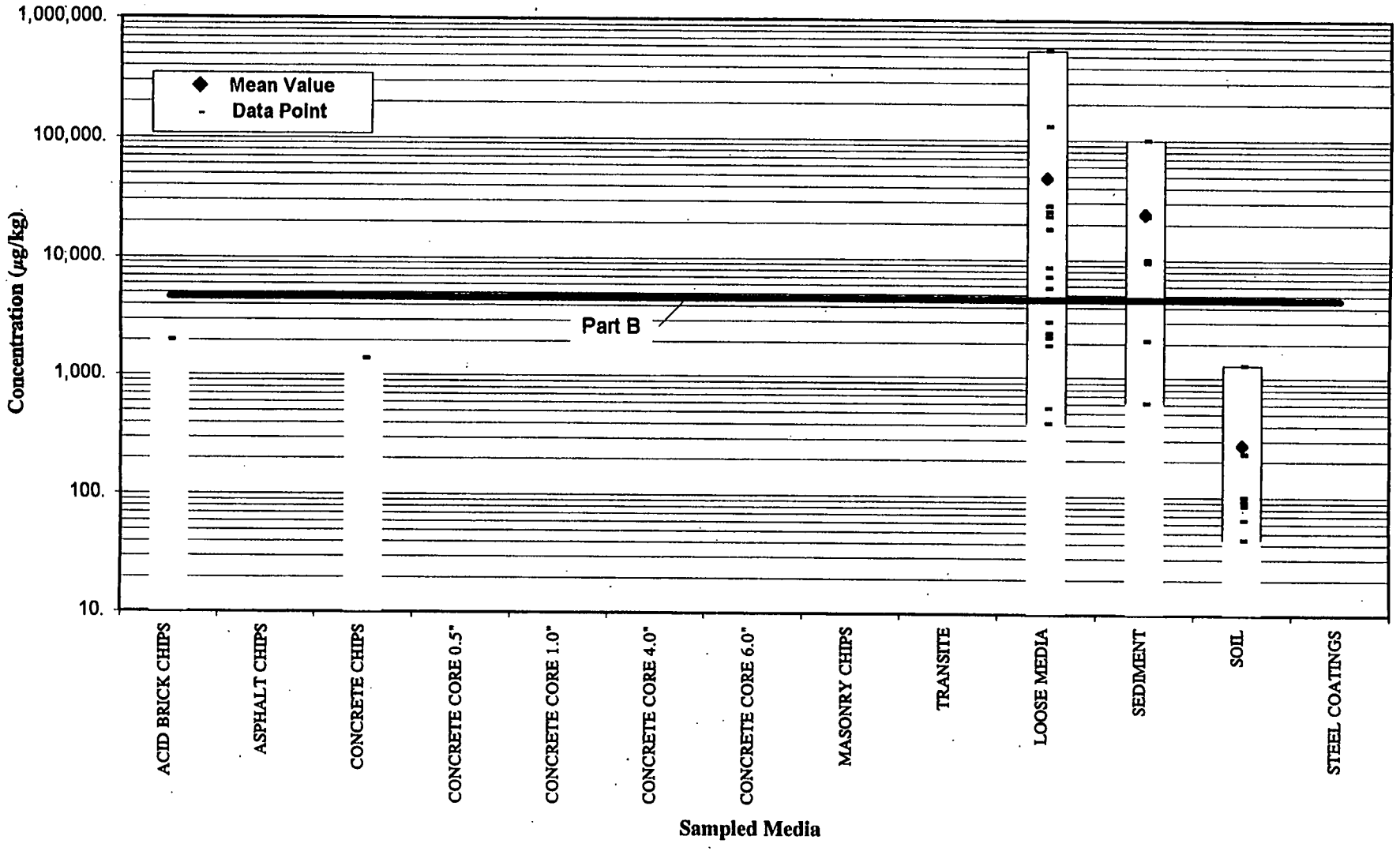

FIGURE A.II-106
SUMMARY OF BIS(2-ETHYLHEXYL)PHTHALATE RESULTS GROUPED BY SOLID MEDIA

000455

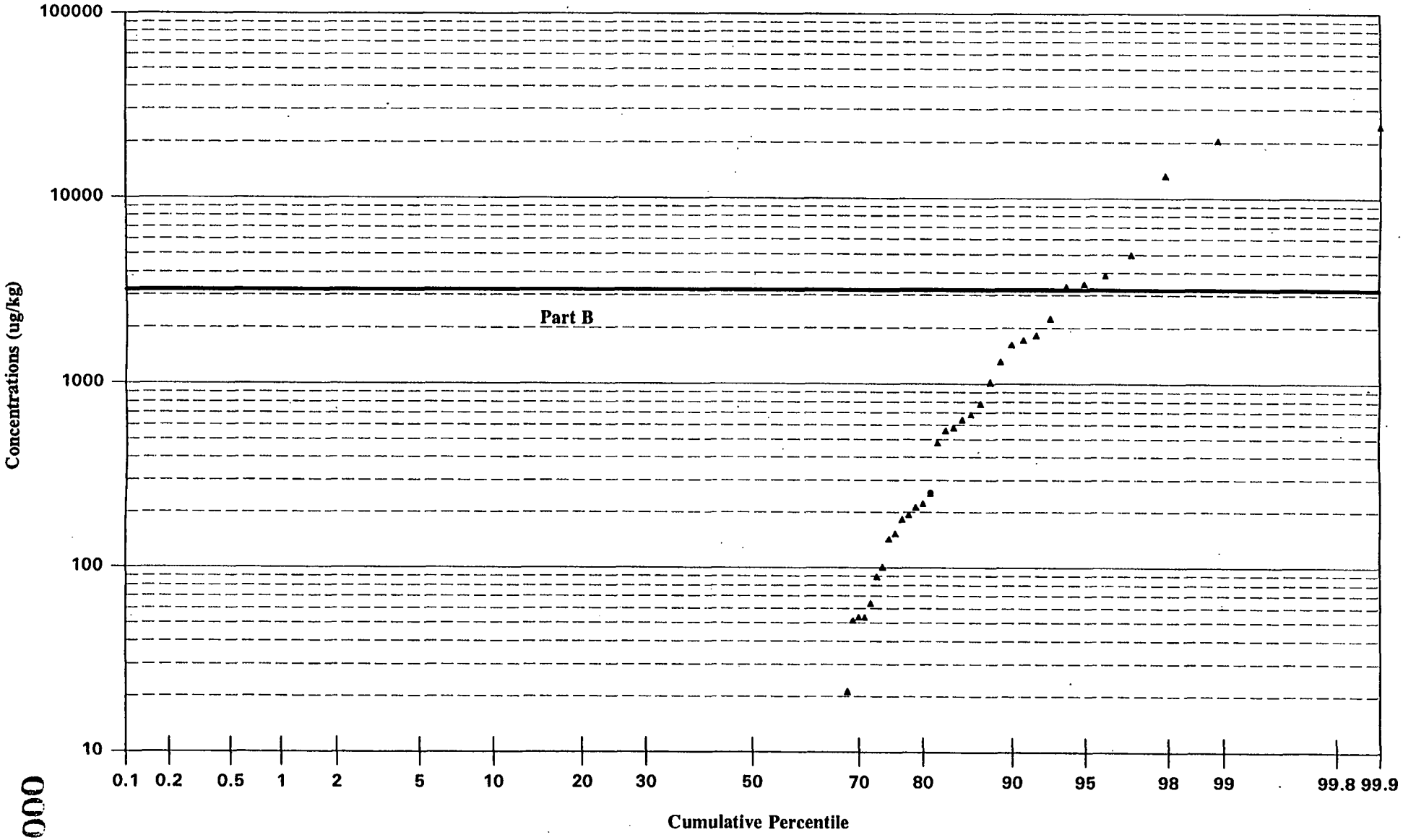

FIGURE A.II-107
CUMULATIVE PROBABILITY PLOT OF CARBAZOLE CONCENTRATIONS IN SOLID MEDIA

DRAFT

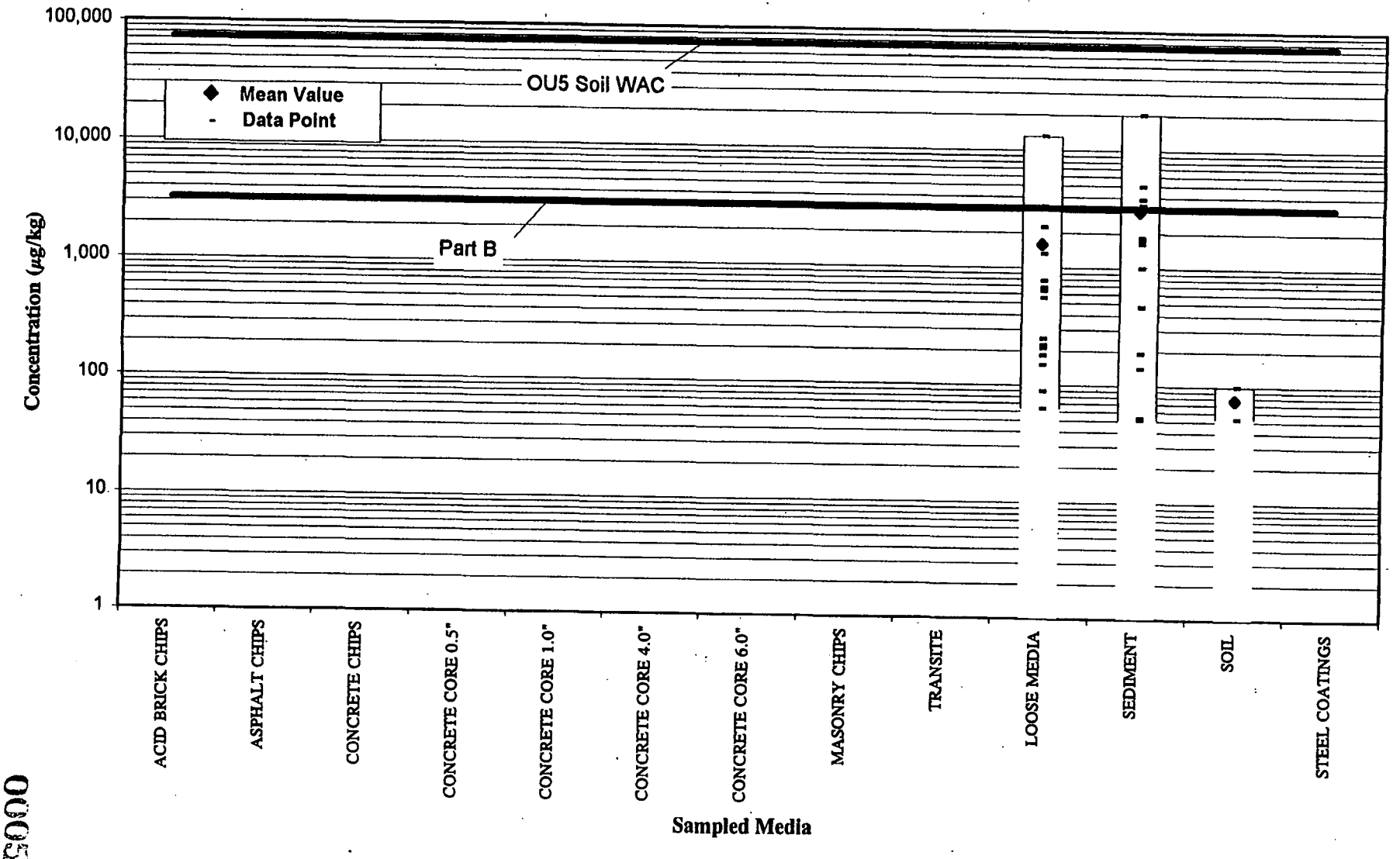

FIGURE A.II-108
SUMMARY OF CARBAZOLE RESULTS GROUPED BY SOLID MEDIA

000501

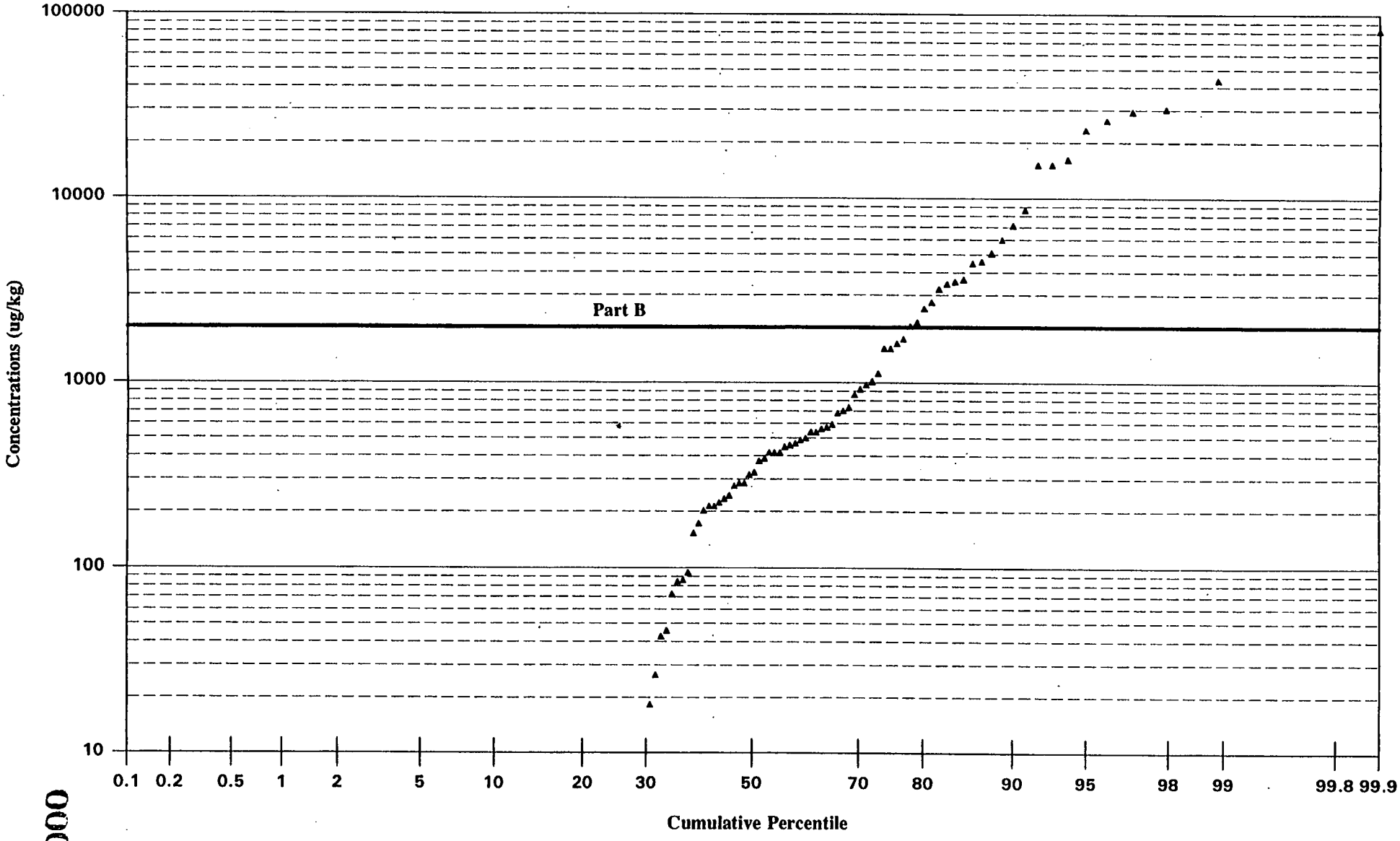

FIGURE A.II-109
CUMULATIVE PROBABILITY PLOT OF CHRYSENE CONCENTRATIONS IN SOLID MEDIA

205000

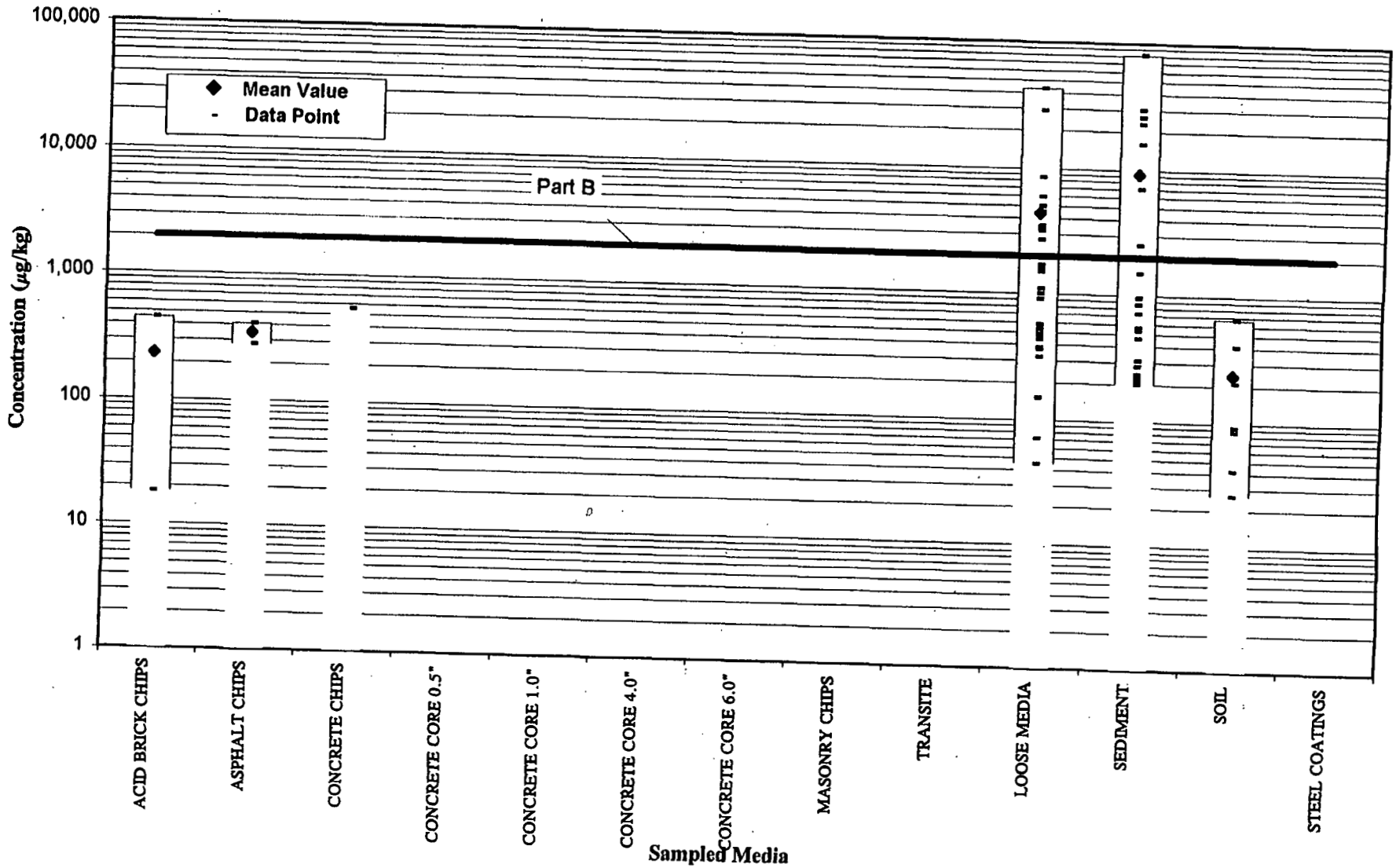

FIGURE A.II-110
SUMMARY OF CHRYSENE RESULTS GROUPED BY SOLID MEDIA

000503

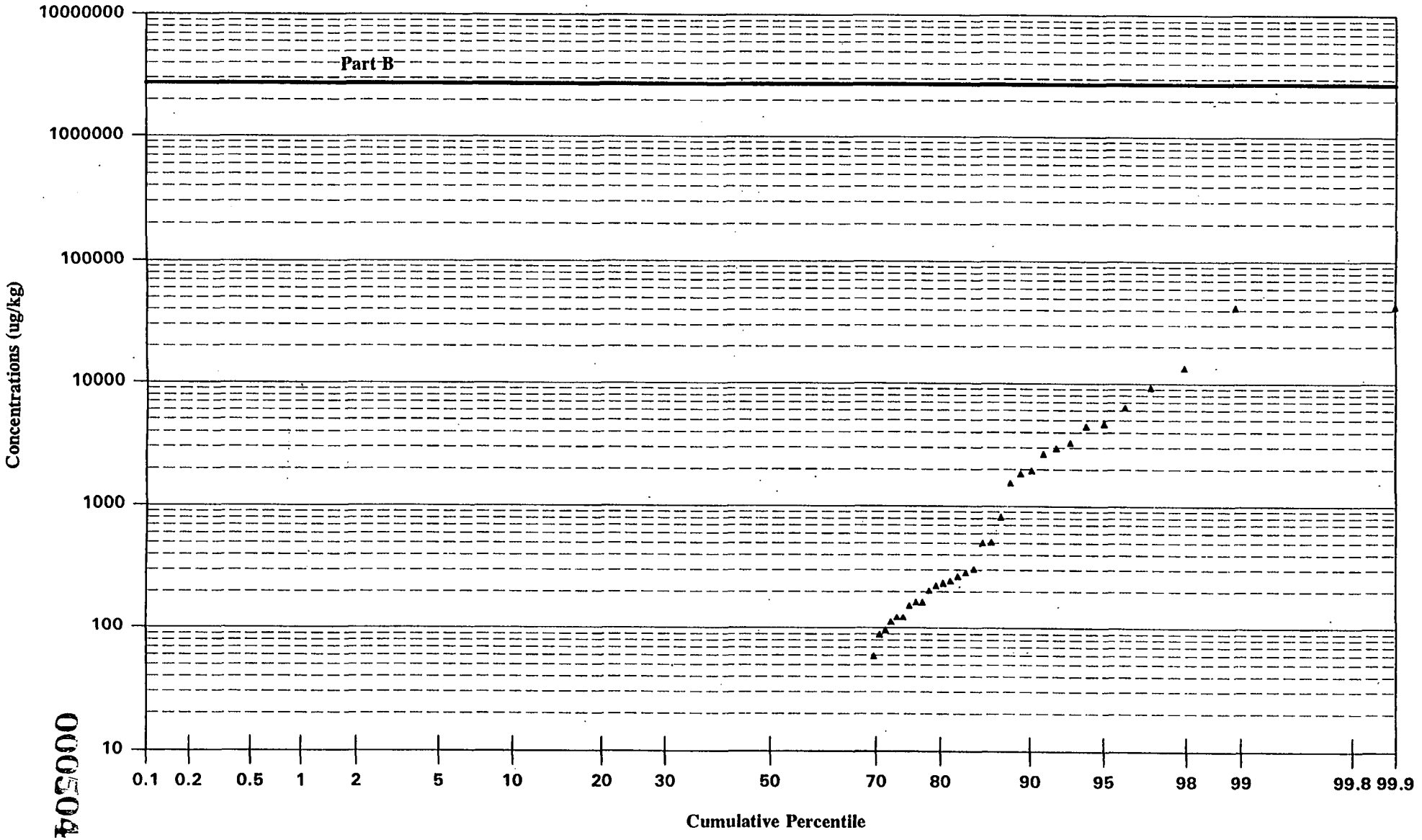

FIGURE A.II-111
CUMULATIVE PROBABILITY PLOT OF DI-N-BUTYLPHTHALATE CONCENTRATIONS IN SOLID MEDIA

DRAFT

000504

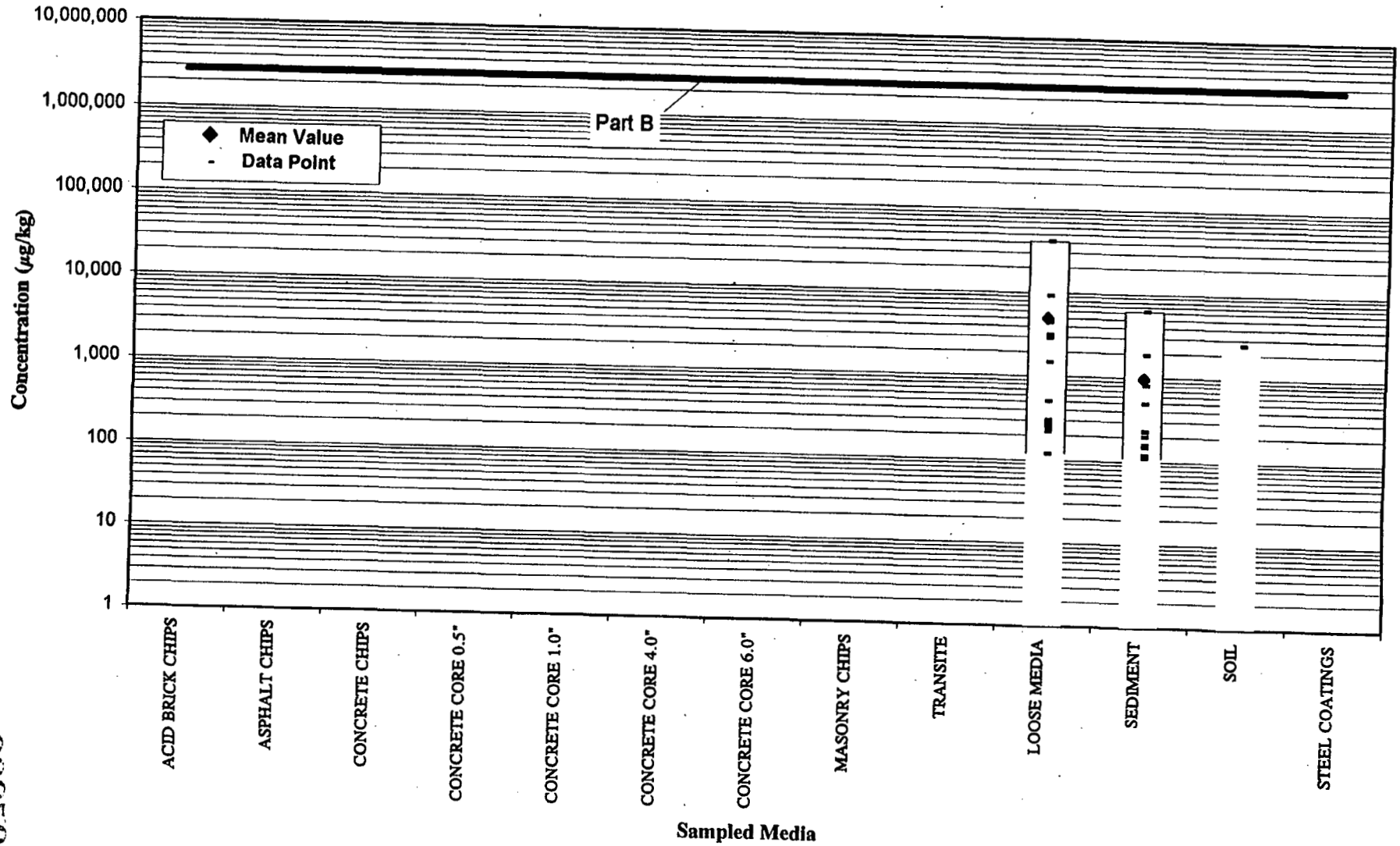

FIGURE A.II-112
SUMMARY OF di-n-BUTYL PHTHALATE RESULTS GROUPED BY SOLID MEDIA

000505

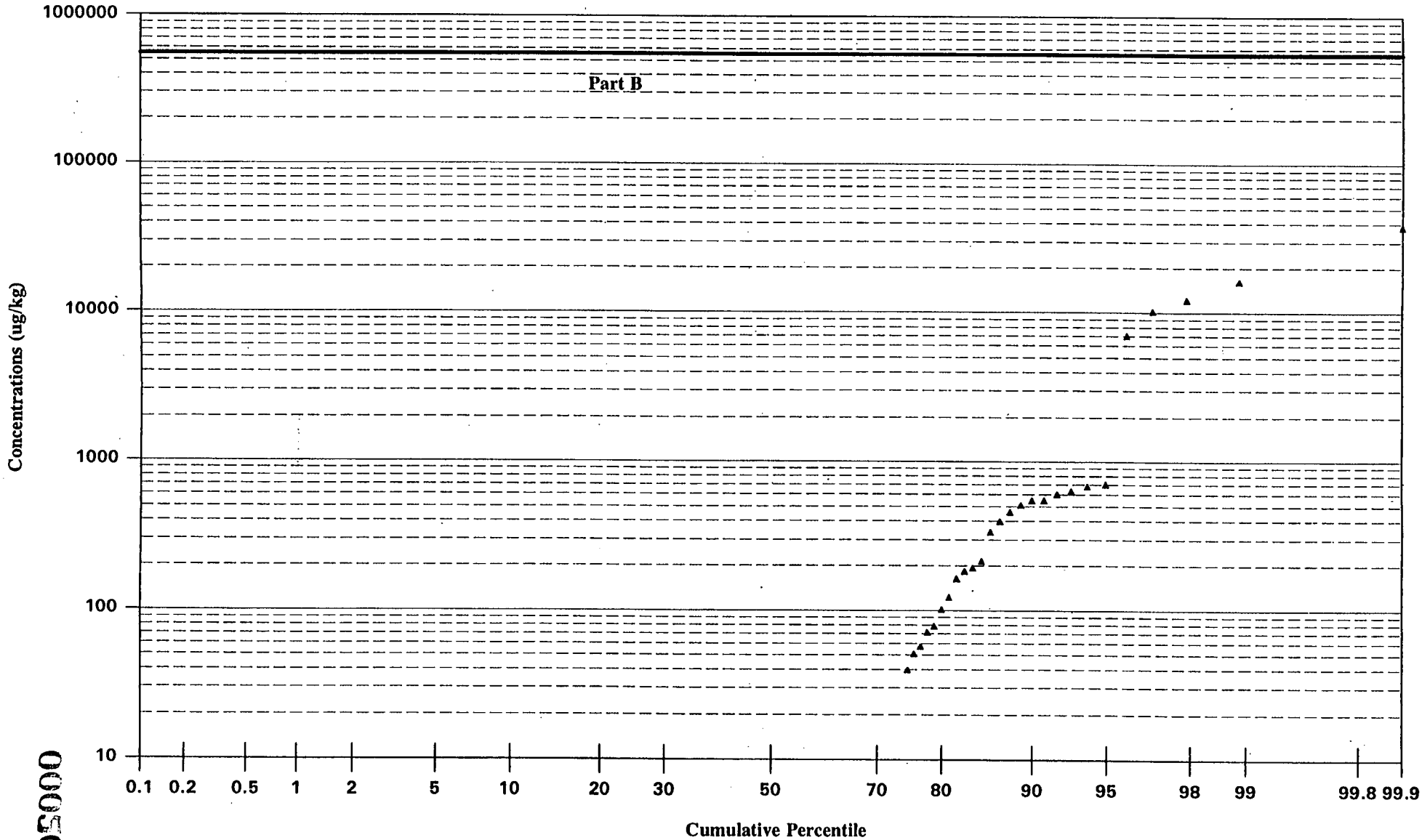

FIGURE A.II-113
CUMULATIVE PROBABILITY PLOT OF DI-N-OCTYLPHTHALATE CONCENTRATIONS IN SOLID MEDIA

005006

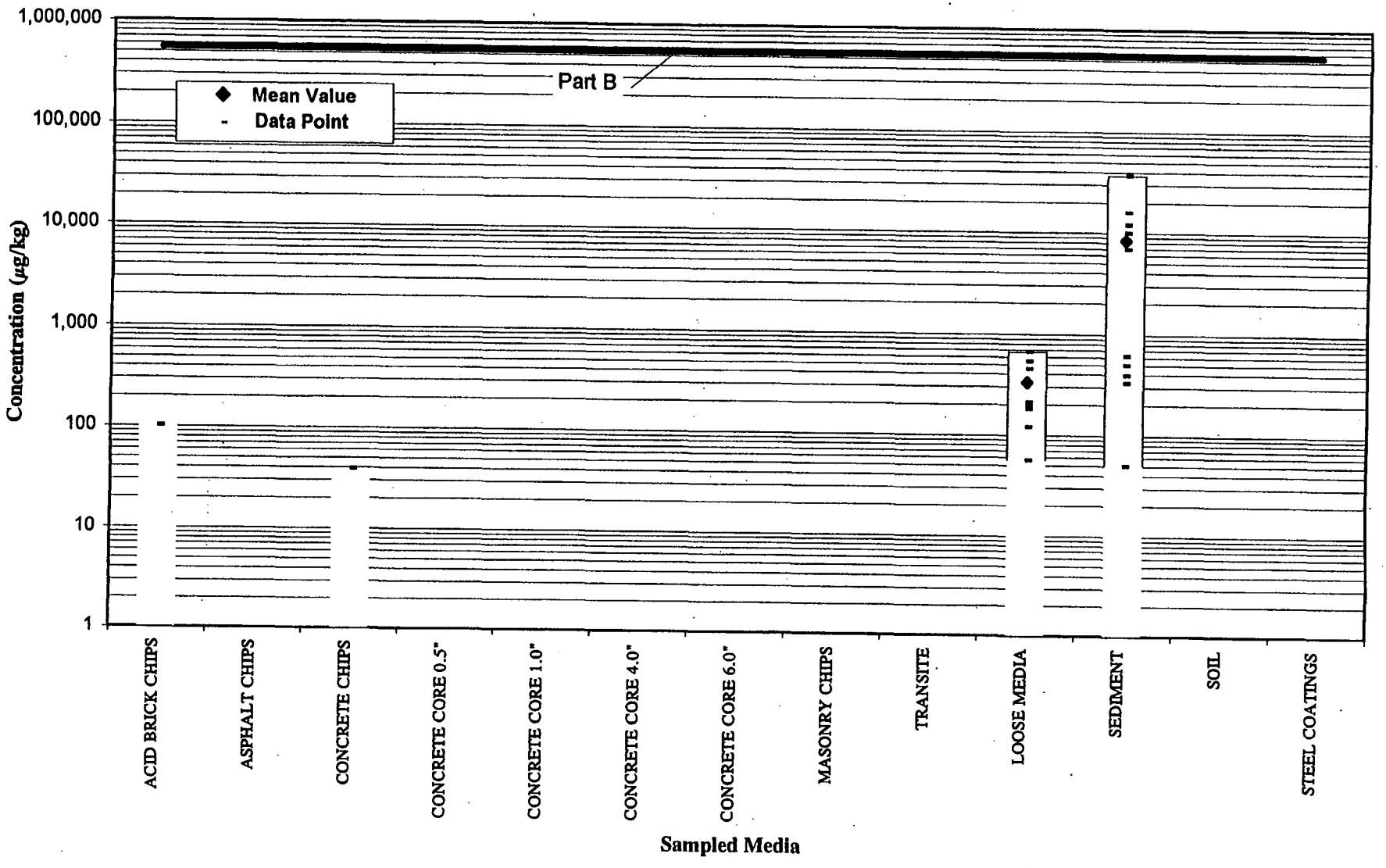

FIGURE A.II-114
SUMMARY OF di-n-OCTYL PHTHALATE RESULTS GROUPED BY SOLID MEDIA

005007

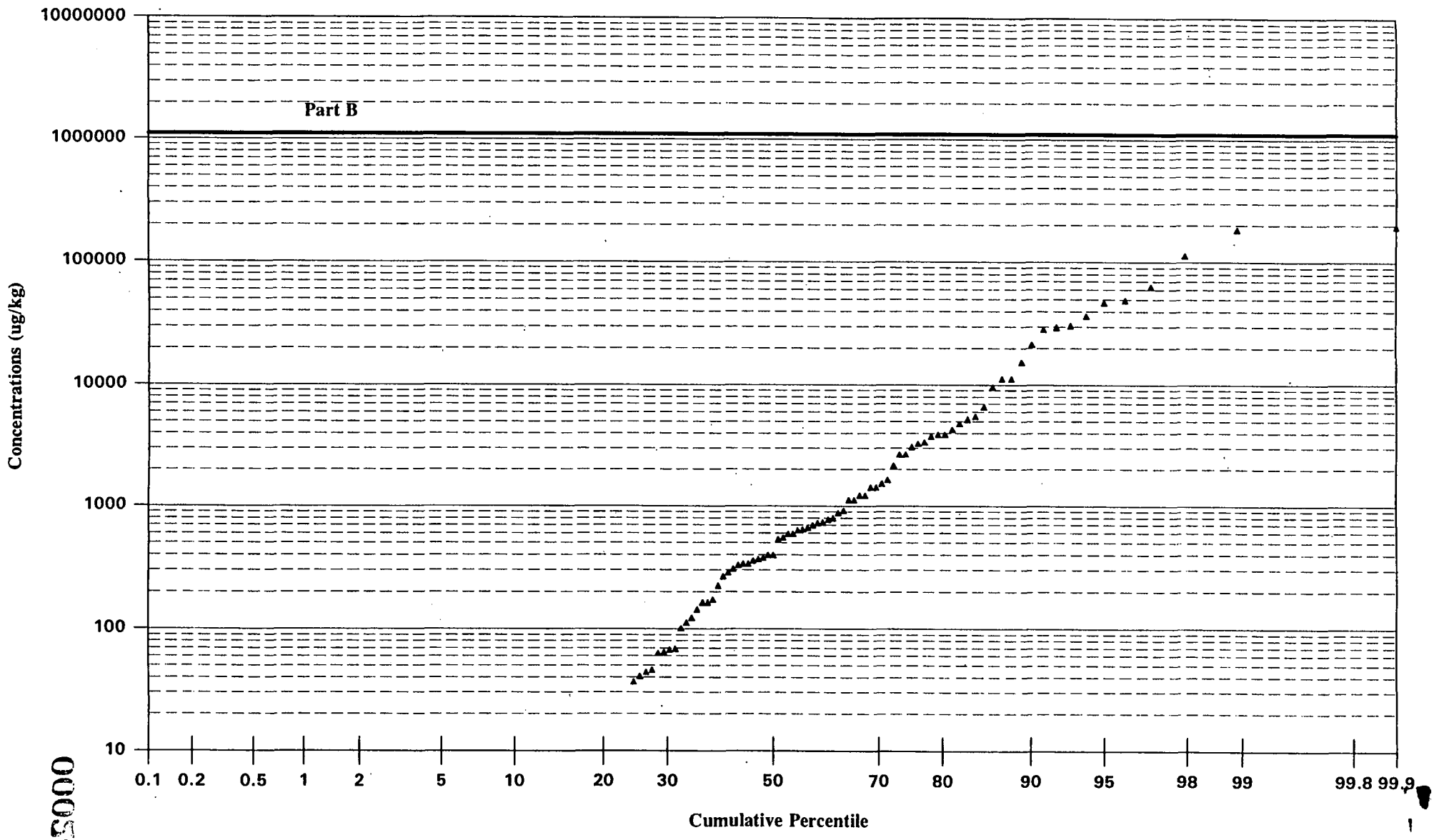

FIGURE A.II-115
CUMULATIVE PROBABILITY PLOT OF FLUORANTHENE CONCENTRATIONS IN SOLID MEDIA

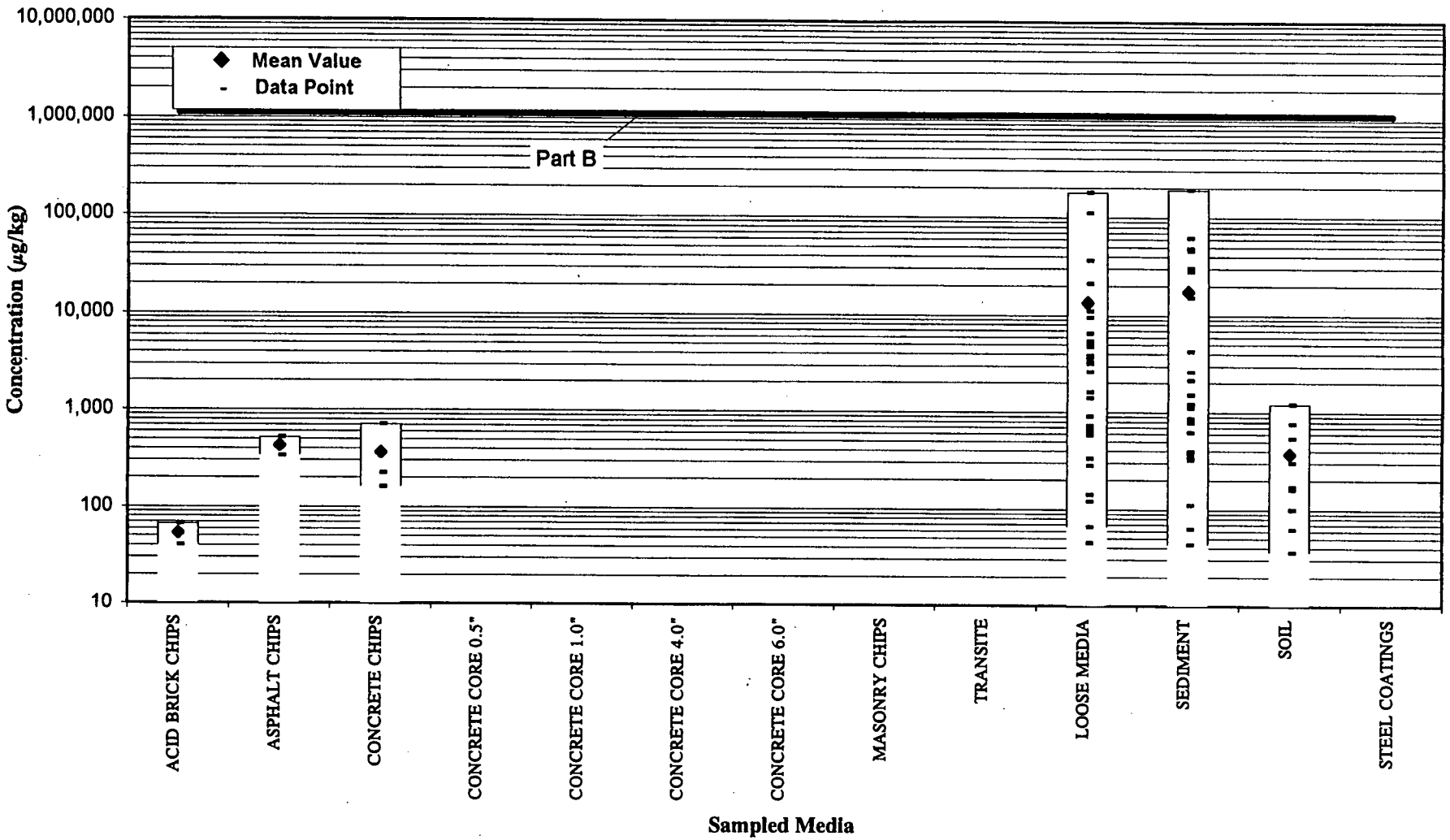

FIGURE A.II-116
SUMMARY OF FLUORANTHENE RESULTS GROUPED BY MEDIA

005009

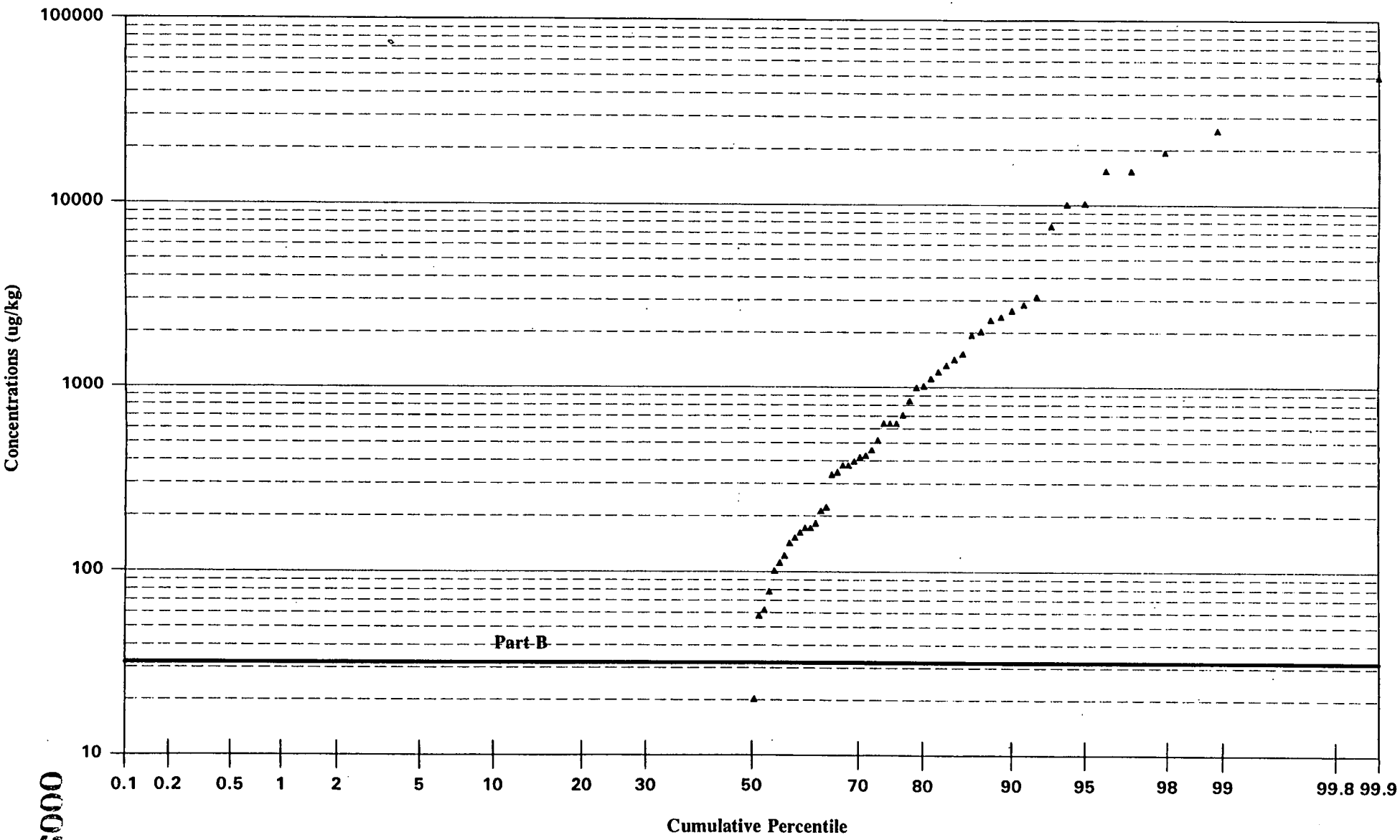

FIGURE A.II-117
CUMULATIVE PROBABILITY PLOT OF IDENO(1,2,3-CD)PYRENE CONCENTRATIONS IN SOLID MEDIA

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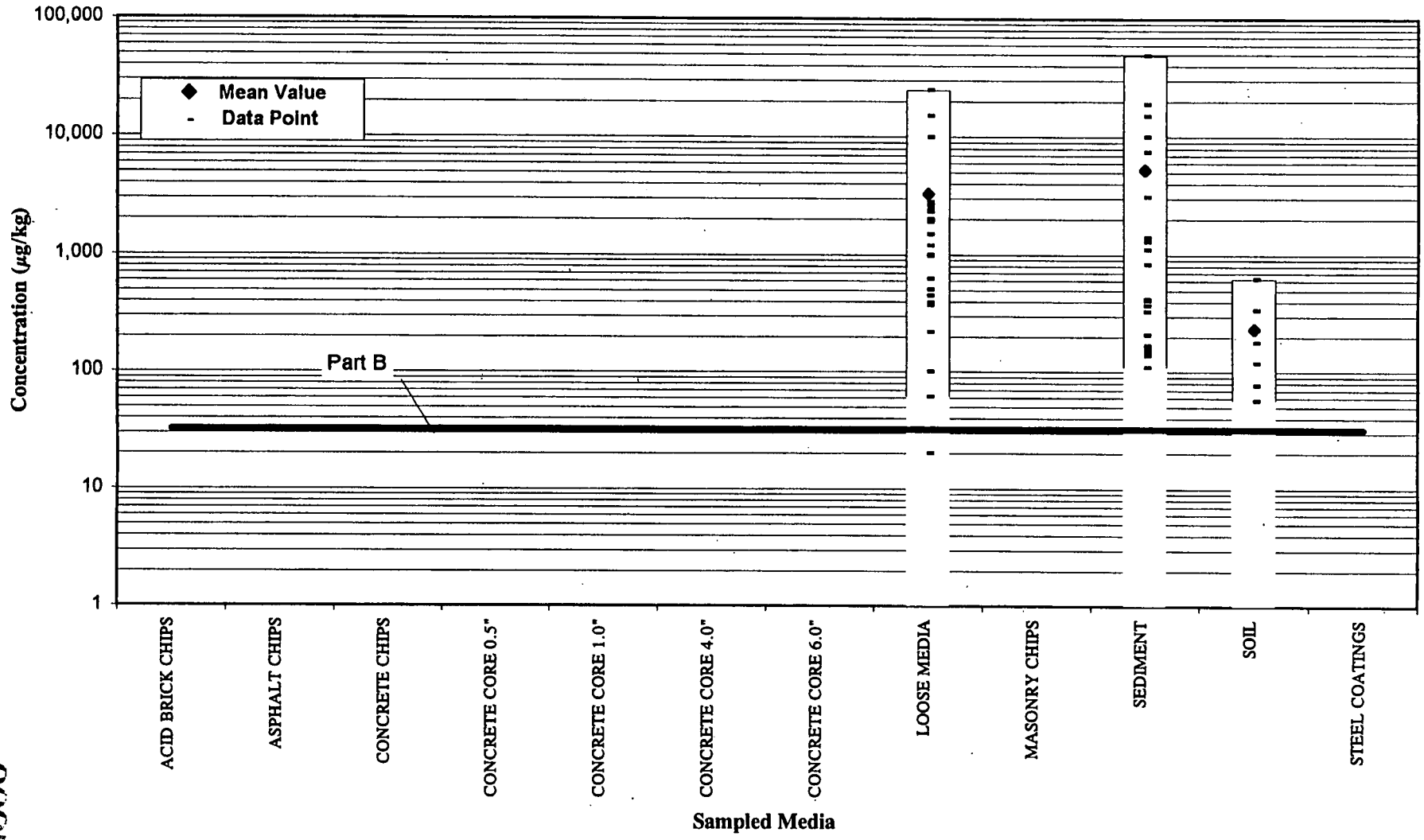

FIGURE A.II-118
SUMMARY OF INDENO(1,2,3-cd)PYRENE RESULTS GROUPED BY SOLID MEDIA

000511

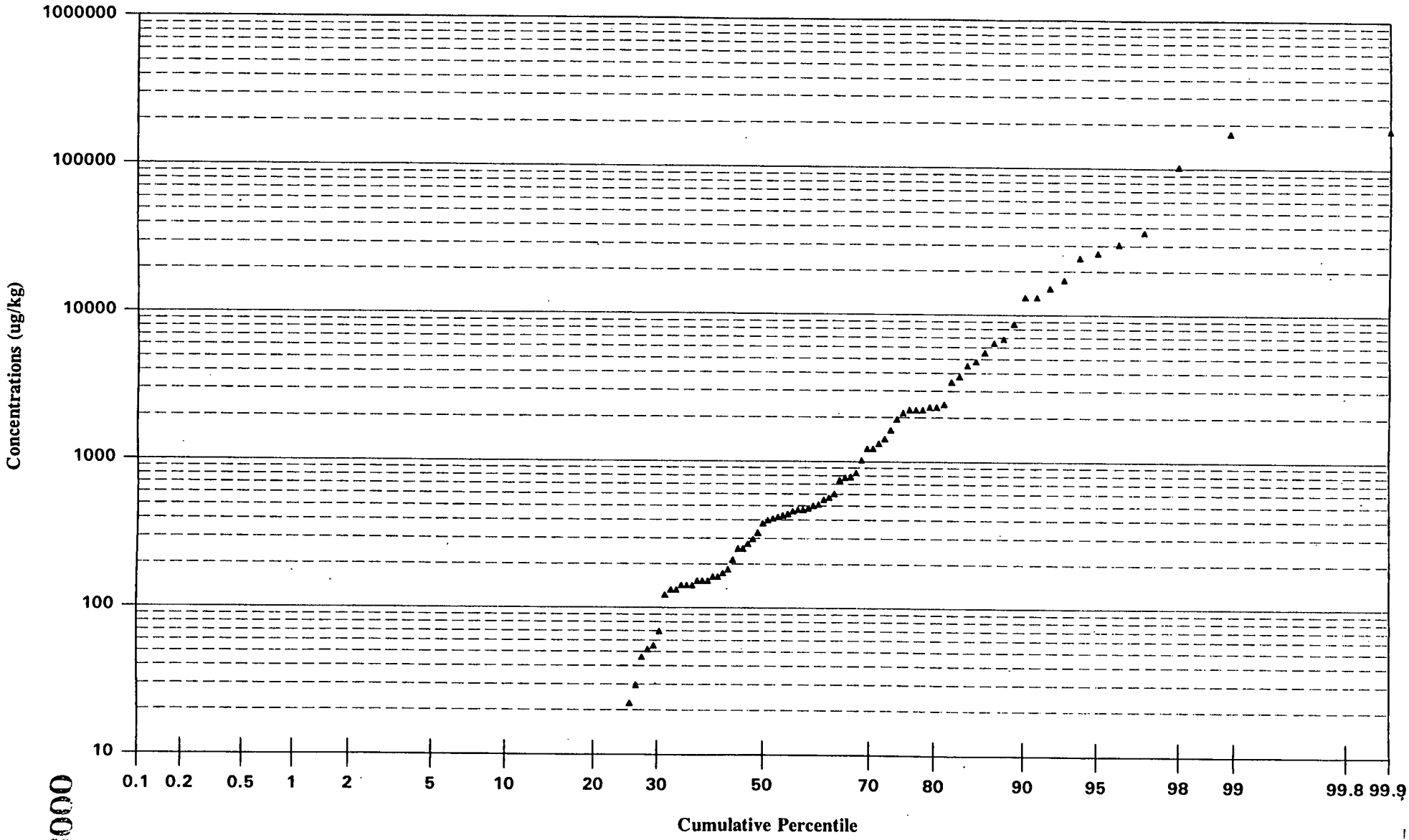

FIGURE A.II-119
CUMULATIVE PROBABILITY PLOT OF PHENANTHRENE CONCENTRATIONS IN SOLID MEDIA

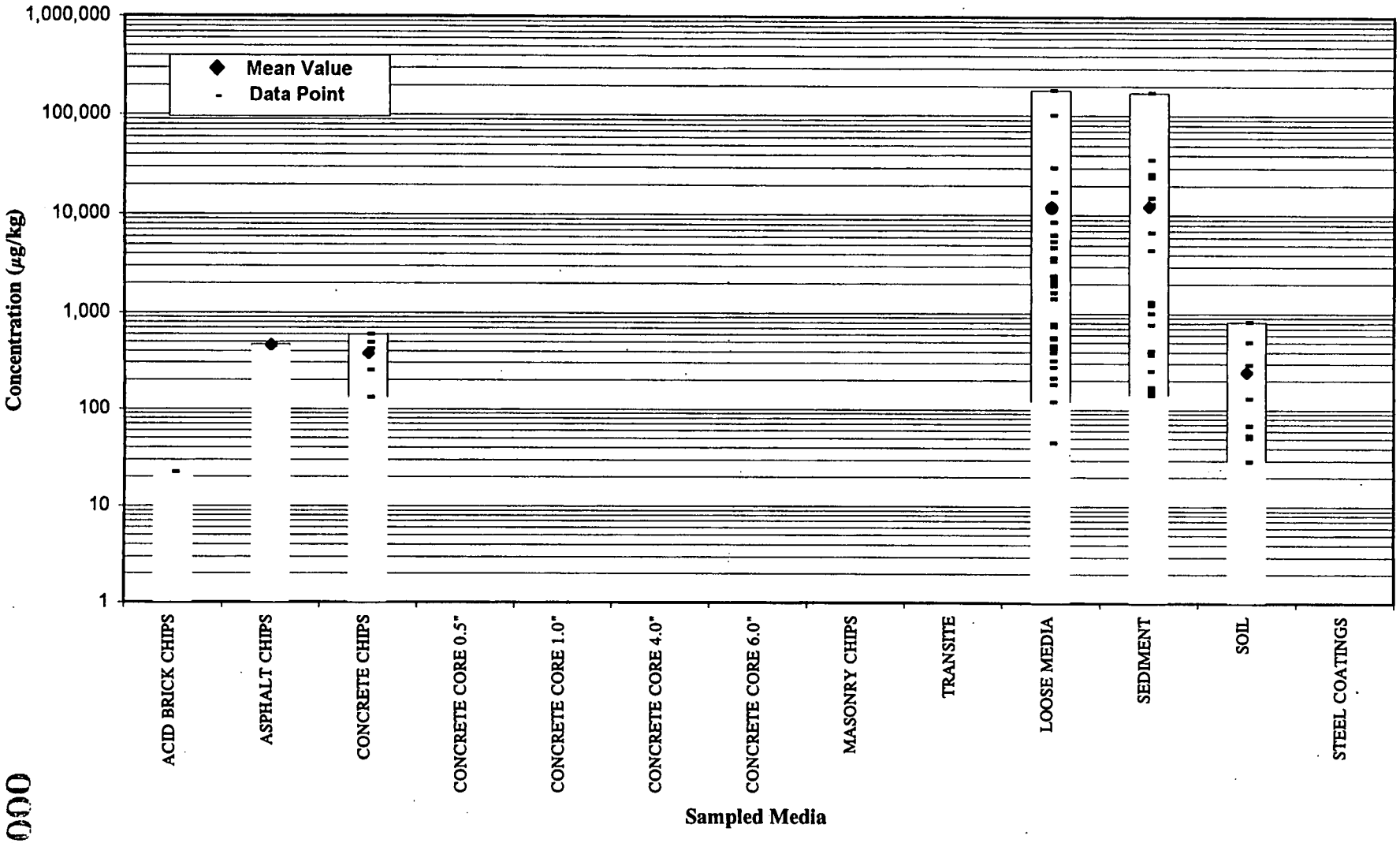

FIGURE A.II-120
SUMMARY OF PHENANTHRENE RESULTS GROUPED BY SOLID MEDIA

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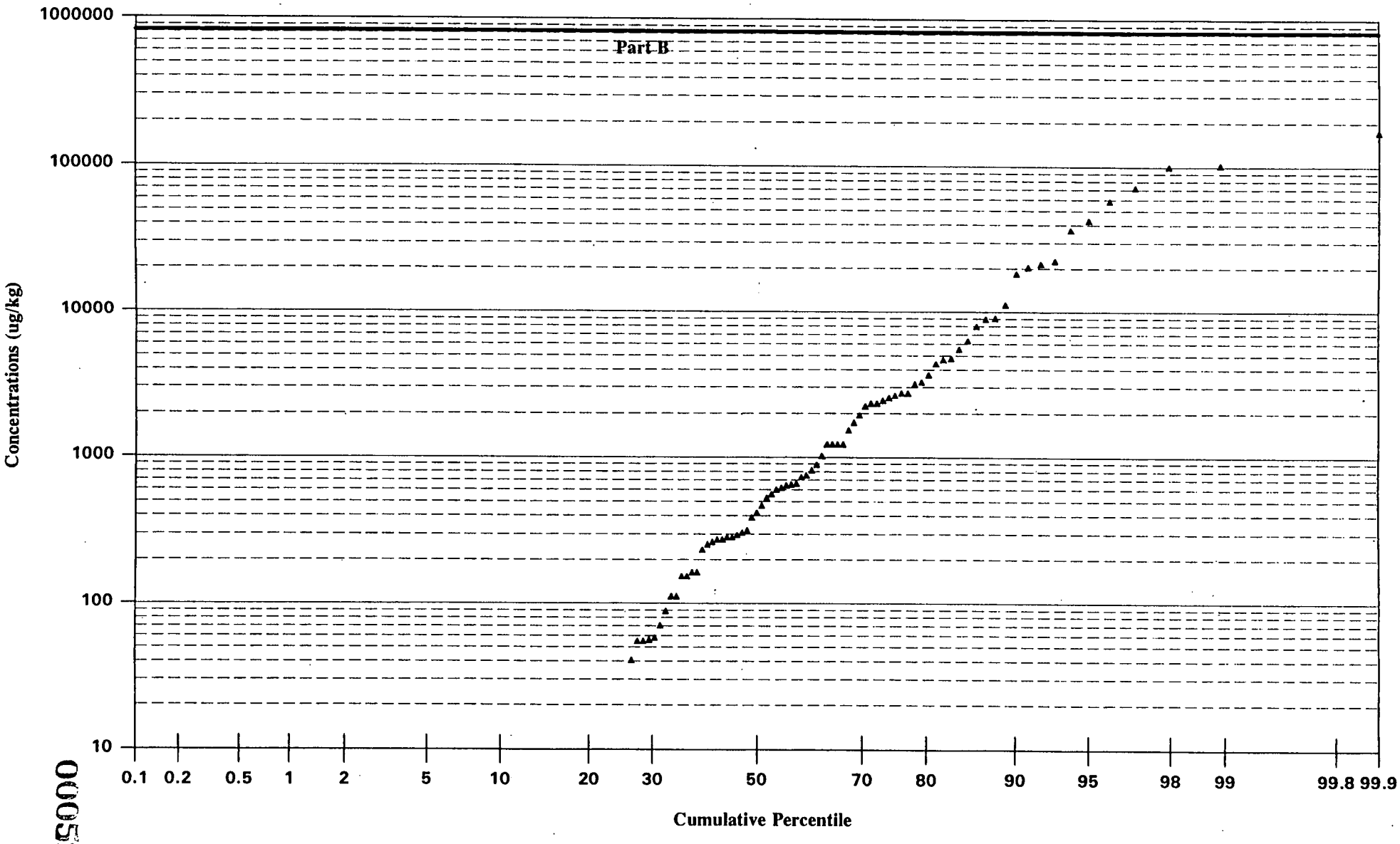

FIGURE A.II-121
CUMULATIVE PROBABILITY PLOT OF PYRENE CONCENTRATIONS IN SOLID MEDIA

000514

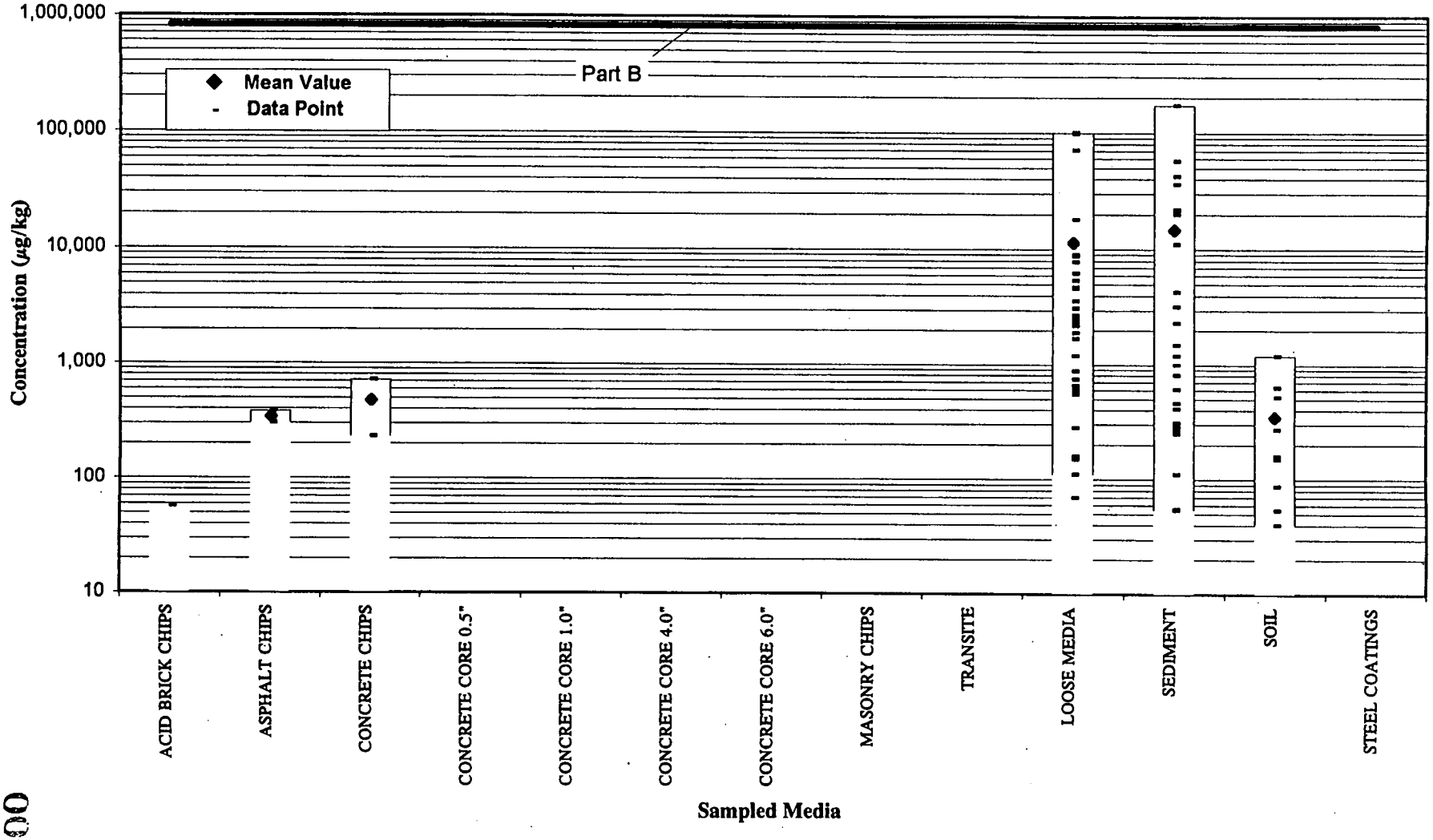

FIGURE A.II-122
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ATTACHMENT A.III

SUMMARY OF CONTAMINATION BY MEDIA

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A.III SUMMARY OF CONTAMINATION BY MEDIA

A.III.1 INTRODUCTION

This attachment presents the results of the Operable Unit 3 (OU3) remedial investigation/feasibility study (RI/FS) field sampling program. The data in this attachment is organized according to sampled medium type. This organization provides the mechanism for identifying the media within OU3 which are of primary concern in terms of the level and extent of contamination.

Table A.III-1 summarizes the results of analyses of samples collected during the field program by sampled media types. The table is separated into two parts: major media, which were collected to characterize OU3, and supplemental media, which were collected to support the characterization of OU3 and provide data for a baseline risk assessment. Since no baseline risk assessment is being performed (see Section 1.0), the supplemental samples are only used to support the characterization provided by the major media.

A.III.2 MAJOR MEDIA

Major media includes acid brick, asphalt, concrete (chips and cores), masonry, steel coatings, and transite. The following sections describe the contamination associated with each of these.

A.III.2.1 Acid Brick

Acid brick was used in several wet process areas as a protective layer for the underlying concrete. It is a heat-treated material that is non-porous and resistant to chemical attack. Since acid brick is nonporous, significant penetration of contaminants is not expected. Samples were collected by chipping away the surface using a jackhammer, hammer drill, or chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of 33 acid brick samples were taken for analysis of radiological and chemical contamination. Note that one of the samples was analyzed only for volatile organics and not inorganics. The following describes the results of the analyses of acid brick samples. In summary, acid brick contains elevated levels of isotopic and elemental uranium, isotopic thorium, technetium-99, and radium-228, and samples from five components contain potentially hazardous levels of chromium, lead, and mercury.

A.III.2.1.1 Radiological Contamination

The results of radiological sample analyses for acid brick are statistically summarized in Table A.III-1. Table A.III-1 indicates that the number of analytical results available from acid brick for each radionuclide varies:

- 21 analytical results were reported for cesium-137, lead-210, radium-226, radium-228, strontium-90, technetium-99, uranium-234, and uranium,
- 20 analytical results are reported for americium-241, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, uranium-235/236, and uranium-238,
- 18 analytical results are reported for plutonium-241, thorium-228, thorium-230, thorium-232,
- 6 analytical results are reported for thorium-227.

All radioactive constituents were detected in at least one sample, with the exception of thorium-227.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison with Baseline	Comparison with Part B
Americium-241 (4.0)	Americium-241 (1.7)
Cesium-137 (2.6)	Cesium-137 (188.5)
Lead-210 (8.1)	Lead-210 (59.8)
Neptunium-237 (2.0)	Neptunium-237 (21.7)
Plutonium-238 (4.8)	Plutonium-238 (1.2)
Plutonium-239/240 (3.4)	Radium-226 (7593)
Plutonium-241 (2.2)	Radium-228 (6.2)
Polonium-210 (2.9)	Thorium-227 (13105)
Radium-226 (3.0)	Thorium-228 (2.5)
Radium-228 (16.3)	Thorium-230 (2983)
Technetium-99 (35.6)	Uranium (129.6)
Thorium-227 (1.1)	Uranium-234 (7.8)
Thorium-228 (16.7)	Polonium-210 (3115)
Thorium-230 (16.8)	Uranium-235/236 (2033)
Thorium-232 (5.7)	Uranium-238 (123.9)
Uranium (59.4)	
Uranium-234 (80.3)	
Uranium-235/236 (63.8)	
Uranium-238 (34.4)	

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The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99, uranium, uranium-234, uranium-235/236, and uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium and two of its isotopes, uranium-235/236 and uranium-238.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison with Baseline	Comparison with Part B reference
Americium-241	Cesium-137
Cesium-137	Lead-210
Radium-228	Neptunium-237
Thorium-228	Radium-226
Thorium-230	Thorium-228
Thorium-232	Uranium
	Uranium-235/236
	Uranium-238

This indicates that these analyte's baseline or Part B reference criteria concentrations exceed the analyte's detection limits. Note that the list of radionuclides with all results greater than the Part B reference criteria concentration is longer than the list of radionuclides with all results greater than the baseline concentration. This is partially attributable to Part B reference criteria concentrations that are substantially lower than baseline concentrations for several radionuclides.

None of the maximum sample results detected are less than the corresponding baseline or Part B reference criteria concentration. This indicates that acid brick in OU3 contains elevated levels of every radionuclide sampled.

TCLP Results:

Two acid brick samples were analyzed for radionuclides using the TCLP test (see Attachment A.II for complete results). All of the radionuclides, except cesium-137 which was not detected in the leachate of either sample, were detected in both the solid phase and the leachate. From 0.3 percent (technetium-99) to 78 percent (neptunium-237) of the radionuclides leached out in the TCLP test.

A.III.2.1.2 Inorganic Contamination

From 11 components, 24 acid brick samples were taken for analysis of TAL inorganics. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganic chemicals for which analyses were performed, except thallium, were detected and all but six (antimony, beryllium, cadmium, selenium, silver, and thallium) were detected in at least 12 samples. Three inorganics (barium, iron, and manganese) were each detected in all 24 samples.

Since there are no baseline concentrations available for acid brick, OU3 baseline concentrations for concrete were used as a reference for evaluating the level of contamination. All 24 acid brick samples exceeded the OU3 baseline concentration of inorganics in concrete for at least one analyte. The baseline concentrations for barium, copper, lead, and mercury were exceeded in over half of the samples. The average concentration of antimony, barium, chromium, copper, lead, mercury, nickel, potassium, selenium, and zinc all exceeded the OU3 baseline concentration in concrete. The average concentration of mercury and lead are the most significant, exceeding the baseline levels by factors of 29 and 26, respectively.

As described in Appendix A.3, a second reference for evaluating the level of contamination in acid brick is the Part B reference criteria. The maximum concentrations of all inorganics except four (arsenic, beryllium, chromium, and copper) are below these screening levels. Most significant of these are arsenic and beryllium, which exceeded the respective screening levels by factors of 638 and 320, respectively. The average concentrations of only two, arsenic and beryllium, exceeded these levels; by factors of 73 and 39, respectively.

Table A.III-3 summarizes the inorganic contamination in acid brick that exceeds 20 times the TCLP limit. Ten samples exceeded one or more of the limits for chromium, lead, or mercury. Lead was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in five samples, with concentrations up to 518 mg/kg. Chromium was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in four samples, with concentrations up to 407 mg/kg, and mercury was detected at concentrations greater than 20 times the TCLP limit (i.e., greater than 4.0 mg/kg) in two samples, with concentrations up to 5.2 mg/kg.

The most extensive inorganic contamination is associated with the Denitration Area of the Ore Refinery Plant (2A), where results exceeded 20 times the TCLP limit for both chromium and lead.

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TCLP Results:

Three acid brick samples were analyzed using the toxicity characteristic leachate procedure (TCLP). Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for total inorganics. Note that only analyses where the leachate concentration was below the theoretical maximum concentration, based on all of the metal in the solid sample leaching, are considered reasonable.

Only two TCLP metals, chromium (at 127 mg/kg) and lead (at 169 mg/kg), were detected at greater than 20 times the TCLP limit in the solid sample. Chromium was detected in the TCLP leachate of the respective sample at 0.116 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only two percent of available chromium leached from the solid sample. Lead was detected in the TCLP leachate of the respective sample at 0.0727 mg/L, well below the TCLP limit of 5.0 mg/L. This indicated that only one percent of the available lead leached from the solid sample.

From 0.9 percent (arsenic) to 66 percent (cobalt) of the TAL inorganics, and a maximum of 35 percent (lead) of any TCLP metal, leached out in the TCLP test. A concentration of 20 times the TCLP limit in the solid sample will be used to conservatively estimate the amount of acid brick that is potentially hazardous.

A.III.2.1.3 Semivolatile Organic Contamination

Three acid brick samples from two components were analyzed for semivolatile organic constituents. Only 12 of the 64 semivolatiles for which analyses were performed were detected. Benzo(b)fluoranthene, chrysene, and fluoranthene were each detected in two samples. All other detected semivolatiles were found in only one sample.

The maximum and average concentration of only two semivolatiles, benzo(a)pyrene and benzo(b)fluoranthene, exceeded the Part B reference criteria. The maximum concentrations exceeded these levels by factors of 39 and 1.2, respectively.

No semivolatiles for which a TCLP limit exists were detected.

TCLP Results:

Two acid brick samples were analyzed for TCLP semivolatile organics (see Attachment A.II for complete details). Only nine semivolatiles were detected in the solid phase of one sample and only

two in the second. No semivolatiles were detected in the leachate from either sample. There are no TCLP limits for any of the detected semivolatiles. Since most of the detection limits for semivolatiles were well above the 20 times TCLP value, no acid brick is expected to be characteristically hazardous due to semivolatiles. Conservatively, 20 times the TCLP limit is used to estimate the amount that is potentially hazardous.

A.III.2.1.4 Volatile Organic Contamination

Four acid brick samples from two components was analyzed for volatile organic constituents. Only 11 of the 36 volatiles for which analyses were performed were detected. 2-Butanone was detected in two samples. All other detected volatiles were found in only one sample.

The maximum and average concentration of all detected volatiles were below the respective Part B reference criteria.

The only detected semivolatiles for which TCLP limits exist were 2-butanone and trichloroethene, which were detected at concentrations of 8 and 5 μg/kg, respectively, well below the 4,000,000 and 14,000 μg/kg (i.e., 20 times the TCLP limits) required to even be potentially hazardous.

TCLP Results:

Two of the acid brick samples were analyzed for volatile organics using the TCLP test (see Attachment A.II for complete details). Only seven volatiles, one of which is regulated by RCRA, (tetrachloroethene) were detected in the solid sample and only one, which is regulated by RCRA, (benzene) was detected in the leachate. The detected concentration in the solid sample did not exceed 20 times the TCLP limited and the detected value in the leachate sample did not exceed the TCLP limit. Since most of the detection limits for volatiles were well above 20 times the TCLP value, no acid brick is expected to be characteristically hazardous due to volatiles. Conservatively, 20 times the TCLP limit is used to estimate the amount that is potentially hazardous.

A.III.2.1.5 Pesticide/PCB Contamination

None of the acid brick samples were analyzed for pesticides or PCBs.

A.III.2.2 Asphalt

Asphalt is a common material used in the construction of roads and parking lots at the FEMP. Samples of asphalt were collected by chipping away the surface using a jackhammer, hammer drill, or

chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of four asphalt samples were taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, asphalt contains elevated levels of elemental uranium but no samples are potentially hazardous.

A.III.2.2.1 Radiological Contamination

The results of radiological sample analyses for asphalt are statistically summarized in Table A.III-1. This indicates four analytical results are available from asphalt for americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium, uranium-234, uranium-235/236, and uranium-238. With the exceptions of americium-241 and neptunium-237, all radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentrations and Part B reference criteria concentrations. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison with Baseline	Comparison with Part B reference
Americium-241 (1.1)	Cesium-137 (28.8)
Lead-210 (1.5)	Lead-210 (11.3)
Plutonium-238 (1.4)	Neptunium-237 (11.6)
Polonium-210 (1.8)	Polonium-210 (4.9)
Radium-228 (2.0)	Radium-226 (1346)
Technetium-99 (8.3)	Strontium-90 (5.6)
Thorium-228 (1.2)	Thorium-228 (956.8)
Uranium (11.0)	Uranium (550.3)
Uranium-235/236 (1.2)	Uranium-234 (1.6)
Uranium-238 (1.7)	

The arithmetic mean is used for comparing results that can not be assigned a statistical distribution to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99 and uranium. The

mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, and uranium.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison with Baseline	Comparison with Part B reference
Plutonium-238	Cesium-137
Technetium-99	Lead-210
Uranium	Radium-226
	Strontium-90
	Thorium-228
	Uranium
	Uranium-235/236
	Uranium-238

This implies that an analyte's baseline or Part B reference criteria concentration exceeds the analyte's detection limit. Note that the list of radionuclides with all results greater than the Part B reference criteria concentration is longer than the list of radionuclides with all results greater than the baseline concentration. This is partially attributable to Part B reference criteria concentrations that are substantially lower than baseline concentrations for several radionuclides.

The following radionuclides were not detected above their corresponding baseline or Part B reference criteria concentrations:

Comparison with Baseline	Comparison with Part B reference criteria
Plutonium-239/240	Plutonium-238
	Plutonium-239/240
	Technetium-99
	Cesium-137
	Thorium-230
	Thorium-232

This indicates that these radionuclides were not found in significant concentrations in the asphalt sampled.

A.III.2.2.2 Inorganic Contamination:

Four asphalt chip samples were taken from three components and analyzed for TAL inorganics. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganic chemicals for which analyses were

performed, except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium), were detected. Ten inorganics (arsenic, barium, calcium, iron, lead, magnesium, manganese, sodium, vanadium, and zinc) were detected in all four samples.

Since there are no baseline concentrations available for asphalt, baseline concentrations for concrete are used as a reference for evaluating the level of contamination. All asphalt samples exceeded the OU3 baseline concentration of inorganics in concrete for at least one analyte. The maximum concentrations of only seven inorganics (arsenic, calcium, lead, magnesium, manganese, vanadium, and zinc), and the average concentration of only two (lead and zinc) exceeded the concrete baseline values. The average concentration of lead and zinc exceeded the baseline levels in concrete by factors of 1.2 and 2.6, respectively.

As described in Appendix A.3, a second reference for evaluating the level of contamination in asphalt is the Part B reference criteria. The maximum and average concentrations, of only two detected inorganics (arsenic and manganese) exceeded these criteria. The average concentration of arsenic and manganese exceeded these criteria, by a factor of 77 and 2.3, respectively.

None of the asphalt samples exceeded 20 times the TCLP limit for any inorganic contaminant.

A.III.2.2.3 Semivolatile Organic Contamination

Two asphalt chip samples, both from roads, were analyzed for semivolatile organic constituents. Only six (2-methylnaphthalene, benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene) of the 63 semivolatiles for which analyses were performed were detected, and all six were detected in both samples.

Benzo(a)anthracene was the only detected semivolatile that exceeded a Part B reference criteria and both samples detected benzo(a)anthracene which exceeded the level, the maximum by a factor of 2.8.

There are no TCLP limits for any of the detected semivolatiles.

A.III.2.2.4 Volatile Organic Contamination

The same two asphalt chip samples that were analyzed for semivolatile contaminants were also analyzed for volatiles. Only one of the 32 volatiles for which analyses were performed was detected, 2-butanone at 4.0 μg/kg.

The Part B reference criteria for 2-butanone is 16,425,000 μg/kg and twenty times the TCLP limit is 4,000,000 μg/kg, which are both well above the detected concentration.

A.III.2.2.5 Pesticides/PCBs

Both samples analyzed for semivolatile/volatile organics were also analyzed for pesticides and PCBs. None of the 28 pesticides/PCBs for which analyses were performed were detected in either sample.

A.III.2.3 Concrete Chips

Concrete constitutes nearly 59 percent of the total weight of OU3 materials. Samples of concrete were collected, primarily in dry process and non-process areas, by chipping away the surface (top one-half inch) using a jackhammer, hammer drill, or chisel. Neither acids nor caustics were used in process operations in these areas, so significant penetration of contaminants is not likely. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of 193 concrete chip samples was taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, concrete chips contain elevated levels of isotopic and elemental uranium, technetium-99, and samples from nine components contain potentially hazardous levels of barium, chromium, lead, and mercury.

A.III.2.3.1 Radiological Contamination

The results of radiological sample analyses for concrete chips are statistically summarized in Table A.III-1. This indicates the number of analytical results from concrete chips for each radioactive constituent varied

- 158 analytical results are reported for uranium-234;
- 156 analytical results are reported for uranium-235/236 and uranium-238;
- 152 analytical results are reported for cesium-137, technetium-99, and uranium,
- 151 analytical results are reported for radium-228;
- 150 analytical results are reported for plutonium-238, plutonium-239/240, and strontium-90;
- 149 analytical results are reported for lead-210;

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- 148 analytical results are reported for neptunium-237, polonium-210, radium-226, thorium-228, thorium-230, thorium-232;
- 142 analytical results are reported for americium-241;
- 85 analytical results are reported for plutonium-241; and
- ten analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison with Baseline	Comparison with Part B reference criteria
Americium-241 (1.3)	Cesium-137 (55.3)
Lead-210 (2.3)	Lead-210 (16.9)
Neptunium-237 (1.3)	Neptunium-237 (13.9)
Radium-228 (2.6)	Polonium-210 (1.4)
Technetium-99 (11.8)	Radium-226 (1603)
Thorium-228 (2.0)	Thorium-227 (77.1)
Thorium-230 (2.9)	Thorium-228 (1553)
Uranium (17.3)	Uranium (870.8)
Uranium-234 (10.7)	Uranium-237 (17.2)
Uranium-235/236 (10.4)	Uranium-235/236 (505.4)
Uranium-238 (15.5)	Uranium-238 (918.5)

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99, uranium, uranium-234, uranium-235/236, and uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium, uranium-235/236, and uranium-238.

The minimum sample results detected exceeds the corresponding concrete baselines or Part B reference criteria concentrations for the following radionuclides:

Comparison with Baseline	Comparison with Part B reference criteria
None	Cesium-137
	Lead-210
	Neptunium-237
	Radium-226
	Thorium-227
	Thorium-228
	Uranium
	Uranium-235/236
	Uranium-238

This indicates that all sample analytical results for these radionuclides are greater than corresponding baseline or Part B reference criteria concentrations. Note that the list of radionuclides with all results greater than the Part B reference criteria concentration is longer than the list of radionuclides with all results greater than the baseline concentration. This is partially attributable to Part B reference criteria concentrations that are substantially lower than baseline concentrations for several radionuclides.

None of the maximum sample results detected are less than the corresponding baselines or Part B reference criteria concentrations. This indicates that elevated levels of every radionuclide and uranium were detected in surface concrete from at least one location.

TCLP Results:

Two concrete chip samples were analyzed for radionuclides using the TCLP test (see Attachment A.II for complete details). Most of the radionuclides were detected in both the solid phase and the leachate. The major exceptions were cesium-137, which was not detected in the solid phase or leachate of either of the samples, and strontium-90, which was not detected in the solid phase of either sample. From less than 0.1 percent (thorium-227) to 25 percent (technetium-99) of the radionuclides leached out in the TCLP test.

A.III.2.3.2 Inorganic Contamination

A total of 154 concrete chip samples were taken from 90 components for analysis of TAL inorganics. As shown on Tables A.III-1 and A.III-2, all of the inorganic chemicals for which analyses were performed were detected and all but seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected in at least 111 samples. Six inorganics (aluminum, barium, calcium, iron, magnesium, and manganese) were detected in all samples.

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All concrete chip samples exceeded the OU3 baseline concentration of inorganics in concrete for at least one analyte. The baseline concentrations of nine inorganics (aluminum, arsenic, barium, chromium, copper, lead, potassium, sodium, and zinc) were exceeded in over half of the samples. Also, the average concentration of all inorganics, except six (calcium, cadmium, beryllium, magnesium, manganese, and silver), exceeds the respective OU3 baseline concentration in concrete. The most significant of these are zinc, lead, and antimony with average concentrations in concrete chips that exceeded the concrete baseline concentrations by factors of 36, 25, and 15, respectively.

For ten inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, manganese, thallium and zinc), the maximum concentration exceeded the respective Part B reference criteria. The average concentration of only four inorganics (antimony, arsenic, beryllium, and manganese) exceeds the respective Part B reference criteria. The most significant of these are arsenic and beryllium, which exceeded these levels by factors of 131 and 48, respectively.

Table A.III-3 summarizes the inorganic contamination in concrete chips that exceeds 20 times the TCLP limit. Five of the eight RCRA metals (barium, cadmium, chromium, lead, and mercury) were detected at greater than 20 times the TCLP limit. Most significant of these is lead, which was detected at greater than 20 times the TCLP limit in 13 samples, with concentrations ranging up to 2730 mg/kg. This is followed by chromium (detected at greater than 20 times the TCLP limit in five samples, with concentrations ranging up to 640 mg/kg) and barium, cadmium, and mercury (each detected at greater than 20 times the TCLP limit in one sample, with concentrations of 5890, 29.4 and 4.8, respectively).

The most extensive inorganic contamination in concrete chips is associated with the Ball Mall Area of the Recovery Plant (8A), where results exceeded 20 times the TCLP limit for barium, chromium, and lead.

TCLP Results:

Seven concrete chip samples were analyzed for inorganics using the TCLP test. In five of these, the same sample or one collected from a nearby location were analyzed for TAL inorganics. Tables A.II-3 through A.II-6 compare the results of the TCLP analyses with those for TAL (total) inorganics. Note that only analyses where the leachate concentration was below the theoretical maximum concentration, based on all of the metal in the solid sample leaching, are considered.

Only one TCLP metal, lead in the Sump Processing System Area of the Pilot Plant Wet Side (13A), was detected at greater than 20 times the TCLP limit in the solid sample (105 mg/kg). Lead was detected in the corresponding TCLP leachate at 0.0075 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only 0.14 percent of the available lead leached from the solid sample.

From 0.1 percent (iron) to 57.9 percent (sodium) of the TAL inorganics, and a maximum of 10 percent (silver) of TCLP metals, leached out in the TCLP test. Conservatively, a concentration of 20 times the TCLP limit in the solid sample has been used to estimate the amount of concrete that is potentially hazardous due to inorganics.

A.III.2.3.3 Semivolatile Organic Contamination

Eight samples from four components were analyzed for semivolatile organic constituents. Only ten of the 64 semivolatile compounds for which analyses were performed were detected. Phenanthrene was detected in five samples. This is followed by fluoranthene (detected in three samples); chrysene and pyrene (each detected in two samples); and benzo(a)anthracene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, and p-methylphenol (Cresol) (each detected in one sample).

The maximum and average concentration of only two detected semivolatiles (benzo(a)anthracene and bis(2-ethylhexyl)phthalate), exceeded Part B reference criteria. Most significant of these was benzo(a)anthracene, whose average concentration exceeded the screening level by a factor of 200.

The only detected semivolatile for which a TCLP limit exists was p-methylphenol (cresol), which was detected at a maximum of 650 μg/kg, well below the 4,000,000 μg/kg (i.e., 20 times the TCLP limit) required to even be potentially hazardous.

TCLP Result:

Seven concrete chip samples analyzed for semivolatile contamination, using the TCLP test (see Attachment A.II for complete details). In four of these, the same sample, or one collected from a nearby location was analyzed for TCL Semivolatile Organics. Only eight were detected in the solid sample, and only one was detected in the leachate. There are no TCLP limits for any of the detected semivolatiles.

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Since most of the detection limits for semivolatiles were well above 20 times the TCLP value, no concrete chips are expected to be characteristically hazardous due to semivolatiles. Conservatively, 20 times the TCLP limit is used to estimate the amount that is potentially hazardous.

A.III.2.3.4 Volatile Organic Contamination

The same eight samples that were analyzed for semivolatile organics were also analyzed for volatile organics. Only ten of the 36 volatiles for which analyses were performed were detected. Ethylbenzene and total xylenes were each detected in three samples. These are followed by 1,1,1-trichloroethane and 2-butanone (each detected in two samples); and 2-hexanone, 4-methyl-2-pentanone, m,p-xylene, o-xylene, tetrachloroethene, and toluene (each detected in one sample).

None of the detected concentrations exceeded the Part B reference criteria.

The only detected volatiles for which TCLP limits exist were 2-butanone and tetrachloroethene, which were detected a maximum concentrations of 3000 and 3 μg/kg, respectively, well below the respective concentration of 4,000,000 and 14,000 μg/kg (i.e., 20 times the respective TCLP limit) required to even be potentially hazardous.

TCLP Results:

Eight concrete chip samples were analyzed for volatile organic contaminating using the TCLP test (see Attachment A.II for complete details). In five of these, the same sample, or one collected from a nearby location, were analyzed for TCL Volatiles Organics. Only seven volatiles were detected in the solid sample, and only five were detected in the leachate.

TCLP limits exist for only four of the detected volatiles: 2-butanone, benzene, chloroform, and tetrachloroethene. All detected concentrations were well below any level of concern.

Since most of the detection limits for volatiles were below 20 times the TCLP value, no concrete chips are expected to be characteristically hazardous due to volatiles. Conservatively, 20 times the TCLP limit is used to estimate the amount of concrete that is potentially hazardous due to volatiles.

A.III.2.3.5 Pesticide/PCB Contamination

A total of 14 samples was taken from 12 components for analysis of pesticides and PCBs. Only ten of 21 pesticides and three of seven PCB compounds were detected. Of the pesticides, Dieldrin was detected in four samples, followed by 4,4'-DDE and Endosulfan sulfate (each detected in three samples); alpha-Chlordane, Endosulfan II, and gamma-Chlordane (each detected in two samples); and delta-BHC, Endosulfan II, Endrin ketone, and Heptachlor epoxide (each detected in only one sample). Of the PCBs, Aroclor-1254 and Aroclor 1260 were each detected in two samples and Aroclor-1248 was detected in only one sample.

The maximum concentration of three of the detected pesticides (alpha-Chlordane, Dieldrin, and gamma-Chlordane), and all of the detected PCBs, exceeded Part B reference criteria. Most significant of these were the PCBs Aroclor-1254, Aroclor-1248 and Aroclor-1260, which exceeded the respective screening level by factors of 390, 200, and 190, respectively.

Only two of the detected pesticides (Chlordane and Heptachlor epoxide) have TCLP limits. They were detected at maximum concentrations of 4 (sum of alpha-Chlordane and gamma-Chlordane) and 1.9 μg/kg, well below the respective concentration of 6000 and 160 μg/kg (i.e., 20 times the TCLP limit) required to even be potentially hazardous.

None of the pesticide concentrations exceeded the 50 ppm TSCA limit.

A.III.2.4 Concrete Cores

Concrete core samples were collected from wet process areas to determine the vertical distribution of contaminants within OU3 media.

The majority of the components in OU3 have concrete floors or pads associated with them. Materials spilled onto this concrete may penetrate its surface and migrate downward. Samples designed to determine the vertical extent of constituent distribution in concrete were collected by extracting concrete cores from floors and pads. These cores were sampled at three depths by cutting them into discs with a known thickness. Section 2.0 of this report contains additional details on this aspect of the sampling and analysis plan.

A total of 375 concrete core samples were taken for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, concrete cores

contain elevated levels of isotopic and elemental uranium, technetium-99, radium-228, thorium-230, and lead-210, and samples from 19 components contain potentially hazardous levels of barium, chromium, lead, and mercury.

A.III.2.4.1 Radiological Contamination

Table A.III-1 presents summary statistics for radionuclide concentrations in concrete cores. Synopses of results from the concrete core sampling efforts are offered below:

- All radionuclides were detected in at least one sample from each depth.
- No nuclide was detected in 100% of the samples collected.
- Americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90 were detected in fewer than 50% of the samples collected from all core sampling intervals.
- Plutonium-239/240 was detected in fewer than 50% of the samples collected from the 0.5 to 1.0 inch and greater than 1 inch core sampling intervals.
- Lead-210, radium-226, uranium, uranium-235/236, and uranium-238 exceed their Part B reference criteria concentrations in all three concrete core sampling intervals over 50% of the time.
- Polonium-210, thorium-227, thorium-228, and uranium-234 exceed their Part B reference criteria concentrations in the top 0.5 inch of concrete core over 50% of the time.
- Polonium-210, thorium-228, and uranium-234 exceed their Part B reference criteria concentrations in the second 0.5 inch of concrete core over 50% of the time.
- No nuclide exceeds their respective concrete baseline concentrations in all three concrete core sampling intervals over 50% of the time.
- Lead-210, radium-228, technetium-99, thorium-230, uranium, uranium-234, uranium-235/236, and uranium-238 exceed their respective concrete baseline concentrations in the top 0.5 inch of concrete core over 50% of the time.
- Technetium-99, uranium, uranium-234, uranium-235/236, and uranium-238 exceed their respective concrete baseline concentrations in the second 0.5 inch of concrete core in over 50% of the samples.

TCLP Results:

Two concrete core samples were analyzed for radionuclides using the TCLP test (see Attachment A.II for complete details). Most of the radionuclides were detected in both the solid phase and the leachate. The major exceptions were cesium-137 and strontium-90, which were not detected in the

solid phase or leachate of either of the samples. From 0.1 percent (thorium-230) to 56 percent (technetium-99) of the radionuclides leached out in the TCLP test.

A.III.2.4.1.1 Vertical Profile of Americium-241 in Concrete

Figure A.III-1 presents americium-241 concentrations measured in 81 concrete cores plotted against depth. Vertical distributions of americium-241 vary from core to core, but concentration generally decreases as depth increases for cores with surface concentrations exceeding 0.2 pCi/g. The highest concentrations, approaching 7 pCi/g, were found in the Southern Extraction area and the Central area of the Pilot Plant Wet Side (13A).

A.III.2.4.1.2 Vertical Profile of Cesium-137 in Concrete

Figure A.III-2 presents cesium-137 concentrations measured in 84 concrete cores plotted against depth. This figure illustrates that the vertical distribution of cesium-137 in cores with surface concentrations exceeding 0.1 pCi/g generally decreases as depth increases. However, numerous exceptions to this generalization stand out in this figure, emphasizing that the concentration profile of cesium-137 in concrete varies from core to core. The midsection of a core collected from the Digestion area of the Ore Refinery Plant produced the highest reported concentration of cesium-137 in a concrete core (4.7 pCi/g).

A.III.2.4.1.3 Vertical Profile of Lead-210 in Concrete

Figure A.III-3 presents lead-210 concentrations measured in 84 concrete cores plotted against depth. The vertical distribution of lead-210 in cores with surface concentrations exceeding 0.9 pCi/g generally decreases as depth increases. Numerous exceptions to this generalization stand out in this figure, especially at lower depths. The surface segment of a core collected from the Contaminated Oil/Graphite Burn Pad (10D) produced the highest reported concentration of 31 pCi/g.

A.III.2.4.1.4 Vertical Profile of Neptunium-237 in Concrete

Figure A.III-4 presents neptunium-237 concentrations measured in 83 concrete cores plotted against depth. The vertical distribution of neptunium-237 appears variable in cores with surface concentrations below 0.5 pCi/g. In cores with surface concentrations above 0.5 pCi/g, the neptunium generally decreases as depth increases. The highest concentration, approaching 11 pCi/g, was found at the surface of a core taken in the Central area of the Pilot Plant Wet Side (13A).

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A.III.2.4.1.5 Vertical Profile of Plutonium-238 in Concrete

Figure A.III-5 presents plutonium-238 concentrations measured in 84 concrete cores plotted against depth. The concentrations generally decrease as depth increases, especially for cores with surface concentrations exceeding 0.2 pCi/g. However, notable exceptions are evident where subsurface concentrations are higher than surface concentrations. The midsection of a core taken from the Southern Extraction area of the Pilot Plant Wet Side (13A) produced the highest concentration of 246 pCi/g. The highest surface concentrations (104 pCi/g and 100 pCi/g) were also reported in cores from the Central area of this same component.

A.III.2.4.1.6 Vertical Profile of Plutonium-239/240 in Concrete

Figure A.III-6 presents plutonium-239/240 concentrations measured in 84 concrete cores plotted against their depth. The vertical distribution of plutonium-239/240 generally decrease as depth increases in cores with surface concentrations exceeding 0.12 pCi/g. Surface intervals from cores taken in the Pilot Plant Wet Side (13A) and the Ore Refinery Plant (2A) exhibited the highest concentrations (34 pCi/g and 22 pCi/g, respectively).

A.III.2.4.1.7 Vertical Profile of Plutonium-241 in Concrete

Figure A.III-7 presents plutonium-241 concentrations measured in 50 concrete cores plotted against their depth. This figure illustrates that the vertical distribution of plutonium-241 varies from core to core. In general, concentration generally decrease as depth increases for cores with surface concentrations exceeding 2 pCi/g. The surface interval of a core taken from the Northern area of the Pilot Plant Wet Side (13A) produced the highest concentration (104 pCi/g).

A.III.2.4.1.8 Vertical Profile of Polonium-210 in Concrete

Figure A.III-8 presents polonium-210 concentrations measured in 84 concrete cores plotted against depth. Concentrations generally decrease as depth increases in cores with surface concentrations exceeding 1 pCi/g. The surface interval of a core collected from the Incinerator Building produced the highest reported concentration of 19 pCi/g.

A.III.2.4.1.9 Vertical Profile of Radium-226 in Concrete

Figure A.III-9 presents radium-226 concentrations measured in 84 concrete cores plotted against depth. The vertical distribution of radium-226 appears variable in cores with surface concentrations below 1.0 pCi/g. In cores with surface concentrations above 1.0 pCi/g, the radium-226 generally

decreases as depth increases. A core collected from the Incinerator Building produced the highest reported concentration of 314 pCi/g.

A.III.2.4.1.10 Vertical Profile of Radium-228 in Concrete

Figure A.III-10 presents radium-228 concentrations measured in 84 concrete cores plotted against depth. This figure illustrates that the concentration of radium-228 generally decreases as depth increases in cores with surface concentrations exceeding 0.5 pCi/g. Cores collected from the Pilot Plant Wet Side (13A) produced the highest reported concentrations, ranging from 165 pCi/g to 2040 pCi/g.

A.III.2.4.1.11 Vertical Profile of Strontium-90 in Concrete

Figure A.III-11 presents strontium-90 concentrations measured in 84 concrete cores plotted against depth. This figure illustrates that the concentration of strontium-90 varies from core to core. Many cores do exhibit decreasing strontium-90 concentrations with increasing depth, but there is no clear trend in the radionuclide's vertical distribution. Cores collected from the Sump Pump House (13C), the Engine House/Garage (31A), and the Digestion area of the Ore Refinery Plant (2A) produced the highest reported concentrations, at 5.8 pCi/g, 5.5 pCi/g and 5.1 pCi/g, respectively.

A.III.2.4.1.12 Vertical Profile of Technetium-99 in Concrete

Figure A.III-12 presents technetium-99 concentrations measured in 84 concrete cores plotted against depth. The vertical distribution of technetium-99 generally decreases as depth increases in cores with surface concentrations exceeding 1 pCi/g. There are a number of notable exceptions to this observation, indicating the vertical distribution of technetium varies from core to core and does not follow a definable trend. Surface intervals of cores collected from the Pilot Plant Wet Side (13A) and the Sump Pump House (13C) produced the highest reported concentrations, at 588 pCi/g and 838 pCi/g, respectively.

A.III.2.4.1.13 Vertical Profile of Thorium-227 in Concrete

Figure A.III-13 presents thorium-227 concentrations measured in 9 concrete cores plotted against depth. This figure illustrates that the concentration of thorium-227 varies from core to core, and the concentration generally decreases as depth increases. Cores collected from the Hot Rafinate Building produced the two highest reported surface concentrations of thorium-227 (23 and 67 pCi/g).

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A.III.2.4.1.14 Vertical Profile of Thorium-228 in Concrete

Figure A.III-14 presents thorium-228 concentrations measured in 85 concrete cores plotted against depth. This figure illustrates that the concentration of thorium-228 varies from core to core, and the concentration generally decreases as depth increases. Cores collected from the Pilot Plant Wet Side (13A) produced the four highest reported surface concentrations of thorium-228, ranging from 990 pCi/g to 604 pCi/g. The mid-section of a core from the Southern Extraction area of the Pilot Plant Wet Side (13A) produced the highest thorium-228 concentration, reported as 1140 pCi/g.

A.III.2.4.1.15 Vertical Profile of Thorium-230 in Concrete

Figure A.III-15 presents thorium-230 concentrations measured in 85 concrete cores plotted against depth. Thorium-230 generally decreases as depth increases in cores with surface concentrations exceeding 0.9 pCi/g. A core collected from the Sump Pump House (13C) produced two of the highest reported concentrations in its surface (649 pCi/g) and middle (871 pCi/g) intervals.

A.III.2.4.1.16 Vertical Profile of Thorium-232 in Concrete

Figure A.III-16 presents thorium-232 concentrations measured in 84 concrete cores plotted against depth. As the depth increases, thorium-232 generally decreases in cores with a surface concentrations of exceeding 0.9 pCi/g. A core collected from the Central area of the Pilot Plant Wet Side (13C) produced two of the highest reported thorium-232 concentrations, 976 pCi/g and 1270 pCi/g, in its surface and middle intervals, respectively.

A.III.2.4.1.17 Vertical Profile of Elemental Uranium in Concrete

Figure A.III-17 depicts the vertical concentration profiles of uranium in 85 cores collected within OU3. The vertical distribution of elemental uranium varies from core to core, but in general decreases over depth. Uranium concentrations in eight cores did not exceed its baseline concentration in concrete. Uranium concentrations in 56 cores decreased as the distance from the surface increased. Uranium profiles in 19 cores did not always decrease as the depth increased. The surface intervals of cores from the Digestion area and the Denitration area of the Ore Refinery Plant (2A) produced the two highest uranium concentrations found in cores, 13900 pCi/g and 11500 pCi/g, respectively.

A.III.2.4.1.18 Vertical Profile of Uranium-234 in Concrete

Figure A.III-18 presents uranium-234 concentrations measured in 82 concrete cores plotted against depth. The concentration of uranium-234 varies from core to core, but the concentration generally decreases as depth increases for cores with surface concentrations exceeding 1 pCi/g. Cores collected

from the Pilot Plant Wet Side (13A) and the Ore Refinery Plant (2A) produced the two highest reported surface concentrations of uranium-234, reported at 11300 pCi/g and 11200 pCi/g, respectively.

A.III.2.4.1.19 Vertical Profile of Uranium-235/236 in Concrete

Figure A.III-19 presents uranium-235/236 concentrations measured in 82 concrete cores plotted against depth. The concentration of uranium-235/236 varies from core to core, but the concentration generally decreases as depth increases for cores with surface concentrations exceeding 0.2 pCi/g. The highest concentrations are scattered among four different components: the Pilot Plant Wet Side (13A) (640 pCi/g), Pilot Plant Wet Side (13A) (611 pCi/g), the Ore Refinery Plant (2A) (579 pCi/g), and the Combined Raffinate Tanks (3J) (560 pCi/g).

A.III.2.4.1.20 Vertical Profile of Uranium-238 in Concrete

Figure A.III-20 presents uranium-238 concentrations measured in 82 concrete cores plotted against depth. The concentration of uranium-238 varies from core to core, but the concentration generally decreases as depth increases for cores with surface concentrations exceeding 1 pCi/g. Cores collected from Pilot Plant Wet Side (13A) and the Ore Refinery Plant (2A) produced the two highest reported surface concentrations of uranium-238, reported at 7600 pCi/g and 7170 pCi/g, respectively.

A.III.2.4.2 Inorganic Contamination

A total of 256 concrete core samples were taken from 48 components for analysis of TAL inorganics. Of these, 93 samples from 48 components were cores from the top ½-inch, 86 samples from 48 components from the second ½-inch, and 55 samples from 36 components from greater than 1-inch depth. Based on the results of the trend analysis discussed in the modification to the WPA (DOE 1994e), the deeper samples of several cores were not analyzed. The trend analysis showed that these samples generally approached background concentrations.

As shown on Tables A.III-1 and A.III-2, all of the 23 inorganic chemicals for which analyses were performed, except thallium in the top ½-inch, were detected at all depths, and all except six (antimony, beryllium, cadmium, mercury, selenium, and silver) were detected in the majority of all samples at all three depths. Six inorganics (aluminum, barium, calcium, iron, magnesium, and manganese) were detected in all samples at all three depths.

The maximum and average concentration of most inorganics at all three depths exceeded the OU3 baselines for concrete. However, the maximum concentration of four (antimony, barium, chromium, and lead) were consistently detected above their respective baseline concentrations and the ratio of the average concentration to the baseline concentration of two (antimony and lead) was close to the highest at all depths.

The maximum concentration of nine inorganics (antimony, arsenic, barium, beryllium, chromium, manganese, mercury, thallium, and vanadium) exceeded the Part B reference criteria at one or more depths. Most significant of these were arsenic and beryllium, which exceeded these criteria by factors of 920 and 320, respectively, at all three depths.

Table A.III-3 summarizes the inorganic contamination in concrete cores that exceeds 20 times TCLP. Only four (barium, chromium, lead, and mercury) were detected at greater than 20 times the TCLP limit. Lead was detected at greater than 20 times the TCLP limit in 16 samples from the top ½-inch, with concentrations ranging up to 1210 mg/kg; and five times in the second ½-inch, with concentrations ranging up to 275 mg/kg. In two of the samples where lead was detected at greater than 20 times the TCLP limit in the top ½-inch, the lead contamination was greater than 20 times the TCLP limit in the second ½-inch. However, in the other three samples where chromium was detected at greater than 20 times the TCLP limit in the second ½-inch, it was not detected at elevated levels in the top ½-inch.

Chromium was detected at greater than 20 times the TCLP limit in five samples from the top ½-inch, with concentrations up to 424 mg/kg; in two samples from the second ½-inch, with concentrations up to 280 mg/kg; and in one sample from below 1-inch, at a concentration of 105 mg/kg. In two of the samples where chromium was detected at greater than 20 times the TCLP limit in the top ½-inch, it was also detected at greater than 20 times the TCLP limit in the second ½-inch. However, in the sample where chromium was detected at greater than 20 times the TCLP limit at a depth greater than 1-inch, the sample taken from the top ½-inch in the same area does not indicate an elevated chromium level.

Barium was detected at greater than 20 times the TCLP limit in four samples from the top ½-inch, with concentrations up to 4800 mg/kg. The barium concentration in lower depths at the same locations were all well within 20 times the TCLP limit.

Mercury was detected at greater than 20 times the TCLP limit in the top ½-inch of one sample, with a concentration of 12.6 mg/kg. The mercury concentration in lower depths at the same location was well within 20 times the TCLP limit.

The most extensive inorganic contamination in concrete core samples is associated with the Ore Refinery Plant (2A), the Ozone Building (3B), and the Old Cooling Water Tower (3K), where results exceeded 20 times the TCLP limit for both lead and chromium.

A.III.2.4.2.1 Vertical Profile of Aluminum in Concrete

Figure A.III-21 presents aluminum concentrations measured in 86 concrete cores plotted against depth. The concentration of aluminum in the top ½-inch varies from 3010 kg to 19,600 mg/kg, and most samples (53) from the top ½-inch exceed the concrete baseline (5000 mg/kg), although only three samples exceed 10,000 mg/kg. The highest two concentrations were detected in samples collected from the Ore Refinery Plant (2A). In most cases, the aluminum concentration does not decrease with depth, which is due at least in part to masking effect of the high baseline concentration. In those cases where the concentration does decrease with depth, except when the concentration in the top ½-inch is high, the decrease is not significant. This is due, at least in part, to the fact that most of the aluminum present at the site was highly soluble (i.e., aluminum sulfate and aluminum cladding and ore impurities that had been dissolved in acid solutions.

A.III.2.4.2.2 Vertical Profile of Antimony in Concrete

Figure A.III-22 presents antimony concentrations measured in 85 concrete cores plotted against depth. The concentration of antimony in the top ½-inch varies from 0.81 mg/kg to 70.4 mg/kg, although most results (76) from the top ½-inch exceed the concrete baseline (1 mg/kg). The highest concentration was detected in a sample collected from the Special Products Plant (9A), although three of the eight highest results were collected from the Ore Refinery Plant (2A). In about half of the samples, the antimony concentration does not decrease with depth, and in those where it does, the decrease is not significant (typically less than 20 percent).

A.III.2.4.2.3 Vertical Profile of Arsenic in Concrete

Figure A.III-23 presents arsenic concentrations measured in 85 concrete cores plotted against depth. The concentration of arsenic in the top ½-inch varies from 0.4 mg/kg to 34.1 mg/kg, and about half of the samples (44) from the top ½-inch exceed the concrete baseline (3.96 mg/kg). The highest concentration was detected in a sample collected from the Green Salt Plant (4A). In over half of the

samples, the arsenic concentration does not decrease with depth, and in those where it does, the amount of the decrease varies widely from less than 10 percent to a maximum of 80 percent.

A.III.2.4.2.4 Vertical Profile of Barium in Concrete

Figure A.III-24 presents barium concentrations measured in 85 concrete cores plotted against depth. The concentration of barium in the top ½-inch varies from 32.3 mg/kg to 4800 mg/kg, and most of the samples (65) from the top ½-inch exceed the baseline concentration (50.4 mg/kg). The concentration in four samples, from the Special Products Plant (9A) - two samples including the highest concentration, the Recovery Plant (8A), and the Sump Pump house (13C) is significantly higher than in the other samples (i.e., well above 1000 mg/kg). In approximately half of the samples, the barium concentration does not decrease with depth, and in those where it does, the amount of the decrease increases (maximum of 97 percent decrease) with increasing concentration in the preceding depth.

A.III.2.4.2.5 Vertical Profile of Beryllium in Concrete

Figure A.III-25 presents beryllium concentrations measured in 85 concrete cores plotted against depth. The concentration of beryllium in the top ½-inch varies from 0.02 mg/kg to 4.8 mg/kg, and most of the samples (65) from the top ½-inch are below the baseline concentration (1.4 mg/kg). The four highest concentrations were in samples collected from the Special Products Plant (9A). In less than half of the samples, the barium concentration does not decrease with depth, and in those where it does, the amount of the decrease is mostly insignificant.

A.III.2.4.2.6 Vertical Profile of Cadmium in Concrete

Figure A.III-26 presents cadmium concentrations measured in 85 concrete cores plotted against depth. The concentration of cadmium in the top ½-inch varies from 0.09 mg/kg to 8.1 mg/kg, and most of the samples (60) from the top ½-inch are below the baseline concentration (2.4 mg/kg). In well over half of the samples, the barium concentration does not decrease with depth, and in those where it does, the amount of the decrease tends to be significant (maximum of 85 percent decrease). This is, at least in part, due to the insolubility of cadmium and many of its compounds.

A.III.2.4.2.7 Vertical Profile of Calcium in Concrete

Figure A.III-27 presents calcium concentrations measured in 85 concrete cores plotted against depth. The concentration of calcium in the top ½-inch varies from 60,000 mg/kg to 267,000 mg/kg, and most of the samples (66) from the top ½-inch are below the baseline concentration (199,000 mg/kg).

In nearly all of the samples, the calcium concentration does not decrease with depth. This is due, at least in part, to the masking effect of the high baseline concentration.

A.III.2.4.2.8 Vertical Profile of Chromium in Concrete

Figure A.III-28 presents chromium concentrations measured in 85 concrete cores plotted against depth. The concentration of chromium in the top ½-inch varies from 0.85 mg/kg to 424 mg/kg, and most of the samples (62) from the top ½-inch exceed the baseline concentration (8.15 mg/kg). The highest concentration, which is significantly higher than the next highest, was in a sample collected from the Old Cooling Water Tower (3K), where chromium was used as a bactericide. In over half of the samples, the chromium concentration does not decrease with depth, but in those where it does, the amount of the decrease varies from a minimum of two percent to a maximum decrease of 92 percent.

A.III.2.4.2.9 Vertical Profile of Cobalt in Concrete

Figure A.III-29 presents cobalt concentrations measured in 85 concrete cores plotted against depth. The concentration of cobalt in the top ½-inch varies from 1.3 mg/kg to 220 mg/kg, and most of the samples (57) from the top ½-inch exceed the baseline concentration (2.89 mg/kg). The highest concentration, which is significantly higher than in the next highest, was in a sample collected from the Laboratory (15A). In approximately half of the samples, the cobalt concentration does decrease with depth and the amount of the decrease is significant (several over 80 percent decrease), this percentage increasing (to a maximum decrease of 97 percent) as the concentration in the preceding depth increases.

A.III.2.4.2.10 Vertical Profile of Copper in Concrete

Figure A.III-30 presents copper concentrations measured in 85 concrete cores plotted against depth. The concentration of copper in the top ½-inch varies from 4.8 mg/kg to 526 mg/kg, and most of the samples (64) from the top ½-inch exceed the baseline concentration (11.1 mg/kg). The highest concentration, was in a sample collected from the Main Maintenance Building (12A). In approximately half of the samples, the copper concentration decreases significantly, with the percent decrease increasing (from approximately 20 percent to a maximum of 97 percent decrease) as the concentration of the preceding depth increases.

A.III.2.4.2.11 Vertical Profile of Iron in Concrete

Figure A.III-31 presents iron concentrations measured in 85 concrete cores plotted against depth. The concentration of iron in the top ½-inch varies from 2490 mg/kg to 95,600 mg/kg, and only a few of

the samples (19) from the top ½-inch exceed the baseline concentration (10,400 mg/kg). The highest concentration, which is significantly higher than in the other samples, is collected from the Metals Fabrication Plant (6A). In approximately 70 percent of the samples, the iron concentration does not decrease with depth, but in those where it does, the amount of decrease increases (from a minimum of 10 percent decrease to a maximum of 93 percent decrease) with increasing concentration in the preceding depth.

A.III.2.4.2.12 Vertical Profile of Lead in Concrete

Figure A.III-32 presents lead concentrations measured in 85 concrete cores plotted against depth. The concentration of lead in the top ½-inch varies from 2.6 mg/kg to 1210 mg/kg, and most of the samples (81) from the top ½-inch exceed the baseline concentration (3.4 mg/kg). The highest concentration, which is significantly higher than in the other samples, was collected from the Metals Production Plant (5A). In over half of the samples, the lead concentration does decrease significantly with depth, and the amount of the decrease (up to 90 percent decrease) increases with increasing concentration in the preceding depth.

A.III.2.4.2.13 Vertical Profile of Magnesium in Concrete

Figure A.III-33 presents magnesium concentrations measured in 85 concrete cores plotted against depth. The concentration of magnesium in the top ½-inch varies from 10,000 mg/kg to 57,500 mg/kg, and very few of the samples (15) from the top ½-inch exceed the baseline concentration (50,600 mg/kg). The highest concentration was collected from the Special Products Plant (9A). In approximately 80 percent of the samples, the magnesium concentration does not decrease with depth, and in those where it does, the amount of the decrease does not exceed 20 percent.

A.III.2.4.2.14 Vertical Profile of Manganese in Concrete

Figure A.III-34 presents manganese concentrations measured in 85 concrete cores plotted against depth. The concentration of manganese in the top ½-inch varies from 70.1 mg/kg to 863 mg/kg, and only 30 of the samples from the top ½-inch exceed the baseline concentration (343 mg/kg). The highest concentration was collected from the Metals Fabrication Plant (6A). In approximately 75 percent of the samples, the manganese concentration does not decrease with depth. In those where it does, the amount of the decrease increases (from approximately 20 percent decrease to a maximum of 64 percent decrease) with increasing concentration in the preceding depth.

A.III.2.4.2.15 Vertical Profile of Mercury in Concrete

Figure A.III-35 presents mercury concentrations measured in 85 concrete cores plotted against depth. The concentration of mercury in the top ½-inch varies from 0.01 mg/kg to 12.6 mg/kg, and most of the samples (73) from the top ½-inch exceed the baseline concentration (0.03 mg/kg). The highest concentration was collected from the Main Electrical Strainer House (26C) is significantly higher than in the other samples. In approximately half of the samples, the mercury concentration does not decrease with depth. In those where it does, the amount of the decrease increases (from approximately 30 percent decrease to over 90 percent decrease) with increasing concentration in the preceding depth.

A.III.2.4.2.16 Vertical Profile of Nickel in Concrete

Figure A.III-36 presents nickel concentrations measured in 85 concrete cores plotted against depth. The concentration of nickel in the top ½-inch varies from 2.6 mg/kg to 172 mg/kg, and most of the samples (57) from the top ½-inch exceed the baseline concentration (9.37 mg/kg). The highest concentration was collected from a sample in the Main Maintenance Building (12A). In approximately half of the samples, the nickel concentration does not decrease with depth. In those where it does, the amount of the decrease increases (from a decrease of approximately 50 percent to a maximum decrease of over 90 percent) with increasing concentration in the preceding depth.

A.III.2.4.2.17 Vertical Profile of Potassium in Concrete

Figure A.III-37 presents potassium concentrations measured in 85 concrete cores plotted against depth. The concentration of potassium in the top ½-inch varies from 436 mg/kg to 15,700 mg/kg, and most of the samples (54) from the top ½-inch exceed the baseline concentration (927 mg/kg). The highest concentration was found in a sample collected from the Green Salt Plant (4A), this result is significantly higher than in the other samples. In over 60 percent of the samples, the potassium concentration does not decrease with depth. In those where it does, the amount of the decrease increases slightly with increasing concentration in the preceding depth, but never exceeds a 60 percent decrease.

A.III.2.4.2.18 Vertical Profile of Selenium in Concrete

Figure A.III-38 presents selenium concentrations measured in 85 concrete cores plotted against depth. The concentration of selenium in the top ½-inch varies from 0.14 mg/kg to 11.7 mg/kg, and most of the samples (70) from the top ½-inch exceed the baseline concentration (0.47 mg/kg). The highest concentration was found in a sample from the Pilot Plant Wet Side (13A). In approximately 85 percent of the samples, the selenium concentration does not decrease with depth. In those where it

does, the amount of the decrease increases slightly with increasing concentration in the preceding depth, from a minimum of 10 percent decrease to a maximum of 60 percent decrease.

A.III.2.4.2.19 Vertical Profile of Silver in Concrete

Figure A.III-39 presents silver concentrations measured in 85 concrete cores plotted against depth. The concentration of silver in the top ½-inch varies from 0.18 mg/kg to 18.5 mg/kg, and only a few of the samples (20) from the top ½-inch exceed the baseline concentration (5.42 mg/kg). The highest concentration was found in a sample collected from the Ore Refinery Plant (2A). In approximately 75 percent of the samples, the silver concentration does not decrease with depth. In those where it does, the amount of the decrease ranges from 10 percent to a maximum of 80 percent.

A.III.2.4.2.20 Vertical Profile of Sodium in Concrete

Figure A.III-40 presents sodium concentrations measured in 85 concrete cores plotted against depth. The concentration of sodium in the top ½-inch varies from 235 mg/kg to 3680 mg/kg, and most of the samples (55) from the top ½-inch exceed the baseline concentration (607 mg/kg). The highest concentration was found in a sample collected from the Main Maintenance Building (12A). In approximately half of the samples, the sodium concentration does decrease with depth. The amount of the decrease typically increases (from a decrease of approximately 10 percent to a maximum decrease of 60 percent) with increasing concentration in the preceding depth.

A.III.2.4.2.21 Vertical Profile of Thallium in Concrete

Figure A.III-41 presents thallium concentrations measured in 85 concrete cores plotted against depth. The concentration of thallium in the top ½-inch varies from 0.08 mg/kg to 5.6 mg/kg, and under half of the samples (39) from the top ½-inch exceed the baseline concentration (0.32 mg/kg). The highest concentration was found in a sample collected from the Bulk Lime Handling Building (2C). In approximately 80 percent of the samples, the thallium concentration does not decrease with depth. In those where it does, the amount of the decrease is typically less than 20 percent with a maximum of 40 percent.

A.III.2.4.2.22 Vertical Profile of Vanadium in Concrete

Figure A.III-42 presents vanadium concentrations measured in 85 concrete cores plotted against depth. The concentration of vanadium in the top ½-inch varies from 0.6 mg/kg to 51.8 mg/kg, and only a few of the samples (29) from the top ½-inch exceed the baseline concentration (13.2 mg/kg). The highest concentration was found in a sample collected from the Plant 6 Salt Oil Heat Treatment

Building (6F). In approximately 80 percent of the samples, the vanadium concentration does not decrease with depth. In those where it does, the amount of the decrease varies from less than 10 percent to a maximum of 70 percent.

A.III.2.4.2.23 Vertical Profile of Zinc in Concrete

Figure A.III-43 presents zinc concentrations measured in 85 concrete cores plotted against depth. The concentration of zinc in the top ½-inch varies from 10 mg/kg to 1880 mg/kg, and most of the samples (69) from the top ½-inch exceed the baseline concentration (27.5 mg/kg). The highest concentration was found in a sample collected from the Electrostatic Precipitator (9F) and the concentration is significantly higher than in the other samples. In over half of the samples, the zinc concentration does decrease with depth. The amount of the decrease varies from less than 10 percent to a maximum of approximately 95 percent.

A.III.2.4.3 Semivolatile Organic Contamination:

Three samples, all from the same location but at three different depths, were analyzed for analysis of semivolatile organics. None of the 65 semivolatiles for which analyses were performed were detected at any of the depths.

A.III.2.4.4 Volatile Organic Contamination

Eighteen samples, from six locations (three components) and three depths, were analyzed for volatile organics. Only six (1,1,1-trichloroethane, 4-methyl-2-pentanone, ethylbenzene, toluene, tetrachloroethene and total xylenes) of 33 volatiles were detected. All of these were detected in the top two depths and all but 1,1,1-trichloroethane and 4-methyl-2-pentanone were detected below the 1-inch depth.

None of the detected concentrations of volatiles exceeded the respective Part B reference criteria. The only detected volatile compound for which a TCLP limit exists is tetrachloroethene, which was detected at a maximum concentration of 8 μg/kg, well below the 700 μg/kg (i.e., 20 times the TCLP limit) required to even be potentially hazardous.

Concrete TCLP Results:

Thirteen concrete core samples were analyzed for volatile organics using the TCLP test (see Attachment A.II for complete results). Only six volatiles were detected in the solid sample, and only nine were detected in the leachate.

TCLP limits exist for only three of the detected volatiles, 2-butanone, chloroform, and tetrachloroethene. All of the detected results are well below any level of concern.

Since most of the detection limits for volatiles were well below 20 times the TCLP value, no concrete cores are expected to be characteristically hazardous due to volatiles. Conservatively, 20 times the TCLP limit is used to estimate the amount of concrete that is potentially hazardous due to volatiles.

Masonry

Neither of the masonry samples was analyzed for volatiles using the TCLP test.

A.III.2.4.5 Pesticide/PCB Contamination

Six samples, from two components and three depths, were collected for analysis of pesticides and PCBs. None of the 21 pesticides, and only two of the seven PCBs, for which analyses were performed were detected. Aroclor-1254 was detected at all three depths in three locations and Aroclor-1260 was detected at all three depths in one location. None of the results exceeded the 50 ppm TSCA limit (see Appendix A.4).

TCLP Results - Organics:

Eleven concrete core samples, (three from the top 1/2-inch, four from the second 1/2-inch, and four below 1 inch) were analyzed for the leachability of organics using the TCLP test. These results, compared to the organic concentration in the core itself, are summarized on Table A.II-3 through A.II-6. Nearly all of the results for both the total and TCLP analyses were below detection limits (designated as less than [<]). None of the analyses where both the total and TCLP results were above detection limits are considered reliable since the apparent percent leached is greater than 100 percent. Many of the other analyses are also unreliable since the apparent percent leached is also greater than 100 percent (designated as a dash ([-]). The remaining results, although not definitive, indicate, based on the detection limits, a very low percentage of contaminant in the core sample leaches during the TCLP test. Since none of these results definitively indicate a leachable percentage, a conservative estimate of 100 percent (i.e., 20 times the TCLP limit) will be used to assess the potential for being a hazardous waste.

A.III.2.5 Masonry Chips

Masonry, or concrete block, was a common construction material used in the construction of building walls at the FEMP. Samples were collected by chipping away the surface (top 1/2-inch) using a

jackhammer, hammer drill, or chisel. Since the masonry was used for walls, significant penetration of contaminants is not likely. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of 77 masonry samples were collected from 28 components for analysis of radiological and chemical contamination. The following describes the results of those analyses. In summary, masonry contains elevated levels of no radionuclides but samples from 18 components contain potentially hazardous levels of barium, cadmium, chromium, lead, and mercury.

A.III.2.5.1 Radiological Contamination

The results of radiological sample analyses for masonry chips are statistically summarized in Table A.III-1. Table A.III-1 indicates the number of analytical results available from masonry chips for each radionuclide is:

- 59 analytical results are reported for plutonium-239/240 and uranium-234;
- 58 analytical results are reported for cesium-137, plutonium-238, radium-226, technetium-99, thorium-228, thorium-230, and thorium-232;
- 57 analytical results are reported for polonium-210 and radium-228;
- 56 analytical results are reported for neptunium-237, strontium-90, uranium-235/236, and uranium-238;
- 55 analytical results are reported for americium-241 and lead-210;
- 30 analytical results are reported for plutonium-241; and
- 4 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference

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criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison with Baseline	Comparison with Part B reference criteria
Americium-241 (1.4)	Cesium-137 (48.0)
Lead-210 (1.6)	Lead-210 (12.2)
Neptunium-237 (1.3)	Neptunium-237 (13.4)
Radium-228 (2.6)	Polonium-210 (1.4)
Technetium-99 (2.3)	Radium-226 (1749)
Thorium-227 (7.0)	Thorium-227 (784.7)
Thorium-228 (1.2)	Thorium-228 (920.2)
Thorium-230 (1.9)	Uranium (244.5)
Uranium (4.9)	Uranium-234 (4.5)
Uranium-234 (2.8)	Uranium-235/236 (93.4)
Uranium-235/236 (1.9)	Uranium-238 (182.6)
Uranium-238 (3.1)	

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: thorium-227 and uranium. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-227, and thorium-228.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison with Baseline	Comparison with Part B reference criteria
Thorium-227	Cesium-137
	Lead-210
	Neptunium-237
	Radium-226
	Thorium-227
	Thorium-228
	Uranium
	Uranium-235/236
	Uranium-238

This indicates an analyte's baseline or Part B reference criteria concentrations exceed the radionuclide detection limit. Note that the list of radionuclides with all results greater than the Part B reference criteria concentration is longer than the list of radionuclides with all results greater than the baseline

concentration. This is partially attributable to Part B reference criteria concentrations that are substantially lower than baseline concentrations for several radionuclides.

All maximum sample results exceed the corresponding baseline or Part B reference criteria concentration. This indicates elevated levels of every radionuclide and uranium were detected in surface masonry samples from at least one location.

A.III.2.5.2 Inorganic Contamination

A total of 60 masonry samples from 28 components were collected for analysis of TAL inorganic contaminants. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganics for which analyses were performed were detected and all but four (antimony, silver, selenium, and thallium) were detected in at least 12 samples. Six inorganics (aluminum, barium, calcium, iron, magnesium, and manganese) were detected in all 60 samples.

Since there are no baseline concentrations available for masonry, OU3 baseline concentrations for concrete were used as a reference for evaluating the level of contamination. All 60 masonry samples exceeded the OU3 baseline concentration of inorganics in concrete for at least one analyte. The maximum concentration of all inorganics exceeded the respective baseline concentration. Most significant are lead, mercury, barium and zinc, which exceeded the respective baseline concentrations by factors of 4800, 170, 75 and 75, respectively. The average concentration 14 inorganics (antimony, arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, potassium, selenium, sodium, thallium, and zinc) exceed the OU3 baseline concentration in concrete. The average concentration of lead, mercury, and antimony are the most significant, exceeding the baseline levels by factors of 185, 18, and 9, respectively.

As described in Appendix A.3, a second reference for evaluating the level of contamination in masonry is the Part B reference criteria. The maximum concentration of eight inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, manganese, and thallium) exceed these screening levels. Most significant of these are arsenic and thallium, which exceed the respective screening level by factors of 913 and 4.4, respectively. The average concentration of only three (arsenic, beryllium, and manganese) exceeded these levels, by factors of 108, 46, and 1.8, respectively.

Table A.III-3 summarizes the inorganic contamination in masonry that exceeds 20 times TCLP. One sample exceeded one or more of the limits for barium, cadmium, chromium, lead, or mercury. Lead

was detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in 23 of 59 samples, with concentrations ranging up to 16,300 mg/kg. This is followed by mercury which was detected at greater than 20 times the TCLP limit (i.e., greater than 4 mg/kg) in two of 60 samples, with concentrations up to 5.2 mg/kg; and barium, cadmium, and chromium which were detected at greater than 20 times the TCLP limit (i.e., greater than 2000 mg/kg, 20 mg/kg, and 100 mg/kg, respectively) each in one of 60 samples, with concentrations of 3820 mg/kg, 21 mg/kg, and 306 mg/kg, respectively.

The most extensive inorganic contamination is associated with the Hydrometallurgical System WINLO, and Water Treatment Area of the Recovery Plant (8A), where results exceeded 20 times the TCLP limit for chromium and lead; the Engine House/Garage (31A), where results exceeded 20 times the TCLP limit for barium and lead; and the Digester and Control Building (25E), where results exceeded 20 times the TCLP limit for lead and mercury.

TCLP Results:

Two samples, both from the Six to Four Reduction Facility #1 (54A) were also analyzed for TCLP inorganics. Table A.II-3 through A.II-6 compare the results of the TCLP analyses with those for total inorganics. Only one TCLP metal, lead in the Autoclave Area, was detected at greater than 20 times the TCLP limit. Lead, which was the only metal with a TCLP regulatory limit detected in the TCLP analysis, was detected in the leachate at 11 mg/L, well above the TCLP limit of 5.0 mg/L. Based on these results, these two masonry samples are considered characteristically hazardous due to TCLP inorganic compounds (metals).

A.III.2.5.3 Semivolatile Organic Contamination

Two masonry samples taken from two components were analyzed for semivolatile organic constituents. None of the 64 semivolatiles for which analyses were performed were detected.

A.III.2.5.4 Volatile Organic Contamination

Two masonry samples were taken from two components were analyzed for volatile organic constituents. Only five of the 35 volatiles for which analyses were performed were detected. 1,1,1-Trichloroethane, ethylbenzene, m,p-xylene, and o-xylene were detected in one sample. Xylenes, (total) was detected in both samples.

The maximum and average concentrations of all detected volatiles were below the respective Part B reference criteria.

No volatiles for which a TCLP limit exists were detected.

A.III.2.5.5 Pesticides/PCB Contamination

None of the masonry samples were analyzed for pesticides or PCBs.

A.III.2.6 Steel Coatings

Structural steel coatings or "scraping" samples were obtained using procedure EP-CRU3-19. Soft Solids (oxides and paint). This procedure offers several options for removing a surface sample. The use of a knurled rasp or coring bit was recommended for wet process areas to assure full penetration of the contamination on the corroded surfaces. Any of the sample extraction options were allowable in the dry process and non-process areas.

A total of 200 steel coating samples were taken for analysis of radiological and chemical contamination. The following describes the results of the analyses of steel coating samples. In summary, steel coatings (paint and oxides) contain elevated levels of isotopic uranium and Technetium-99, and there are no inorganics present at potentially hazardous levels.

A.III.2.6.1 Radiological Contamination

The results of radiological sample analyses for steel coatings are statistically summarized in Table A.III-1. Table A.III-1 indicates the number of analytical results available for each radioactive analyte in steel coatings varies:

- 83 analytical results are reported for americium-241, cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, and uranium;
- 82 analytical results are reported for strontium-90;
- 81 analytical results are reported for neptunium-237;
- 78 analytical results are reported for plutonium-241;
- 75 analytical results are reported for uranium-234;
- 73 analytical results are reported for uranium-235/236, and uranium-238; and

- 28 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding paint baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding paint baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison with Baseline	Comparison with Part B reference criteria
Americium-241 (3.1)	Americium-241 (1.6)
Cesium-137 (1.8)	Cesium-137 (298.5)
Lead-210 (7.2)	Lead-210 (35.8)
Neptunium-237 (1.3)	Neptunium-237 (32.9)
Plutonium-238 (1.3)	Plutonium-238 (1.1)
Plutonium-239/240 (4.1)	Plutonium-239/240 (2.2)
Radium-228 (2.6)	Polonium-210 (5.6)
Technetium-99 (16.4)	Radium-226 (4808)
Thorium-227 (3.4)	Radium-228 (8.8)
Thorium-228 (1.3)	Thorium-227 (54.2)
Thorium-230 (1.7)	Thorium-228 (7894)
Thorium-232 (1.1)	Thorium-230 (4.5)
Uranium (9.3)	Uranium (6559)
Uranium-234 (14.4)	Uranium-234 (192.2)
Uranium-235/236 (11.3)	Uranium-235/236 (4522)
Uranium-238 (15.9)	Uranium-238 (9084)

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to paint baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99, uranium, uranium-234, uranium-235/236, uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium, uranium-235/236, and uranium-238.

The minimum sample result detected exceeds the corresponding paint baseline or Part B reference criteria concentration for the following radionuclides:

Comparison with Baseline	Comparison with Part B reference criteria
Lead-210	Americium-241
	Cesium-137
	Lead-210
	Neptunium-237
	Radium-226
	Thorium-227
	Thorium-228
	Uranium
	Uranium-235/236
	Uranium-238

This indicates that an analyte's baseline or Part B reference criteria concentrations exceed the analyte's detection limit. Note that the list of radionuclides with all results greater than the Part B reference criteria concentration is longer than the list of radionuclides with all results greater than the baseline concentration. This is partially attributable to Part B reference criteria concentrations that are substantially lower than baseline concentrations for several radionuclides.

All maximum sample results exceeded the corresponding baseline or Part B reference criteria concentration. This indicates elevated concentrations of all radioactive analytes were detected in steel coatings from at least one location.

A.III.2.6.2 Inorganic Contamination

A total of 139 steel coating samples were taken from 60 components for analysis of TAL Inorganics. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganics for which analyses were performed were detected. Twelve inorganics were detected in over 90 percent of the samples analyzed. These are aluminum, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, and zinc.

OU3 baseline concentrations were calculated for steel coating samples and will be used as a reference for evaluating the level of contamination. The maximum concentration of all except one inorganic (thallium) exceeds the OU3 paint baseline concentrations. Most significant of these are selenium, potassium, nickel, and sodium, which exceed by factors of 93, 21, 19, and 15, respectively. The average concentration of only selenium exceed the OU3 paint baseline concentration, by a factor of 1.9.

As described in Appendix A.3, a second reference for evaluating the level of contamination in steel coatings is the Part B reference criteria. The maximum concentration of 12 inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, manganese, mercury, nickel, thallium, and zinc) exceed these screening levels. The most significant of these is arsenic, which exceeds by a factor of 6140. The average of only five inorganics (antimony, arsenic, beryllium, chromium, and mercury) exceed the Part B reference criteria. Most significant of these is still arsenic, which exceeds the screening levels by a factor of 227.

Table A.III-3 summarizes the inorganic contamination in steel coatings that exceeds 20 times the TCLP limit. All samples exceeded 20 times the TCLP limit for at least one analyte. Lead and chromium were detected at greater than 20 times the TCLP limit (i.e., 100 mg/kg) in 131 and 123 of 139 samples, respectively, with concentrations ranging up to 375,000 mg/kg for lead and 17,300 mg/kg for chromium. These are followed by cadmium which was detected at greater than 20 times the TCLP limit (i.e., 20 mg/kg) in 37 of 138 samples, with concentrations ranging up to 558 mg/kg; barium and mercury which were detected at greater than 20 times the TCLP limit (i.e., 2000 mg/kg and 4 mg/kg, respectively) in 24 and 32 of 139 samples, with concentrations ranging up to 23,700 mg/kg and 32.6 mg/kg, respectively; arsenic which was detected at greater than 20 times the TCLP limit (i.e., 100 mg/kg) in five of 138 samples, with concentrations ranging up to 227 mg/kg; and selenium which was detected at greater than 20 times the TCLP limit (i.e., 20 mg/kg) in three of 107 samples, with concentrations ranging up to 77.5 mg/kg.

The most extensive inorganic contamination in steel coatings is associated with the Trash Baler Area of the Incinerator Building (39A), where results exceeded 20 times the TCLP limit for arsenic, barium, cadmium, chromium, lead, mercury, and selenium, and the Pilot Plant Warehouse (68), where results exceeded 20 times TCLP for arsenic, cadmium, chromium, lead, and mercury.

Although several inorganics exceed 20 times the TCLP limit, it has been determined that metal coated with lead-based paint does not exhibit the toxicity characteristic (TC) for lead, and are therefore, not a hazardous waste (DOE 1995i). In summary, the FEMP conducted TCLP analysis of light-gauge metal debris (16-18 gauge) coated with lead-based paint with a paint thickness varying from 1 mil to 23 mil. The paint contained lead ranging from 9500 mg/kg to 170,000 mg/kg. The TCLP extraction of the metal resulted in a maximum TCLP leachate result of 1.1 mg/L, well below the TCLP limit of 5 mg/L. The percent of lead that leached from the light-gauge metal ranged from less than 0.1 percent to a maximum of 1.1 percent.

The maximum lead value determined in the OU3 RI/FS characterization study for lead-based paint was 375,000 mg/kg. To determine if this result would result in a potentially hazardous waste, the anticipated TCLP leachate result was calculated. The following variables were used in the calculation:

- the minimum metal thickness (18 gauge or 0.0478 inches) determined in the light-gauge metal study,
- the maximum paint thickness (23 mil) determined in the light-gauge metal study;
- the maximum percent of lead leached (1.1 percent) determined in the light-gauge metal study, and
- the maximum lead result (375,000 mg/kg) determined in the OU3 RI/FS characterization study.

The resulting TCLP leachate concentration was calculated to be 4.3 mg/L, below the 5 mg/L TCLP limit for lead. Therefore, no painted material in OU3 is considered characteristically hazardous as a result of being painted with lead-based paint. However, any paint that is removed from any surface will be considered characteristically hazardous waste unless actual TCLP results show otherwise. This conclusion is extended to the other toxicity characteristic (TC) metals. This is possible because the maximum concentration for lead was so much higher than the maximum concentration of the other eight TC metals (375,000 mg/kg in lead versus 17,500 mg/kg in chromium, or 558 mg/kg for cadmium).

A.III.2.6.3 Organic Contamination

None of the steel coatings samples were analyzed for organic contamination.

A.III.2.7 Transite

Transite, a mixture of cement and asbestos, is a common construction material used for walls and roofs for many components in OU3. All transite is assumed to be radiologically contaminated. Samples of transite were collected by chipping away the surface using a jackhammer, hammer drill, or chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge.

A total of ten transite samples collected from nine components were analyzed for chemical contamination. The following describes the results of the analyses of transite. In summary, samples from three components contain hazardous levels of either chromium, 1,4-dichlorobenzene; hexachlorobutadiene; nitrobenzene; or tetrachloroethene.

A.III.2.7.1 Radiological Contamination

Samples of transite collected were assumed to be radiologically contaminated and were not subjected to radiological analyses at the analytical laboratory.

A.III.2.7.2 Inorganic Contamination

Eleven samples of transite were collected from nine components and analyzed for the leachability of metals using the TCLP test. Tables A.III-1 and A.III-2 summarize the inorganic chemical contamination associated with transite. Of the eight TC metals, all except cadmium and selenium were detected in at least one transite sample, while only one metal (chromium) exceeded the TCLP limit. As indicated on Table A.III-4, chromium was detected in eight of the 11 samples, one of which exceeded the TCLP limit (5.0 mg/L). This sample was collected from the Hot Raffinate Building (3E). The chromium concentration in the leachate was 5.96 mg/L; the TCLP limit for chromium is 5.0 mg/L, indicating that the transite in this component is characteristically hazardous.

A.III.2.7.3 Semivolatile Organic Contamination

Twelve samples were analyzed for the leachability of semivolatiles using the TCLP test. Only five semivolatile constituents were detected, and three of these were in excess of the TCLP limits: 1,4-dichlorobenzene (17.2 mg/L detected compared to a TCLP limit of 7.5 mg/L), hexachlorobutadiene (14.9 mg/L detected compared to a TCLP limit of 0.5 mg/L), and nitrobenzene (28.3 mg/L detected compared to a TCLP limit of 2.0 mg/L). All three results were found in the same sample of transite in the Special Products Plant (9A).

A.III.2.7.4 Volatile Organic Contamination

Only two volatile constituents were detected, tetrachloroethene and 2-butanone. Tetrachloroethene was the only detected result that exceeds the TCLP limit at 59 mg/L (compared to a TCLP limit of 0.7 mg/L). This sample was collected from the Ore Refinery Plant (2A).

A.III.2.7.5 Pesticides/PCBs

None of the transite samples were analyzed for pesticides or PCBs.

A.III.3 SUPPLEMENTAL MEDIA

Supplemental media includes air filters, loose media, sediment, soil, and wood. The following sections describe the contamination associated with each of these.

A.III.3.1 Air Filters

Air filters were used throughout the FEMP to collect dust in HVAC systems. Samples of four air filters were cut (using shears or knives) and sent to the laboratory for analysis. The following describes the results of these analyses.

A.III.3.1.1 Radiological Contamination

A qualitative assessment of the presence of radionuclide constituents in component air can be made from examination of analytical results of four HVAC filters collected for analysis. The results indicate nondeductible quantities ("U" qualifier) for virtually every radionuclide in all four samples. In addition, 88 percent of these analyses are qualified as either "J" (estimated result) or in a few cases "R" (rejected result). Considering the qualifiers attached to these data and without data on the source of the air, the flow rate of air through the filters, and the duration of air flow through the filters, no quantitative assessment can be made with air filter analytical results provided in Table A.III-1. The data does appear to confirm the presence of thorium-230, uranium and its isotopes, and the radon daughters lead-210 and polonium-210 in ventilation systems.

A.III.3.1.2 Inorganic Contamination

One HVAC air filter sample was taken from the Rust Engineering Building (45A) for analysis of TAL inorganics. As shown on Table A.III-1, 14 of the 23 inorganic chemicals for which analyses were performed were detected.

There are no baseline criteria available for evaluating the level of contamination in the HVAC filters. Therefore, as described in Appendix A.3, the Part B reference criteria will be used for this evaluation. Only two (arsenic and chromium) exceeded the Part B reference criteria by factors of 22 and 1.4, respectively.

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Chromium was detected at a level greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg), with a concentration of 197 mg/kg.

A.III.3.1.3 Organic Contamination

The HVAC air filter was not analyzed for volatiles, semivolatiles, or pesticide/PCBs.

A.III.3.2 Loose Media

Significant quantities of removable materials, such as particulate matter deposited on horizontal surfaces, that are likely to reflect general conditions in components were also sampled. The objectives of this sampling were to determine:

- Potential health and safety risks during decontamination and dismantling activities;
- The presence of residual, removable contamination throughout the process area; and,
- Potential contaminants available for wind and water erosion and transport.

All loose media will be collected and placed in drums during the Interim Remedial Action.

DOE's strategy (DOE 1994a) is to manage the low level waste (LLW) portion of this loose media under Removal Action No. 9. The mixed and hazardous waste portion will be managed in accordance with the Site Treatment Plan (STP). Therefore, the projected characteristics and inventory of this loose media are addressed in this RI/FS Report but their treatment and disposition are not. Furthermore, since all of this material will be handled separately, Appendix A and Section 3.0 do not address loose media.

A total of 45 loose media samples were taken for analysis of radiological and chemical contamination. The following describes the results of these analyses.

A.III.3.2.1 Radiological Contamination

The results of radiological sample analyses for loose media are statistically summarized in Table A.III-1. Table A.III-1 indicates that the number of analytical results available for each radioactive constituent in loose media varies:

- 39 analytical results are reported for cesium-137, lead-210, plutonium-238, plutonium-239/240, thorium-228, thorium-230, thorium-232, strontium-90, technetium-99, uranium-234, uranium-235/236, uranium-238, and uranium;
- 38 analytical results are reported for americium-241;
- 36 analytical results are reported for neptunium-237 and polonium-210;
- 35 analytical results are reported for radium-226 and radium-228; and
- 33 analytical results are reported for plutonium-241.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison With Baseline	Comparison With Part B reference criteria
Americium-241 (6.8)	Americium-241 (2.9)
Cesium-137 (5.3)	Cesium-137 (377.6)
Lead-210 (11.4)	Lead-210 (84.9)
Neptunium-237 (9.3)	Neptunium-237 (98.5)
Plutonium-238 (9.8)	Plutonium-238 (2.4)
Plutonium-239/240 (24.1)	Radium-226 (8443)
Plutonium-241 (4.1)	Radium-228 (8.4)
Polonium-210 (4.2)	Thorium-228 (17194)
Radium-226 (3.3)	Thorium-230 (7.9)
Radium-228 (22.1)	uranium (27848)
Technetium-99 (273.0)	Uranium-234 (345.5)
Thorium-228 (21.9)	Uranium-235/236 (11076)
Thorium-230 (52.2)	Uranium-238 (20757)
Thorium-232 (8.0)	Technetium-99 (1.8)
uranium (554.7)	Plutonium-239/240 (7.1)
Uranium-234 (214.0)	Polonium-210 (11.3)
Uranium-235/236 (226.9)	
Uranium-238 (351.3)	

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99, uranium, uranium-234,

uranium-235/236, and uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium, uranium-235/236, and uranium-238.

The minimum sample result detected exceeds the corresponding baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
Americium-241	Cesium-137
Cesium-137	Lead-210
Thorium-230	Neptunium-237
Plutonium-239/240	Radium-226
Plutonium-241	Thorium-228
Technetium-99	uranium
	Uranium-235/236
	Uranium-238

This indicates that baseline or Part B reference criteria concentrations for these analytes exceed their detection limits.

None of the maximum sample results detected are less than the corresponding baseline or Part B reference criteria concentration.

A.III.3.2.2 Inorganic Contamination

From 28 components, 41 of the loose media samples were collected for analysis of TAL inorganics. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganic chemicals for which analyses were performed, except three (beryllium, selenium, and thallium) were detected in at least 21 samples. Six inorganics (aluminum, barium, iron, lead, magnesium, and manganese) were detected in all 41 samples.

There are no baseline concentrations available for loose media. Therefore, as described in Appendix A.4, the Part B reference criteria is used as a reference for evaluating the level of contamination in loose media. The maximum concentration of 15 inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) exceeded these respective screening levels. Most significant of these are arsenic, beryllium, and nickel, which exceed the respective screening level by factors of 6650, 3750, and 97, respectively. The average concentration of only seven (antimony, arsenic, beryllium, chromium, copper,

manganese, and nickel) exceed these levels. Most significant of these are still arsenic and beryllium, which exceed the respective screening level by factors of 886 and 209, respectively.

Table A.III-3 summarizes the inorganic contamination in loose media that exceeds 20 times the TCLP limit. At least two samples exceed one or more of the limits for all eight inorganics with TCLP regulatory limits. Lead and chromium were detected at greater than 20 times the TCLP limit (i.e., both greater than 100 mg/kg) in 34 of 41 and 21 of 41 samples, respectively, with concentrations ranging up to 10,300 mg/kg and 3210 mg/kg, respectively. These are followed by mercury, which was detected at greater than 20 times the TCLP limit (i.e., greater than 4 mg/kg) in 5 of 40 samples, with concentrations up to 18 mg/kg; arsenic and cadmium detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg and 20 mg/kg, respectively) in four of 41 samples, with concentrations up to 246 and 62.4 mg/kg, respectively; selenium detected at greater than 20 times the TCLP limit (i.e., greater than 20 mg/kg) in four of 39 samples, with concentrations up to 157 mg/kg, respectively; silver detected at greater than 20 times the TCLP limit (i.e., 100 mg/kg) in four of 38 samples, with concentrations up to 1360 mg/kg; and barium detected at greater than 20 times the TCLP limit (i.e., greater than 2000 mg/kg) in two of 41 samples, with concentrations up to 4080 mg/kg.

The most extensive inorganic contamination in loose media is associated with the Metals Production Plant (5A), where results exceeded 20 times TCLP (for lead and chromium) in five samples, and the Green Salt Plant (4A), where results from two samples exceeded 20 times the TCLP limit for five contaminants (arsenic, chromium, lead, mercury, and selenium) in two samples.

A.III.3.2.3 Semivolatile Organic Contamination

From 27 components, 40 loose media samples were collected and analyzed for semivolatile organic constituents. Only 39 of 65 semivolatiles for which analyses were performed were detected. Fluoranthene, phenanthrene, and pyrene were each detected in 32 samples, followed by chrysene (detected in 30 samples); benzo(b)fluoranthene (detected in 26 samples); benzo(a)anthracene (detected in 25 samples); benzo(a)pyrene, benzo(g,h,i)pyrene, and indeno(1,2,3-cd)pyrene (detected in 22 samples); and benzo(k)fluoranthene (detected in 20 samples). The maximum concentration detected for semivolatiles was 560,000 μg/kg for bis(2-ethylhexyl)phthalate.

The maximum concentration of 12 semivolatiles (1,4-dichlorobenzene, 2,4-dinitrotoluene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthrene, benzo(k)fluoranthene,

bis(2-ethylhexyl)phthalate, carbazole, chrysene, indeno(1,2,3-cd)pyrene, n-nitroso-di-n-propylamine, and pentachlorophenol) exceed the Part B reference criteria. Most significant of these are n-nitroso-di-n-propylamine and benzo(a)anthracene, which exceed the respective screening level by factors of 5270 and 1050, respectively. The average concentration of the same twelve semivolatiles exceed the Part B reference criteria. The most significant of these are still n-nitroso-di-n-propylamine and benzo(a)anthracene, which exceed the respective screening level by factors of 1270 and 190, respectively.

The five detected semivolatile compounds for which a TCLP limit exists are 1,4-dichlorobenzene, 2,4-dinitrotoluene, o-methylphenol, p-methylphenol (cresol), and pentachlorophenol. 2,4-Dinitrotoluene was the only semivolatile detected at greater than 20 times the TCLP limit (i.e., greater than 2,600 μg/kg), with a concentration of 50,000 μg/kg.

A.III.3.2.4 Volatile Organic Contamination

From 27 components, 40 loose media samples were collected and analyzed for volatile organic constituents. Only 16 of 33 volatiles for which analyses were performed were detected. Xylenes (total) was detected in 13 samples, followed by ethylbenzene (detected in 8 samples); toluene (detected in 7 samples); methylene chloride and acetone (both detected in 5 samples); 1,1,1-trichloroethane, 4-methyl-2-pentanone, and tetrachloroethene (each detected in 4 samples); 2-butanone and benzene (each detected in 3 samples) and; bromoform, styrene, chlorobenzene, m,p-xylene, o-xylene, and trichloroethene (each detected in 1 or 2 samples). The maximum concentration detected for volatiles was 100,000 μg/kg for 4-methyl-2-pentanone.

The maximum concentration of only one volatile, benzene, exceeded the Part B reference criteria by a factor of 1.3. None of the average concentrations exceed the Part B reference criteria.

Only five volatile compounds for which a TCLP limit exists were detected. They are 2-butanone, benzene, chlorobenzene, tetrachloroethene, and trichloroethene. None of the detected concentrations exceeded the respective 20 times the TCLP limits required to even be potentially hazardous.

A.III.3.2.5 Pesticides/PCBs

Two samples from two components were analyzed for pesticides and PCBs. Only one of 21 pesticide compounds (methoxychlor) and two of seven PCB compounds (Aroclor-1254 and Aroclor-1260) were detected. The maximum concentration detected for pesticides and PCBs was 530 μg/kg for Aroclor-1260.

Both Aroclor-1254 and Aroclor-1260 exceed the Part B reference criteria. The most significant being Aroclor-1260, by a factor of 64. None of the pesticides exceed this screening criteria.

None of the pesticides exceed 20 times the TCLP limit while none of the results exceeded the 50 ppm TSCA limit.

A.III.3.3 Sediment

Quantities of sediments or sludges sufficient to support chemical and/or radiological analyses were sampled from various collection points. These collection points included sumps, pits, drains, ponds, basins, and runoff locations. The objective of this sampling was to determine the potential for release or transfer of contaminants to the environment or for direct contact by a receptor.

All sediment will be collected and placed in drums during the Interim Remedial Action. DOE's strategy (DOE 1994a) is to manage the LLW portion of this sediment under Removal Action No. 9. The mixed and hazardous waste portion will be managed in accordance with the STP (see Section A.3.2). Therefore, the projected characteristics and inventory of these wastes are addressed in this RI/FS Report but their treatment and disposition are not. Furthermore, since all of this material will be handled separately, Appendix A and Section 3 does not address sediment.

A total of 31 sediment and sludge samples were taken for analysis of radiological and chemical contamination. The following describes the results of these analysis.

A.III.3.3.1 Radiological Contamination

The results of radiological sample analyses for sediment are statistically summarized in Table A.III-1. Table A.III-1 indicates the number of analytical results available for each radioactive constituent in sediment varies:

- 29 analytical results are reported for cesium-137,lead-210, polonium-210, strontium-90, thorium-228, and uranium;

- 28 analytical results are reported for americium-241, radium-226, radium-228, technetium-99, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238;
- 27 analytical results are reported for neptunium-237, and plutonium-238; plutonium-239/240,
- 20 analytical results are reported for plutonium-241, and
- 5 analytical results are reported for thorium-227.

All radionuclides and uranium were detected in at least one sample, with the exception of thorium-227.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison With Baseline	Comparison With Part B reference criteria
Americium-241 (2.1)	Neptunium-237 (56.5)
Cesium-137 (8.5)	Cesium-137 (606.8)
Lead-210 (7.9)	Lead-210 (58.6)
Neptunium-237 (5.3)	Plutonium-239/240 (1.2)
Plutonium-238 (3.7)	Polonium-210 (22.4)
Plutonium-239/240 (4.0)	Radium-226 (8233)
Polonium-210 (8.3)	Radium-228 (7.9)
Radium-226 (3.2)	Thorium-227 (251.2)
Radium-228 (20.7)	Thorium-228 (9580)
Technetium-99 (158.3)	Thorium-230 (4.9)
Thorium-227 (2.3)	uranium (2536)
Thorium-228 (12.2)	Uranium-234 (44.5)
Thorium-230 (32.6)	Uranium-235/236 (1095)
Thorium-232 (5.4)	Uranium-238 (2294)
uranium (50.5)	
Uranium-234 (27.6)	
Uranium-235/236 (22.4)	
Uranium-238 (38.8)	

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the

baseline concentration by the greatest ratios for: technetium-99, thorium-230, uranium, uranium-234, uranium-235/236, and uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium, uranium-235/236, and uranium-238.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
Lead-210	Cesium-137
Neptunium-237	Lead-210
Plutonium-238	Neptunium-237
Polonium-210	Polonium-210
Radium-228	Radium-226
Technetium-99	Radium-228
Thorium-228	Thorium-228
Thorium-230	uranium
	Uranium-234
	Uranium-235/236
	Uranium-238

This indicates that baseline or Part B reference criteria concentrations for these analytes exceed their detection limits.

None of the maximum sample results detected are less than the corresponding baseline or Part B reference criteria concentration.

A.III.3.3.2 Inorganic Contamination

A total of 30 sediment/sludge samples from Of the 23 inorganic chemicals for which analyses were performed, all were detected in at least one sample and all inorganics except antimony, beryllium, cadmium, selenium, and thallium were detected in at least 11 samples. Aluminum, calcium, iron, and magnesium were generally detected at the highest concentrations.

There are no baseline values available for use as a comparison with sediment samples. However, as described in Appendix A.3, Part B reference criteria is used for evaluating the level of contamination. The maximum concentration of 10 inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, manganese, mercury, and silver) exceed these screening levels. Most significant of these are arsenic and beryllium, which exceed screening levels by factors of 3800 and 670, respectively. The average concentration of only four inorganics exceed the screening levels. These

are antimony, arsenic, beryllium, and manganese. Most significant of these are arsenic and beryllium, which exceed screening levels by factors of 260 and 73, respectively.

Table A.III-3 summarizes the inorganic contamination in sediment and sludge that exceeds 20 times the TCLP limit. At least one sample exceeds one or more of the limits for six of the eight inorganics with TCLP regulatory limits. Lead was detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in 19 of 29 samples, with concentrations ranging up to 12,500 mg/kg. This was followed by chromium which was detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg) in ten of 29 samples, with concentrations up to 857 mg/kg; mercury was detected at greater than 20 times the TCLP limits in six of 223 mg/kg; arsenic, barium, cadmium, and silver were detected at greater than their respective 20 times the TCLP limits in only one of 29 samples.

The most extensive contamination in sediment samples is associated with the Laboratory (15A), where results exceeded 20 times the TCLP limit for cadmium, chromium, lead, and mercury; the BDN Surge Lagoon (18A), where results exceeded 20 times the TCLP limit for chromium, lead and mercury; and the Low Nitrate Tank (18K), where results exceeded 20 times the TCLP limit for chromium, lead, and mercury.

A.III.3.3.3 Semivolatile Organic Contamination

From 15 components, 32 sediment and sludge samples were collected for analysis of semivolatile organics. As shown on Tables A.III-1 and A.III-2, only 31 of 65 semivolatiles for which analyses were performed were detected. Eleven semivolatiles (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, p-methylphenol (cresol), phenanthrene, and pyrene) were detected in over half of the sediments and sludges analyzed. 2-Methylnaphthalene, anthracene, benzo(g,h,i)perylene, carbazole, di-n-butyl phthalate, di-n-octyl phthalate, dibenzofuran, and fluorene were detected in between 10 and 15 samples each. 2,4,6-Trichlorophenol, acenaphthene, acenaphthylene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, dibenzo(a,h)anthracene, diethyl phthalate, nitrobenzene, o-methylphenol, p-chloroaniline, pentachlorophenol, and phenol were each detected in less than ten samples analyzed.

The maximum concentration of 10 semivolatiles exceed the Part B reference criteria. They are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, pentachlorophenol. The most significant of these is benzo(a)pyrene, which exceeds the screening

limits by a factor of 8400. The average concentration of only seven semivolatiles exceed these screening criteria. They are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, di benzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and pentachlorophenol. Most significant of these is, again, benzo(a)pyrene, which exceeds the screening limits by a factor of 150.

There were five semivolatiles that were detected for which a TCLP limit exists: 2,4,6-trichlorophenol; nitrobenzene; o-mehtylphenol; p-methylphenol (cresol); and pentachlorophenol. None of the sediment or sludge results exceeded 20 times the TCLP limit.

A.III.3.3.4 Volatile Organic Contamination

Thirty-one sediment and sludge samples were analyzed for volatile organic constituents. As shown of Table A.III-1, nine of the 33 volatiles for which analyses were performed were detected. Toluene was detected in seven samples, 2-butanone and styrene were detected in six samples, acetone and ethylbenzene in three samples, tetrachloroethene in two samples, and 1,1,1-trichloroethane, 4-methyl-2-pentanone, and carbon disulfide were detected in only one sample.

The maximum concentration of only one volatile (styrene) exceeds the Part B reference criteria, by a factor of 1.48. No average concentrations exceed the screening criteria.

The only two detected volatile compounds for which a TCLP limit exists are 2-butanone and tetrachloroethene. They were detected at 9600 μg/kg and 310 μg/kg, respectively, well below their respective 20 times the TCLP limits of 4,000,000 μg/kg and 14,000 μg/kg.

A.III.3.3.5 Pesticides/PCBs

No sediment samples were analyzed for pesticides and PCBs.

A.III.3.4 Soil

Significant quantities of soil in piles (G-013) were also sampled. All of this material will be dispositioned by OU5 in accordance with its Proposed Plan and subsequent Record of Decision. Therefore, the projected characteristics and inventory of this loose media are addressed in this RI/FS Report but their treatment and disposition are not. Since soil will be handled separately, Appendix A and Section 3.0 do not address soil.

A total of 12 samples was collected from six of the soil piles comprising the component G-13. These samples were taken from what was determined to be the location of maximum radiological contamination based on a survey of core samples taken from a grid of sampling locations. The following describes the results of this sampling.

A total of 59 individual soil samples was collected for the analysis of radiological and chemical contamination. The following describes the results of these analyses.

A.III.3.4.1 Radiological Contamination

The results of radiological sample analyses for soil are statistically summarized in Table A.III-1. Table A.III-1 indicates the number of analytical results available for each radioactive constituent in soil varies:

- 13 analytical results are reported for americium-241, lead-210, neptunium-237, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium, uranium-234, and uranium-235/236;
- 12 analytical results are reported for cesium-137, plutonium-239/240, plutonium-241, polonium-210, radium-226 and radium-228;
- 11 analytical results are reported for thorium-227 and uranium-238; and
- 10 analytical results are reported for plutonium-238.

With the exceptions of americium-241, plutonium-241, and thorium-227, all radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference

criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison With Baseline	Comparison With Part B reference criteria
Lead-210 (2.0)	Cesium-137 (27.6)
Radium-228 (4.1)	Lead-210 (15.0)
Technetium-99 (5.1)	Polonium-210 (3.6)
Thorium-228 (2.1)	Radium-226 (1880)
Thorium-230 (3.5)	Radium-228 (1.6)
uranium (2.8)	Thorium-227 (38.7)
Uranium-234 (1.8)	Thorium-228 (1662)
Uranium-238 (2.1)	uranium (141.4)
Polonium-210 (1.4)	Uranium-234 (2.8)
	Uranium-235/236 (32.5)
	Uranium-238 (124.6)
	Neptunium-237 (6.1)

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: technetium-99, radium-228, and thorium-230. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, and uranium.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
Radium-228	Cesium-137
Thorium-228	Lead-210
Thorium-230	Polonium-210
uranium	Radium-226
Neptunium-237	Radium-228
	Thorium-228
	uranium
	Uranium-235/236
	Uranium-238
	Neptunium-237

This indicates that all sample analytical results for these radionuclides are greater than corresponding baseline or Part B reference criteria concentrations.

The maximum sample result detected is less than the corresponding baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
None	Plutonium-238
	Plutonium-239/240
	Technetium-99
	Thorium-232
	Strontium-90

A.III.3.4.2 Inorganic Contamination

A total of 11 soil samples from seven soil piles was collected for analysis of TAL inorganic contaminants. As shown on Tables A.III-1 and A.III-2, all except four of the 23 inorganics (antimony, mercury, silver, and thallium) were detected in at least one sample. Fourteen inorganics were detected in all 11 soil samples. These inorganics included all of the detected inorganics except beryllium (detected in only seven samples), cadmium (detected in only one sample), potassium (detected in nine samples), and selenium (detected in two samples).

As described in Appendix A.3, the Part B reference criteria is used as a reference for evaluating the level of contamination in soil. The maximum concentration of only three inorganics (arsenic, beryllium, and manganese) exceed these screening levels. Most significant of these is arsenic, with a factor of 280. Results for all 11 soil samples exceed the screening levels for both arsenic and manganese. Only seven of the 11 soil samples exceed screening levels for beryllium. The average concentration for all three inorganics (arsenic, beryllium, and manganese) exceed the screening levels by factors of 204, 51, and 4.2, respectively.

Table A.III-3 summarizes the inorganic contamination in soil that exceeds 20 times the TCLP limit. Lead was the only inorganic that was detected at greater than 20 times the TCLP limit (i.e., greater than 100 mg/kg), with concentrations ranging up to 143 mg/kg.

A.III.3.4.3 Semivolatile Organic Contamination

Twelve samples were collected and analyzed for semivolatile constituents. Nineteen of the 64 semivolatile constituents analyzed for were detected. Fluoranthene and pyrene were each detected in nine samples. These were followed by benzo(a)anthracene, chrysene, and phenanthrene (each detected in eight samples); benzo(a)pyrene, benzo(b)fluoranthene, and bis(2-chloroethyl)ether (each detected in seven samples); indeno(1,2,3-cd)pyrene (detected in six samples); benzo(g,h,i)perylene

and benzo(k)fluoranthene (each detected in five samples); and several analytes which were detected in less than five samples. The maximum concentration of semivolatile constituents detected was 2600 μg/kg for di-n-butyl phthalate.

Maximum concentrations for six semivolatiles [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene] exceed the Part B reference criteria. Most significant of these is benzo(a)pyrene, which exceeds the screening levels by a factor of 79.5. The average concentration of these same semivolatiles exceed the screening criteria. Most significant is still benzo(a)pyrene, which exceed the screening limit by a factor of 35.3.

None of the semivolatile compounds for which a TCLP limit exists were detected.

A.III.3.4.4 Volatile Organic Contamination

Twelve samples were collected and analyzed for volatile organics. Only one of 33 volatiles were detected, acetone, which was detected in two samples. The maximum concentration of acetone detected was 33 μg/kg. This concentration does not exceed the Part B reference criteria.

None of the volatile compounds for which a TCLP limit exists were detected.

A.III.3.4.5 Pesticides/PCBs

A total of 11 samples was taken for analysis of pesticides and 12 samples were taken for analysis of PCBs. Only six of 21 pesticides and three of seven PCB compounds were detected. The maximum concentration of pesticides detected was 22 μg/kg for Endrin, and that for PCBs was 5100 μg/kg for Aroclor-1254. Aroclor-1254 was detected in five samples, followed by Aroclor-1260 (detected in two samples); and 4,4'-DDD, dieldrin, endosulfan II, endrin, endrin ketone, gamma-chlordane and Aroclor-1248 which were detected in only one sample.

The maximum concentration of only three (Aroclor-1248, Aroclor-1254, and Aroclor-1260) of the seven PCBs exceed the Part B reference criteria. Most significant of these is Aroclor-1254, which exceed these screening criteria by a factor of 610. The average concentrations of all three Aroclors still exceed the screening criteria. Most significant is still Aroclor-1254, by a factor of 4.8.

Only one of the pesticides, endrin, for which a TCLP limit exists was detected. No pesticides exceed 20 times the TCLP limit. No PCBs exceed the TSCA limit of 50 ppm (50,000 μg/kg).

A.III.3.5 Wood

Wood was a common construction material used in the construction of buildings at the FEMP. However, most of the wood is covered by drywall and not readily accessible and not expected to have significant contamination. Samples of exposed wood were collected by chipping away the surface using a jackhammer, hammer drill, or chisel. The sampling was intended to be representative of the maximum expected radiological and chemical contamination (note that these locations may be different) based on nonintrusive sampling results and process knowledge. The following describes the results of the analyses performed on the two wood samples.

A.III.3.5.1 Radiological Contamination

The results of radiological sample analyses for wood are statistically summarized in Table A.III-1. Tables A.III-1 and A.III-2 indicates the number of analytical results available for each radioactive constituent in wood varies:

- two analytical results are reported for americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-226, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, uranium-238, and uranium;
- one analytical results are reported for plutonium-241 and polonium-210.

All radionuclides and uranium were detected in at least one sample, with the exception of cesium-137 and plutonium-241.

Radionuclide sample analytical results can be compared with the corresponding concrete baseline concentration and Part B reference criteria concentration. Comparison with these two parameters reveals that the mean sample result exceeds the corresponding concrete baseline or Part B reference criteria for the following radionuclides (sample-to-baseline/screen ratios are included in parentheses for each radionuclide):

Comparison With Baseline	Comparison With Part B reference criteria
Cesium-137 (1.5)	Cesium-137 (104.8)
Lead-210 (5.6)	Lead-210 (41.7)
Plutonium-238 (8.9)	Neptunium-237 (6.9)
Polonium-210 (4.8)	Plutonium-238 (2.2)
Radium-228 (9.5)	Polonium-210 (12.8)
Technetium-99 (8.4)	Radium-226 (1449)
Thorium-228 (2.2)	Radium-228 (3.6)
Thorium-230 (1.9)	Thorium-228 (1689)
Thorium-232 (1.1)	uranium (5202)
uranium (103.6)	Uranium-234 (26.9)
Uranium-234 (16.7)	Uranium-235/236 (394.1)
Uranium-235/236 (8.1)	Uranium-238 (1156)
Uranium-238 (19.6)	

The geometric mean of sample analytical results is used for comparing lognormal and the arithmetic mean is used for comparing normally distributed radionuclide sample results to concrete baseline and Part B reference criteria radionuclide concentrations. The mean of sample results exceeds the baseline concentration by the greatest ratios for: uranium, uranium-234, uranium-235/236, and uranium-238. The mean exceeds the Part B reference criteria concentration by the greatest ratios for: radium-226, thorium-228, uranium, and uranium-238.

The minimum sample result detected exceeds the corresponding concrete baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
Lead-210	Lead-210
Plutonium-238	Neptunium-237
Polonium-210	Plutonium-238
Radium-228	Polonium-210
Technetium-99	Radium-226
Thorium-230	Radium-228
Thorium-232	Thorium-228
Uranium-235/236	uranium
	Uranium-235/236
	Uranium-238

This indicates that all sample analytical results for these radionuclides are greater than corresponding baseline or Part B reference criteria concentrations.

The maximum sample result detected is less than the corresponding baseline or Part B reference criteria concentration for the following radionuclides:

Comparison With Baseline	Comparison With Part B reference criteria
Neptunium-237	Americium-241
Plutonium-239/240	Plutonium-239/240
	Strontium-90
	Technetium-99
	Thorium-230
	Thorium-232

A.III.3.5.2 Inorganic Contamination

Two wood samples were taken from separate components for analysis of TAL inorganic contaminants. As shown on Tables A.III-1 and A.III-2, 15 of the 23 inorganic chemicals for which analyses were performed were detected in at least one sample, and ten of these were detected in both samples. Aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, sodium, and zinc were detected in both samples. Antimony, arsenic, chromium, nickel, and potassium were detected in only one sample. The maximum inorganic contaminant was calcium at 3020 mg/kg.

There are no baseline values for wood, therefore, the Part B reference criteria is used to evaluate the level of contamination. The maximum concentration of four inorganics exceed the screening criteria, antimony, arsenic, chromium, and copper. Most significant of these was arsenic with a factor of 73,000. The average concentration of antimony and arsenic also exceed the screening criteria, by factors of 1.3 and 1150, respectively.

Table A.III-3 summarizes the inorganic contamination in wood that exceeds 20 times the TCLP limits. One sample exceeded 20 times the TCLP limit for arsenic (i.e., 100 mg/kg) and chromium (i.e., 100 mg/kg). The sample was from the Electrical Panels & Transformers (16C), with concentrations of 2690 mg/kg for arsenic and 2740 mg/kg for chromium.

A.III.3.5.3 Semivolatile Organic Contamination

One wood sample was analyzed for semivolatile organic constituents. Only ten of the 64 semivolatiles analyzed for were detected. These were benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluornanthene, carbazole, chrysene, dibenzofuran, fluoranthene, phenanthrene, and pyrene. The maximum concentration detected was 260 μg/kg for both fluoranthene and pyrene.

Only three of the ten semivolatile organics detected exceed the Part B reference criteria. benzo(a)anthracene (by a factor of 1.9), benzo(a)pyrene (by a factor of 9.7), and benzo(b)fluoranthene (by a factor of 1.4).

None of the semivolatiles exceed 20 times the TCLP limit.

A.III.3.5.4 Volatile Organic Contamination

One wood sample was analyzed for volatile organic constituents. None of the 33 volatiles for which analyses was performed were detected.

A.III.3.5.5 Pesticides/PCBs

One wood sample was analyzed for pesticides and PCBs. Only two of 18 pesticides, endosulfan-I (at a concentration of 1.5 μg/kg) and endrin (at a concentration of 0.98 μg/kg) were detected. Neither of these results exceed the Part B reference criteria or 20 times the TCLP limit. None of the seven PCBs analyzed were detected.

A.III.3.6 Unknown Liquids

Quantities of liquids sufficient to support chemical and/or radiological analyses were sampled from various collection points. These collection points included sumps, pits, drains, ponds, basins, and runoff locations, many of which still receive flow. The objective of this sampling was to determine the potential for release or transfer of contaminants to the environment or for direct contact by a receptor.

All such liquids are, and will continue to be, treated through the on-property wastewater treatment system prior to discharge to the Great Miami River under an National Pollution Discharge Elimination System (NPDES) permit. Therefore, the characteristics of these liquids are addressed in this RI/FS Report but their inventory, treatment, and disposition are not. Furthermore, since all of this material will be handled separately, Appendix A and Section 3.0 does not address liquids.

A total of 98 unknown liquids was taken for the analysis of radiological and chemical contamination. The following describes the results of these analyses.

A.III.3.6.1 Radiological Contamination

The results of radiological sample analyses for unknown liquids are statistically summarized in Tables A.III-1 and A.III-2. Table A.III-1 indicates the number of analytical results available for each radioactive constituent in unknown liquids varies:

- 88 analytical results are reported for cesium-137, neptunium-237, radium-226, strontium-90, technetium-99, and uranium;
- 87 analytical results are reported for radium-228;
- 86 analytical results are reported for lead-210;
- 85 analytical results are reported for plutonium-238 and plutonium-239/240;
- 84 analytical results are reported for uranium-234;
- 83 analytical results are reported for polonium-210;
- 82 analytical results are reported for thorium-228, thorium-230 and thorium-232;
- 81 analytical results are reported for uranium-235/236 and uranium-238;
- 80 analytical results are reported for americium-241; and
- 39 analytical results are reported for plutonium-241.

All radionuclides and uranium were detected in at least one sample.

Radionuclide sample analytical results can be compared with water quality in upgradient wells in the Great Miami Aquifer (DOE, 1993). Comparison with upgradient groundwater quality parameters (i.e., UTL values) reveals that the mean sample result is greater for the following radionuclides (sample-to-water quality ratios are included in parentheses for each radionuclide):

Comparison With Upgradient Water Quality	Upgradient Groundwater Quality
Lead-210 (2.7)	Lead-210 = 8.5 pCi/L
Technetium-99 (5.2)	Technetium-99 = 36 pCi/L
uranium (79.9)	uranium = 15 μg/L
Uranium-234 (77.6)	Uranium-234 = 4.2 pCi/L
Uranium-235/236 (27.2)	Uranium-235/236 = 1.3 pCi/L
Uranium-238 (81.7)	Uranium-238 = 4.4 pCi/L

The geometric mean of sample analytical results is used for comparing lognormal, and the arithmetic mean is used for comparing normally distributed radionuclide sample results. The water quality

criterion for lead-210 is assumed to be the same as for radium-226 and the water quality criterion for uranium is derived from the isotopic criteria. The mean of sample results is higher by the greatest ratios for: uranium, uranium-234, uranium-235/236, and uranium-238.

None of the minimum sample results detected are greater than upgradient groundwater quality. None of the maximum sample results detected is less than upgradient groundwater quality.

A.III.3.6.2 Inorganic Contamination

A total of 91 liquid samples was taken from 52 components for analysis of TAL inorganic constituents. As shown on Tables A.III-1 and A.III-2, all of the 23 inorganics for which analyses were performed were detected and 11 of these were detected in at least half of the samples. These inorganics include aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, potassium, sodium, and zinc. The maximum inorganic contamination was sodium at 3,490,000 μg/L.

Table A.III-4 summarizes the inorganic contamination in liquid samples that exceed the TCLP limits. One sample, from the Zirnlo Decladding Area of the Special Products Plant (9A) exceeds the TCLP limit for lead (13,500 μg/L detected compared to a TCLP limit of 5000 μg/L).

The most extensive inorganic contamination in an unknown liquid sample is associated with the Southern Extraction Area of the Pilot Plant Wet Side (13A), were 20 analytes were detected.

A.III.3.6.3 Semivolatile Organic Contamination

From 52 components, 93 liquid samples were collected for analysis of semivolatile organic constituents. Only 32 of 65 semivolatiles for which analyses were performed were detected. Bis(2-ethylhexyl)phthalate was detected most often which 21 detects out of 93 samples. Followed by fluoranthene (detected in 14 of 92 samples); phenanthrene (detected in 11 of 93 samples); pyrene (detected in 12 of 92 samples); phenol (detected in 10 of 90 samples); and 2,4-dimethylphenol, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, diethyl phthalate, naphthalene, and p-methylphenol(cresol) (each detected between 5 and 10 samples). The remaining 19 semivolatiles were detected in less than 5 samples of the 93 samples analyzed. The maximum semivolatile contaminant was phenol at 520 μg/L.

No semivolatile organics exceed the TCLP limits.

A.III.3.6.4 Volatile Organic Contamination

From 52 components, 93 liquid samples were collected for analysis of volatile organic constituents. Only 18 of the 33 volatiles for which analyses were performed were detected. Acetone and toluene were detected in 15 of 67 samples and 14 of 93 samples, respectively. These are followed by tetrachloroethene (detected in 12 samples); 2-butanone (detected in 11 samples); and several analytes which were detected in fewer than ten samples. The maximum concentration of volatile constituents detected was 510,000 μg/kg for acetone.

Table A.III-4 summarizes the volatile organics that exceed the TCLP limits. One sample from the Machining area of the Metals Plant (6A) exceed TLCP limits for tetrachloroethene (6800 μg/L detected compared to a TLCP limit of 700 μg/L).

The most extensive organic contamination in unknown liquids is associated with the Center Area of the Pilot Plant Wet Side (13A), where 27 organics (semivolatile and volatile) were detected, and the Garage Area of the Engine House/Garage (31A), where 19 organics were detected. Thirty-five samples from 14 components indicated no organic contamination.

A.III.3.6.5 Pesticides/PCBs

One sample was collected for analysis of pesticides and PCBs. No pesticides nor PCB compounds were detected.

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				ACID BRICK							
INORGANICS											
Aluminum	23	24	Undefined	1220	811	891	1120	803	264	4400	mg/kg
Antimony	3	18	Normal	3.78	1.7	2.53	3.38	4.9	1.3	9	mg/kg
Arsenic	17	24	Lognormal	2.71	1.5	1.55	4.76	1.03	0.81	23.6	mg/kg
Barium	24	24	Lognormal	367	192	150	481	390	7.3	1770	mg/kg
Beryllium	2	24	Lognormal	0.584	0.09	0.111	1.33	0.33	0.5	0.95	mg/kg
Cadmium	7	24	Lognormal	0.994	0.585	0.491	1.5	0.38	0.11	3.4	mg/kg
Calcium	21	24	Undefined	1750	1340	1240	1560	1780	360	6430	mg/kg
Chromium	20	24	Lognormal	56.6	6.45	10.3	116	41.3	1	407	mg/kg
Cobalt	13	24	Undefined	2.26	1.7	1.7	1.96	1.69	0.47	5.4	mg/kg
Copper	21	24	Lognormal	127	30.6	30.8	360	53.4	2.7	1780	mg/kg
Iron	24	24	Lognormal	4930	3470	3510	5740	2890	761	29200	mg/kg
Lead	22	24	Lognormal	90	34.3	38.3	130	72.2	5	518	mg/kg
Magnesium	22	24	Undefined	496	438	374	404	408	92.5	1910	mg/kg
Manganese	24	24	Normal	55.9	57.4	43.9	32.6	39.3	7	126	mg/kg
Mercury	15	24	Lognormal	0.875	0.09	0.202	1.75	0.74	0.05	7	mg/kg
Nickel	16	24	Lognormal	29	13.6	11.8	39.5	34.8	0.88	168	mg/kg
Potassium	16	24	Lognormal	1100	488	578	2010	325	174	9630	mg/kg
Selenium	4	23	Undefined	1.03	0.8	0.739	0.941	0.58	0.62	3.6	mg/kg
Silver	9	24	Lognormal	1.64	0.64	0.726	2.55	1.25	0.49	10.1	mg/kg
Sodium	19	24	Lognormal	577	298	329	785	399	88.6	3460	mg/kg
Thallium	.	24	Normal	0.632	0.655	0.49	0.41	0.59			
Vanadium	12	24	Normal	3.58	2.75	2.62	2.8	3.8	1.1	10.6	mg/kg
Zinc	18	24	Lognormal	41.1	19.3	19.1	52.4	54.2	2.7	230	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	13	20	Lognormal	2.37	0.23	0.401	7.25	0.656	0.13	32.6	pCi/g
Cesium-137	10	21	Lognormal	1.61	0.36	0.396	4.48	1.03	0.5	20.9	pCi/g
Lead-210	17	21	Lognormal	112	3.3	7.18	385	10.1	0.4	1750	pCi/g
Neptunium-237	10	20	Lognormal	0.311	0.185	0.204	0.382	0.308	0.094	1.72	pCi/g
Plutonium-238	10	20	Lognormal	75.7	0.115	0.436	289	0.789	0.015	1300	pCi/g
Plutonium-239/240	12	20	Lognormal	5.46	0.099	0.342	16.7	2.88	0.012	74.5	pCi/g
Plutonium-241	8	18	Lognormal	60.4	3.23	7.21	217	21.7	1.45	923	pCi/g
Polonium-210	16	20	Lognormal	189	2.94	4.12	671	11.3	0.058	2970	pCi/g
Radium-226	21	21	Lognormal	39.5	3.4	5.24	116	12.7	0.248	530	pCi/g
Radium-228	18	21	Lognormal	137	2.5	4.88	389	2.88	0.7	1710	pCi/g
Strontium-90	9	21	Lognormal	1.04	0.45	0.588	1.56	0.73	0.36	7.1	pCi/g
Technetium-99	20	21	Lognormal	50.5	17	14.2	79.2	50.5	0.353	296	pCi/g
Thorium-227	.	6	Undeterminable	3.22	2.62	0.972	3.48	4.62			
Thorium-228	13	18	Normal	9.7	5.6	5.99	9.09	13.7	0.91	31.1	pCi/g
Thorium-230	16	18	Lognormal	48.3	9.31	14.4	80.8	59.6	1.6	295	pCi/g
Thorium-232	13	18	Normal	4.79	3.66	3.67	3.38	5.01	1.26	13.4	pCi/g
Uranium, Total	21	21	Lognormal	2080	1140	746	2660	2250	6.9	9400	ug/g
Uranium-234	18	22	Undefined	622	335	254	683	712	0.44	2790	pCi/g
Uranium-235/236	17	20	Normal	53	32.9	19.4	57.5	75.8	0.58	200	pCi/g
Uranium-238	17	20	Lognormal	658	303	224	887	858	4.86	3800	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
1,2-Dichlorobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
1,3-Dichlorobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
1,4-Dichlorobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,2-oxybis(1-Chloropropane)	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,4,5-Trichlorophenol	.	3	Undeterminable	4430	3400	2800	4340	8500	.	.	
2,4,6-Trichlorophenol	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,4-Dichlorophenol	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,4-Dimethylphenol	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,4-Dinitrophenol	.	2	Undeterminable	2550	2550	2400	1200	1700	.	.	
2,4-Dinitrotoluene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2,6-Dinitrotoluene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2-Chloronaphthalene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2-Chlorophenol	1	3	Undeterminable	3540	1400	488	4950	9190	9	9	ug/kg
2-Methylnaphthalene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
2-Nitroaniline	.	3	Undeterminable	4430	3400	2800	4340	8500	.	.	
2-Nitrophenol	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
3,3'-Dichlorobenzidine	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
3-Nitroaniline	.	3	Undeterminable	4430	3400	2800	4340	8500	.	.	
4,6-Dinitro-2-methylphenol	.	3	Undeterminable	9370	3400	5100	11800	21300	.	.	
4-Bromophenyl phenyl ether	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
4-Chloro-3-methylphenol	1	3	Undeterminable	3550	1400	781	4940	9160	37	37	ug/kg
4-Chlorophenylphenyl ether	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
4-Nitroaniline	.	3	Undeterminable	9370	3400	5100	11800	21300	.	.	
4-Nitrophenol	.	3	Undeterminable	9370	3400	5100	11800	21300	.	.	
Acenaphthene	1	3	Undeterminable	3540	1400	636	4950	9180	20	20	ug/kg
Acenaphthylene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Anthracene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Benzo(a)anthracene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Benzo(a)pyrene	1	3	Undeterminable	3410	700	1300	5010	8860	340	340	ug/kg
Benzo(b)fluoranthene	2	3	Undeterminable	3160	260	357	5230	9180	19	260	ug/kg
Benzo(g,h,i)perylene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Benzo(k)fluoranthene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
bis(2-Chloroethoxy)methane	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethyl)ether	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
bis(2-Ethylhexyl)phthalate	1	3	Undeterminable	3970	2000	2340	4580	8500	2000	2000	ug/kg
Butyl benzyl phthalate	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Carbazole	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Chrysene	2	3	Undeterminable	3220	450	421	5180	9180	18	450	ug/kg
Di-n-butyl phthalate	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Di-n-octyl phthalate	1	3	Undeterminable	733	700	461	651	1300	100	100	ug/kg
Dibenzo(a,h)anthracene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Dibenzofuran	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Diethyl phthalate	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Dimethyl phthalate	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Fluoranthene	2	3	Undeterminable	502	67	155	778	1360	40	67	ug/kg
Fluorene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Hexachlorobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Hexachlorobutadiene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Hexachlorocyclopentadiene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Hexachloroethane	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Indeno(1,2,3-cd)pyrene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Isophorone	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
N-Nitroso-di-n-propylamine	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
N-Nitrosodiphenylamine	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Naphthalene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Nitrobenzene	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
o-Methylphenol	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
p-Chloroaniline	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
p-Methylphenol (Cresol)	.	3	Undeterminable	3770	1400	2080	4720	8500	.	.	
Pentachlorophenol	.	2	Undeterminable	13200	13200	8840	13900	19600	.	.	
Phenanthrene	1	3	Undeterminable	3540	1400	657	4950	9180	22	22	ug/kg
Phenol	1	3	Undeterminable	3550	1400	795	4940	9160	39	39	ug/kg
Pyrene	1	3	Undeterminable	3550	1400	902	4940	9140	57	57	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	1	4	Undeterminable	113	11	26.7	205	205	10	10	ug/kg
1,1,2,2-Tetrachloroethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,1,2-Trichloroethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,1-Dichloroethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,1-Dichloroethene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,2-Dichloroethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,2-Dichloroethene (Total)	.	4	Undeterminable	113	11	26.7	205	205	.	.	
1,2-Dichloropropane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
2-Butanone	2	4	Undeterminable	111	9	21.2	206	208	6	8	ug/kg
2-Hexanone	.	4	Undeterminable	113	11	26.7	205	205	.	.	
4-Methyl-2-pentanone	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Acetone	.	2	Undeterminable	215	215	64.8	290	410	.	.	
Benzene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Bromodichloromethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Bromoform	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Bromomethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Carbon disulfide	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Carbon Tetrachloride	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Chlorobenzene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Chloroethane	.	2	Undeterminable	215	215	64.8	290	410	.	.	
Chloroform	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Chloromethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
cis-1,3-Dichloropropene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Dibromochloromethane	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Ethylbenzene	1	4	Undeterminable	112	11	22.5	206	208	5	5	ug/kg
m,p-Xylene	1	1	Undeterminable	14	14	14	.	0	14	14	ug/kg
Methylene chloride	1	4	Undeterminable	113	11	26	205	206	9	9	ug/kg
o-Xylene	1	1	Undeterminable	4	4	4	.	0	4	4	ug/kg
Styrene	1	4	Undeterminable	22.5	11	16.3	23.7	24	58	58	ug/kg
Tetrachloroethene	1	4	Undeterminable	112	11	22.5	206	208	5	5	ug/kg
Toluene	1	4	Undeterminable	111	10.5	17.4	206	210	2	2	ug/kg
trans-1,3-Dichloropropene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Trichloroethene	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Trichlorofluoromethane	1	3	Undeterminable	146	11	30.3	238	414	6	6	ug/kg
Vinyl chloride	.	4	Undeterminable	113	11	26.7	205	205	.	.	
Xylenes, Total	1	4	Undeterminable	115	14.5	30.9	203	208	18	18	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	AIR FILTERS										
INORGANICS											
Aluminum	1	1	Undeterminable	261	261	261	.	0	261	261	mg/kg
Antimony	.	1	Undeterminable	9.3	9.3	9.3	.	0	.	.	
Arsenic	1	1	Undeterminable	0.81	0.81	0.81	.	0	0.81	0.81	mg/kg
Barium	.	1	Undeterminable	10	10	10	.	0	.	.	
Beryllium	.	1	Undeterminable	0.2	0.2	0.2	.	0	.	.	
Cadmium	1	1	Undeterminable	1.2	1.2	1.2	.	0	1.2	1.2	mg/kg
Calcium	1	1	Undeterminable	3380	3380	3380	.	0	3380	3380	mg/kg
Chromium	1	1	Undeterminable	197	197	197	.	0	197	197	mg/kg
Cobalt	.	1	Undeterminable	1.4	1.4	1.4	.	0	.	.	
Copper	.	1	Undeterminable	10.3	10.3	10.3	.	0	.	.	
Iron	1	1	Undeterminable	1380	1380	1380	.	0	1380	1380	mg/kg
Lead	1	1	Undeterminable	4.3	4.3	4.3	.	0	4.3	4.3	mg/kg
Magnesium	1	1	Undeterminable	467	467	467	.	0	467	467	mg/kg
Manganese	1	1	Undeterminable	25.5	25.5	25.5	.	0	25.5	25.5	mg/kg
Mercury	.	1	Undeterminable	0.05	0.05	0.05	.	0	.	.	
Nickel	1	1	Undeterminable	128	128	128	.	0	128	128	mg/kg
Potassium	1	1	Undeterminable	273	273	273	.	0	273	273	mg/kg
Selenium	1	1	Undeterminable	0.72	0.72	0.72	.	0	0.72	0.72	mg/kg
Silver	.	1	Undeterminable	1.4	1.4	1.4	.	0	.	.	
Sodium	1	1	Undeterminable	4700	4700	4700	.	0	4700	4700	mg/kg
Thallium	.	1	Undeterminable	0.41	0.41	0.41	.	0	.	.	
Vanadium	.	1	Undeterminable	0.61	0.61	0.61	.	0	.	.	
Zinc	1	1	Undeterminable	125	125	125	.	0	125	125	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	.	23	Lognormal	4.2	0.13	0.335	16.6	1.1	.	.	
Cesium-137	10	29	Lognormal	20.2	4.78	0.663	87.9	6.9	4.78	9.85	pCi/Fi
Lead-210	7	21	Lognormal	38.9	0.291	1.34	116	10.7	0.0937	224	pCi/Fi
Neptunium-237	:	3	Undeterminable	0	0	0.0031	0.00494	0.0088	.	.	
Plutonium-238	2	22	Normal	1.19	1.3	1.02	1.01	0.4	2.58	3.95	pCi/Fi
Plutonium-239/240	.	22	Lognormal	4.96	0.985	0.919	19.2	0.56	.	.	
Polonium-210	16	19	Lognormal	35.8	15.8	12.9	87.2	7.6	8.85	26.9	pCi/Fi
Radium-226	6	29	Lognormal	3.44	1.4	0.523	12	2.11	0.0354	2.15	pCi/Fi
Radium-228	5	20	Lognormal	22.4	0.265	0.659	80.2	10.4	0.23	19	pCi/Fi
Strontium-90	1	21	Lognormal	11.4	2.6	3.05	40.7	0.3	3.02	3.02	pCi/Fi
Technetium-99	1	11	Normal	39.8	46	16.5	41.7	44.2	3.7	3.7	pCi/g
Thorium-228	5	22	Lognormal	6.11	2.5	2.06	9.61	1.44	5.61	38.2	pCi/Fi
Thorium-230	11	22	Lognormal	9.67	2.2	2.59	26	4.58	0.125	33.2	pCi/Fi
Thorium-232	7	22	Lognormal	3.1	1.3	1.11	5.05	1.11	0.0562	18.5	pCi/Fi
Uranium, Total	30	43	Lognormal	116	1.44	2.94	373	53.8	0.0263	2140	ug/Fil
Uranium-234	15	21	Lognormal	128	16.2	19.7	213	88.1	0.0911	848	pCi/Fi
Uranium-235/236	9	23	Lognormal	5.92	2.72	2.43	8.7	5.34	0.94	36	pCi/Fi
Uranium-238	15	21	Lognormal	110	12.5	17.1	197	84.2	0.138	786	pCi/Fi

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				ASPHALT							
INORGANICS											
Aluminum	3	4	Undeterminable	1660	1490	1600	509	580	1250	2400	mg/kg
Antimony	.	4	Undeterminable	8.73	9.2	8.68	1.02	1.05	.	.	
Arsenic	4	4	Undeterminable	2.84	2.6	2.4	1.77	2.43	0.95	5.2	mg/kg
Barium	4	4	Undeterminable	26.3	27.1	24.1	11.9	20.3	13.7	37.1	mg/kg
Beryllium	.	4	Undeterminable	0.288	0.275	0.274	0.103	0.175	.	.	
Cadmium	.	4	Undeterminable	0.59	0.6	0.59	0.02	0.02	.	.	
Calcium	4	4	Undeterminable	168000	165000	162000	50000	85000	121000	221000	mg/kg
Chromium	2	4	Undeterminable	4.28	3.7	4.14	1.36	1.55	3.4	3.6	mg/kg
Cobalt	1	4	Undeterminable	1.83	1.8	1.82	0.222	0.35	1.9	1.9	mg/kg
Copper	3	4	Undeterminable	5.88	6.2	5.36	2.62	4.25	2.7	8.4	mg/kg
Iron	4	4	Undeterminable	5350	5520	5290	884	1400	4220	6150	mg/kg
Lead	4	4	Undeterminable	4.1	3.55	3.53	2.57	3.7	1.7	7.6	mg/kg
Magnesium	4	4	Undeterminable	50600	50200	50400	5190	7250	44800	57300	mg/kg
Manganese	4	4	Undeterminable	324	331	306	122	203	188	446	mg/kg
Mercury	.	4	Undeterminable	0.095	0.1	0.0946	0.01	0.01	.	.	
Nickel	1	4	Undeterminable	8.23	6.9	7.76	3.5	4.05	6.7	6.7	mg/kg
Potassium	1	4	Undeterminable	418	412	387	178	260	211	211	mg/kg
Selenium	.	4	Undeterminable	1.35	0.6	0.939	1.5	1.5	.	.	
Silver	.	4	Undeterminable	0.773	0.8	0.771	0.0619	0.065	.	.	
Sodium	4	4	Undeterminable	440	476	430	99.4	116	294	516	mg/kg
Thallium	.	4	Undeterminable	0.635	0.8	0.517	0.33	0.33	.	.	
Vanadium	4	4	Undeterminable	13	10.3	11	8.71	12.4	6.1	25.2	mg/kg
Zinc	4	4	Undeterminable	72.7	28.2	42.9	94.3	102	20.6	214	mg/kg

000599

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
4,4'-DDE	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
4,4'-DDT	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Aldrin	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
Aroclor-1016	.	2	Undeterminable	176	176	101	204	288	.	.	
Aroclor-1221	.	2	Undeterminable	358	358	206	414	585	.	.	
Aroclor-1232	.	2	Undeterminable	176	176	101	204	288	.	.	
Aroclor-1242	.	2	Undeterminable	176	176	101	204	288	.	.	
Aroclor-1248	.	2	Undeterminable	176	176	101	204	288	.	.	
Aroclor-1254	.	2	Undeterminable	176	176	101	204	288	.	.	
Aroclor-1260	.	2	Undeterminable	176	176	101	204	288	.	.	
Dieldrin	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Endosulfan II	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Endosulfan sulfate	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Endosulfan-I	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
Endrin	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Endrin aldehyde	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Endrin ketone	.	2	Undeterminable	17.6	17.6	10.1	20.4	28.8	.	.	
Heptachlor	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
Heptachlor epoxide	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
Methoxychlor	.	2	Undeterminable	88	88	50.6	102	144	.	.	
Toxaphene	.	2	Undeterminable	880	880	506	1020	1440	.	.	
alpha-BHC	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
alpha-Chlordane	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
beta-BHC	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
delta-BHC	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
gamma-BHC (Lindane)	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	
gamma-Chlordane	.	2	Undeterminable	8.8	8.8	5.06	10.2	14.4	.	.	

000600

2121

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	.	4	Undeterminable	0.112	0.136	0.0855	0.0648	0.0853	.	.	
Cesium-137	3	4	Undeterminable	0.0605	0.0354	0.0445	0.0601	0.0671	0.021	0.15	pCi/g
Lead-210	3	4	Undeterminable	1.35	1.35	0.974	1.06	1.82	0.57	2.4	pCi/g
Neptunium-237	.	4	Undeterminable	0.11	0.112	0.109	0.0126	0.021	.	.	
Plutonium-238	1	4	Undeterminable	0.125	0.16	0.0823	0.077	0.0897	0.15	0.15	pCi/g
Plutonium-239/240	1	4	Undeterminable	0.0762	0.0645	0.0676	0.0447	0.0536	0.0358	0.0358	pCi/g
Polonium-210	3	4	Undeterminable	2.6	1.65	1.7	2.74	3.5	0.508	6.6	pCi/g
Radium-226	4	4	Undeterminable	0.929	0.533	0.691	0.918	0.998	0.35	2.3	pCi/g
Radium-228	4	4	Undeterminable	0.604	0.33	0.405	0.67	0.733	0.154	1.6	pCi/g
Strontium-90	2	4	Undeterminable	13.3	12.6	2.16	15.2	26.3	25	28	pCi/g
Technetium-99	2	4	Undeterminable	3.31	2.64	1.29	3.68	6.08	5	7.7	pCi/g
Thorium-228	4	4	Undeterminable	0.708	0.421	0.495	0.737	0.844	0.19	1.8	pCi/g
Thorium-230	4	4	Undeterminable	0.771	0.501	0.541	0.768	0.861	0.18	1.9	pCi/g
Thorium-232	4	4	Undeterminable	0.44	0.216	0.291	0.508	0.56	0.13	1.2	pCi/g
Uranium, Total	4	4	Undeterminable	138	128	118	83.9	135	55	240	ug/g
Uranium-234	3	4	Undeterminable	7.91	3	2.88	11.7	13.5	2	25.3	pCi/g
Uranium-235/236	2	4	Undeterminable	0.983	0.195	0.346	1.63	1.68	0.21	3.43	pCi/g
Uranium-238	3	4	Undeterminable	11.2	3.7	3.36	17.3	20.1	1.9	36.9	pCi/g

000001

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
1,2-Dichlorobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
1,3-Dichlorobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
1,4-Dichlorobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,2-oxybis(1-Chloroprop	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,4,5-Trichlorophenol	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
2,4,6-Trichlorophenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,4-Dichlorophenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,4-Dimethylphenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,4-Dinitrophenol	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
2,4-Dinitrotoluene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2,6-Dinitrotoluene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2-Chloronaphthalene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2-Chlorophenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
2-Methylnaphthalene	2	2	Undeterminable	150	150	149	28.3	40	130	170	ug/kg
2-Nitroaniline	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
2-Nitrophenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
3-Nitroaniline	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
4,6-Dinitro-2-methylphe	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
4-Bromophenyl phenyl et	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
4-Chloro-3-methylphenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
4-Chlorophenylphenyl et	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
4-Nitroaniline	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
4-Nitrophenol	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
Acenaphthene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Acenaphthylene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Anthracene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Benzo(a)anthracene	2	2	Undeterminable	165	165	163	35.4	50	140	190	ug/kg
Benzo(a)pyrene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Benzo(b)fluoranthene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Benzo(g,h,i)perylene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Benzo(k)fluoranthene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	

000602

I 2 I 2

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Butyl benzyl phthalate	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Carbazole	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Chrysene	2	2	Undeterminable	345	345	339	91.9	130	280	410	ug/kg
Di-n-butyl phthalate	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Di-n-octyl phthalate	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Dibenzo(a,h)anthracene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Dibenzofuran	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Diethyl phthalate	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Dimethyl phthalate	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Fluoranthene	2	2	Undeterminable	425	425	414	134	190	330	520	ug/kg
Fluorene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Hexachlorobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Hexachlorobutadiene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Hexachlorocyclopentadie	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Hexachloroethane	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Indeno(1,2,3-cd)pyrene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Isophorone	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
N-Nitroso-di-n-propylam	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
N-Nitrosodiphenylamine	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Naphthalene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Nitrobenzene	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Pentachlorophenol	.	2	Undeterminable	5200	5200	5200	0	0	.	.	
Phenanthrene	2	2	Undeterminable	460	460	460	14.1	20	450	470	ug/kg
Phenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
Pyrene	2	2	Undeterminable	340	340	338	56.6	80	300	380	ug/kg
bis(2-Chloroethoxy)meth	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
bis(2-Chloroethyl)ether	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
bis(2-Ethylhexyl)phthal	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
o-Methylphenol	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
p-Chloroaniline	.	2	Undeterminable	2100	2100	2100	0	0	.	.	
p-Methylphenol (Cresol)	.	2	Undeterminable	2100	2100	2100	0	0	.	.	

000603

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
1,1,2,2-Tetrachloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
1,1,2-Trichloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
1,1-Dichloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
1,1-Dichloroethene	.	2	Undeterminable	10	10	10	0	0	.	.	
1,2-Dichloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
1,2-Dichloroethene (Total)	.	2	Undeterminable	10	10	10	0	0	.	.	
1,2-Dichloropropane	.	2	Undeterminable	10	10	10	0	0	.	.	
2-Butanone	1	2	Undeterminable	7	7	6.32	4.24	6	4	4	ug/kg
2-Hexanone	.	2	Undeterminable	10	10	10	0	0	.	.	
4-Methyl-2-pentanone	.	2	Undeterminable	10	10	10	0	0	.	.	
Benzene	.	2	Undeterminable	10	10	10	0	0	.	.	
Bromodichloromethane	.	2	Undeterminable	10	10	10	0	0	.	.	
Bromoform	.	2	Undeterminable	10	10	10	0	0	.	.	
Bromomethane	.	2	Undeterminable	10	10	10	0	0	.	.	
Carbon Tetrachloride	.	2	Undeterminable	10	10	10	0	0	.	.	
Carbon disulfide	.	2	Undeterminable	10	10	10	0	0	.	.	
Chlorobenzene	.	2	Undeterminable	10	10	10	0	0	.	.	
Chloroethane	.	2	Undeterminable	10	10	10	0	0	.	.	
Chloroform	.	2	Undeterminable	10	10	10	0	0	.	.	
Chloromethane	.	2	Undeterminable	10	10	10	0	0	.	.	
Dibromochloromethane	.	2	Undeterminable	10	10	10	0	0	.	.	
Ethylbenzene	.	2	Undeterminable	10	10	10	0	0	.	.	
Methylene chloride	.	2	Undeterminable	10	10	10	0	0	.	.	
Styrene	.	2	Undeterminable	10	10	10	0	0	.	.	
Tetrachloroethene	.	2	Undeterminable	11.5	11.5	11.4	2.12	3	.	.	
Toluene	.	2	Undeterminable	10	10	10	0	0	.	.	
Trichloroethene	.	2	Undeterminable	10	10	10	0	0	.	.	
Vinyl chloride	.	2	Undeterminable	10	10	10	0	0	.	.	
Xylenes, Total	.	2	Undeterminable	10	10	10	0	0	.	.	
cis-1,3-Dichloropropene	.	2	Undeterminable	10	10	10	0	0	.	.	
trans-1,3-Dichloropropene	.	2	Undeterminable	10	10	10	0	0	.	.	

000604

I 2 I 2

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	CONCRETE CHIPS										
INORGANICS											
Aluminum	154	154	Undefined	5230	5040	5100	1250	1480	2570	11100	mg/kg
Antimony	26	130	Lognormal	15.2	9.3	7.3	19.2	7.4	0.83	44.1	mg/kg
Arsenic	145	152	Undefined	4.83	4.3	4.32	2.67	2.2	1.1	24	mg/kg
Barium	154	154	Lognormal	139	57.5	68.2	505	31	23.5	5890	mg/kg
Beryllium	67	149	Lognormal	0.715	0.41	0.295	0.941	0.72	0.2	2.6	mg/kg
Cadmium	38	154	Lognormal	1.95	0.795	0.991	3.03	1.73	0.69	29.4	mg/kg
Calcium	154	154	Normal	181000	182000	179000	25400	30000	60100	273000	mg/kg
Chromium	135	154	Lognormal	25.6	11.1	12.8	65	12.2	4.6	640	mg/kg
Cobalt	83	154	Undefined	4.58	3.7	3.87	3.92	2.3	1.7	41.3	mg/kg
Copper	128	152	Lognormal	49.8	17.1	21.5	134	29.5	5.2	1440	mg/kg
Iron	154	154	Undefined	11500	8040	9300	12200	3090	4340	105000	mg/kg
Lead	144	154	Lognormal	86.1	14	16.5	309	27.6	1.5	2730	mg/kg
Magnesium	154	154	Normal	40300	39800	39300	8840	9900	19100	75000	mg/kg
Manganese	154	154	Undefined	328	316	307	140	111	35.6	1470	mg/kg
Mercury	26	144	Lognormal	0.187	0.07	0.0785	0.594	0.05	0.03	4.8	mg/kg
Nickel	111	154	Lognormal	21.4	12.2	13.6	39.7	17.9	3.1	462	mg/kg
Potassium	118	154	Undefined	2390	1340	1640	2690	1560	498	19200	mg/kg
Selenium	13	125	Lognormal	1.36	0.62	0.864	1.6	1.4	1.2	10.2	mg/kg
Silver	29	151	Lognormal	2.75	0.81	0.97	4.4	3.79	0.17	26	mg/kg
Sodium	137	154	Undefined	1120	815	848	1220	654	253	11000	mg/kg
Thallium	11	147	Lognormal	0.653	0.31	0.368	1.56	0.6	0.04	16	mg/kg
Vanadium	119	154	Undefined	17	11.8	12.4	15.2	13.3	2.3	120	mg/kg
Zinc	145	154	Lognormal	1010	56.1	66.7	11000	71.5	13.5	136000	mg/kg

000603

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	13	Undefined	3.26	3.4	3.19	0.569	0.1	.	.	
4,4'-DDE	3	13	Lognormal	10.1	3.4	3.86	25.2	0.2	0.69	94	ug/kg
4,4'-DDT	.	13	Undefined	3.26	3.4	3.19	0.569	0.1	.	.	
Aldrin	.	13	Undefined	1.65	1.7	1.61	0.299	0	.	.	
alpha-BHC	.	13	Undefined	1.65	1.7	1.61	0.299	0	.	.	
alpha-Chlordane	2	13	Lognormal	7.27	1.7	2.35	19.2	0.1	5.4	71	ug/kg
Aroclor-1016	.	14	Undefined	32.7	34	32	5.48	1	.	.	
Aroclor-1221	.	14	Undefined	63.4	68	61.2	14.1	2	.	.	
Aroclor-1232	.	14	Undefined	32.7	34	32	5.48	1	.	.	
Aroclor-1242	.	14	Undefined	32.7	34	32	5.48	1	.	.	
Aroclor-1248	1	14	Lognormal	152	34	42.4	446	2	1700	1700	ug/kg
Aroclor-1254	2	14	Lognormal	261	34	47.9	846	1	41	3200	ug/kg
Aroclor-1260	2	14	Lognormal	146	34	43.4	419	1	50	1600	ug/kg
beta-BHC	.	13	Undefined	1.65	1.7	1.61	0.299	0	.	.	
Chlordane	.	2	Undeterminable	0	0		0	0	.	.	
delta-BHC	1	13	Undefined	1.74	1.7	1.68	0.437	0.1	2.8	2.8	ug/kg
Dieldrin	4	13	Normal	3.44	3.4	3.21	1.3	0.1	1.6	6.9	ug/kg
Endosulfan II	2	13	Undefined	3.19	3.4	3.12	0.595	0.1	1.6	2.2	ug/kg
Endosulfan sulfate	3	13	Undefined	3.61	3.4	3.37	1.52	0.1	2.4	8.2	ug/kg
Endosulfan-I	1	13	Undefined	1.73	1.7	1.67	0.417	0.1	2.7	2.7	ug/kg
Endrin	.	13	Undefined	3.26	3.4	3.19	0.569	0.1	.	.	
Endrin aldehyde	.	13	Undefined	3.26	3.4	3.19	0.569	0.1	.	.	
Endrin ketone	1	13	Undefined	3.55	3.4	3.38	1.21	0.1	7.1	7.1	ug/kg
gamma-BHC (Lindane)	.	13	Undefined	1.65	1.7	1.61	0.299	0	.	.	
gamma-Chlordane	2	13	Lognormal	7.35	1.7	2.08	20.6	0.1	0.42	76	ug/kg
Heptachlor	.	13	Undefined	1.65	1.7	1.61	0.299	0	.	.	
Heptachlor epoxide	1	13	Undefined	1.68	1.7	1.67	0.186	0	1.1	1.1	ug/kg
Methoxychlor	.	13	Undefined	16.5	17	16.1	2.99	0	.	.	
Toxaphene	.	13	Undefined	165	170	161	29.9	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	45	142	Lognormal	0.272	0.1	0.127	1.12	0.153	0.0452	13	pCi/g
Cesium-137	36	152	Lognormal	0.28	0.1	0.116	0.664	0.164	0.02	4.8	pCi/g
Gross Alpha	.	25	Lognormal	3810	28	74.5	16900	332	.	.	
Gross Beta	.	25	Lognormal	2520	28	74.2	10500	332	.	.	
Lead-210	89	149	Lognormal	5.77	2	2.03	21.9	3.2	0.2	69.1	pCi/g
Neptunium-237	42	148	Lognormal	0.453	0.113	0.13	1.89	0.19	0.011	18	pCi/g
Plutonium-238	54	150	Lognormal	0.785	0.0493	0.0765	5.64	0.14	0.00332	67.7	pCi/g
Plutonium-239/240	52	150	Lognormal	0.527	0.0642	0.0874	2.78	0.145	0.0118	30.3	pCi/g
Plutonium-241	27	85	Lognormal	0	1.7	2.66	14.7	4.1	1	47	pCi/g
Polonium-210	124	148	Lognormal	1.63	0.61	0.72	4.29	0.8	0.17	36	pCi/g
Radium-226	137	148	Lognormal	14.1	0.9	1.11	127	0.937	0.25	1530	pCi/g
Radium-228	107	151	Lognormal	109	0.4	0.77	1220	1.2	0.12	15000	pCi/g
Strontium-90	35	150	Lognormal	1.14	0.3	0.422	4.94	0.74	0.11	59.7	pCi/g
Technetium-99	111	152	Lognormal	162	3.3	4.74	878	21.1	0.2	8100	pCi/g
Thorium-227	8	10	Normal	15.5	1.31	2	24.1	30.7	0.16	62	pCi/g
Thorium-228	100	148	Lognormal	79.4	0.495	1.15	748	2.58	0.13	8950	pCi/g
Thorium-230	122	148	Lognormal	32.8	1.35	2.53	116	5.46	0.114	980	pCi/g
Thorium-232	102	148	Lognormal	9.54	0.338	0.781	31.6	1.79	0.0975	230	pCi/g
Uranium, Total	147	152	Lognormal	2150	430	218	6110	1480	1	65000	ug/g
Uranium-234	127	158	Lognormal	1250	141	82.7	4700	708	0.27	49000	pCi/g
Uranium-235/236	119	156	Lognormal	149	12.1	8.59	628	69.2	0.0807	6800	pCi/g
Uranium-236	.	2	Undeterminable								
Uranium-238	126	156	Lognormal	1290	190	101	4390	721	0.576	37000	pCi/g

000607

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
1,2-Dichlorobenzene	.	7	Normal	13000	9300	11200	9520	6000	.	.	
1,3-Dichlorobenzene	.	7	Normal	13000	9300	11200	9520	6000	.	.	
1,4-Dichlorobenzene	.	7	Normal	13000	9300	11200	9520	6000	.	.	
2,2-oxybis(1-Chloropropane)	.	7	Normal	13000	9300	11200	9520	6000	.	.	
2,4,5-Trichlorophenol	.	4	Undeterminable	35600	25500	25700	32700	44900	.	.	
2,4,6-Trichlorophenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
2,4-Dichlorophenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
2,4-Dimethylphenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
2,4-Dinitrophenol	.	2	Undeterminable	25500	25500	24000	12000	17000	.	.	
2,4-Dinitrotoluene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
2,6-Dinitrotoluene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
2-Chloronaphthalene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
2-Chlorophenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
2-Methylnaphthalene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
2-Nitroaniline	.	8	Normal	23300	13200	12800	26000	21400	.	.	
2-Nitrophenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
3,3'-Dichlorobenzidine	.	7	Normal	11700	9200	7410	10600	7300	.	.	
3-Nitroaniline	.	8	Normal	23300	13200	12800	26000	21400	.	.	
4,6-Dinitro-2-methylphenol	.	4	Undeterminable	39000	28500	32300	29500	38000	.	.	
4-Bromophenyl phenyl ether	.	8	Normal	11400	9250	7220	9890	4650	.	.	
4-Chloro-3-methylphenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
4-Chlorophenylphenyl ether	.	8	Normal	11400	9250	7220	9890	4650	.	.	
4-Nitroaniline	.	8	Normal	28200	23000	18000	23700	11500	.	.	
4-Nitrophenol	.	4	Undeterminable	39000	28500	32300	29500	38000	.	.	
Acenaphthene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Acenaphthylene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Anthracene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Benzo(a)anthracene	1	7	Normal	11600	9200	5270	10700	7300	52	52	ug/kg
Benzo(a)pyrene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Benzo(b)fluoranthene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Benzo(g,h,i)perylene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Benzo(k)fluoranthene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
bis(2-Chloroethoxy)methane	.	8	Normal	11400	9250	7220	9890	4650	.	.	
bis(2-Chloroethyl)ether	.	7	Normal	13000	9300	11200	9520	6000	.	.	
bis(2-Ethylhexyl)phthalate	1	7	Normal	10700	9200	5770	11300	12600	1400	1400	ug/kg
Butyl benzyl phthalate	1	7	Normal	10400	8000	4890	11400	13400	500	500	ug/kg
Carbazole	.	8	Normal	10300	8600	5040	10600	8020	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Chrysene	2	7	Normal	10500	9200	3850	11500	13500	83	550	ug/kg
Di-n-butyl phthalate	1	8	Normal	10200	8600	3800	10700	8130	58	58	ug/kg
Di-n-octyl phthalate	1	8	Normal	9120	7350	2550	11200	11200	39	39	ug/kg
Dibenzo(a,h)anthracene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Dibenzofuran	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Diethyl phthalate	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Dimethyl phthalate	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Fluoranthene	3	8	Normal	8180	3710	2000	11600	11400	160	710	ug/kg
Fluorene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Hexachlorobenzene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Hexachlorobutadiene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Hexachlorocyclopentadiene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Hexachloroethane	.	7	Normal	13000	9300	11200	9520	6000	.	.	
Indeno(1,2,3-cd)pyrene	.	8	Normal	10300	8600	5040	10600	8020	.	.	
Isophorone	.	8	Normal	11400	9250	7220	9890	4650	.	.	
N-Nitroso-di-n-propylamine	.	7	Normal	13000	9300	11200	9520	6000	.	.	
N-Nitrosodiphenylamine	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Naphthalene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
Nitrobenzene	.	8	Normal	11400	9250	7220	9890	4650	.	.	
o-Methylphenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
p-Chloroaniline	.	8	Normal	11400	9250	7220	9890	4650	.	.	
p-Methylphenol (Cresol)	1	5	Undeterminable	12900	9200	7180	12700	7300	650	650	ug/kg
Pentachlorophenol	.	4	Undeterminable	39000	28500	32300	29500	38000	.	.	
Phenanthrene	5	8	Normal	2870	455	772	5020	3350	130	590	ug/kg
Phenol	.	4	Undeterminable	16000	11600	13100	12400	16100	.	.	
Pyrene	2	7	Normal	10600	9200	4620	11400	13300	230	720	ug/kg

000609

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	2	8	Lognormal	5160	1300	377	12500	1270	8	36000	ug/kg
1,1,2,2-Tetrachloroethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,1,2-Trichloroethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,1-Dichloroethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,1-Dichloroethene	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,2-Dichloroethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,2-Dichloroethene (Total)	.	8	Normal	1280	1300	303	1630	1270	.	.	
1,2-Dichloropropane	.	8	Normal	1280	1300	303	1630	1270	.	.	
2-Butanone	2	7	Normal	1890	1300	488	1790	2990	2600	3000	ug/kg
2-Hexanone	1	8	Normal	1280	1300	302	1630	1270	49	49	ug/kg
4-Methyl-2-pentanone	1	8	Normal	1280	1300	302	1630	1270	48	48	ug/kg
Acetone	.	7	Normal	1460	1300	412	1670	1290	.	.	
Benzene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Bromodichloromethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
Bromoform	.	8	Normal	1280	1300	303	1630	1270	.	.	
Bromomethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
Carbon disulfide	.	8	Normal	1280	1300	303	1630	1270	.	.	
Carbon Tetrachloride	.	8	Normal	1280	1300	303	1630	1270	.	.	
Chlorobenzene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Chloroethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
Chloroform	.	8	Normal	1280	1300	303	1630	1270	.	.	
Chloromethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
cis-1,3-Dichloropropene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Dibromochloromethane	.	8	Normal	1280	1300	303	1630	1270	.	.	
Ethylbenzene	3	8	Lognormal	2730	1300	412	5390	990	3	16000	ug/kg
m,p-Xylene	1	1	Undeterminable	68000	68000	68000	.	0	68000	68000	ug/kg
Methylene chloride	.	7	Normal	754	1300	209	681	1290	.	.	
o-Xylene	1	1	Undeterminable	40000	40000	40000	.	0	40000	40000	ug/kg
Styrene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Tetrachloroethene	1	8	Normal	1280	1300	261	1630	1270	3	3	ug/kg
Toluene	1	8	Normal	1280	1300	329	1630	1270	19	19	ug/kg
trans-1,3-Dichloropropene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Trichloroethene	.	8	Normal	1280	1300	303	1630	1270	.	.	
Trichlorofluoromethane	.	1	Undeterminable	10	10	10	.	0	.	.	
Vinyl chloride	.	8	Normal	1280	1300	303	1630	1270	.	.	
Xylenes, Total	3	8	Lognormal	14700	1300	731	38500	1300	10	110000	ug/kg

000610

1212

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	CONCRETE CORE (0.0" - 0.5")										
INORGANICS											
Aluminum	93	93	Undefined	5450	5310	5250	1870	1290	3010	19600	mg/kg
Antimony	9	72	Lognormal	15.3	9.4	7.18	19.5	11.7	1.1	52.3	mg/kg
Arsenic	82	91	Undefined	5.55	4	4.5	4.75	3.2	0.94	34.1	mg/kg
Barium	93	93	Lognormal	305	63.9	92.5	836	32.3	32.3	4800	mg/kg
Beryllium	27	90	Lognormal	0.792	0.4	0.312	1.14	0.67	0.23	4.8	mg/kg
Cadmium	36	93	Undefined	1.82	1	1.15	1.77	2.08	0.46	8.1	mg/kg
Calcium	93	93	Undefined	182000	187000	179000	30600	23000	60600	267000	mg/kg
Chromium	79	93	Lognormal	27	11.4	14.6	49.3	16.3	4	424	mg/kg
Cobalt	60	93	Lognormal	8.66	3.6	4.46	24.9	3.8	1.3	220	mg/kg
Copper	78	92	Lognormal	48.3	21.2	25	79.9	39.6	5	526	mg/kg
Iron	93	93	Undefined	12000	8050	9380	12800	3000	2490	95600	mg/kg
Lead	86	93	Lognormal	67.1	20.9	24.2	151	54.4	3.4	1210	mg/kg
Magnesium	93	93	Normal	40000	40700	38000	10700	15200	5310	57500	mg/kg
Manganese	93	93	Undefined	331	314	307	129	117	70.1	863	mg/kg
Mercury	35	91	Lognormal	0.304	0.06	0.0897	1.34	0.05	0.03	12.6	mg/kg
Nickel	75	93	Lognormal	27	13.4	16.4	31.8	28.8	2.6	172	mg/kg
Potassium	76	93	Undefined	1830	1230	1350	2040	1030	436	15700	mg/kg
Selenium	13	72	Undefined	1.85	1.15	1.17	2.04	1.59	1.7	11.7	mg/kg
Silver	32	93	Lognormal	2.87	1.2	1.36	3.79	3.42	0.21	23.5	mg/kg
Sodium	77	93	Undefined	943	731	775	666	555	235	3680	mg/kg
Thallium	.	86	Lognormal	0.542	0.32	0.376	0.657	0.61			
Vanadium	73	93	Undefined	14.4	10.8	10.3	11.5	10	2.4	51.8	mg/kg
Zinc	87	93	Lognormal	100	47.5	54.6	225	55	10	1880	mg/kg

000611

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
4,4'-DDE	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
4,4'-DDT	.	1	Undeterminable	3.4	3.4	3.4	.	0	.	.	
Aldrin	.	1	Undeterminable	1.7	1.7	1.7	.	0	.	.	
alpha-BHC	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
alpha-Chlordane	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
Aroclor-1016	.	2	Undeterminable	34	34	34	0	0	.	.	
Aroclor-1221	.	2	Undeterminable	68.5	68.5	68.5	0.707	1	.	.	
Aroclor-1232	.	2	Undeterminable	34	34	34	0	0	.	.	
Aroclor-1242	.	2	Undeterminable	34	34	34	0	0	.	.	
Aroclor-1248	.	2	Undeterminable	34	34	34	0	0	.	.	
Aroclor-1254	2	2	Undeterminable	2500	2500	2070	1980	2800	1100	3900	ug/kg
Aroclor-1260	1	2	Undeterminable	1720	1720	340	2380	3370	3400	3400	ug/kg
beta-BHC	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
delta-BHC	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
Dieldrin	.	1	Undeterminable	3.4	3.4	3.4	.	0	.	.	
Endosulfan II	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
Endosulfan sulfate	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
Endosulfan-I	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
Endrin	.	1	Undeterminable	3.4	3.4	3.4	.	0	.	.	
Endrin aldehyde	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
Endrin ketone	.	2	Undeterminable	3.4	3.4	3.4	0	0	.	.	
gamma-BHC (Lindane)	.	1	Undeterminable	1.7	1.7	1.7	.	0	.	.	
gamma-Chlordane	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
Heptachlor	.	1	Undeterminable	1.7	1.7	1.7	.	0	.	.	
Heptachlor epoxide	.	2	Undeterminable	1.7	1.7	1.7	0	0	.	.	
Methoxychlor	.	2	Undeterminable	17	17	17	0	0	.	.	
Toxaphene	.	2	Undeterminable	170	170	170	0	0	.	.	

000842

2121

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	36	85	Lognormal	0.491	0.1	0.165	1.2	0.177	0.00378	6.99	pCi/g
Cesium-137	32	94	Lognormal	0.307	0.18	0.165	0.538	0.2	0.022	3.61	pCi/g
Gross Alpha	.	16	Lognormal	626	77.5	111	1310	620	.	.	
Gross Beta	.	16	Lognormal	627	77.5	117	1310	619	.	.	
Lead-210	62	93	Lognormal	3.44	1.9	1.94	5.44	2.2	0.3	31.1	pCi/g
Neptunium-237	30	89	Lognormal	0.427	0.15	0.165	1.24	0.341	0.0325	10.8	pCi/g
Plutonium-238	44	89	Lognormal	4.78	0.07	0.145	18.3	0.247	0.00568	104	pCi/g
Plutonium-239/240	52	89	Lognormal	1.26	0.14	0.184	4.31	0.477	0.00789	33.9	pCi/g
Plutonium-241	19	69	Lognormal	12.7	2.64	4.71	29.4	15.4	0.86	129	pCi/g
Polonium-210	74	89	Lognormal	1.44	0.8	0.867	2.28	1.09	0.18	19	pCi/g
Radium-226	84	89	Lognormal	6.23	1.1	1.46	33.3	2.2	0.27	314	pCi/g
Radium-228	70	93	Lognormal	48.1	0.73	1.43	239	1.89	0.197	2040	pCi/g
Strontium-90	24	93	Lognormal	0.8	0.382	0.45	1.1	0.782	0.097	5.8	pCi/g
Technetium-99	78	92	Lognormal	48.2	6.65	5.94	119	36.9	0.111	838	pCi/g
Thorium-227	8	11	Lognormal	11.8	2.4	3.22	19.8	14.4	0.39	67	pCi/g
Thorium-228	67	87	Lognormal	51.7	0.75	1.92	160	3.4	0.15	990	pCi/g
Thorium-230	72	87	Lognormal	34.4	3.8	4.42	104	16.3	0.2	660	pCi/g
Thorium-232	68	87	Lognormal	32	0.52	1.16	133	2.78	0.1	976	pCi/g
Uranium, Total	93	94	Lognormal	1610	450	324	2550	2050	1.33	13900	ug/g
Uranium-234	79	91	Lognormal	1180	109	116	3060	868	0.4	18900	pCi/g
Uranium-235/236	77	88	Lognormal	98.6	11	10.3	290	77.1	0.0712	2470	pCi/g
Uranium-238	80	88	Lognormal	882	125	118	1840	878	0.39	12200	pCi/g

000613

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
1,2-Dichlorobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
1,3-Dichlorobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
1,4-Dichlorobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2,4,5-Trichlorophenol	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
2,4,6-Trichlorophenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2,4-Dichlorophenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2,4-Dimethylphenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2,4-Dinitrophenol	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
2,4-Dinitrotoluene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2,6-Dinitrotoluene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2-Chloronaphthalene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2-Chlorophenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2-Methylnaphthalene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
2-Nitroaniline	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
2-Nitrophenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
3,3'-Dichlorobenzidine	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
3-Nitroaniline	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
4,6-Dinitro-2-methylphenol	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
4-Bromophenyl phenyl ether	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
4-Chloro-3-methylphenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
4-Chlorophenylphenyl ether	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
4-Nitroaniline	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
4-Nitrophenol	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
Acenaphthene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Acenaphthylene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Anthracene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Benzo(a)anthracene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Benzo(a)pyrene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Benzo(b)fluoranthene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Benzo(g,h,i)perylene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Benzo(k)fluoranthene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
bis(2-Chloroethoxy)methane	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
bis(2-Chloroethyl)ether	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
bis(2-Chloroisopropyl) ether	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
bis(2-Ethylhexyl)phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Butyl benzyl phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Carbazole	.	1	Undeterminable	10000	10000	10000	.	0	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Chrysene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Di-n-butyl phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Di-n-octyl phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Dibenzo(a,h)anthracene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Dibenzofuran	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Diethyl phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Dimethyl phthalate	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Fluoranthene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Fluorene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Hexachlorobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Hexachlorobutadiene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Hexachlorocyclopentadiene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Hexachloroethane	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Indeno(1,2,3-cd)pyrene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Isophorone	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
N-Nitroso-di-n-propylamine	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
N-Nitrosodiphenylamine	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Naphthalene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Nitrobenzene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
o-Methylphenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
p-Chloroaniline	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
p-Methylphenol (Cresol)	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Pentachlorophenol	.	1	Undeterminable	26000	26000	26000	.	0	.	.	
Phenanthrene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Phenol	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
Pyrene	.	1	Undeterminable	10000	10000	10000	.	0	.	.	

000615

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	1	6	Undeterminable	8200	10.5	65.8	20000	140	150	150	ug/kg
1,1,2,2-Tetrachloroethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,1,2-Trichloroethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,1-Dichloroethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,1-Dichloroethene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,2-Dichloroethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,2-Dichloroethene (Total)	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
1,2-Dichloropropane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
2-Butanone	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
2-Hexanone	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
4-Methyl-2-pentanone	1	6	Undeterminable	8180	10.5	55.3	20000	43	53	53	ug/kg
Acetone	.	1	Undeterminable	44	44	44	.	0	.	.	
Benzene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Bromodichloromethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Bromoform	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Bromomethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Carbon disulfide	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Carbon Tetrachloride	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Chlorobenzene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Chloroethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Chloroform	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Chloromethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
cis-1,3-Dichloropropene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Dibromochloromethane	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Ethylbenzene	2	6	Undeterminable	36700	10.5	91.3	89800	230	240	220000	ug/kg
Methylene chloride	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Styrene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Tetrachloroethene	2	6	Undeterminable	8170	10	28.1	20000	0	1	10	ug/kg
Toluene	3	6	Undeterminable	8170	9.5	22.6	20000	7	1	9	ug/kg
trans-1,3-Dichloropropene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Trichloroethene	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Vinyl chloride	.	6	Undeterminable	8180	10.5	54.9	20000	41	.	.	
Xylenes, Total	3	6	Undeterminable	217000	10	138	531000	1290	4	1300000	ug/kg

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
CONCRETE CORE (0.5" - 1.0")											
INORGANICS											
Aluminum	86	86	Undefined	4950	4820	4810	1330	1610	2790	12800	mg/kg
Antimony	6	67	Lognormal	14	8.4	6.49	19.1	7.9	1.6	11.6	mg/kg
Arsenic	73	86	Undefined	4.32	3.7	3.77	2.33	2.4	0.91	14.5	mg/kg
Barium	86	86	Lognormal	74.7	50	57.5	97.8	21.6	24.4	783	mg/kg
Beryllium	21	84	Lognormal	0.803	0.235	0.286	1.23	0.765	0.03	4.4	mg/kg
Cadmium	25	86	Undefined	1.73	0.895	1.07	1.78	1.72	0.45	6.9	mg/kg
Calcium	86	86	Normal	187000	189000	185000	21000	30000	120000	233000	mg/kg
Chromium	74	86	Lognormal	16.5	8.8	10.6	32.7	5	5	280	mg/kg
Cobalt	51	86	Undefined	3.93	2.75	3.26	3.5	2.1	1.7	29.7	mg/kg
Copper	65	85	Undefined	13.3	9.7	10.9	10.3	7.5	4.3	64.8	mg/kg
Iron	86	86	Undefined	8460	6910	7700	5050	2700	4440	37400	mg/kg
Lead	72	85	Lognormal	20.6	5	7.2	46.6	7.5	1.8	275	mg/kg
Magnesium	86	86	Normal	44200	44900	42900	9560	12600	10400	64800	mg/kg
Manganese	86	86	Undefined	321	306	306	105	114	153	803	mg/kg
Mercury	13	83	Lognormal	0.0881	0.05	0.0625	0.173	0.05	0.04	1.6	mg/kg
Nickel	60	86	Undefined	13.2	7.85	9.55	13.8	10.2	3.2	100	mg/kg
Potassium	68	86	Undefined	1560	929	1140	1610	826	348	6870	mg/kg
Selenium	9	68	Undefined	1.59	1.1	1.06	1.53	1.55	1.6	9.2	mg/kg
Silver	30	86	Lognormal	2.98	1.25	1.57	3.7	4.19	0.22	22.7	mg/kg
Sodium	68	86	Undefined	695	580	615	407	368	250	2900	mg/kg
Thallium	1	80	Lognormal	0.555	0.32	0.385	0.672	0.61	0.29	0.29	mg/kg
Vanadium	68	86	Undefined	15.6	10.8	12.2	12.7	9.9	6.2	61.9	mg/kg
Zinc	74	86	Lognormal	50.8	24	31	86.5	31.3	10.5	650	mg/kg

000617

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
4,4'-DDE	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
4,4'-DDT	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Aldrin	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
alpha-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
alpha-Chlordane	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Aroclor-1016	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1221	.	2	Undeterminable	69.5	69.5	69.5	2.12	3	.	.	
Aroclor-1232	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1242	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1248	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1254	2	2	Undeterminable	2150	2150	883	2760	3910	190	4100	ug/kg
Aroclor-1260	1	2	Undeterminable	1370	1370	303	1890	2670	2700	2700	ug/kg
beta-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
delta-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Dieldrin	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan II	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan sulfate	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan-I	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Endrin	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endrin aldehyde	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endrin ketone	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
gamma-BHC (Lindane)	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
gamma-Chlordane	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Heptachlor	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Heptachlor epoxide	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Methoxychlor	.	2	Undeterminable	17.5	17.5	17.5	0.707	1	.	.	
Toxaphene	.	2	Undeterminable	175	175	175	7.07	10	.	.	

000618

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	19	78	Lognormal	0.262	0.095	0.11	0.86	0.095	0.045	6.84	pCi/g
Cesium-137	15	85	Lognormal	0.208	0.1	0.105	0.528	0.154	0.1	4.68	pCi/g
Gross Alpha	.	15	Lognormal	44.8	13	21.5	68.2	52.3	.	.	
Gross Beta	.	15	Lognormal	47.1	20	25.8	67	51	.	.	
Lead-210	47	84	Lognormal	1.25	0.7	0.849	1.69	0.815	0.2	13.7	pCi/g
Neptunium-237	11	84	Lognormal	0.115	0.072	0.0879	0.524	0.101	0.0321	3.83	pCi/g
Plutonium-238	26	85	Lognormal	3.67	0.05	0.093	26.8	0.116	0.00136	246	pCi/g
Plutonium-239/240	33	85	Lognormal	0.363	0.056	0.0718	1.6	0.0785	0.00649	13.8	pCi/g
Plutonium-241	15	54	Lognormal	6.38	1.86	4.23	22	9.68	0.758	104	pCi/g
Polonium-210	72	85	Undefined	0.872	0.54	0.601	0.989	0.56	0.18	4.8	pCi/g
Radium-226	81	82	Lognormal	1.27	0.736	0.793	1.93	0.78	0.2	11.9	pCi/g
Radium-228	53	85	Lognormal	26.6	0.34	0.739	140	0.54	0.1	1000	pCi/g
Strontium-90	13	82	Lognormal	0.591	0.347	0.364	0.72	0.4	0.045	4.7	pCi/g
Technetium-99	63	84	Lognormal	8.97	1.26	1.92	19.1	10.2	0.095	140	pCi/g
Thorium-227	8	11	Normal	2.23	1	0.813	2.55	3.5	0.2	8.1	pCi/g
Thorium-228	65	84	Lognormal	26.7	0.35	0.718	143	0.708	0.14	1140	pCi/g
Thorium-230	76	84	Lognormal	18.2	0.965	1.52	98.8	2.85	0.144	871	pCi/g
Thorium-232	72	84	Lognormal	22.7	0.24	0.475	142	0.309	0.1	1270	pCi/g
Uranium, Total	85	85	Lognormal	447	41	49.8	939	262	1.11	4900	ug/g
Uranium-234	78	85	Lognormal	173	14	15.3	419	65	0.416	2250	pCi/g
Uranium-235/236	66	83	Lognormal	13.3	1.11	1.43	30.6	5.29	0.03	158	pCi/g
Uranium-236	.	1	Undeterminable	0.078	0.078	0.078		0			
Uranium-238	77	82	Lognormal	184	16.5	17.1	413	87.8	0.361	1800	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
1,2-Dichlorobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
1,3-Dichlorobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
1,4-Dichlorobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
2,4-Dinitrotoluene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
2,6-Dinitrotoluene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
2-Chloronaphthalene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
2-Methylnaphthalene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
2-Nitroaniline	.	1	Undeterminable	52000	52000	52000	.	0	.	.	
3-Nitroaniline	.	1	Undeterminable	52000	52000	52000	.	0	.	.	
4-Bromophenyl phenyl ether	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
4-Chlorophenylphenyl ether	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
4-Nitroaniline	.	1	Undeterminable	52000	52000	52000	.	0	.	.	
Acenaphthene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Acenaphthylene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Anthracene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Benzo(a)anthracene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Benzo(a)pyrene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Benzo(b)fluoranthene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Benzo(g,h,i)perylene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Benzo(k)fluoranthene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
bis(2-Chloroethoxy)methane	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
bis(2-Chloroethyl)ether	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
bis(2-Chloroisopropyl) ether	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
bis(2-Ethylhexyl)phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	

000620

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics							Units
				Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	
SEMIVOLATILE ORGANICS (cont.)											
Butyl benzyl phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Carbazole	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Chrysene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Di-n-butyl phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Di-n-octyl phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Dibenzo(a,h)anthracene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Dibenzofuran	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Diethyl phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Dimethyl phthalate	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Fluoranthene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Fluorene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Hexachlorobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Hexachlorobutadiene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Hexachlorocyclopentadiene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Hexachloroethane	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Indeno(1,2,3-cd)pyrene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Isophorone	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
N-Nitroso-di-n-propylamine	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
N-Nitrosodiphenylamine	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Naphthalene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Nitrobenzene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
p-Chloroaniline	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Phenanthrene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	
Pyrene	.	1	Undeterminable	21000	21000	21000	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	1	6	Undeterminable	2010	10	31.4	4900	0	8	8	ug/kg
1,1,2,2-Tetrachloroethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,1,2-Trichloroethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,1-Dichloroethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,1-Dichloroethene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,2-Dichloroethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,2-Dichloroethene (Total)	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
1,2-Dichloropropane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
2-Butanone	.	6	Undeterminable	2010	10	33.1	4890	1	.	.	
2-Hexanone	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
4-Methyl-2-pentanone	1	6	Undeterminable	2010	10	38.9	4890	19	29	29	ug/kg
Acetone	.	1	Undeterminable	25	25	25	.	0	.	.	
Benzene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Bromodichloromethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Bromoform	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Bromomethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Carbon disulfide	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Carbon Tetrachloride	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Chlorobenzene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Chloroethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Chloroform	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Chloromethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
cis-1,3-Dichloropropene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Dibromochloromethane	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Ethylbenzene	2	6	Undeterminable	7360	10	58.6	18000	82	92	44000	ug/kg
Methylene chloride	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Styrene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Tetrachloroethene	1	6	Undeterminable	2010	10	37.5	4890	13	23	23	ug/kg
Toluene	3	6	Undeterminable	2010	9	18.4	4900	8	2	8	ug/kg
trans-1,3-Dichloropropene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Trichloroethene	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Vinyl chloride	.	6	Undeterminable	2010	10	32.6	4890	0	.	.	
Xylenes, Total	3	6	Undeterminable	43400	10	77.3	106000	400	2	260000	ug/kg

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
CONCRETE CORE (1.0" - 4.0")											
INORGANICS											
Aluminum	77	77	Normal	4860	4890	4760	951	1220	1680	7290	mg/kg
Antimony	4	59	Lognormal	15.5	7.5	6.61	20.3	12.4	1	11.4	mg/kg
Arsenic	63	76	Undefined	4.52	3.5	3.43	5.12	1.65	0.75	36.8	mg/kg
Barium	77	77	Undefined	52.3	46.3	48.8	24.9	18.1	14.3	224	mg/kg
Beryllium	14	75	Lognormal	0.873	0.41	0.299	1.22	1.18	0.23	2.2	mg/kg
Cadmium	31	77	Undefined	1.99	1.1	1.26	2.09	2.07	0.54	7.8	mg/kg
Calcium	77	77	Undefined	186000	187000	171000	31000	21000	164	252000	mg/kg
Chromium	62	77	Undefined	11.9	8.7	9.57	13.7	3.8	4.4	105	mg/kg
Cobalt	46	77	Undefined	4.2	3	3.44	3.42	2.2	1.6	23.3	mg/kg
Copper	56	76	Undefined	11.7	9	9.8	8.76	5.5	4.7	61.6	mg/kg
Iron	77	77	Undefined	8430	7300	7860	3840	2460	3680	25200	mg/kg
Lead	60	77	Lognormal	8.59	3.7	4.91	12.4	4.2	0.54	74.8	mg/kg
Magnesium	77	77	Normal	46500	46600	45700	8320	11800	23500	64200	mg/kg
Manganese	77	77	Normal	311	299	300	82.6	89	96	619	mg/kg
Mercury	11	74	Lognormal	0.0764	0.05	0.0544	0.149	0.02	0.03	1.3	mg/kg
Nickel	56	77	Undefined	11.9	7.2	8.8	10.5	7.5	2.5	35.4	mg/kg
Potassium	59	77	Undefined	1570	929	1130	1630	502	438	5650	mg/kg
Selenium	7	58	Undefined	1.7	1.6	1.23	1.27	1.58	0.47	5.9	mg/kg
Silver	41	77	Lognormal	4.4	2.4	2.33	5.57	5.36	0.32	38.8	mg/kg
Sodium	59	77	Undefined	553	512	515	234	238	197	1880	mg/kg
Thallium	2	71	Lognormal	0.533	0.31	0.361	0.705	0.44	0.28	0.32	mg/kg
Vanadium	62	77	Lognormal	24.7	12.1	14.1	59.6	13.4	5.9	494	mg/kg
Zinc	64	77	Undefined	29.3	19.5	23.1	24.9	17	6	121	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
4,4'-DDE	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
4,4'-DDT	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Aldrin	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
alpha-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
alpha-Chlordane	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Aroclor-1016	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1221	.	2	Undeterminable	69	69	69	1.41	2	.	.	
Aroclor-1232	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1242	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1248	.	2	Undeterminable	34.5	34.5	34.5	0.707	1	.	.	
Aroclor-1254	2	2	Undeterminable	1610	1610	1260	1410	1990	610	2600	ug/kg
Aroclor-1260	1	2	Undeterminable	667	667	210	895	1270	1300	1300	ug/kg
beta-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
delta-BHC	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Dieldrin	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan II	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan sulfate	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endosulfan-I	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Endrin	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endrin aldehyde	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
Endrin ketone	.	2	Undeterminable	3.45	3.45	3.45	0.0707	0.1	.	.	
gamma-BHC (Lindane)	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
gamma-Chlordane	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Heptachlor	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Heptachlor epoxide	.	2	Undeterminable	1.75	1.75	1.75	0.0707	0.1	.	.	
Methoxychlor	.	2	Undeterminable	17.5	17.5	17.5	0.707	1	.	.	
Toxaphene	.	2	Undeterminable	175	175	175	7.07	10	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	9	81	Undefined	0.0906	0.062	0.0739	0.0965	0.06	0.045	0.6	pCi/g
Cesium-137	6	85	Lognormal	0.127	0.056	0.0748	0.19	0.07	0.0643	0.328	pCi/g
Gross Alpha	.	13	Lognormal	35.2	8.8	16.1	59.4	37	.	.	
Gross Beta	.	13	Lognormal	37.5	15	19.9	58.3	36.1	.	.	
Lead-210	56	84	Lognormal	1.15	0.54	0.663	2.98	0.395	0.2	26.9	pCi/g
Neptunium-237	8	83	Undefined	0.0956	0.063	0.0751	0.147	0.0943	0.037	0.29	pCi/g
Plutonium-238	16	82	Lognormal	0.225	0.034	0.0589	1.08	0.109	0.0091	9.76	pCi/g
Plutonium-239/240	16	81	Lognormal	0.186	0.036	0.0496	0.954	0.081	0.013	8.59	pCi/g
Plutonium-241	8	43	Lognormal	0.0687	1.8	2.2	12.5	2.27	1.8	41.4	pCi/g
Polonium-210	73	85	Lognormal	0.665	0.45	0.501	0.846	0.492	0.139	7.51	pCi/g
Radium-226	81	81	Lognormal	0.812	0.59	0.625	1.05	0.51	0.23	9.21	pCi/g
Radium-228	49	85	Lognormal	2.51	0.3	0.518	10.2	0.494	0.14	86.2	pCi/g
Strontium-90	10	82	Lognormal	0.614	0.33	0.377	0.794	0.43	0.16	5.2	pCi/g
Technetium-99	45	84	Lognormal	3.88	0.575	0.961	12	2.42	0.075	89	pCi/g
Thorium-227	8	11	Normal	1.8	0.16	0.618	2.66	2.79	0.15	8.6	pCi/g
Thorium-228	72	83	Lognormal	2.19	0.295	0.459	6.65	0.34	0.12	43.9	pCi/g
Thorium-230	74	83	Lognormal	3.68	0.64	0.79	17.5	0.82	0.17	153	pCi/g
Thorium-232	70	83	Lognormal	1.42	0.22	0.312	5.39	0.157	0.114	43.2	pCi/g
Uranium, Total	85	85	Lognormal	117	8.7	13.4	626	47.5	1	5700	ug/g
Uranium-234	75	82	Lognormal	59.5	4.06	4.6	354	14.1	0.237	3200	pCi/g
Uranium-235/236	63	82	Lognormal	5.29	0.344	0.462	33.2	1.41	0.0475	300	pCi/g
Uranium-238	76	82	Lognormal	60.3	4.07	4.83	357	16	0.291	3200	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,2-Dichlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,3-Dichlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,4-Dichlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2,2-oxybis(1-Chloropropane)	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2,4-Dinitrotoluene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2,6-Dinitrotoluene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Chloronaphthalene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Methylnaphthalene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Nitroaniline	.	1	Undeterminable	29000	29000	29000	.	0	.	.	
3,3'-Dichlorobenzidine	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
3-Nitroaniline	.	1	Undeterminable	29000	29000	29000	.	0	.	.	
4-Bromophenyl phenyl ether	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4-Chlorophenylphenyl ether	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4-Nitroaniline	.	1	Undeterminable	29000	29000	29000	.	0	.	.	
Acenaphthene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Acenaphthylene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Anthracene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Benzo(a)anthracene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Benzo(a)pyrene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Benzo(b)fluoranthene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Benzo(g,h,i)perylene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics							Units
				Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	
Benzo(k)fluoranthene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
bis(2-Chlorocthoxy)methane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
bis(2-Chloroethyl)ether	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
bis(2-Ethylhexyl)phthalate	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Butyl benzyl phthalate	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Carbazole	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Chrysene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Di-n-butyl phthalate	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Dibenzo(a,h)anthracene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Dibenzofuran	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Diethyl phthalate	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Dimethyl phthalate	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Fluoranthene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Fluorene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Hexachlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Hexachlorobutadiene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Hexachlorocyclopentadiene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Hexachloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Indeno(1,2,3-cd)pyrene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Isophorone	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
N-Nitroso-di-n-propylamine	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
N-Nitrosodiphenylamine	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Naphthalene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Nitrobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
p-Chloroaniline	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Phenanthrene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Pyrene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS								0			
1,1,1-Trichloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,1,2,2-Tetrachloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,1,2-Trichloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,1-Dichloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,1-Dichloroethene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,2-Dichloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,2-Dichloroethene (Total)	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
1,2-Dichloropropane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
2-Butanone	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
2-Hexanone	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
4-Methyl-2-pentanone	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Acetone	.	1	Undeterminable	18	18	18	.	0	.	.	
Benzene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Bromodichloromethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Bromoform	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Bromomethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Carbon disulfide	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Carbon Tetrachloride	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Chlorobenzene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Chloroethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Chloroform	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Chloromethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
cis-1,3-Dichloropropene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Dibromochloromethane	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Ethylbenzene	3	5	Undeterminable	7000	10	25.4	15600	7	1	35000	ug/kg
Methylene chloride	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Styrene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Tetrachloroethene	3	5	Undeterminable	2400	8	23.8	5360	6	2	8	ug/kg
Toluene	1	5	Undeterminable	2410	10	29.9	5360	0	2	2	ug/kg
trans-1,3-Dichloropropene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Trichloroethene	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Vinyl chloride	.	5	Undeterminable	2410	10	41.3	5360	0	.	.	
Xylenes, Total	2	5	Undeterminable	40000	10	62.6	89400	14	2	200000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	CONCRETE CORE (1.0" - 6.0")										
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
1,1,2,2-Tetrachloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
1,1,2-Trichloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
1,1-Dichloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
1,1-Dichloroethene	.	1	Undeterminable	10	10	10	.	0	.	.	
1,2-Dichloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
1,2-Dichloroethene (Total)	.	1	Undeterminable	10	10	10	.	0	.	.	
1,2-Dichloropropane	.	1	Undeterminable	10	10	10	.	0	.	.	
2-Butanone	.	1	Undeterminable	10	10	10	.	0	.	.	
2-Hexanone	.	1	Undeterminable	10	10	10	.	0	.	.	
4-Methyl-2-pentanone	.	1	Undeterminable	10	10	10	.	0	.	.	
Benzene	.	1	Undeterminable	10	10	10	.	0	.	.	
Bromodichloromethane	.	1	Undeterminable	10	10	10	.	0	.	.	
Bromoform	.	1	Undeterminable	10	10	10	.	0	.	.	
Bromomethane	.	1	Undeterminable	10	10	10	.	0	.	.	
Carbon disulfide	.	1	Undeterminable	10	10	10	.	0	.	.	
Carbon Tetrachloride	.	1	Undeterminable	10	10	10	.	0	.	.	
Chlorobenzene	.	1	Undeterminable	10	10	10	.	0	.	.	
Chloroethane	.	1	Undeterminable	10	10	10	.	0	.	.	
Chloroform	.	1	Undeterminable	10	10	10	.	0	.	.	
Chloromethane	.	1	Undeterminable	10	10	10	.	0	.	.	
cis-1,3-Dichloropropene	.	1	Undeterminable	10	10	10	.	0	.	.	
Dibromochloromethane	.	1	Undeterminable	10	10	10	.	0	.	.	
Ethylbenzene	.	1	Undeterminable	10	10	10	.	0	.	.	
Methylene chloride	.	1	Undeterminable	10	10	10	.	0	.	.	
Styrene	.	1	Undeterminable	10	10	10	.	0	.	.	
Tetrachloroethene	.	1	Undeterminable	10	10	10	.	0	.	.	
Toluene	.	1	Undeterminable	10	10	10	.	0	.	.	
trans-1,3-Dichloropropene	.	1	Undeterminable	10	10	10	.	0	.	.	
Trichloroethene	.	1	Undeterminable	10	10	10	.	0	.	.	
Vinyl chloride	.	1	Undeterminable	10	10	10	.	0	.	.	
Xylenes, Total	.	1	Undeterminable	10	10	10	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				LOOSE MEDIA							
INORGANICS											
Aluminum	41	41	Lognormal	8850	4900	4510	23000	3950	421	150000	mg/kg
Antimony	23	38	Lognormal	17.5	9.05	8.46	34.9	12.4	1.2	214	mg/kg
Arsenic	38	41	Lognormal	32.8	12.3	13.7	56.4	20.2	2.4	246	mg/kg
Barium	41	41	Lognormal	500	205	209	817	407	17.9	4080	mg/kg
Beryllium	7	40	Lognormal	3.13	0.815	0.464	9.66	1.3	0.34	56.3	mg/kg
Cadmium	33	41	Undefined	10.8	8.4	6.58	11	10.7	0.43	62.4	mg/kg
Calcium	39	41	Normal	62300	60400	37100	51100	70700	1300	195000	mg/kg
Chromium	39	41	Lognormal	355	111	105	639	302	5.2	3210	mg/kg
Cobalt	38	41	Undefined	21	16	13.8	20.8	16.7	0.74	103	mg/kg
Copper	40	41	Lognormal	1300	347	317	4190	580	17.4	26300	mg/kg
Iron	41	41	Undefined	103000	63800	62300	94000	116000	6180	354000	mg/kg
Lead	41	41	Lognormal	1160	359	402	2000	880	5	10300	mg/kg
Magnesium	41	41	Normal	19800	17200	13500	15300	17500	609	54800	mg/kg
Manganese	41	41	Normal	712	609	543	496	832	78.8	2170	mg/kg
Mercury	27	40	Lognormal	2.11	0.485	0.496	3.99	1.9	0.06	18	mg/kg
Nickel	38	41	Lognormal	1530	98.5	100	8330	211	6.3	53500	mg/kg
Potassium	34	41	Lognormal	7910	1010	1280	34500	1980	145	221000	mg/kg
Selenium	10	39	Lognormal	9.85	0.84	1.19	29.8	1.57	0.29	157	mg/kg
Silver	21	38	Lognormal	57.3	1.2	2.72	224	9.23	0.31	1360	mg/kg
Sodium	35	41	Lognormal	3860	778	967	12900	2320	159	82200	mg/kg
Thallium	2	40	Lognormal	1.06	0.31	0.474	2.32	0.665	0.31	0.87	mg/kg
Vanadium	29	38	Lognormal	35.3	17.5	13.5	56.6	25.4	1.7	302	mg/kg
Zinc	40	41	Lognormal	1830	1040	797	2520	1590	28.5	11900	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	2	Undeterminable	18.9	18.9	11.4	21.4	30.2	.	.	
4,4'-DDE	.	2	Undeterminable	18.9	18.9	11.4	21.4	30.2	.	.	
4,4'-DDT	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
Aldrin	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
alpha-BHC	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
alpha-Chlordane	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Aroclor-1016	.	2	Undeterminable	53	53	50.8	21.2	30	.	.	
Aroclor-1221	.	2	Undeterminable	109	109	104	43.8	62	.	.	
Aroclor-1232	.	2	Undeterminable	53	53	50.8	21.2	30	.	.	
Aroclor-1242	.	2	Undeterminable	53	53	50.8	21.2	30	.	.	
Aroclor-1248	.	2	Undeterminable	53	53	50.8	21.2	30	.	.	
Aroclor-1254	1	2	Undeterminable	84	84	82.5	22.6	32	100	100	ug/kg
Aroclor-1260	1	2	Undeterminable	284	284	142	348	492	530	530	ug/kg
beta-BHC	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
delta-BHC	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Dieldrin	.	2	Undeterminable	18.9	18.9	11.4	21.4	30.2	.	.	
Endosulfan II	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
Endosulfan sulfate	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
Endosulfan-I	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Endrin	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
Endrin aldehyde	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
Endrin ketone	.	2	Undeterminable	5.3	5.3	5.08	2.12	3	.	.	
gamma-BHC (Lindane)	.	2	Undeterminable	9.5	9.5	5.83	10.6	15	.	.	
gamma-Chlordane	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Heptachlor	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Heptachlor epoxide	.	2	Undeterminable	2.7	2.7	2.61	0.99	1.4	.	.	
Methoxychlor	1	2	Undeterminable	80	80	52.9	84.9	120	140	140	ug/kg
Toxaphene	.	2	Undeterminable	270	270	261	99	140	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics							
				Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	33	38	Lognormal	3.86	0.487	0.684	13.6	0.8	0.14	83	pCi/g
Cesium-137	24	39	Lognormal	1.9	0.9	0.793	2.86	1.89	0.2	13	pCi/g
Gross Alpha	.	2	Undeterminable	5100	5100	5090	424	600	.	.	
Gross Beta	.	2	Undeterminable	5100	5100	5090	424	600	.	.	
Lead-210	25	39	Lognormal	21.9	9.02	10.2	28.6	26	0.9	100	pCi/g
Neptunium-237	28	36	Lognormal	4.48	0.99	0.926	11.6	3.55	0.039	68	pCi/g
Plutonium-238	30	39	Lognormal	19.2	0.39	0.879	77.7	2.35	0.0279	366	pCi/g
Plutonium-239/240	36	39	Lognormal	9.2	2.49	2.41	17.5	6.39	0.117	69	pCi/g
Plutonium-241	20	33	Lognormal	42.5	6.5	13.4	79.5	25.1	3.45	289	pCi/g
Polonium-210	35	36	Lognormal	16.4	5.88	6.01	22.7	22.9	0.434	86.8	pCi/g
Radium-226	31	35	Lognormal	23.3	8.8	5.83	52.9	14.3	0.163	282	pCi/g
Radium-228	31	35	Lognormal	114	4.8	6.63	464	22.3	0.252	2650	pCi/g
Strontium-90	20	39	Lognormal	4.72	0.625	0.648	22.3	1.28	0.043	140	pCi/g
Technetium-99	39	39	Lognormal	976	68	109	2640	543	1.2	13000	pCi/g
Thorium-228	37	39	Lognormal	84.1	11.6	12.7	185	65.4	0.34	718	pCi/g
Thorium-230	39	39	Lognormal	262	37	44.9	661	187	1.08	3700	pCi/g
Thorium-232	36	39	Lognormal	45.2	4.04	6.69	108	35.6	0.23	530	pCi/g
Uranium, Total	39	39	Lognormal	50600	11300	6960	109000	42000	6.6	520000	ug/g
Uranium-234	39	39	Lognormal	17000	2000	1660	43700	7170	1.76	210000	pCi/g
Uranium-235/236	39	39	Lognormal	2290	167	188	5940	938	0.23	27000	pCi/g
Uranium-238	39	39	Lognormal	21100	2160	2280	47400	15700	2.28	180000	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	1	40	Lognormal	11300	1430	2530	19300	19100	39000	39000	ug/kg
1,2-Dichlorobenzene	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
1,3-Dichlorobenzene	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
1,4-Dichlorobenzene	1	40	Lognormal	11300	1430	2530	19300	19100	39000	39000	ug/kg
2,2-oxybis(1-Chloropropane)	.	23	Lognormal	10300	540	1790	23300	10700	.	.	
2,4,5-Trichlorophenol	.	39	Lognormal	18700	5800	5270	27100	26100	.	.	
2,4,6-Trichlorophenol	.	39	Lognormal	10900	2300	2630	19000	18600	.	.	
2,4-Dichlorophenol	4	39	Lognormal	10600	550	2180	19100	18700	48	450	ug/kg
2,4-Dimethylphenol	2	39	Lognormal	10900	2300	2360	19000	18600	32	140	ug/kg
2,4-Dinitrophenol	.	34	Lognormal	30000	17200	7860	49100	48900	.	.	
2,4-Dinitrotoluene	1	39	Lognormal	11000	680	2420	19700	18600	50000	50000	ug/kg
2,6-Dinitrotoluene	.	40	Lognormal	10600	1490	2500	18800	15600	.	.	
2-Chloronaphthalene	.	40	Lognormal	10600	1490	2500	18800	15600	.	.	
2-Chlorophenol	1	39	Lognormal	12000	2300	2690	20400	19600	57000	57000	ug/kg
2-Methylnaphthalene	12	40	Lognormal	9510	1700	1590	18500	12200	17	6300	ug/kg
2-Nitroaniline	.	40	Lognormal	18200	3750	5030	26900	24100	.	.	
2-Nitrophenol	.	39	Lognormal	10900	2300	2580	19000	18600	.	.	
3,3'-Dichlorobenzidine	.	34	Lognormal	12200	6850	3260	20000	19600	.	.	
3-Nitroaniline	.	37	Lognormal	19700	9300	5840	27500	25900	.	.	
4,6-Dinitro-2-methylphenol	.	39	Lognormal	27100	7900	6790	46500	47100	.	.	
4-Bromophenyl phenyl ether	.	40	Lognormal	10700	2800	2600	18800	15600	.	.	
4-Chloro-3-methylphenol	1	39	Lognormal	12400	2300	2700	21100	19600	69000	69000	ug/kg
4-Chlorophenylphenyl ether	.	40	Lognormal	10600	1490	2500	18800	15600	.	.	
4-Nitroaniline	.	38	Lognormal	26900	3750	6170	47200	47100	.	.	
4-Nitrophenol	1	38	Lognormal	28400	7550	6910	47300	49100	57000	57000	ug/kg
Acenaphthene	18	40	Lognormal	9780	610	1360	19700	15300	31	50000	ug/kg
Acenaphthylene	5	40	Lognormal	10600	1490	2100	18800	15700	21	260	ug/kg
Anthracene	17	40	Lognormal	9200	480	1430	19100	12200	52	37000	ug/kg
Benzo(a)anthracene	25	40	Lognormal	11000	1700	2010	20600	15700	18	61000	ug/kg
Benzo(a)pyrene	23	39	Lognormal	10100	2300	2460	19500	10600	27	44000	ug/kg
Benzo(b)fluoranthene	27	39	Lognormal	7710	2300	2350	12600	9460	23	66000	ug/kg
Benzo(g,h,i)perylene	23	39	Lognormal	8320	1500	1940	18300	11600	31	15000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
Benzo(k)fluoranthene	20	39	Lognormal	9280	2300	2260	18700	10600	18	37000	ug/kg
bis(2-Chloroethoxy)methane	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
bis(2-Chloroethyl)ether	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
bis(2-Chloroisopropyl) ether	.	12	Normal	9970	6780	2900	10200	20100	.	.	
bis(2-Ethylhexyl)phthalate	18	40	Lognormal	33500	10000	6880	94900	20500	410	560000	ug/kg
Butyl benzyl phthalate	15	40	Lognormal	9390	695	1720	18800	11200	61	8700	ug/kg
Carbazole	17	40	Lognormal	9350	650	1640	18800	15700	63	24000	ug/kg
Chrysene	31	40	Lognormal	6410	1850	1910	9710	6740	45	43000	ug/kg
Di-n-butyl phthalate	17	40	Lognormal	18500	3950	3120	61300	12600	94	42000	ug/kg
Di-n-octyl phthalate	12	40	Lognormal	9500	555	1640	18700	12200	56	670	ug/kg
Dibenzo(a,h)anthracene	6	39	Lognormal	10800	2300	2460	19000	18600	88	8000	ug/kg
Dibenzofuran	14	40	Lognormal	9450	680	1540	18600	12700	36	13000	ug/kg
Diethyl phthalate	3	40	Lognormal	10200	690	2190	18800	12100	69	700	ug/kg
Dimethyl phthalate	2	40	Lognormal	10200	820	2270	18900	15600	960	3000	ug/kg
Fluoranthene	33	40	Lognormal	13300	3500	2680	32600	10400	45	180000	ug/kg
Fluorene	14	40	Lognormal	9730	1800	1960	18400	12200	55	19000	ug/kg
Hexachlorobenzene	.	40	Lognormal	10700	2800	2600	18800	15600	.	.	
Hexachlorobutadiene	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
Hexachlorocyclopentadiene	.	40	Lognormal	10600	1490	2500	18800	15600	.	.	
Hexachloroethane	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
Indeno(1,2,3-cd)pyrene	23	39	Lognormal	8560	1900	1840	18400	10600	20	25000	ug/kg
Isophorone	1	40	Lognormal	11700	3000	2770	19500	19100	45000	45000	ug/kg
N-Nitroso-di-n-propylamine	1	40	Lognormal	11500	1430	2540	19700	19100	48000	48000	ug/kg
N-Nitrosodiphenylamine	.	40	Lognormal	10700	2800	2600	18800	15600	.	.	
Naphthalene	13	40	Lognormal	9410	1550	1600	18500	11700	30	6400	ug/kg
Nitrobenzene	.	40	Lognormal	10600	1430	2450	18800	15600	.	.	
o-Methylphenol	3	39	Lognormal	10600	1300	2230	19100	18700	57	1300	ug/kg
p-Chloroaniline	.	37	Lognormal	10400	550	2140	19500	12600	.	.	
p-Methylphenol (Cresol)	2	39	Lognormal	10900	2300	2430	19000	18600	58	420	ug/kg
Pentachlorophenol	1	38	Lognormal	25300	6850	6230	46300	31100	14000	14000	ug/kg
Phenanthrene	33	40	Lognormal	12200	2200	2210	32000	8790	45	180000	ug/kg
Phenol	8	39	Lognormal	9290	820	2110	13700	18600	65	67000	ug/kg
Pyrene	33	40	Lognormal	11700	2700	2860	23600	8760	69	100000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	4	39	Lognormal	904	16	56.9	2840	529	1	150	ug/kg
1,1,2,2-Tetrachloroethane	.	38	Lognormal	927	14.5	60.5	2870	530	.	.	
1,1,2-Trichloroethane	.	39	Lognormal	903	14	58.2	2840	530	.	.	
1,1-Dichloroethane	.	40	Lognormal	881	14	55.7	2800	505	.	.	
1,1-Dichloroethene	.	40	Lognormal	881	14	55.7	2800	505	.	.	
1,2-Dichloroethane	.	40	Lognormal	881	14	55.7	2800	505	.	.	
1,2-Dichloroethene (Total)	.	38	Lognormal	927	14.5	61	2870	530	.	.	
1,2-Dichloropropane	.	39	Lognormal	903	14	58.2	2840	530	.	.	
2-Butanone	3	39	Lognormal	530	17	60	1630	479	14	58	ug/kg
2-Hexanone	.	35	Lognormal	1000	14	62.2	2980	540	.	.	
4-Methyl-2-pentanone	4	37	Lognormal	3440	15	68.8	16400	530	8	100000	ug/kg
Acetone	5	32	Lognormal	1030	38	82.5	3110	501	17	220	ug/kg
Benzene	3	39	Lognormal	589	15	55.6	1680	530	18	2800	ug/kg
Bromodichloromethane	.	39	Lognormal	903	14	58.2	2840	530	.	.	
Bromoform	2	39	Lognormal	846	14	52.5	2840	210	140	220	ug/kg
Bromomethane	.	40	Lognormal	881	14	55.7	2800	505	.	.	
Carbon disulfide	.	40	Lognormal	881	14	55.7	2800	505	.	.	
Carbon Tetrachloride	.	39	Lognormal	903	14	58.2	2840	530	.	.	
Chlorobenzene	1	38	Lognormal	927	14.5	60.9	2870	530	63	63	ug/kg
Chloroethane	.	40	Lognormal	881	14	55.7	2800	505	.	.	
Chloroform	.	40	Lognormal	881	14	55.7	2800	505	.	.	
Chloromethane	.	40	Lognormal	881	14	55.7	2800	505	.	.	
cis-1,3-Dichloropropene	.	39	Lognormal	903	14	58.2	2840	530	.	.	
Dibromochloromethane	.	39	Lognormal	903	14	58.2	2840	530	.	.	
Ethylbenzene	8	38	Lognormal	554	14.5	50	1670	260	1	1500	ug/kg
m,p-Xylene	1	1	Undeterminable	1900	1900	1900	.	0	1900	1900	ug/kg
Methylene chloride	5	40	Lognormal	587	16.5	53.1	1670	504	1	3200	ug/kg
o-Xylene	1	1	Undeterminable	1200	1200	1200	.	0	1200	1200	ug/kg
Styrene	2	38	Lognormal	913	14.5	56.9	2870	440	55	450	ug/kg
Tetrachloroethene	4	38	Lognormal	921	14	55.1	2870	530	2	290	ug/kg
Toluene	7	38	Lognormal	965	23.5	68.6	2870	529	2	1800	ug/kg
trans-1,2-Dichloroethene	.	1	Undeterminable	10	10	10	.	0	.	.	
trans-1,3-Dichloropropene	.	39	Lognormal	903	14	58.2	2840	530	.	.	
Trichloroethene	1	39	Lognormal	903	14	57.9	2840	530	42	42	ug/kg
Trichlorofluoromethane	.	9	Lognormal	1800	14	74.6	4950	480	.	.	
Vinyl chloride	.	40	Lognormal	881	14	55.7	2800	505	.	.	
Xylenes, Total	13	38	Lognormal	1750	14.5	69.9	4970	570	4	24000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				MASONRY CHIPS							
INORGANICS											
Aluminum	60	60	Undefined	4260	4180	3700	2020	1240	226	15000	mg/kg
Antimony	4	49	Lognormal	9.33	7.2	5.64	11.7	6.1	1.8	6.7	mg/kg
Arsenic	55	60	Undefined	4	3.3	3.24	4.34	1.45	1.8	33.8	mg/kg
Barium	60	60	Lognormal	249	59.2	92.6	544	204	23.6	3820	mg/kg
Beryllium	17	60	Lognormal	0.696	0.21	0.228	1.22	0.605	0.14	1.4	mg/kg
Cadmium	12	60	Lognormal	1.96	0.61	0.836	3.93	0.725	0.2	21	mg/kg
Calcium	60	60	Undefined	150000	161000	111000	49800	18500	719	218000	mg/kg
Chromium	59	60	Lognormal	23.1	13.3	14.6	39.9	16.9	1.5	306	mg/kg
Cobalt	35	60	Undefined	4.66	3.9	4.04	2.64	3	2	13.8	mg/kg
Copper	49	57	Lognormal	19.4	9.7	12.4	27.4	8.1	5.7	142	mg/kg
Iron	60	60	Normal	6830	6800	6530	2020	2100	1710	14700	mg/kg
Lead	57	59	Lognormal	633	86	60.5	2680	141	2.8	16300	mg/kg
Magnesium	60	60	Undefined	36700	39500	26500	14000	10800	251	59800	mg/kg
Manganese	60	60	Normal	247	264	223	82.6	102	20.6	409	mg/kg
Mercury	42	60	Lognormal	0.525	0.22	0.223	0.958	0.39	0.04	5.2	mg/kg
Nickel	40	60	Undefined	12.4	8.05	9.38	10.9	8.85	2.9	48.4	mg/kg
Potassium	47	60	Undefined	1560	1040	1190	1400	750	151	6630	mg/kg
Selenium	3	53	Undefined	1.23	0.61	0.906	0.974	1.4	0.66	2.3	mg/kg
Silver	5	60	Lognormal	3.12	0.8	0.843	11	0.685	0.23	84.7	mg/kg
Sodium	51	60	Undefined	699	567	552	591	396	227	4170	mg/kg
Thallium	5	57	Lognormal	0.641	0.4	0.381	1.09	0.55	0.04	0.32	mg/kg
Vanadium	46	60	Undefined	11.5	9.25	9.8	8.62	4.45	5.8	50.3	mg/kg
Zinc	58	60	Lognormal	191	91.7	91.1	311	178	14	2050	mg/kg

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	16	55	Lognormal	0.58	0.11	0.142	2.16	0.128	0.038	12	pCi/g
Cesium-137	10	58	Lognormal	0.661	0.1	0.101	2.83	0.153	0.0949	16	pCi/g
Gross Alpha	.	11	Normal	59.6	27	29.8	65.1	86.9	.	.	
Gross Beta	.	11	Normal	62.5	27	30.6	67.2	112	.	.	
Lead-210	38	55	Lognormal	30	1.1	1.47	143	1.41	0.3	810	pCi/g
Neptunium-237	18	56	Lognormal	0.209	0.098	0.126	0.607	0.13	0.01	4.2	pCi/g
Plutonium-238	22	58	Lognormal	0.337	0.062	0.0818	0.91	0.193	0.00805	6	pCi/g
Plutonium-239/240	17	59	Lognormal	0.212	0.048	0.0575	0.607	0.059	0.0092	3.54	pCi/g
Plutonium-241	6	30	Lognormal	0.703	1.8	3.05	9.57	4.7	2.66	22	pCi/g
Polonium-210	51	57	Lognormal	7.67	0.55	0.75	34.5	0.853	0.19	210	pCi/g
Radium-226	58	58	Lognormal	85.4	0.741	1.21	442	0.672	0.2	2500	pCi/g
Radium-228	45	57	Lognormal	4.27	0.5	0.787	12.7	0.8	0.196	62	pCi/g
Strontium-90	11	56	Lognormal	0.977	0.341	0.435	2.24	0.43	0.3	13	pCi/g
Technetium-99	38	58	Lognormal	3.7	0.596	0.919	9.89	1.4	0.189	63	pCi/g
Thorium-227	2	4	Undeterminable	20.4	17.3	2.61	23.8	40.2	34	47	pCi/g
Thorium-228	47	58	Lognormal	2.19	0.401	0.681	4.98	0.56	0.22	22	pCi/g
Thorium-230	52	58	Lognormal	29.2	0.97	1.62	129	2.48	0.116	740	pCi/g
Thorium-232	47	58	Lognormal	1.76	0.35	0.519	4.37	0.597	0.114	20	pCi/g
Uranium, Total	58	58	Lognormal	423	84.1	61.1	1140	318	1.12	7720	ug/g
Uranium-234	51	59	Lognormal	190	34	21.9	504	122	0.282	2800	pCi/g
Uranium-235/236	48	56	Lognormal	14.7	2.4	1.59	36.2	8.37	0.0347	170	pCi/g
Uranium-236	.	1	Undeterminable	0.017	0.017	0.017	.	0	.	.	
Uranium-238	51	56	Lognormal	121	35.3	20.1	250	106	0.362	1390	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
1,2-Dichlorobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
1,3-Dichlorobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
1,4-Dichlorobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2,2-oxybis(1-Chloropropane)	.	1	Undeterminable	11000	11000	11000	.	0	.	.	
2,4,5-Trichlorophenol	.	2	Undeterminable	18000	18000	16600	9900	14000	.	.	
2,4,6-Trichlorophenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2,4-Dichlorophenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2,4-Dimethylphenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2,4-Dinitrophenol	.	1	Undeterminable	25000	25000	25000	.	0	.	.	
2,4-Dinitrotoluene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2,6-Dinitrotoluene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2-Chloronaphthalene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2-Chlorophenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2-Methylnaphthalene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
2-Nitroaniline	.	2	Undeterminable	18000	18000	16600	9900	14000	.	.	
2-Nitrophenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
3,3'-Dichlorobenzidine	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
3-Nitroaniline	.	2	Undeterminable	18000	18000	16600	9900	14000	.	.	
4,6-Dinitro-2-methylphenol	.	2	Undeterminable	25500	25500	25500	707	1000	.	.	
4-Bromophenyl phenyl ether	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
4-Chloro-3-methylphenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
4-Chlorophenylphenyl ether	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
4-Nitroaniline	.	2	Undeterminable	25500	25500	25500	707	1000	.	.	
4-Nitrophenol	.	2	Undeterminable	25500	25500	25500	707	1000	.	.	
Acenaphthene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Acenaphthylene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Anthracene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Benzo(a)anthracene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Benzo(a)pyrene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Benzo(b)fluoranthene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Benzo(g,h,i)perylene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Benzo(k)fluoranthene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
bis(2-Chloroethoxy)methane	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
bis(2-Chloroethyl)ether	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroisopropyl) ether	.	1	Undeterminable	10000	10000	10000	.	0	.	.	
bis(2-Ethylhexyl)phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Butyl benzyl phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Carbazole	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Chrysene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Di-n-butyl phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Di-n-octyl phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Dibenzo(a,h)anthracene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Dibenzofuran	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Diethyl phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Dimethyl phthalate	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Fluoranthene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Fluorene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Hexachlorobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Hexachlorobutadiene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Hexachlorocyclopentadiene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Hexachloroethane	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Indeno(1,2,3-cd)pyrene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Isophorone	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
N-Nitroso-di-n-propylamine	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
N-Nitrosodiphenylamine	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Naphthalene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Nitrobenzene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
o-Methylphenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
p-Chloroaniline	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
p-Methylphenol (Cresol)	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Pentachlorophenol	.	2	Undeterminable	25500	25500	25500	707	1000	.	.	
Phenanthrene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Phenol	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	
Pyrene	.	2	Undeterminable	10500	10500	10500	707	1000	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	1	2	Undeterminable	17.5	17.5	15.8	10.6	15	25	25	ug/kg
1,1,2,2-Tetrachloroethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,1,2-Trichloroethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,1-Dichloroethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,1-Dichloroethene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,2-Dichloroethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,2-Dichloroethene (Total)	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
1,2-Dichloropropane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
2-Butanone	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
2-Hexanone	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
4-Methyl-2-pentanone	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Acetone	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Benzene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Bromodichloromethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Bromoform	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Bromomethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Carbon disulfide	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Carbon Tetrachloride	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Chlorobenzene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Chloroethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Chloroform	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Chloromethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
cis-1,3-Dichloropropene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Dibromochloromethane	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Ethylbenzene	1	2	Undeterminable	8.5	8.5	8.37	2.12	3	7	7	ug/kg
m,p-Xylene	1	1	Undeterminable	28	28	28	.	0	28	28	ug/kg
Methylene chloride	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
o-Xylene	1	1	Undeterminable	13	13	13	.	0	13	13	ug/kg
Styrene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Tetrachloroethene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Toluene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
trans-1,3-Dichloropropene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Trichloroethene	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Vinyl chloride	.	2	Undeterminable	30	30	22.4	28.3	40	.	.	
Xylenes, Total	2	2	Undeterminable	22.5	22.5	11.2	27.6	39	3	42	ug/kg

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				SEDIMENT							
INORGANICS											
Aluminum	28	29	Normal	9990	9760	7100	6090	9330	2030	24800	mg/kg
Antimony	4	25	Lognormal	18.2	12.6	12.2	27.5	8.6	2.3	24.8	mg/kg
Arsenic	27	28	Lognormal	15.9	9.2	9.44	25.9	7.55	1.1	140	mg/kg
Barium	29	29	Lognormal	478	199	250	596	458	3.3	2690	mg/kg
Beryllium	7	29	Lognormal	2.53	0.81	1.09	3.06	4.82	0.38	10	mg/kg
Cadmium	11	29	Undefined	5.31	3	3.49	5.47	5.2	2.2	28.4	mg/kg
Calcium	28	29	Undefined	158000	101000	95600	149000	157000	24200	663000	mg/kg
Chromium	28	29	Lognormal	126	78	54.7	199	92.7	3.8	857	mg/kg
Cobalt	17	29	Lognormal	25.4	17.7	14.9	38.7	15.7	3.2	213	mg/kg
Copper	28	29	Lognormal	318	193	139	444	240	2	1980	mg/kg
Iron	29	29	Normal	33300	27100	21500	27600	22400	191	113000	mg/kg
Lead	22	29	Lognormal	802	135	142	2300	565	48.9	12500	mg/kg
Magnesium	28	29	Normal	20100	19400	15000	12700	9600	4650	67000	mg/kg
Manganese	29	29	Normal	674	673	508	321	365	1.8	1530	mg/kg
Mercury	18	29	Lognormal	9.77	0.73	0.721	41.3	2.85	0.27	223	mg/kg
Nickel	24	29	Normal	104	61.2	59.5	100	122	14.7	387	mg/kg
Potassium	24	29	Normal	1910	1550	1330	1520	2000	96.9	6200	mg/kg
Selenium	11	27	Undefined	2.85	2.3	2.01	2.39	2.7	0.67	9.4	mg/kg
Silver	19	29	Lognormal	17.5	1.9	1.98	80.4	2.28	0.48	435	mg/kg
Sodium	25	29	Undefined	876	475	557	995	670	50.1	4260	mg/kg
Thallium	2	26	Lognormal	1.63	1.1	1.01	2.35	1.35	0.26	0.91	mg/kg
Vanadium	19	29	Undefined	29.8	21.4	17.5	33	19.5	7.5	148	mg/kg
Zinc	26	29	Undefined	854	743	474	796	713	109	4090	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics							
				Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	15	28	Lognormal	0.562	0.18	0.209	1.41	0.339	0.08	7.5	pCi/g
Cesium-137	26	29	Lognormal	3.61	1.1	1.27	4.67	4.38	0.1	16	pCi/g
Lead-210	25	29	Lognormal	10.8	6.3	7.04	16.6	7.7	1.7	93.3	pCi/g
Neptunium-237	20	27	Lognormal	1.65	0.412	0.531	4.35	0.857	0.134	22	pCi/g
Plutonium-238	18	27	Lognormal	0.404	0.192	0.334	0.689	0.528	0.102	3.1	pCi/g
Plutonium-239/240	18	27	Lognormal	1.68	0.42	0.396	5.03	0.475	0.109	26	pCi/g
Plutonium-241	7	20	Lognormal	3.25	1.05	1.49	7.11	2.27	1.3	32	pCi/g
Polonium-210	29	29	Lognormal	24.8	12	11.9	39.4	13.4	1.48	165	pCi/g
Radium-226	28	28	Lognormal	12.4	5.15	5.68	27.2	3.78	0.95	143	pCi/g
Radium-228	28	28	Lognormal	25.5	4.5	6.21	85	8.38	0.9	450	pCi/g
Strontium-90	16	29	Lognormal	1.51	0.4	0.434	2.74	0.748	0.11	11.5	pCi/g
Technetium-99	25	28	Lognormal	571	53.9	63.3	1280	622	0.524	6500	pCi/g
Thorium-227	.	5	Undeterminable	6.53	4.12	5.44	5.26	1.1			
Thorium-228	28	29	Lognormal	34.5	5	7.09	117	4.88	0.9	630	pCi/g
Thorium-230	28	28	Lognormal	102	19.8	28.1	192	58	1.51	650	pCi/g
Thorium-232	28	28	Lognormal	28	3.16	4.54	98.1	2.42	0.78	510	pCi/g
Uranium, Total	29	29	Lognormal	4790	532	634	12300	1810	10.1	61000	ug/g
Uranium-234	28	28	Lognormal	1610	237	214	4900	500	5.3	25000	pCi/g
Uranium-235/236	28	28	Lognormal	103	28	18.6	227	52.6	0.56	1100	pCi/g
Uranium-238	28	28	Lognormal	1400	343	252	3660	704	5.87	18000	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
1,2-Dichlorobenzene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
1,3-Dichlorobenzene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
1,4-Dichlorobenzene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2,2-oxybis(1-Chloropropane)	.	22	Lognormal	8340	860	1990	13600	12500	.	.	
2,4,5-Trichlorophenol	.	30	Lognormal	16300	2850	4850	28400	12800	.	.	
2,4,6-Trichlorophenol	1	30	Lognormal	6750	1150	2060	11900	4880	970	970	ug/kg
2,4-Dichlorophenol	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2,4-Dimethylphenol	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2,4-Dinitrophenol	.	30	Lognormal	16300	2850	4850	28400	12800	.	.	
2,4-Dinitrotoluene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2,6-Dinitrotoluene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2-Chloronaphthalene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2-Chlorophenol	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
2-Methylnaphthalene	10	30	Lognormal	6450	740	1090	12000	5080	34	860	ug/kg
2-Nitroaniline	.	30	Lognormal	16300	2850	4850	28400	12800	.	.	
2-Nitrophenol	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
3,3'-Dichlorobenzidine	.	29	Lognormal	6960	1200	2140	12000	4840	.	.	
3-Nitroaniline	.	29	Lognormal	16800	2900	5060	28800	12800	.	.	
4,6-Dinitro-2-methylphenol	.	30	Lognormal	16300	2850	4850	28400	12800	.	.	
4-Bromophenyl phenyl ether	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
4-Chloro-3-methylphenol	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
4-Chlorophenylphenyl ether	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
4-Nitroaniline	.	29	Lognormal	16800	2900	5060	28800	12800	.	.	
4-Nitrophenol	.	30	Lognormal	16300	2850	4850	28400	12800	.	.	
Acenaphthene	8	30	Lognormal	3100	1050	1250	5180	2720	100	15000	ug/kg
Acenaphthylene	2	30	Lognormal	6680	1150	1760	11900	4920	160	160	ug/kg
Anthracene	13	30	Lognormal	4710	840	981	11200	2860	31	43000	ug/kg
Benzo(a)anthracene	22	30	Lognormal	5240	510	992	13600	5090	120	73000	ug/kg
Benzo(a)pyrene	18	30	Lognormal	7820	550	1330	16100	10600	170	74000	ug/kg
Benzo(b)fluoranthene	24	30	Lognormal	7800	655	1470	16700	5720	230	81000	ug/kg
Benzo(g,h,i)perylene	13	30	Lognormal	4830	970	1510	10700	2800	100	56000	ug/kg
Benzo(k)fluoranthene	19	30	Lognormal	5870	535	1000	13800	770	130	69000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethoxy)methane	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
bis(2-Chloroethyl)ether	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
bis(2-Chloroisopropyl) ether	.	1	Undeterminable	480	480	480	.	0	.	.	
bis(2-Ethylhexyl)phthalate	6	30	Lognormal	10300	3100	3470	19700	9040	610	100000	ug/kg
Butyl benzyl phthalate	4	30	Lognormal	6380	835	1340	12000	2820	49	780	ug/kg
Carbazole	13	29	Lognormal	2710	1600	1130	4210	2820	51	20000	ug/kg
Chrysene	24	30	Lognormal	7550	620	1340	16300	6540	200	81000	ug/kg
Di-n-butyl phthalate	12	30	Lognormal	6250	620	1090	12100	5970	87	6200	ug/kg
Di-n-octyl phthalate	11	30	Lognormal	5490	950	1540	10200	2810	50	37000	ug/kg
Dibenzo(a,h)anthracene	4	30	Lognormal	5810	1250	1770	9990	4900	56	15000	ug/kg
Dibenzofuran	10	30	Lognormal	4400	765	1060	9310	2920	20	12000	ug/kg
Diethyl phthalate	5	30	Lognormal	6440	740	1180	12000	4940	34	95	ug/kg
Dimethyl phthalate	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
Fluoranthene	27	30	Lognormal	15600	980	1760	37100	14600	43	190000	ug/kg
Fluorene	12	30	Lognormal	2370	635	801	4150	2440	24	19000	ug/kg
Hexachloro-1,3-butadiene	.	1	Undeterminable	800	800	800	.	0	.	.	
Hexachlorobenzene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
Hexachlorobutadiene	.	29	Lognormal	6930	1200	2050	12000	4900	.	.	
Hexachlorocyclopentadiene	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
Hexachloroethane	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
Indeno(1,2,3-cd)pyrene	21	30	Lognormal	4300	510	908	9790	1070	110	49000	ug/kg
Isophorone	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
N-Nitroso-di-n-propylamine	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
N-Nitrosodiphenylamine	.	30	Lognormal	6730	1150	1980	11900	4900	.	.	
Naphthalene	15	30	Lognormal	6070	390	784	12200	5220	39	430	ug/kg
Nitrobenzene	1	30	Lognormal	6630	1050	1790	11900	4910	140	140	ug/kg
o-Methylphenol	2	30	Lognormal	5140	1150	1750	9120	2800	1200	20000	ug/kg
p-Chloroaniline	1	29	Lognormal	6930	1200	1990	12000	4900	140	140	ug/kg
p-Methylphenol (Cresol)	18	30	Lognormal	3470	450	618	8540	1000	13	20000	ug/kg
Pentachlorophenol	1	30	Lognormal	16300	2850	4830	28400	12800	730	730	ug/kg
Phenanthrene	26	30	Lognormal	10600	600	1180	31500	6530	140	170000	ug/kg
Phenol	4	30	Lognormal	6070	960	1360	11900	2820	18	1600	ug/kg
Pyrene	27	30	Lognormal	13300	900	1580	32900	10700	54	170000	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	1	28	Lognormal	3030	90.5	169	9300	1430	2	2	ug/kg
1,1,2,2-Tetrachloroethane	.	27	Lognormal	3140	96	202	9460	1470	.	.	
1,1,2-Trichloroethane	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
1,1-Dichloroethane	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
1,1-Dichloroethene	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
1,2-Dichloroethane	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
1,2-Dichloroethene (Total)	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
1,2-Dichloropropane	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
2-Butanone	6	30	Lognormal	3150	155	237	9070	1470	43	9600	ug/kg
2-Hexanone	.	24	Lognormal	3300	79.5	155	10000	1380	.	.	
4-Chloroaniline	.	1	Undeterminable	800	800	800		0	.	.	
4-Methyl-2-pentanone	1	27	Lognormal	3140	96	194	9460	1470	5	5	ug/kg
Acetone	3	19	Lognormal	4460	1200	490	11100	2170	32	300	ug/kg
Benzene	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Bromodichloromethane	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Bromoform	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Bromomethane	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
Carbon disulfide	1	30	Lognormal	2750	79.5	153	9010	1370	500	500	ug/kg
Carbon Tetrachloride	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Chlorobenzene	.	27	Lognormal	3140	96	202	9460	1470	.	.	
Chloroethane	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
Chloroform	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
Chloromethane	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
cis-1,3-Dichloropropene	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Dibromochloromethane	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Ethylbenzene	3	27	Lognormal	3140	96	194	9460	1470	4	15	ug/kg
Methylene chloride	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
Styrene	6	27	Lognormal	3090	96	184	9480	1370	25	3100	ug/kg
Tetrachloroethene	2	27	Lognormal	3060	96	178	9480	1370	190	310	ug/kg
Toluene	7	27	Lognormal	4060	74	198	10500	1480	8	27000	ug/kg
trans-1,3-Dichloropropene	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Trichloroethene	.	28	Lognormal	3030	90.5	181	9300	1430	.	.	
Vinyl chloride	.	30	Lognormal	2830	79.5	162	9000	1370	.	.	
Xylenes, Total	5	27	Lognormal	3030	96	192	9480	1370	3	890	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				SLUDGE							
INORGANICS											
Aluminum	1	1	Undeterminable	2510	2510	2510	.	0	2510	2510	mg/kg
Antimony	1	1	Undeterminable	2.9	2.9	2.9	.	0	2.9	2.9	mg/kg
Arsenic	1	1	Undeterminable	11.1	11.1	11.1	.	0	11.1	11.1	mg/kg
Barium	1	1	Undeterminable	248	248	248	.	0	248	248	mg/kg
Beryllium	1	1	Undeterminable	0.64	0.64	0.64	.	0	0.64	0.64	mg/kg
Cadmium	1	1	Undeterminable	6.8	6.8	6.8	.	0	6.8	6.8	mg/kg
Calcium	1	1	Undeterminable	114000	114000	114000	.	0	114000	114000	mg/kg
Chromium	1	1	Undeterminable	125	125	125	.	0	125	125	mg/kg
Cobalt	1	1	Undeterminable	13.9	13.9	13.9	.	0	13.9	13.9	mg/kg
Copper	1	1	Undeterminable	204	204	204	.	0	204	204	mg/kg
Iron	1	1	Undeterminable	135000	135000	135000	.	0	135000	135000	mg/kg
Lead	1	1	Undeterminable	1290	1290	1290	.	0	1290	1290	mg/kg
Magnesium	1	1	Undeterminable	25800	25800	25800	.	0	25800	25800	mg/kg
Manganese	1	1	Undeterminable	566	566	566	.	0	566	566	mg/kg
Mercury	.	1	Undeterminable	0.12	0.12	0.12	.	0	.	.	
Nickel	1	1	Undeterminable	855	855	855	.	0	855	855	mg/kg
Potassium	1	1	Undeterminable	286	286	286	.	0	286	286	mg/kg
Selenium	.	1	Undeterminable	0.85	0.85	0.85	.	0	.	.	
Silver	1	1	Undeterminable	11.7	11.7	11.7	.	0	11.7	11.7	mg/kg
Sodium	1	1	Undeterminable	2260	2260	2260	.	0	2260	2260	mg/kg
Thallium	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Vanadium	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Zinc	1	1	Undeterminable	1170	1170	1170	.	0	1170	1170	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	1	1	Undeterminable	0.24	0.24	0.24	.	0	0.24	0.24	pCi/g
Cesium-137	1	1	Undeterminable	0.44	0.44	0.44	.	0	0.44	0.44	pCi/g
Lead-210	1	1	Undeterminable	0.96	0.96	0.96	.	0	0.96	0.96	pCi/g
Neptunium-237	.	1	Undeterminable	0.13	0.13	0.13	.	0	.	.	
Plutonium-238	1	1	Undeterminable	1.8	1.8	1.8	.	0	1.8	1.8	pCi/g
Plutonium-239/240	1	1	Undeterminable	0.73	0.73	0.73	.	0	0.73	0.73	pCi/g
Plutonium-241	1	1	Undeterminable	2.4	2.4	2.4	.	0	2.4	2.4	pCi/g
Polonium-210	1	1	Undeterminable	7.7	7.7	7.7	.	0	7.7	7.7	pCi/g
Radium-226	1	1	Undeterminable	6.2	6.2	6.2	.	0	6.2	6.2	pCi/g
Radium-228	1	1	Undeterminable	14	14	14	.	0	14	14	pCi/g
Strontium-90	1	1	Undeterminable	7.5	7.5	7.5	.	0	7.5	7.5	pCi/g
Technetium-99	1	1	Undeterminable	140	140	140	.	0	140	140	pCi/g
Thorium-228	1	1	Undeterminable	16	16	16	.	0	16	16	pCi/g
Thorium-230	1	1	Undeterminable	18	18	18	.	0	18	18	pCi/g
Thorium-232	1	1	Undeterminable	27	27	27	.	0	27	27	pCi/g
Uranium, Total	1	1	Undeterminable	2000	2000	2000	.	0	2000	2000	ug/g
Uranium-234	1	1	Undeterminable	1750	1750	1750	.	0	1750	1750	pCi/g
Uranium-235/236	1	1	Undeterminable	73.4	73.4	73.4	.	0	73.4	73.4	pCi/g
Uranium-238	1	1	Undeterminable	1400	1400	1400	.	0	1400	1400	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
1,2-Dichlorobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
1,3-Dichlorobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
1,4-Dichlorobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,2-oxybis(1-Chloropropane)	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,4,5-Trichlorophenol	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2,4,6-Trichlorophenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,4-Dichlorophenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,4-Dimethylphenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,4-Dinitrophenol	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2,4-Dinitrotoluene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2,6-Dinitrotoluene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2-Chloronaphthalene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2-Chlorophenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
2-Methylnaphthalene	1	1	Undeterminable	110	110	110	.	0	110	110	ug/kg
2-Nitroaniline	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Nitrophenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
3,3'-Dichlorobenzidine	.	1	Undeterminable	470	470	470	.	0	.	.	
3-Nitroaniline	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4,6-Dinitro-2-methylphenol	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4-Bromophenyl phenyl ether	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
4-Chloro-3-methylphenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
4-Chlorophenylphenyl ether	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
4-Nitroaniline	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4-Nitrophenol	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Acenaphthene	1	1	Undeterminable	130	130	130	.	0	130	130	ug/kg
Acenaphthylene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Anthracene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Benzo(a)anthracene	1	1	Undeterminable	1000	1000	1000	.	0	1000	1000	ug/kg
Benzo(a)pyrene	1	1	Undeterminable	920	920	920	.	0	920	920	ug/kg
Benzo(b)fluoranthene	1	1	Undeterminable	1300	1300	1300	.	0	1300	1300	ug/kg
Benzo(g,h,i)perylene	1	1	Undeterminable	760	760	760	.	0	760	760	ug/kg
Benzo(k)fluoranthene	1	1	Undeterminable	1100	1100	1100	.	0	1100	1100	ug/kg
bis(2-Chloroethoxy)methane	.	1	Undeterminable	4700	4700	4700	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethyl)ether	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
bis(2-Ethylhexyl)phthalate	1	1	Undeterminable	38000	38000	38000	.	0	38000	38000	ug/kg
Butyl benzyl phthalate	1	1	Undeterminable	560	560	560	.	0	560	560	ug/kg
Carbazole	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Chrysene	1	1	Undeterminable	2100	2100	2100	.	0	2100	2100	ug/kg
Di-n-butyl phthalate	1	1	Undeterminable	1800	1800	1800	.	0	1800	1800	ug/kg
Di-n-octyl phthalate	1	1	Undeterminable	690	690	690	.	0	690	690	ug/kg
Dibenzo(a,h)anthracene	.	1	Undeterminable	470	470	470	.	0	.	.	
Dibenzofuran	1	1	Undeterminable	110	110	110	.	0	110	110	ug/kg
Diethyl phthalate	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Dimethyl phthalate	1	1	Undeterminable	170	170	170	.	0	170	170	ug/kg
Fluoranthene	1	1	Undeterminable	3000	3000	3000	.	0	3000	3000	ug/kg
Fluorene	1	1	Undeterminable	160	160	160	.	0	160	160	ug/kg
Hexachlorobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Hexachlorobutadiene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Hexachlorocyclopentadiene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Hexachloroethane	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Indeno(1,2,3-cd)pyrene	1	1	Undeterminable	700	700	700	.	0	700	700	ug/kg
Isophorone	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
N-Nitroso-di-n-propylamine	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
N-Nitrosodiphenylamine	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Naphthalene	1	1	Undeterminable	120	120	120	.	0	120	120	ug/kg
Nitrobenzene	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
o-Methylphenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
p-Chloroaniline	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
p-Methylphenol (Cresol)	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Pentachlorophenol	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Phenanthrene	1	1	Undeterminable	2300	2300	2300	.	0	2300	2300	ug/kg
Phenol	.	1	Undeterminable	4700	4700	4700	.	0	.	.	
Pyrene	1	1	Undeterminable	2400	2400	2400	.	0	2400	2400	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,1,2,2-Tetrachloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,1,2-Trichloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,1-Dichloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,1-Dichloroethene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,2-Dichloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,2-Dichloroethene (Total)	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
1,2-Dichloropropane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Butanone	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
2-Hexanone	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
4-Methyl-2-pentanone	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Acetone	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Benzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Bromodichloromethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Bromoform	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Bromomethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Carbon disulfide	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Carbon Tetrachloride	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Chlorobenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Chloroethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Chloroform	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Chloromethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
cis-1,3-Dichloropropene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Dibromochloromethane	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Ethylbenzene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Methylene chloride	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Styrene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Tetrachloroethene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Toluene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
trans-1,3-Dichloropropene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Trichloroethene	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Vinyl chloride	.	1	Undeterminable	12000	12000	12000	.	0	.	.	
Xylenes, Total	.	1	Undeterminable	12000	12000	12000	.	0	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	SOIL (1st DEPTH)										
INORGANICS											
Aluminum	9	9	Normal	10900	9530	10600	2910	4100	8240	15700	mg/kg
Antimony	.	9	Normal	8.78	9.9	8.63	1.66	2.8	.	.	
Arsenic	9	9	Normal	7.7	6.9	7.56	1.61	3.2	6.3	10.2	mg/kg
Barium	9	9	Normal	97.3	76.3	91.9	39.6	27.6	69.3	191	mg/kg
Beryllium	6	9	Normal	0.859	0.76	0.747	0.599	0.25	0.39	2.4	mg/kg
Cadmium	.	9	Normal	0.611	0.65	0.592	0.138	0.03	.	.	
Calcium	9	9	Normal	79200	75100	69200	39100	52200	19700	142000	mg/kg
Chromium	9	9	Normal	15.1	13.6	14.6	4.46	4.2	11.4	24.9	mg/kg
Cobalt	9	9	Normal	8.33	8.5	8.1	2.02	3.1	5.4	10.6	mg/kg
Copper	9	9	Normal	18.8	18.9	18.4	4.1	5.1	14.5	25.6	mg/kg
Iron	9	9	Normal	22300	20500	21300	7540	8400	14900	38400	mg/kg
Lead	9	9	Normal	35.9	17.8	24	42.5	27.9	11.2	143	mg/kg
Magnesium	9	9	Normal	21100	22000	19600	7760	10500	8220	33900	mg/kg
Manganese	9	9	Normal	574	579	565	108	65	389	795	mg/kg
Mercury	.	9	Normal	0.0911	0.1	0.088	0.0237	0.05	.	.	
Nickel	9	9	Normal	20.4	20.1	19.9	4.34	6.7	14.2	26.2	mg/kg
Potassium	8	9	Normal	1290	1160	1220	434	300	845	2140	mg/kg
Selenium	1	9	Normal	0.6	0.65	0.563	0.21	0.25	0.99	0.99	mg/kg
Silver	.	9	Normal	0.829	0.87	0.822	0.109	0.02	.	.	
Sodium	9	9	Normal	419	452	394	142	195	184	600	mg/kg
Thallium	.	9	Normal	0.651	0.86	0.551	0.304	0.51	.	.	
Vanadium	9	9	Normal	22.1	20.2	21.5	6.15	7	16.3	35.4	mg/kg
Zinc	9	9	Undefined	82	60	66.4	77.7	18.4	39.8	287	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
4,4'-DDE	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
4,4'-DDT	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Aldrin	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
alpha-BHC	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
alpha-Chlordane	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Aroclor-1016	.	9	Normal	36.2	36	36.1	3.07	1	.	.	
Aroclor-1221	.	9	Normal	73.1	73	72.8	6.37	4	.	.	
Aroclor-1232	.	9	Normal	36.2	36	36.1	3.07	1	.	.	
Aroclor-1242	.	9	Normal	36.2	36	36.1	3.07	1	.	.	
Aroclor-1248	.	9	Normal	36.2	36	36.1	3.07	1	.	.	
Aroclor-1254	3	9	Lognormal	665	39	88.5	1670	14	50	5100	ug/kg
Aroclor-1260	1	9	Normal	34.9	36	34.5	5.11	1	24	24	ug/kg
beta-BHC	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
delta-BHC	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Dieldrin	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Endosulfan II	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Endosulfan sulfate	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Endosulfan-I	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Endrin	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Endrin aldehyde	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
Endrin ketone	.	8	Normal	3.61	3.6	3.6	0.327	0.2	.	.	
gamma-BHC (Lindane)	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
gamma-Chlordane	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Heptachlor	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Heptachlor epoxide	.	8	Normal	1.83	1.85	1.82	0.191	0.15	.	.	
Methoxychlor	.	8	Normal	18.3	18.5	18.2	1.91	1.5	.	.	
Toxaphene	.	8	Normal	183	185	182	19.1	15	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	.	5	Undeterminable	0.0707	0.0522	0.0561	0.0564	0.0501	.	.	
Cesium-137	3	5	Undeterminable	0.0306	0.0262	0.0268	0.0162	0.0266	0.0262	0.0476	pCi/g
Gross Alpha	.	4	Undeterminable	21.8	21	19.7	10.8	18.5	.	.	
Gross Beta	.	4	Undeterminable	19.5	18.5	18.5	7.14	10	.	.	
Lead-210	5	5	Undeterminable	1.39	1.38	1.37	0.261	0.33	1.05	1.71	pCi/g
Neptunium-237	.	5	Undeterminable	0.00468	0.0049	0.0138	0.0642	0.0376	.	.	
Plutonium-238	1	5	Undeterminable	0.0399	0.0117	0.0199	0.0656	0.0294	0.155	0.155	pCi/g
Plutonium-239/240	3	5	Undeterminable	0.0425	0.0491	0.0138	0.0403	0.0537	0.0491	0.0977	pCi/g
Plutonium-241	.	5	Undeterminable	0	0		0.219	0.097	.	.	
Polonium-210	4	4	Undeterminable	1.26	1.18	1.1	0.703	1.17	0.602	2.07	pCi/g
Radium-226	5	5	Undeterminable	1.16	1.12	1.16	0.129	0.051	1.05	1.39	pCi/g
Radium-228	5	5	Undeterminable	1.25	1.19	1.22	0.267	0.493	0.997	1.56	pCi/g
Strontium-90	.	5	Undeterminable	0	0	0.0703	0.206	0.112	.	.	
Technetium-99	5	5	Undeterminable	2.51	2.75	2.38	0.802	0.71	1.25	3.32	pCi/g
Thorium-227	.	5	Undeterminable	1.81	2.21	1.28	1.05	1.17	.	.	
Thorium-228	5	5	Undeterminable	1.06	1.03	1.05	0.118	0.147	0.937	1.23	pCi/g
Thorium-230	5	5	Undeterminable	3.29	1.82	2.31	3.67	0.3	1.06	9.82	pCi/g
Thorium-232	5	5	Undeterminable	0.804	0.778	0.768	0.264	0.369	0.483	1.13	pCi/g
Uranium, Total	5	5	Undeterminable	25.9	21.4	24.1	11.6	9.09	14.5	44.5	ug/g
Uranium-234	5	5	Undeterminable	9.86	9.94	8.82	5.05	6.35	4.62	17.1	pCi/g
Uranium-235/236	5	5	Undeterminable	0.369	0.346	0.345	0.148	0.26	0.221	0.547	pCi/g
Uranium-238	5	5	Undeterminable	9.74	9.9	8.85	4.54	5.19	4.48	16.1	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
1,2-Dichlorobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
1,3-Dichlorobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
1,4-Dichlorobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
2,2-oxybis(1-Chloropropane)	.	9	Normal	370	370	370	14.1	20	.	.	
2,4,5-Trichlorophenol	.	9	Normal	913	920	913	27.4	20	.	.	
2,4,6-Trichlorophenol	.	9	Normal	370	370	370	14.1	20	.	.	
2,4-Dichlorophenol	.	9	Normal	370	370	370	14.1	20	.	.	
2,4-Dimethylphenol	.	9	Normal	370	370	370	14.1	20	.	.	
2,4-Dinitrophenol	.	9	Normal	913	920	913	27.4	20	.	.	
2,4-Dinitrotoluene	.	9	Normal	370	370	370	14.1	20	.	.	
2,6-Dinitrotoluene	.	9	Normal	370	370	370	14.1	20	.	.	
2-Chloronaphthalene	.	9	Normal	370	370	370	14.1	20	.	.	
2-Chlorophenol	.	9	Normal	370	370	370	14.1	20	.	.	
2-Methylnaphthalene	1	9	Undefined	335	370	296	108	20	49	49	ug/kg
2-Nitroaniline	.	9	Normal	913	920	913	27.4	20	.	.	
2-Nitrophenol	.	9	Normal	370	370	370	14.1	20	.	.	
3,3'-Dichlorobenzidine	.	9	Normal	370	370	370	14.1	20	.	.	
3-Nitroaniline	.	9	Normal	913	920	913	27.4	20	.	.	
4,6-Dinitro-2-methylphenol	.	9	Normal	913	920	913	27.4	20	.	.	
4-Bromophenyl phenyl ether	.	9	Normal	370	370	370	14.1	20	.	.	
4-Chloro-3-methylphenol	.	9	Normal	370	370	370	14.1	20	.	.	
4-Chlorophenylphenyl ether	.	9	Normal	370	370	370	14.1	20	.	.	
4-Nitroaniline	.	9	Normal	913	920	913	27.4	20	.	.	
4-Nitrophenol	.	9	Normal	913	920	913	27.4	20	.	.	
Acenaphthene	2	9	Normal	303	370	243	140	30	38	77	ug/kg
Acenaphthylene	2	9	Undefined	301	360	244	140	30	54	59	ug/kg
Anthracene	3	9	Normal	290	360	243	134	150	58	230	ug/kg
Benzo(a)anthracene	7	9	Normal	253	270	166	189	311	19	580	ug/kg
Benzo(a)pyrene	6	9	Normal	320	380	234	200	200	23	700	ug/kg
Benzo(b)fluoranthene	6	9	Normal	359	380	266	219	150	24	760	ug/kg
Benzo(g,h,i)perylene	5	9	Normal	345	380	277	217	200	57	810	ug/kg
Benzo(k)fluoranthene	5	9	Normal	352	380	298	163	90	50	640	ug/kg
bis(2-Chloroethoxy)methane	.	9	Normal	370	370	370	14.1	20	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethyl)ether	.	9	Normal	370	370	370	14.1	20	.	.	
bis(2-Ethylhexyl)phthalate	6	9	Normal	350	230	210	395	298	44	1300	ug/kg
Butyl benzyl phthalate	.	9	Normal	370	370	370	14.1	20	.	.	
Carbazole	2	9	Normal	307	370	259	132	30	53	99	ug/kg
Chrysene	7	9	Normal	293	390	193	215	317	26	670	ug/kg
Di-n-butyl phthalate	1	9	Undefined	610	370	448	747	30	2600	2600	ug/kg
Di-n-octyl phthalate	.	9	Normal	370	370	370	14.1	20	.	.	
Dibenzo(a,h)anthracene	4	9	Normal	256	360	202	149	280	55	190	ug/kg
Dibenzofuran	.	9	Normal	370	370	370	14.1	20	.	.	
Diethyl phthalate	.	9	Normal	370	370	370	14.1	20	.	.	
Dimethyl phthalate	.	9	Normal	370	370	370	14.1	20	.	.	
Fluoranthene	8	9	Normal	394	300	233	386	441	36	1200	ug/kg
Fluorene	1	9	Undefined	339	370	312	98.4	20	79	79	ug/kg
Hexachlorobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
Hexachlorobutadiene	.	9	Normal	370	370	370	14.1	20	.	.	
Hexachlorocyclopentadiene	.	9	Normal	370	370	370	14.1	20	.	.	
Hexachloroethane	.	9	Normal	370	370	370	14.1	20	.	.	
Indeno(1,2,3-cd)pyrene	5	9	Normal	320	370	270	170	210	77	630	ug/kg
Isophorone	.	9	Normal	370	370	370	14.1	20	.	.	
N-Nitroso-di-n-propylamine	.	9	Normal	370	370	370	14.1	20	.	.	
N-Nitrosodiphenylamine	.	9	Normal	370	370	370	14.1	20	.	.	
Naphthalene	.	9	Normal	370	370	370	14.1	20	.	.	
Nitrobenzene	.	9	Normal	370	370	370	14.1	20	.	.	
o-Methylphenol	.	9	Normal	370	370	370	14.1	20	.	.	
p-Chloroaniline	.	9	Normal	370	370	370	14.1	20	.	.	
p-Methylphenol (Cresol)	.	9	Normal	370	370	370	14.1	20	.	.	
Pentachlorophenol	.	9	Normal	913	920	913	27.4	20	.	.	
Phenanthrene	7	9	Normal	295	290	179	263	336	29	820	ug/kg
Phenol	.	9	Normal	370	370	370	14.1	20	.	.	
Pyrene	8	9	Normal	372	270	221	375	433	40	1200	ug/kg

000653

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
1,1,2,2-Tetrachloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
1,1,2-Trichloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
1,1-Dichloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
1,1-Dichloroethene	.	9	Normal	11	11	11	0.5	0	.	.	
1,2-Dichloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
1,2-Dichloroethene (Total)	.	9	Normal	11	11	11	0.5	0	.	.	
1,2-Dichloropropane	.	9	Normal	11	11	11	0.5	0	.	.	
2-Butanone	.	9	Normal	11	11	11	0.5	0	.	.	
2-Hexanone	.	9	Normal	11	11	11	0.5	0	.	.	
4-Methyl-2-pentanone	.	9	Normal	11	11	11	0.5	0	.	.	
Acetone	2	5	Undeterminable	15.2	11	13.4	9.96	0	10	33	ug/kg
Benzene	.	9	Normal	11	11	11	0.5	0	.	.	
Bromodichloromethane	.	9	Normal	11	11	11	0.5	0	.	.	
Bromoform	.	9	Normal	11	11	11	0.5	0	.	.	
Bromomethane	.	9	Normal	11	11	11	0.5	0	.	.	
Carbon disulfide	.	9	Normal	11	11	11	0.5	0	.	.	
Carbon Tetrachloride	.	9	Normal	11	11	11	0.5	0	.	.	
Chlorobenzene	.	9	Normal	11	11	11	0.5	0	.	.	
Chloroethane	.	9	Normal	11	11	11	0.5	0	.	.	
Chloroform	.	9	Normal	11	11	11	0.5	0	.	.	
Chloromethane	.	9	Normal	11	11	11	0.5	0	.	.	
cis-1,3-Dichloropropene	.	9	Normal	11	11	11	0.5	0	.	.	
Dibromochloromethane	.	9	Normal	11	11	11	0.5	0	.	.	
Ethylbenzene	.	9	Normal	11	11	11	0.5	0	.	.	
Methylene chloride	.	9	Normal	11	11	11	0.5	0	.	.	
Styrene	.	9	Normal	11	11	11	0.5	0	.	.	
Tetrachloroethene	.	9	Normal	11	11	11	0.5	0	.	.	
Toluene	.	9	Normal	11	11	11	0.5	0	.	.	
trans-1,3-Dichloropropene	.	9	Normal	11	11	11	0.5	0	.	.	
Trichloroethene	.	9	Normal	11	11	11	0.5	0	.	.	
Vinyl chloride	.	9	Normal	11	11	11	0.5	0	.	.	
Xylenes, Total	.	9	Normal	11	11	11	0.5	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				SOIL (2nd DEPTH)							
INORGANICS											
Aluminum	2	2	Undeterminable	9510	9510	9420	1830	2590	8210	10800	mg/kg
Antimony	.	1	Undeterminable	6.9	6.9	6.9		0	.	.	
Arsenic	2	2	Undeterminable	6.95	6.95	6.87	1.48	2.1	5.9	8	mg/kg
Barium	2	2	Undeterminable	87.7	87.7	87.6	5.09	7.2	84.1	91.3	mg/kg
Beryllium	1	2	Undeterminable	0.815	0.815	0.794	0.262	0.37	0.63	0.63	mg/kg
Cadmium	1	2	Undeterminable	0.4	0.4	0.387	0.141	0.2	0.3	0.3	mg/kg
Calcium	2	2	Undeterminable	93600	93600	91600	27400	38800	74200	113000	mg/kg
Chromium	2	2	Undeterminable	12	12	11.5	4.45	6.3	8.8	15.1	mg/kg
Cobalt	2	2	Undeterminable	7.95	7.95	7.76	2.47	3.5	6.2	9.7	mg/kg
Copper	2	2	Undeterminable	19.5	19.5	19.4	2.47	3.5	17.7	21.2	mg/kg
Iron	2	2	Undeterminable	17400	17400	17200	3820	5400	14700	20100	mg/kg
Lead	2	2	Undeterminable	36.7	36.7	29	31.7	44.9	14.2	59.1	mg/kg
Magnesium	2	2	Undeterminable	25900	25900	25500	6510	9200	21300	30500	mg/kg
Manganese	2	2	Undeterminable	686	686	683	91.9	130	621	751	mg/kg
Mercury	.	2	Undeterminable	0.06	0.06	0.06	0	0	.	.	
Nickel	2	2	Undeterminable	15.8	15.8	15.2	6.01	8.5	11.5	20	mg/kg
Potassium	1	2	Undeterminable	854	854	821	334	472	1090	1090	mg/kg
Selenium	1	2	Undeterminable	0.77	0.77	0.559	0.75	1.06	1.3	1.3	mg/kg
Silver	.	2	Undeterminable	0.71	0.71	0.709	0.0424	0.06	.	.	
Sodium	2	2	Undeterminable	149	149	142	61.5	87	105	192	mg/kg
Thallium	.	2	Undeterminable	0.44	0.44	0.402	0.255	0.36	.	.	
Vanadium	2	2	Undeterminable	21.1	21.1	21.1	1.84	2.6	19.8	22.4	mg/kg
Zinc	2	2	Undeterminable	49.2	49.2	48.4	12.4	17.6	40.4	58	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	1	3	Undeterminable	3.1	3.6	2.96	1.04	1.9	1.9	1.9	ug/kg
4,4'-DDE	.	3	Undeterminable	3.8	3.8	3.8	0.2	0.4	.	.	
4,4'-DDT	.	3	Undeterminable	3.8	3.8	3.8	0.2	0.4	.	.	
Aldrin	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
alpha-BHC	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
alpha-Chlordane	.	3	Undeterminable	1.87	2	1.86	0.231	0.4	.	.	
Aroclor-1016	.	3	Undeterminable	38	38	38	2	4	.	.	
Aroclor-1221	.	3	Undeterminable	77	77	76.9	4	8	.	.	
Aroclor-1232	.	3	Undeterminable	38	38	38	2	4	.	.	
Aroclor-1242	.	3	Undeterminable	38	38	38	2	4	.	.	
Aroclor-1248	1	3	Undeterminable	43.7	40	43.2	8.14	15	53	53	ug/kg
Aroclor-1254	2	3	Undeterminable	213	220	147	171	342	220	380	ug/kg
Aroclor-1260	1	3	Undeterminable	51.7	40	48.9	22	39	77	77	ug/kg
beta-BHC	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
delta-BHC	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
Dieldrin	1	3	Undeterminable	3.47	3.6	3.45	0.416	0.8	3	3	ug/kg
Endosulfan II	1	3	Undeterminable	6.13	3.8	5.32	4.22	7.4	11	11	ug/kg
Endosulfan sulfate	.	3	Undeterminable	3.8	3.8	3.8	0.2	0.4	.	.	
Endosulfan-I	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
Endrin	1	3	Undeterminable	9.8	3.8	6.7	10.6	18.4	22	22	ug/kg
Endrin aldehyde	.	3	Undeterminable	3.8	3.8	3.8	0.2	0.4	.	.	
Endrin ketone	1	3	Undeterminable	3	3.6	2.8	1.22	2.2	1.6	1.6	ug/kg
gamma-BHC (Lindane)	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
gamma-Chlordane	1	3	Undeterminable	1.67	1.6	1.65	0.306	0.6	1.4	1.4	ug/kg
Heptachlor	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
Heptachlor epoxide	.	3	Undeterminable	1.93	2	1.93	0.115	0.2	.	.	
Methoxychlor	.	3	Undeterminable	19.3	20	19.3	1.15	2	.	.	
Toxaphene	.	3	Undeterminable	193	200	193	11.5	20	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	.	8	Normal	0.0765	0.068	0.0684	0.0416	0.0486	.	.	
Cesium-137	6	7	Lognormal	0.203	0.111	0.101	0.321	0.1	0.0342	0.923	pCi/g
Gross Alpha	.	2	Undeterminable	29.5	29.5	28.2	12	17	.	.	
Gross Beta	.	2	Undeterminable	26	26	25.5	7.07	10	.	.	
Lead-210	7	8	Normal	2.05	1.78	1.76	1.19	1.61	0.67	4.18	pCi/g
Neptunium-237	2	8	Normal	0.101	0.0764	0.136	0.178	0.161	0.161	0.491	pCi/g
Plutonium-238	1	5	Undeterminable	0.064	0.0547	0.045	0.0555	0.0645	0.082	0.082	pCi/g
Plutonium-239/240	1	7	Normal	0.0406	0.0436	0.0277	0.0513	0.0545	0.0436	0.0436	pCi/g
Plutonium-241	.	7	Undeterminable	0	0	.	0.149	0.233	.	.	
Polonium-210	7	8	Normal	2.27	1.95	1.84	1.64	1.69	0.726	5.8	pCi/g
Radium-226	7	7	Normal	1.39	1.19	1.34	0.479	0.319	1.07	2.43	pCi/g
Radium-228	7	7	Normal	1.23	1.2	1.21	0.267	0.314	0.916	1.74	pCi/g
Strontium-90	2	8	Normal	0	0	0.312	0.48	0.86	0.409	0.54	pCi/g
Technetium-99	7	8	Normal	1.74	1.42	1.39	1.18	1.62	0.41	3.96	pCi/g
Thorium-227	.	6	Undeterminable	0.334	0.603	0.642	1.32	1.22	.	.	
Thorium-228	7	8	Normal	1.34	1.36	1.26	0.486	0.635	0.769	2.27	pCi/g
Thorium-230	7	8	Normal	2.78	2.07	2.4	1.79	2.08	1.42	6.44	pCi/g
Thorium-232	6	8	Normal	0.944	0.895	0.811	0.555	0.685	0.455	2.03	pCi/g
Uranium, Total	7	8	Normal	41.3	40.2	35.1	22.9	39.4	14.1	70.1	ug/g
Uranium-234	7	8	Normal	16	13.6	13.2	11	13.4	5.72	38.3	pCi/g
Uranium-235/236	7	8	Normal	0.667	0.557	0.51	0.518	0.607	0.179	1.73	pCi/g
Uranium-238	6	6	Undeterminable	17	14.9	13.6	12.5	14.2	5.97	39	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
1,2-Dichlorobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
1,3-Dichlorobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
1,4-Dichlorobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,2-oxybis(1-Chloropropane)	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,4,5-Trichlorophenol	.	3	Undeterminable	913	900	913	41.6	80	.	.	
2,4,6-Trichlorophenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,4-Dichlorophenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,4-Dimethylphenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,4-Dinitrophenol	.	3	Undeterminable	913	900	913	41.6	80	.	.	
2,4-Dinitrotoluene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2,6-Dinitrotoluene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2-Chloronaphthalene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2-Chlorophenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2-Methylnaphthalene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
2-Nitroaniline	.	3	Undeterminable	913	900	913	41.6	80	.	.	
2-Nitrophenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
3,3'-Dichlorobenzidine	.	2	Undeterminable	365	365	365	7.07	10	.	.	
3-Nitroaniline	.	2	Undeterminable	920	920	919	56.6	80	.	.	
4,6-Dinitro-2-methylphenol	.	3	Undeterminable	913	900	913	41.6	80	.	.	
4-Bromophenyl phenyl ether	.	3	Undeterminable	377	370	376	20.8	40	.	.	
4-Chloro-3-methylphenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
4-Chlorophenylphenyl ether	.	3	Undeterminable	377	370	376	20.8	40	.	.	
4-Nitroaniline	.	2	Undeterminable	920	920	919	56.6	80	.	.	
4-Nitrophenol	.	3	Undeterminable	913	900	913	41.6	80	.	.	
Acenaphthene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Acenaphthylene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Anthracene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Benzo(a)anthracene	1	3	Undeterminable	280	370	218	182	330	70	70	ug/kg
Benzo(a)pyrene	1	3	Undeterminable	284	370	229	176	319	81	81	ug/kg
Benzo(b)fluoranthene	1	3	Undeterminable	293	370	253	159	290	110	110	ug/kg
Benzo(g,h,i)perylene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Benzo(k)fluoranthene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
bis(2-Chloroethoxy)methane	.	3	Undeterminable	377	370	376	20.8	40	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethyl)ether	.	3	Undeterminable	377	370	376	20.8	40	.	.	
bis(2-Ethylhexyl)phthalate	1	3	Undeterminable	275	360	210	184	336	64	64	ug/kg
Butyl benzyl phthalate	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Carbazole	.	2	Undeterminable	380	380	379	28.3	40	.	.	
Chrysene	1	3	Undeterminable	285	370	233	174	315	85	85	ug/kg
Di-n-butyl phthalate	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Di-n-octyl phthalate	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Dibenzo(a,h)anthracene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Dibenzofuran	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Diethyl phthalate	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Dimethyl phthalate	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Fluoranthene	1	3	Undeterminable	313	370	293	125	230	170	170	ug/kg
Fluorene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Hexachlorobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Hexachlorobutadiene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Hexachlorocyclopentadiene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Hexachloroethane	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Indeno(1,2,3-cd)pyrene	1	3	Undeterminable	276	370	204	190	343	57	57	ug/kg
Isophorone	.	3	Undeterminable	377	370	376	20.8	40	.	.	
N-Nitroso-di-n-propylamine	.	3	Undeterminable	377	370	376	20.8	40	.	.	
N-Nitrosodiphenylamine	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Naphthalene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Nitrobenzene	.	3	Undeterminable	377	370	376	20.8	40	.	.	
o-Methylphenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
p-Chloroaniline	.	3	Undeterminable	377	370	376	20.8	40	.	.	
p-Methylphenol (Cresol)	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Pentachlorophenol	.	3	Undeterminable	913	900	913	41.6	80	.	.	
Phenanthrene	1	3	Undeterminable	279	370	216	184	332	68	68	ug/kg
Phenol	.	3	Undeterminable	377	370	376	20.8	40	.	.	
Pyrene	1	3	Undeterminable	307	370	281	137	250	150	150	ug/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,1,2,2-Tetrachloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,1,2-Trichloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,1-Dichloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,1-Dichloroethene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,2-Dichloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
1,2-Dichloroethene (Total)	.	2	Undeterminable	11.5	11.5	11.5	0.707	1	.	.	
1,2-Dichloropropane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
2-Butanone	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
2-Hexanone	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
4-Methyl-2-pentanone	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Acetone	.	1	Undeterminable	12	12	12	.	0	.	.	
Benzene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Bromodichloromethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Bromoform	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Bromomethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Carbon disulfide	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Carbon Tetrachloride	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Chlorobenzene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Chloroethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Chloroform	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Chloromethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
cis-1,3-Dichloropropene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Dibromochloromethane	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Ethylbenzene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Methylene chloride	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Styrene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Tetrachloroethene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Toluene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
trans-1,2-Dichloroethene	.	1	Undeterminable	12	12	12	.	0	.	.	
trans-1,3-Dichloropropene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Trichloroethene	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Vinyl chloride	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	
Xylenes, Total	.	3	Undeterminable	11.7	12	11.7	0.577	1	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	STEEL COATINGS										
INORGANICS											
Aluminum	131	139	Lognormal	10800	4040	5380	14400	10900	777	69400	mg/kg
Antimony	70	113	Lognormal	51.1	21.2	17.2	70.3	62.8	1.1	393	mg/kg
Arsenic	115	138	Lognormal	20.8	7.65	8.4	35	20.1	0.23	227	mg/kg
Barium	133	139	Lognormal	1800	324	409	4130	1340	13.4	23700	mg/kg
Beryllium	29	128	Lognormal	1.1	0.74	0.434	1.34	1.1	0.28	4.5	mg/kg
Cadmium	109	138	Lognormal	27.5	7.35	8.63	66.4	20.4	0.13	558	mg/kg
Calcium	129	139	Lognormal	23500	15500	14300	27800	24200	528	199000	mg/kg
Chromium	133	139	Lognormal	3200	1620	1200	3780	4350	22.7	17300	mg/kg
Cobalt	132	139	Undefined	90.7	83.3	63.6	78.2	71.9	1.7	588	mg/kg
Copper	130	139	Lognormal	266	147	147	353	208	9	2310	mg/kg
Iron	134	139	Undefined	88100	60200	53400	87500	101000	980	486000	mg/kg
Lead	134	139	Undefined	60400	37800	17500	69200	87300	12.6	375000	mg/kg
Magnesium	129	139	Undefined	4600	3740	3600	3140	4810	647	14300	mg/kg
Manganese	134	139	Undefined	715	457	469	810	650	47.5	5560	mg/kg
Mercury	109	137	Lognormal	4.07	0.64	0.855	7.09	3.72	0.06	32.6	mg/kg
Nickel	127	139	Lognormal	98.4	42.1	47.3	256	59.2	1.9	2570	mg/kg
Potassium	104	139	Lognormal	1930	741	963	3370	1550	103	24900	mg/kg
Selenium	23	107	Lognormal	3.87	1.6	1.55	9.2	2.58	0.43	77.5	mg/kg
Silver	69	137	Lognormal	4.3	1.4	1.75	8.16	4.6	0.29	59.2	mg/kg
Sodium	117	139	Lognormal	1100	710	706	1480	846	137	12900	mg/kg
Thallium	13	118	Lognormal	1.32	0.795	0.704	1.83	1.22	0.09	3.1	mg/kg
Vanadium	74	133	Lognormal	13	7.4	6.71	17.4	12.3	0.23	146	mg/kg
Zinc	134	139	Lognormal	9440	3410	3060	21300	8980	12.5	215000	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	47	83	Lognormal	1.57	0.19	0.375	4.57	0.66	0.111	32.6	pCi/g
Cesium-137	12	83	Undefined	0.627	0.54	0.477	0.584	0.34	0.34	4.1	pCi/g
Gross Alpha	.	31	Lognormal	1720	570	315	2490	2840	.	.	
Gross Beta	.	31	Lognormal	1720	570	315	2490	2840	.	.	
Lead-210	28	83	Lognormal	33.4	3.3	4.3	151	5.7	0.83	1040	pCi/g
Neptunium-237	61	81	Lognormal	1.3	0.3	0.309	5.56	0.499	0.052	49	pCi/g
Plutonium-238	64	83	Lognormal	10.8	0.334	0.414	51.3	0.633	0.051	420	pCi/g
Plutonium-239/240	76	83	Lognormal	4.01	0.647	0.736	11.5	1.52	0.055	92	pCi/g
Plutonium-241	26	78	Lognormal	15.3	2.65	4.04	41.2	11.6	1.59	260	pCi/g
Polonium-210	83	83	Lognormal	40.3	1.9	2.96	144	3.99	0.23	797	pCi/g
Radium-226	57	83	Lognormal	173	2.1	3.32	989	7.82	0.11	6710	pCi/g
Radium-228	64	83	Lognormal	96.4	4.2	6.97	380	24.4	0.55	2280	pCi/g
Strontium-90	27	82	Lognormal	1.16	0.43	0.437	4.55	0.63	0.42	41	pCi/g
Technetium-99	70	83	Lognormal	89.8	28.2	23.7	160	78.9	0.568	1000	pCi/g
Thorium-227	21	28	Lognormal	7.63	0.785	1.41	17.9	2.84	0.3	80	pCi/g
Thorium-228	82	83	Lognormal	25.6	5.2	5.84	67.9	16.5	0.11	470	pCi/g
Thorium-230	82	83	Lognormal	208	26	25.8	771	64.8	0.34	5600	pCi/g
Thorium-232	82	83	Lognormal	19.9	4.3	4.53	46.1	14.8	0.071	260	pCi/g
Uranium, Total	83	83	Lognormal	5950	1400	1640	10000	5750	23.5	45000	ug/g
Uranium-234	73	75	Lognormal	3040	1400	922	5160	2920	0.018	37000	pCi/g
Uranium-235/236	73	73	Lognormal	251	115	76.9	519	216	0.826	3900	pCi/g
Uranium-238	73	73	Lognormal	2860	1400	999	4700	3260	15.3	33000	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
	SWIPE SAMPLES										
RADIONUCLIDES											
Americium-241	.	14	Lognormal	6.84	1.45	2.24	20.8	0.9	.	.	
Cesium-137	2	14	Lognormal	62.7	6.63	9.23	208	1.4	6.66	21.5	pCi/Fi
Lead-210	4	14	Lognormal	63.8	10.6	18	137	12.1	11.7	21.9	pCi/Fi
Plutonium-238	1	14	Lognormal	2.43	0.94	1.49	6	0.83	23.1	23.1	pCi/Fi
Plutonium-239/240	2	14	Lognormal	7.64	0.83	0.945	24.9	0.98	1.84	3.19	pCi/Fi
Plutonium-241	.	3	Undeterminable	23.3	25	23	4.73	9	.	.	
Polonium-210	.	14	Lognormal	29.4	9.85	13.6	82.5	2.2	.	.	
Radium-226	4	14	Lognormal	8.22	2.5	4.18	19	1.28	3.39	16.5	pCi/Fi
Radium-228	1	13	Lognormal	35.7	8.1	11.2	76.7	1.1	107	107	pCi/Fi
Strontium-90	.	14	Lognormal	17.9	1.6	2.32	60.8	0.5	.	.	
Technetium-99	6	16	Lognormal	977	64.5	105	2420	164	8.7	1310	pCi/Fi
Thorium-228	3	14	Lognormal	12.7	2.2	2.84	39.5	0.8	2.41	150	pCi/Fi
Thorium-230	3	14	Lognormal	24.3	2.7	7.71	35.8	51	5.39	56.3	pCi/Fi
Thorium-232	4	14	Lognormal	6.25	0.92	1.26	20.3	0.839	0.277	76.7	pCi/Fi
Uranium, Total	21	25	Lognormal	380	3.3	11.1	1090	41.6	0.34	5330	ug/100
Uranium-234	8	14	Lognormal	502	57	54.2	802	418	2.88	1900	pCi/Fi
Uranium-235/236	5	14	Lognormal	28.2	3.66	5.09	46.7	18.6	1.06	89.2	pCi/Fi
Uranium-238	8	14	Lognormal	508	79.7	53.7	807	424	2.99	1840	pCi/Fi

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				UNKNOWN LIQUID							
INORGANICS											
Aluminum	54	91	Lognormal	7040	252	509	21100	1320	27.4	148000	ug/L
Antimony	7	90	Lognormal	61.9	46	30.1	201	23.3	4.3	62.2	ug/L
Arsenic	29	91	Lognormal	4.52	2.3	2.67	6.69	2	0.89	43.7	ug/L
Barium	79	90	Lognormal	257	39.6	55.9	1130	63.8	3.2	10300	ug/L
Beryllium	15	87	Lognormal	3.5	1	1.39	7.36	3.39	1.2	49	ug/L
Cadmium	25	91	Lognormal	17.5	3	4.7	58.4	3	1.4	351	ug/L
Calcium	90	91	Lognormal	114000	50700	49900	277000	52600	8810	2090000	ug/L
Chromium	32	91	Lognormal	200	8	16	620	13.3	5.8	4190	ug/L
Cobalt	23	91	Lognormal	24.9	8	11.9	50.8	13.7	3.4	324	ug/L
Copper	58	91	Lognormal	798	30.6	48.6	2740	121	3.7	18200	ug/L
Iron	72	91	Lognormal	31700	909	1490	88800	6770	34.6	492000	ug/L
Lead	53	89	Lognormal	328	8.8	14.5	1530	70.8	1.2	13500	ug/L
Magnesium	87	91	Lognormal	37500	17400	14000	92500	31000	1130	852000	ug/L
Manganese	70	91	Lognormal	617	62	94.7	1660	518	6.2	14000	ug/L
Mercury	26	90	Lognormal	1.5	0.11	0.234	4.51	0.17	0.1	26.9	ug/L
Nickel	36	91	Lognormal	847	16.7	37.5	6060	70.9	8.2	57800	ug/L
Potassium	83	91	Lognormal	44700	4750	7210	138000	7320	750	716000	ug/L
Selenium	15	86	Lognormal	5.97	2	2.52	11.7	1.9	1	64.6	ug/L
Silver	23	84	Lognormal	19.7	4	5	58.2	2.85	1	357	ug/L
Sodium	85	91	Lognormal	150000	27000	26300	477000	45500	907	3490000	ug/L
Thallium	4	88	Undefined	2.29	1.5	1.78	2.37	2	0.76	2.1	ug/L
Vanadium	15	89	Lognormal	29.4	8	9.56	96.3	8	5.3	697	ug/L
Zinc	60	91	Lognormal	4230	127	155	28000	450	6.1	265000	ug/L

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
4,4'-DDE	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
4,4'-DDT	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Aldrin	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
alpha-BHC	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
alpha-Chlordane	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Aroclor-1016	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Aroclor-1221	.	1	Undeterminable	2.2	2.2	2.2	.	0	.	.	
Aroclor-1232	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Aroclor-1242	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Aroclor-1248	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Aroclor-1254	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
Aroclor-1260	.	1	Undeterminable	1.1	1.1	1.1	.	0	.	.	
beta-BHC	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Chlordane	.	1	Undeterminable	.	.	.		.		.	
delta-BHC	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Dieldrin	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Endosulfan II	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Endosulfan sulfate	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Endosulfan-I	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Endrin	.	2	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Endrin aldehyde	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
Endrin ketone	.	1	Undeterminable	0.11	0.11	0.11	.	0	.	.	
gamma-BHC (Lindane)	.	2	Undeterminable	0.056	0.056	0.056	.	0	.	.	
gamma-Chlordane	.	1	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Heptachlor	.	2	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Heptachlor epoxide	.	2	Undeterminable	0.056	0.056	0.056	.	0	.	.	
Methoxychlor	.	2	Undeterminable	0.56	0.56	0.56	.	0	.	.	
Toxaphene	.	2	Undeterminable	5.6	5.6	5.6	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	24	80	Lognormal	3.57	0.2	0.311	21	0.5	0.114	185	pCi/L
Cesium-137	10	88	Lognormal	8.25	6.74	5.17	12.9	6.1	1.6	110	pCi/L
Lead-210	43	86	Lognormal	115	16	23.1	220	116	1.6	873	pCi/L
Neptunium-237	20	88	Lognormal	3.06	0.2	0.32	22.4	0.508	0.14	210	pCi/L
Plutonium-238	25	85	Lognormal	17.3	0.19	0.196	149	0.286	0.019	1370	pCi/L
Plutonium-239/240	34	85	Lognormal	7.55	0.17	0.232	48	0.291	0.0439	430	pCi/L
Plutonium-241	10	39	Lognormal	273	1.9	5.1	1430	2.51	2.1	8230	pCi/L
Polonium-210	43	83	Lognormal	4.07	0.621	0.899	11.5	2.5	0.065	82	pCi/L
Radium-226	61	88	Lognormal	12.3	0.635	1.1	62.6	1.68	0.13	561	pCi/L
Radium-228	37	87	Lognormal	91	2.1	3.9	467	2.8	0.9	3850	pCi/L
Strontium-90	34	88	Lognormal	3.77	1.55	1.73	7.73	2.69	0.29	62.7	pCi/L
Technetium-99	76	88	Lognormal	1730	200	186	6550	493	7.86	47000	pCi/L
Thorium-228	51	82	Lognormal	68.4	0.43	1.36	347	2.56	0.14	2710	pCi/L
Thorium-230	51	82	Lognormal	413	0.697	2.21	3390	15	0.1	30700	pCi/L
Thorium-232	48	82	Lognormal	35.5	0.201	0.575	204	1.15	0.049	1780	pCi/L
Uranium, Total	87	89	Lognormal	22200	1700	1200	74300	5340	0.98	431000	ug/L
Uranium-234	77	84	Lognormal	16500	395	326	52900	1430	0.76	340000	pCi/L
Uranium-235/236	74	81	Lognormal	1500	45	35.3	5840	213	0.04	49000	pCi/L
Uranium-238	78	81	Lognormal	14200	570	360	41900	1220	0.602	230000	pCi/L

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	1	92	Lognormal	16.9	10	12	30.6	0	22	22	ug/L
1,2-Dichlorobenzene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
1,3-Dichlorobenzene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
1,4-Dichlorobenzene	1	92	Lognormal	16.7	10	11.7	30.6	0	5	5	ug/L
2,2-oxybis(1-Chloropropane)	.	75	Lognormal	17.2	10	12.1	32.4	1	.	.	
2,4,5-Trichlorophenol	.	91	Lognormal	45.1	25	30.9	80.7	1	.	.	
2,4,6-Trichlorophenol	.	91	Lognormal	17.9	10	12.3	32	1	.	.	
2,4-Dichlorophenol	1	91	Lognormal	16.8	10	11.8	30.8	0	3	3	ug/L
2,4-Dimethylphenol	5	92	Lognormal	17.4	10	11.6	31.2	0.5	1	71	ug/L
2,4-Dinitrophenol	2	82	Lognormal	46.9	25	30.9	84.9	1	7	18	ug/L
2,4-Dinitrotoluene	.	92	Lognormal	16.8	10	11.9	30.6	0	.	.	
2,6-Dinitrotoluene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
2-Chloronaphthalene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
2-Chlorophenol	.	91	Lognormal	17.9	10	12.2	32	0	.	.	
2-Methylnaphthalene	3	93	Lognormal	16.4	10	11	30.5	0	0.1	4	ug/L
2-Nitroaniline	.	93	Lognormal	42.3	25	30.1	76.9	1	.	.	
2-Nitrophenol	2	91	Lognormal	17.7	10	11.7	32	0	1	2	ug/L
3,3'-Dichlorobenzidine	.	73	Lognormal	18.6	10	12.5	34.2	1	.	.	
3-Nitroaniline	.	90	Lognormal	42.9	25	30.2	78.1	1	.	.	
4,6-Dinitro-2-methylphenol	.	91	Lognormal	45.1	25	30.9	80.7	1	.	.	
4-Bromophenyl phenyl ether	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
4-Chloro-3-methylphenol	1	90	Lognormal	17.9	10	11.8	32.2	0	0.4	0.4	ug/L
4-Chlorophenylphenyl ether	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
4-Nitroaniline	.	91	Lognormal	42.7	25	30.2	77.7	1	.	.	
4-Nitrophenol	3	88	Lognormal	44.8	25	28.9	82.3	1	1	7	ug/L
Acenaphthene	1	92	Lognormal	16.7	10	11.4	30.6	0	0.2	0.2	ug/L
Acenaphthylene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Anthracene	4	93	Lognormal	16.4	10	10.3	30.6	0	0.02	4	ug/L
Benzo(a)anthracene	4	93	Lognormal	16.3	10	10.8	30.6	0	0.7	4	ug/L
Benzo(a)pyrene	2	92	Lognormal	16.2	10	11.1	30.6	0	0.2	5	ug/L
Benzo(b)fluoranthene	3	92	Lognormal	16.2	10	11	30.6	0	0.6	7	ug/L
Benzo(g,h,i)perylene	.	92	Lognormal	16.5	10	11.8	30.5	0	.	.	
Benzo(k)fluoranthene	2	92	Lognormal	16.3	10	11	30.6	0	0.2	1	ug/L

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethoxy)methane	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
bis(2-Chloroethyl)ether	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
bis(2-Chloroisopropyl) ether	.	16	Undeterminable	10	10	10	0	0	.	.	
bis(2-Ethylhexyl)phthalate	21	93	Lognormal	22.7	10	11.1	49.8	0	0.8	280	ug/L
Butyl benzyl phthalate	6	93	Lognormal	17.4	10	11	32.7	0	0.2	130	ug/L
Carbazole	1	91	Lognormal	16.8	10	11.6	30.8	1	0.7	0.7	ug/L
Chrysene	5	93	Lognormal	16.2	10	10.4	30.6	0	0.5	6	ug/L
Di-n-butyl phthalate	5	92	Lognormal	19.6	10	11.7	41.9	0	1	290	ug/L
Di-n-octyl phthalate	9	93	Lognormal	15.6	10	9.94	30.2	0	0.3	87	ug/L
Dibenzo(a,h)anthracene	.	92	Lognormal	16.5	10	11.8	30.5	0	.	.	
Dibenzofuran	1	93	Lognormal	16.7	10	11.4	30.5	0	0.2	0.2	ug/L
Diethyl phthalate	7	93	Lognormal	16.2	10	10.8	25.8	0	0.1	190	ug/L
Dimethyl phthalate	3	93	Lognormal	16.6	10	11.3	30.5	0	0.2	14	ug/L
Fluoranthene	14	92	Lognormal	14.2	10	8.44	29.6	0	0.2	11	ug/L
Fluorene	1	93	Lognormal	16.7	10	11.5	30.5	0	0.3	0.3	ug/L
Hexachlorobenzene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Hexachlorobutadiene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Hexachlorocyclopentadiene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Hexachloroethane	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Indeno(1,2,3-cd)pyrene	.	92	Lognormal	16.5	10	11.8	30.5	0	.	.	
Isophorone	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
N-Nitroso-di-n-propylamine	.	92	Lognormal	16.8	10	11.9	30.6	0	.	.	
N-Nitrosodiphenylamine	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
Naphthalene	7	93	Lognormal	18	10	10.5	36	0	0.09	200	ug/L
Nitrobenzene	.	93	Lognormal	16.8	10	11.9	30.4	0	.	.	
o-Methylphenol	4	92	Lognormal	16.6	10	11.2	30.7	0	0.5	10	ug/L
p-Chloroaniline	.	86	Lognormal	17.2	10	12	31.6	0	.	.	
p-Methylphenol (Cresol)	7	91	Lognormal	15.7	10	10.5	30.6	0	0.5	20	ug/L
Pentachlorophenol	.	90	Lognormal	45.3	25	31	81.1	1	.	.	
Phenanthrene	11	93	Lognormal	15.4	10	9.17	30.7	0	0.06	8	ug/L
Phenol	10	90	Lognormal	22.9	10	11	62.4	0	0.3	520	ug/L
Pyrene	12	92	Lognormal	15.4	10	8.64	30.9	0	0.2	9	ug/L

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geometric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	9	92	Lognormal	117	10	15.1	546	0	0.4	290	ug/L
1,1,2,2-Tetrachloroethane	1	93	Lognormal	115	10	16.1	542	0	2	2	ug/L
1,1,2-Trichloroethane	.	93	Lognormal	115	10	16.4	542	0	.		
1,1-Dichloroethane	10	93	Lognormal	115	10	14.7	543	0	1	200	ug/L
1,1-Dichloroethene	.	93	Lognormal	115	10	16.4	542	0	.		
1,2-Dichloroethane	.	93	Lognormal	115	10	16.4	542	0	.		
1,2-Dichloroethene (Total)	1	86	Lognormal	65.8	10	16.1	186	0	40	40	ug/L
1,2-Dichloropropane	.	93	Lognormal	115	10	16.4	542	0	.		
2-Butanone	11	89	Lognormal	216	20	34	840	46	18	6100	ug/L
2-Hexanone	1	87	Lognormal	122	10	16.9	560	0	8	8	ug/L
4-Methyl-2-pentanone	4	92	Lognormal	117	10	16.7	545	0	6	95	ug/L
Acetone	15	67	Lognormal	7870	14	35.2	62300	40	7	510000	ug/L
Benzene	1	93	Lognormal	115	10	16.4	542	0	11	11	ug/L
Bromodichloromethane	.	93	Lognormal	115	10	16.4	542	0	.		
Bromoform	.	93	Lognormal	115	10	16.4	542	0	.		
Bromomethane	.	93	Lognormal	115	10	16.4	542	0	.		
Carbon disulfide	1	93	Lognormal	115	10	16.1	542	0	2	2	ug/L
Carbon Tetrachloride	.	93	Lognormal	115	10	16.4	542	0	.		
Chlorobenzene	.	93	Lognormal	115	10	16.4	542	0	.		
Chloroethane	.	93	Lognormal	115	10	16.4	542	0	.		
Chloroform	.	93	Lognormal	115	10	16.4	542	0	.		
Chloromethane	.	93	Lognormal	115	10	16.4	542	0	.		
cis-1,3-Dichloropropene	.	93	Lognormal	115	10	16.4	542	0	.		
Dibromochloromethane	.	93	Lognormal	115	10	16.4	542	0	.		
Ethylbenzene	5	93	Lognormal	115	10	15.4	542	0	1	13	ug/L
m,p-Xylene	.	3	Undeterminable	15	10	13.6	8.66	15	.		
Methylene chloride	2	93	Lognormal	170	10	17.5	749	0	1	5100	ug/L
o-Xylene	.	3	Undeterminable	15	10	13.6	8.66	15	.		
Pyridine	.	2	Undeterminable	15	15	14.1	7.07	10	.		
Styrene	3	93	Lognormal	115	10	15.9	542	0	1	17	ug/L
Tetrachloroethene	12	93	Lognormal	193	10	16.1	880	0	1	6800	ug/L
Toluene	14	93	Lognormal	119	10	14.9	543	0	1	370	ug/L
trans-1,2-Dichloroethene	.	7	Lognormal	723	10	24.3	1890	0	.		
trans-1,3-Dichloropropene	.	93	Lognormal	115	10	16.4	542	0	.		
Trichloroethene	3	93	Lognormal	115	10	16.3	542	0	3	78	ug/L
Trichlorofluoromethane	.	14	Lognormal	381	10	22.5	1330	10	.		
Vinyl chloride	1	93	Lognormal	115	10	16.4	542	0	9	9	ug/L
Xylenes, Total	8	93	Lognormal	116	10	16.1	542	0	1	93	ug/L

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
				WOOD							
INORGANICS											
Aluminum	2	2	Undeterminable	79.1	79.1	70.4	50.8	71.9	43.1	115	mg/kg
Antimony	1	2	Undeterminable	15.4	15.4	14.6	7.07	10	20.4	20.4	mg/kg
Arsenic	1	2	Undeterminable	1350	1350	42.5	1900	2690	2690	2690	mg/kg
Barium	2	2	Undeterminable	11.2	11.2	11	2.62	3.7	9.3	13	mg/kg
Beryllium	.	2	Undeterminable	0.125	0.125	0.0678	0.148	0.21	.	.	
Cadmium	.	2	Undeterminable	0.395	0.395	0.274	0.403	0.57	.	.	
Calcium	2	2	Undeterminable	2090	2090	1860	1320	1870	1150	3020	mg/kg
Chromium	1	2	Undeterminable	1370	1370	77.6	1940	2740	2740	2740	mg/kg
Cobalt	.	2	Undeterminable	1.04	1.04	0.697	1.08	1.53	.	.	
Copper	2	2	Undeterminable	850	850	123	1190	1680	9	1690	mg/kg
Iron	2	2	Undeterminable	475	475	258	564	798	76.4	874	mg/kg
Lead	2	2	Undeterminable	17.5	17.5	9.8	20.5	29	3	32	mg/kg
Magnesium	2	2	Undeterminable	394	394	354	243	344	222	566	mg/kg
Manganese	2	2	Undeterminable	44.8	44.8	44.6	5.59	7.9	40.8	48.7	mg/kg
Mercury	.	2	Undeterminable	0.07	0.07	0.0575	0.0566	0.08	.	.	
Nickel	1	2	Undeterminable	1.64	1.64	1.16	1.64	2.32	0.48	0.48	mg/kg
Potassium	1	2	Undeterminable	904	904	705	800	1130	1470	1470	mg/kg
Selenium	.	2	Undeterminable	0.44	0.44	0.375	0.325	0.46	.	.	
Silver	.	2	Undeterminable	0.56	0.56	0.445	0.481	0.68	.	.	
Sodium	2	2	Undeterminable	2820	2820	2630	1430	2020	1810	3830	mg/kg
Thallium	.	2	Undeterminable	0.6	0.6	0.52	0.424	0.6	.	.	
Vanadium	.	2	Undeterminable	0.585	0.585	0.493	0.445	0.63	.	.	
Zinc	2	2	Undeterminable	54.5	54.5	49.5	32.2	45.6	31.7	77.3	mg/kg

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
PESTICIDES/PCBs											
4,4'-DDD	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
4,4'-DDE	.	1	Undeterminable	18	18	18	.	0	.	.	
4,4'-DDT	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
Aldrin	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
alpha-BHC	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
alpha-Chlordane	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
Aroclor-1016	.	1	Undeterminable	36	36	36	.	0	.	.	
Aroclor-1221	.	1	Undeterminable	72	72	72	.	0	.	.	
Aroclor-1232	.	1	Undeterminable	36	36	36	.	0	.	.	
Aroclor-1242	.	1	Undeterminable	36	36	36	.	0	.	.	
Aroclor-1248	.	1	Undeterminable	36	36	36	.	0	.	.	
Aroclor-1254	.	1	Undeterminable	36	36	36	.	0	.	.	
Aroclor-1260	.	1	Undeterminable	36	36	36	.	0	.	.	
beta-BHC	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
delta-BHC	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
Dieldrin	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
Endosulfan II	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
Endosulfan sulfate	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
Endosulfan-I	1	1	Undeterminable	1.5	1.5	1.5	.	0	1.5	1.5	ug/kg
Endrin	1	1	Undeterminable	0.98	0.98	0.98	.	0	0.98	0.98	ug/kg
Endrin aldehyde	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
Endrin ketone	.	1	Undeterminable	3.6	3.6	3.6	.	0	.	.	
gamma-BHC (Lindane)	.	1	Undeterminable	9	9	9	.	0	.	.	
gamma-Chlordane	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
Heptachlor	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
Heptachlor epoxide	.	1	Undeterminable	1.8	1.8	1.8	.	0	.	.	
Methoxychlor	.	1	Undeterminable	90	90	90	.	0	.	.	
Toxaphene	.	1	Undeterminable	180	180	180	.	0	.	.	

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
RADIONUCLIDES											
Americium-241	1	2	Undeterminable	0.0679	0.0679	0.0598	0.0455	0.0643	0.1	0.1	pCi/g
Cesium-137	.	2	Undeterminable	0.22	0.22	0.219	0.0283	0.04	.	.	
Lead-210	2	2	Undeterminable	5	5	3.25	5.37	7.6	1.2	8.8	pCi/g
Neptunium-237	1	2	Undeterminable	0.065	0.065	0.06	0.0354	0.05	0.09	0.09	pCi/g
Plutonium-238	1	2	Undeterminable	0.8	0.8	0.529	0.849	1.2	1.4	1.4	pCi/g
Plutonium-239/240	1	2	Undeterminable	0.065	0.065	0.0548	0.0495	0.07	0.03	0.03	pCi/g
Plutonium-241	.	1	Undeterminable	0.69	0.69	0.69	.	0	.	.	
Polonium-210	1	1	Undeterminable	6.8	6.8	6.8	.	0	6.8	6.8	pCi/g
Radium-226	2	2	Undeterminable	1	1	0.436	1.27	1.8	0.1	1.9	pCi/g
Radium-228	1	2	Undeterminable	2.85	2.85	1.27	3.61	5.1	5.4	5.4	pCi/g
Strontium-90	1	2	Undeterminable	0.715	0.715	0.602	0.544	0.77	0.33	0.33	pCi/g
Technetium-99	1	2	Undeterminable	3.35	3.35	1.59	4.17	5.9	6.3	6.3	pCi/g
Thorium-228	2	2	Undeterminable	1.25	1.25	0.678	1.48	2.1	0.2	2.3	pCi/g
Thorium-230	1	2	Undeterminable	1.65	1.65	0.566	2.19	3.1	3.2	3.2	pCi/g
Thorium-232	1	2	Undeterminable	0.92	0.92	0.268	1.24	1.76	1.8	1.8	pCi/g
Uranium, Total	2	2	Undeterminable	1300	1300	45.6	1840	2600	0.8	2600	ug/g
Uranium-234	2	2	Undeterminable	129	129	7.18	182	258	0.2	258	pCi/g
Uranium-235/236	1	2	Undeterminable	6.7	6.7	1.15	9.33	13.2	13.3	13.3	pCi/g
Uranium-238	2	2	Undeterminable	127	127	8.73	179	254	0.3	254	pCi/g

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TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS											
1,2,4-Trichlorobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
1,2-Dichlorobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
1,3-Dichlorobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
1,4-Dichlorobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
2,2-oxybis(1-Chloropropane)	.	1	Undeterminable	340	340	340	.	0	.	.	
2,4,5-Trichlorophenol	.	1	Undeterminable	820	820	820	.	0	.	.	
2,4,6-Trichlorophenol	.	1	Undeterminable	340	340	340	.	0	.	.	
2,4-Dichlorophenol	.	1	Undeterminable	340	340	340	.	0	.	.	
2,4-Dimethylphenol	.	1	Undeterminable	340	340	340	.	0	.	.	
2,4-Dinitrophenol	.	1	Undeterminable	820	820	820	.	0	.	.	
2,4-Dinitrotoluene	.	1	Undeterminable	340	340	340	.	0	.	.	
2,6-Dinitrotoluene	.	1	Undeterminable	340	340	340	.	0	.	.	
2-Chloronaphthalene	.	1	Undeterminable	340	340	340	.	0	.	.	
2-Chlorophenol	.	1	Undeterminable	340	340	340	.	0	.	.	
2-Methylnaphthalene	.	1	Undeterminable	340	340	340	.	0	.	.	
2-Nitroaniline	.	1	Undeterminable	820	820	820	.	0	.	.	
2-Nitrophenol	.	1	Undeterminable	340	340	340	.	0	.	.	
3,3'-Dichlorobenzidine	.	1	Undeterminable	340	340	340	.	0	.	.	
3-Nitroaniline	.	1	Undeterminable	820	820	820	.	0	.	.	
4,6-Dinitro-2-methylphenol	.	1	Undeterminable	820	820	820	.	0	.	.	
4-Bromophenyl phenyl ether	.	1	Undeterminable	340	340	340	.	0	.	.	
4-Chloro-3-methylphenol	.	1	Undeterminable	340	340	340	.	0	.	.	
4-Chlorophenylphenyl ether	.	1	Undeterminable	340	340	340	.	0	.	.	
4-Nitroaniline	.	1	Undeterminable	820	820	820	.	0	.	.	
4-Nitrophenol	.	1	Undeterminable	820	820	820	.	0	.	.	
Acenaphthene	.	1	Undeterminable	340	340	340	.	0	.	.	
Acenaphthylene	.	1	Undeterminable	340	340	340	.	0	.	.	
Anthracene	.	1	Undeterminable	340	340	340	.	0	.	.	
Benzo(a)anthracene	1	1	Undeterminable	110	110	110	.	0	110	110	ug/kg
Benzo(a)pyrene	1	1	Undeterminable	85	85	85	.	0	85	85	ug/kg
Benzo(b)fluoranthene	1	1	Undeterminable	100	100	100	.	0	100	100	ug/kg
Benzo(g,h,i)perylene	.	1	Undeterminable	340	340	340	.	0	.	.	
Benzo(k)fluoranthene	1	1	Undeterminable	120	120	120	.	0	120	120	ug/kg
bis(2-Chloroethoxy)methane	.	1	Undeterminable	340	340	340	.	0	.	.	

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
SEMIVOLATILE ORGANICS (cont.)											
bis(2-Chloroethyl)ether	.	1	Undeterminable	340	340	340	.	0	.	.	
bis(2-Ethylhexyl)phthalate	.	1	Undeterminable	340	340	340	.	0	.	.	
Butyl benzyl phthalate	.	1	Undeterminable	340	340	340	.	0	.	.	
Carbazole	1	1	Undeterminable	21	21	21	.	0	21	21	ug/kg
Chrysene	1	1	Undeterminable	170	170	170	.	0	170	170	ug/kg
Di-n-butyl phthalate	.	1	Undeterminable	340	340	340	.	0	.	.	
Dibenzo(a,h)anthracene	.	1	Undeterminable	340	340	340	.	0	.	.	
Dibenzofuran	1	1	Undeterminable	19	19	19	.	0	19	19	ug/kg
Diethyl phthalate	.	1	Undeterminable	340	340	340	.	0	.	.	
Dimethyl phthalate	.	1	Undeterminable	340	340	340	.	0	.	.	
Fluoranthene	1	1	Undeterminable	260	260	260	.	0	260	260	ug/kg
Fluorene	.	1	Undeterminable	340	340	340	.	0	.	.	
Hexachlorobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
Hexachlorobutadiene	.	1	Undeterminable	340	340	340	.	0	.	.	
Hexachlorocyclopentadiene	.	1	Undeterminable	340	340	340	.	0	.	.	
Hexachloroethane	.	1	Undeterminable	340	340	340	.	0	.	.	
Indeno(1,2,3-cd)pyrene	.	1	Undeterminable	340	340	340	.	0	.	.	
Isophorone	.	1	Undeterminable	340	340	340	.	0	.	.	
N-Nitroso-di-n-propylamine	.	1	Undeterminable	340	340	340	.	0	.	.	
N-Nitrosodiphenylamine	.	1	Undeterminable	340	340	340	.	0	.	.	
Naphthalene	.	1	Undeterminable	340	340	340	.	0	.	.	
Nitrobenzene	.	1	Undeterminable	340	340	340	.	0	.	.	
o-Methylphenol	.	1	Undeterminable	340	340	340	.	0	.	.	
p-Chloroaniline	.	1	Undeterminable	340	340	340	.	0	.	.	
p-Methylphenol (Cresol)	.	1	Undeterminable	340	340	340	.	0	.	.	
Pentachlorophenol	.	1	Undeterminable	820	820	820	.	0	.	.	
Phenanthrene	1	1	Undeterminable	150	150	150	.	0	150	150	ug/kg
Phenol	.	1	Undeterminable	340	340	340	.	0	.	.	
Pyrene	1	1	Undeterminable	260	260	260	.	0	260	260	ug/kg

TABLE A.III-1
SUMMARY STATISTICS FOR ALL ANALYTES BY SAMPLED MEDIA TYPE

Parameter	# of Detects	# of Samples	Distribution	Summary Statistics: Mean	Median	Geormetric Mean	Standard Deviation	Inter-Quartil Range	Minimum Detect	Maximum Detect	Units
VOLATILE ORGANICS											
1,1,1-Trichloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
1,1,2,2-Tetrachloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
1,1,2-Trichloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
1,1-Dichloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
1,1-Dichloroethene	.	1	Undeterminable	900	900	900	.	0	.	.	
1,2-Dichloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
1,2-Dichloroethene (Total)	.	1	Undeterminable	900	900	900	.	0	.	.	
1,2-Dichloropropane	.	1	Undeterminable	900	900	900	.	0	.	.	
2-Butanone	.	1	Undeterminable	900	900	900	.	0	.	.	
2-Hexanone	.	1	Undeterminable	900	900	900	.	0	.	.	
4-Methyl-2-pentanone	.	1	Undeterminable	900	900	900	.	0	.	.	
Acetone	.	1	Undeterminable	900	900	900	.	0	.	.	
Benzene	.	1	Undeterminable	900	900	900	.	0	.	.	
Bromodichloromethane	.	1	Undeterminable	900	900	900	.	0	.	.	
Bromoform	.	1	Undeterminable	900	900	900	.	0	.	.	
Bromomethane	.	1	Undeterminable	900	900	900	.	0	.	.	
Carbon disulfide	.	1	Undeterminable	900	900	900	.	0	.	.	
Carbon Tetrachloride	.	1	Undeterminable	900	900	900	.	0	.	.	
Chlorobenzene	.	1	Undeterminable	900	900	900	.	0	.	.	
Chloroethane	.	1	Undeterminable	900	900	900	.	0	.	.	
Chloroform	.	1	Undeterminable	900	900	900	.	0	.	.	
Chloromethane	.	1	Undeterminable	900	900	900	.	0	.	.	
cis-1,3-Dichloropropene	.	1	Undeterminable	900	900	900	.	0	.	.	
Dibromochloromethane	.	1	Undeterminable	900	900	900	.	0	.	.	
Ethylbenzene	.	1	Undeterminable	900	900	900	.	0	.	.	
Methylene chloride	.	1	Undeterminable	900	900	900	.	0	.	.	
Styrene	.	1	Undeterminable	900	900	900	.	0	.	.	
Tetrachloroethene	.	1	Undeterminable	900	900	900	.	0	.	.	
Toluene	.	1	Undeterminable	900	900	900	.	0	.	.	
trans-1,3-Dichloropropene	.	1	Undeterminable	900	900	900	.	0	.	.	
Trichloroethene	.	1	Undeterminable	900	900	900	.	0	.	.	
Vinyl chloride	.	1	Undeterminable	900	900	900	.	0	.	.	
Xylenes, Total	.	1	Undeterminable	900	900	900	.	0	.	.	

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
			ACID BRICK					
INORGANICS								
Aluminum	23	24	0	0	0	0	0	0
Antimony	3	18	0	0	0	0	3	0
Arsenic	17	24	17	0	0	0	3	0
Barium	24	24	0	0	0	0	18	0
Beryllium	2	24	2	0	0	0	0	0
Cadmium	7	24	0	0	0	0	1	0
Calcium	21	24	0	0	0	0	0	0
Chromium	20	24	3	4	0	0	11	0
Cobalt	13	24	0	0	0	0	2	0
Copper	21	24	1	0	0	0	17	0
Iron	24	24	0	0	0	0	2	0
Lead	22	24	0	5	0	0	22	0
Magnesium	22	24	0	0	0	0	0	0
Manganese	24	24	0	0	0	0	0	0
Mercury	15	24	0	2	0	0	15	0
Nickel	16	24	0	0	0	0	11	0
Potassium	16	24	0	0	0	0	4	0
Selenium	4	23	0	0	0	0	4	0
Silver	9	24	0	0	0	0	1	0
Sodium	19	24	0	0	0	0	5	0
Thallium	.	24	.	.	.	.	.	.
Vanadium	12	24	0	0	0	0	0	0
Zinc	18	24	0	0	0	0	10	0

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	13	20	8	NA [a]	0	0	13	0
Cesium-137	10	21	10	NA [a]	0	0	10	0
Lead-210	17	21	17	NA [a]	0	0	16	0
Neptunium-237	10	20	10	NA [a]	0	0	9	0
Plutonium-238	10	20	6	NA [a]	0	0	7	0
Plutonium-239/240	12	20	8	NA [a]	0	0	8	0
Plutonium-241	8	18	4	NA [a]	0	0	6	0
Polonium-210	16	20	14	NA [a]	0	0	12	0
Radium-226	21	21	21	NA [a]	0	0	13	0
Radium-228	18	21	17	NA [a]	0	0	18	0
Strontium-90	9	21	1	NA [a]	0	0	0	0
Technetium-99	20	21	4	NA [a]	0	0	19	0
Thorium-227	.	6	.	NA [a]	.	.	.	.
Thorium-228	13	18	13	NA [a]	0	0	13	0
Thorium-230	16	18	10	NA [a]	0	0	16	0
Thorium-232	13	18	5	NA [a]	0	0	13	0
Uranium, Total	21	21	21	NA [a]	14	0	19	0
Uranium-234	18	22	17	NA [a]	16	0	16	0
Uranium-235/236	17	20	17	NA [a]	15	0	16	0
Uranium-238	17	20	17	NA [a]	15	0	16	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	3	.	.	.	.	.	.
1,2-Dichlorobenzene	.	3	.	.	.	.	.	.
1,3-Dichlorobenzene	.	3	.	.	.	.	.	.
1,4-Dichlorobenzene	.	3	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	3	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	3	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	3	.	.	.	.	.	.
2,4-Dichlorophenol	.	3	.	.	.	.	.	.
2,4-Dimethylphenol	.	3	.	.	.	.	.	.
2,4-Dinitrophenol	.	2	.	.	.	.	.	.
2,4-Dinitrotoluene	.	3	.	.	.	.	.	.
2,6-Dinitrotoluene	.	3	.	.	.	.	.	.
2-Chloronaphthalene	.	3	.	.	.	.	.	.
2-Chlorophenol	1	3	0	0	0	0	0	0
2-Methylnaphthalene	.	3	.	.	.	.	.	.
2-Nitroaniline	.	3	.	.	.	.	.	.
2-Nitrophenol	.	3	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	3	.	.	.	.	.	.
3-Nitroaniline	.	3	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	3	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	3	.	.	.	.	.	.
4-Chloro-3-methylphenol	1	3	0	0	0	0	0	0
4-Chlorophenylphenyl ether	.	3	.	.	.	.	.	.
4-Nitroaniline	.	3	.	.	.	.	.	.
4-Nitrophenol	.	3	.	.	.	.	.	.
Acenaphthene	1	3	0	0	0	0	0	0
Acenaphthylene	.	3	.	.	.	.	.	.
Anthracene	.	3	.	.	.	.	.	.
Benzo(a)anthracene	.	3	.	.	.	.	.	.
Benzo(a)pyrene	1	3	1	0	0	0	0	0
Benzo(b)fluoranthene	2	3	1	0	0	0	0	0
Benzo(g,h,i)perylene	.	3	.	.	.	.	.	.
Benzo(k)fluoranthene	.	3	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	3	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	3	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	1	3	0	0	0	0	0	0
Butyl benzyl phthalate	.	3	.	.	.	.	.	.
Carbazole	.	3	.	.	.	.	.	.
Chrysene	2	3	0	0	0	0	0	0
Di-n-butyl phthalate	.	3	.	.	.	.	.	.
Di-n-octyl phthalate	1	3	0	0	0	0	0	0
Dibenzo(a,h)anthracene	.	3	.	.	.	.	.	.
Dibenzofuran	.	3	.	.	.	.	.	.
Diethyl phthalate	.	3	.	.	.	.	.	.
Dimethyl phthalate	.	3	.	.	.	.	.	.
Fluoranthene	2	3	0	0	0	0	0	0
Fluorene	.	3	.	.	.	.	.	.
Hexachlorobenzene	.	3	.	.	.	.	.	.
Hexachlorobutadiene	.	3	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	3	.	.	.	.	.	.
Hexachloroethane	.	3	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	3	.	.	.	.	.	.
Isophorone	.	3	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	3	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	3	.	.	.	.	.	.
Naphthalene	.	3	.	.	.	.	.	.
Nitrobenzene	.	3	.	.	.	.	.	.
o-Methylphenol	.	3	.	.	.	.	.	.
p-Chloroaniline	.	3	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	3	.	.	.	.	.	.
Pentachlorophenol	.	2	.	.	.	.	.	.
Phenanthrene	1	3	0	0	0	0	0	0
Phenol	1	3	0	0	0	0	0	0
Pyrene	1	3	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	1	4	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	4	.	.	.	.	.	.
1,1,2-Trichloroethane	.	4	.	.	.	.	.	.
1,1-Dichloroethane	.	4	.	.	.	.	.	.
1,1-Dichloroethene	.	4	.	.	.	.	.	.
1,2-Dichloroethane	.	4	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	4	.	.	.	.	.	.
1,2-Dichloropropane	.	4	.	.	.	.	.	.
2-Butanone	2	4	0	0	0	0	0	0
2-Hexanone	.	4	.	.	.	.	.	.
4-Methyl-2-pentanone	.	4	.	.	.	.	.	.
Acetone	.	2	.	.	.	.	.	.
Benzene	.	4	.	.	.	.	.	.
Bromodichloromethane	.	4	.	.	.	.	.	.
Bromoform	.	4	.	.	.	.	.	.
Bromomethane	.	4	.	.	.	.	.	.
Carbon disulfide	.	4	.	.	.	.	.	.
Carbon Tetrachloride	.	4	.	.	.	.	.	.
Chlorobenzene	.	4	.	.	.	.	.	.
Chloroethane	.	2	.	.	.	.	.	.
Chloroform	.	4	.	.	.	.	.	.
Chloromethane	.	4	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	4	.	.	.	.	.	.
Dibromochloromethane	.	4	.	.	.	.	.	.
Ethylbenzene	1	4	0	0	0	0	0	0
m,p-Xylene	1	1	0	0	0	0	0	0
Methylene chloride	1	4	0	0	0	0	0	0
o-Xylene	1	1	0	0	0	0	0	0
Styrene	1	4	0	0	0	0	0	0
Tetrachloroethene	1	4	0	0	0	0	0	0
Toluene	1	4	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	4	.	.	.	.	.	.
Trichloroethene	.	4	.	.	.	.	.	.
Trichlorofluoromethane	1	3	0	0	0	0	0	0
Vinyl chloride	.	4	.	.	.	.	.	.
Xylenes, Total	1	4	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	AIR FILTERS							
INORGANICS								
Aluminum	1	1	0	0	0	0	0	0
Antimony	.	1	.	.	.	.	.	.
Arsenic	1	1	1	0	0	0	0	0
Barium	.	1	.	.	.	.	.	.
Beryllium	.	1	.	.	.	.	.	.
Cadmium	1	1	0	0	0	0	0	0
Calcium	1	1	0	0	0	0	0	0
Chromium	1	1	1	1	0	0	0	0
Cobalt	.	1	.	.	.	.	.	.
Copper	.	1	.	.	.	.	.	.
Iron	1	1	0	0	0	0	0	0
Lead	1	1	0	0	0	0	0	0
Magnesium	1	1	0	0	0	0	0	0
Manganese	1	1	0	0	0	0	0	0
Mercury	.	1	.	.	.	.	.	.
Nickel	1	1	0	0	0	0	0	0
Potassium	1	1	0	0	0	0	0	0
Selenium	1	1	0	0	0	0	0	0
Silver	.	1	.	.	.	.	.	.
Sodium	1	1	0	0	0	0	0	0
Thallium	.	1	.	.	.	.	.	.
Vanadium	.	1	.	.	.	.	.	.
Zinc	1	1	0	0	0	0	0	0

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a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	.	23	.	NA [a]	.	.	.	.
Cesium-137	10	29	10	NA [a]	0	0	0	0
Lead-210	7	21	6	NA [a]	0	0	0	0
Neptunium-237	.	3	.	NA [a]	.	.	.	.
Plutonium-238	2	22	2	NA [a]	0	0	0	0
Plutonium-239/240	.	22	.	NA [a]	.	.	.	.
Polonium-210	16	19	16	NA [a]	0	0	0	0
Radium-226	6	29	6	NA [a]	0	0	0	0
Radium-228	5	20	2	NA [a]	0	0	0	0
Strontium-90	1	21	1	NA [a]	0	0	0	0
Technetium-99	1	11	0	NA [a]	0	0	0	0
Thorium-228	5	22	5	NA [a]	0	0	0	0
Thorium-230	11	22	5	NA [a]	0	0	0	0
Thorium-232	7	22	3	NA [a]	0	0	0	0
Uranium, Total	30	43	24	NA [a]	2	0	0	0
Uranium-234	15	21	11	NA [a]	3	0	0	0
Uranium-235/236	9	23	9	NA [a]	3	0	0	0
Uranium-238	15	21	15	NA [a]	2	0	0	0

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	ASPHALT							
INORGANICS								
Aluminum	3	4	0	0	0	0	0	0
Antimony	.	4	.	.	.	.	.	.
Arsenic	4	4	4	0	0	0	1	0
Barium	4	4	0	0	0	0	0	0
Beryllium	.	4	.	.	.	.	.	.
Cadmium	.	4	.	.	.	.	.	.
Calcium	4	4	0	0	0	0	2	0
Chromium	2	4	0	0	0	0	0	0
Cobalt	1	4	0	0	0	0	0	0
Copper	3	4	0	0	0	0	0	0
Iron	4	4	0	0	0	0	0	0
Lead	4	4	0	0	0	0	2	0
Magnesium	4	4	0	0	0	0	2	0
Manganese	4	4	4	0	0	0	2	0
Mercury	.	4	.	.	.	.	.	.
Nickel	1	4	0	0	0	0	0	0
Potassium	1	4	0	0	0	0	0	0
Selenium	.	4	.	.	.	.	.	.
Silver	.	4	.	.	.	.	.	.
Sodium	4	4	0	0	0	0	0	0
Thallium	.	4	.	.	.	.	.	.
Vanadium	4	4	0	0	0	0	1	0
Zinc	4	4	0	0	0	0	2	0

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a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	2	.	.	.	.	.	.
4,4'-DDE	.	2	.	.	.	.	.	.
4,4'-DDT	.	2	.	.	.	.	.	.
Aldrin	.	2	.	.	.	.	.	.
Aroclor-1016	.	2	.	.	.	.	.	.
Aroclor-1221	.	2	.	.	.	.	.	.
Aroclor-1232	.	2	.	.	.	.	.	.
Aroclor-1242	.	2	.	.	.	.	.	.
Aroclor-1248	.	2	.	.	.	.	.	.
Aroclor-1254	.	2	.	.	.	.	.	.
Aroclor-1260	.	2	.	.	.	.	.	.
Dieldrin	.	2	.	.	.	.	.	.
Endosulfan II	.	2	.	.	.	.	.	.
Endosulfan sulfate	.	2	.	.	.	.	.	.
Endosulfan-I	.	2	.	.	.	.	.	.
Endrin	.	2	.	.	.	.	.	.
Endrin aldehyde	.	2	.	.	.	.	.	.
Endrin ketone	.	2	.	.	.	.	.	.
Heptachlor	.	2	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	.	2	.	.	.	.	.	.
Toxaphene	.	2	.	.	.	.	.	.
alpha-BHC	.	2	.	.	.	.	.	.
alpha-Chlordane	.	2	.	.	.	.	.	.
beta-BHC	.	2	.	.	.	.	.	.
delta-BHC	.	2	.	.	.	.	.	.
gamma-BHC (Lindane)	.	2	.	.	.	.	.	.
gamma-Chlordane	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	.	4	.	NA [a]	.	.	.	.
Cesium-137*	3	4	3	NA [a]	0	0	0	0
Lead-210	3	4	3	NA [a]	0	0	2	0
Neptunium-237	.	4	.	NA [a]	.	.	.	.
Plutonium-238	1	4	0	NA [a]	0	0	1	0
Plutonium-239/240	1	4	0	NA [a]	0	0	0	0
Polonium-210	3	4	2	NA [a]	0	0	2	0
Radium-226	4	4	4	NA [a]	0	0	1	0
Radium-228	4	4	1	NA [a]	0	0	3	0
Strontium-90	2	4	2	NA [a]	0	0	0	0
Technetium-99	2	4	0	NA [a]	0	0	2	0
Thorium-228	4	4	4	NA [a]	0	0	1	0
Thorium-230	4	4	0	NA [a]	0	0	1	0
Thorium-232	4	4	0	NA [a]	0	0	1	0
Uranium, Total	4	4	4	NA [a]	0	0	4	0
Uranium-234	3	4	1	NA [a]	0	0	1	0
Uranium-235/236	2	4	2	NA [a]	0	0	1	0
Uranium-238	3	4	3	NA [a]	0	0	1	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

			Detects Above Given Criteria					
Parameter	# of Detects	# of Samples	Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	2	.	.	.	.	.	.
1,2-Dichlorobenzene	.	2	.	.	.	.	.	.
1,3-Dichlorobenzene	.	2	.	.	.	.	.	.
1,4-Dichlorobenzene	.	2	.	.	.	.	.	.
2,2-oxybis(1-Chloroprop	.	2	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	2	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	2	.	.	.	.	.	.
2,4-Dichlorophenol	.	2	.	.	.	.	.	.
2,4-Dimethylphenol	.	2	.	.	.	.	.	.
2,4-Dinitrophenol	.	2	.	.	.	.	.	.
2,4-Dinitrotoluene	.	2	.	.	.	.	.	.
2,6-Dinitrotoluene	.	2	.	.	.	.	.	.
2-Chloronaphthalene	.	2	.	.	.	.	.	.
2-Chlorophenol	.	2	.	.	.	.	.	.
2-Methylnaphthalene	2	2	0	0	0	0	0	0
2-Nitroaniline	.	2	.	.	.	.	.	.
2-Nitrophenol	.	2	.	.	.	.	.	.
3-Nitroaniline	.	2	.	.	.	.	.	.
4,6-Dinitro-2-methylphe	.	2	.	.	.	.	.	.
4-Bromophenyl phenyl et	.	2	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	2	.	.	.	.	.	.
4-Chlorophenylphenyl et	.	2	.	.	.	.	.	.
4-Nitroaniline	.	2	.	.	.	.	.	.
4-Nitrophenol	.	2	.	.	.	.	.	.
Acenaphthene	.	2	.	.	.	.	.	.
Acenaphthylene	.	2	.	.	.	.	.	.
Anthracene	.	2	.	.	.	.	.	.
Benzo(a)anthracene	2	2	2	0	0	0	0	0
Benzo(a)pyrene	.	2	.	.	.	.	.	.
Benzo(b)fluoranthene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
Benzo(g,h,i)perylene	.	2	.	.	.	.	.	.
Benzo(k)fluoranthene	.	2	.	.	.	.	.	.
Butyl benzyl phthalate	.	2	.	.	.	.	.	.
Carbazole	.	2	.	.	.	.	.	.
Chrysene	2	2	.	.	.	.	.	.
Di-n-butyl phthalate	.	2	.	.	.	.	.	.
Di-n-octyl phthalate	.	2	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	2	0	0	0	0	0	0
Dibenzofuran	.	2	.	.	.	.	.	.
Diethyl phthalate	.	2	.	.	.	.	.	.
Dimethyl phthalate	.	2	.	.	.	.	.	.
Fluoranthene	2	2	.	.	.	.	.	.
Fluorene	.	2	.	.	.	.	.	.
Hexachlorobenzene	.	2	.	.	.	.	.	.
Hexachlorobutadiene	.	2	0	0	0	0	0	0
Hexachlorocyclopentadie	.	2	.	.	.	.	.	.
Hexachloroethane	.	2	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	2	.	.	.	.	.	.
Isophorone	.	2	.	.	.	.	.	.
N-Nitroso-di-n-propylam	.	2	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	2	.	.	.	.	.	.
Naphthalene	.	2	.	.	.	.	.	.
Nitrobenzene	.	2	.	.	.	.	.	.
Pentachlorophenol	.	2	.	.	.	.	.	.
Phenanthrene	2	2	.	.	.	.	.	.
Phenol	.	2	.	.	.	.	.	.
Pyrene	2	2	.	.	.	.	.	.
bis(2-Chloroethoxy)meth	.	2	.	.	.	.	.	.
bis(2-Chloroethyl)ether	.	2	.	.	.	.	.	.
bis(2-Ethylhexyl)phthal	.	2	.	.	.	.	.	.
o-Methylphenol	.	2	0	0	0	0	0	0
p-Chloroaniline	.	2	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	2	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	2	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	2	.	.	.	.	.	.
1,1,2-Trichloroethane	.	2	.	.	.	.	.	.
1,1-Dichloroethane	.	2	.	.	.	.	.	.
1,1-Dichloroethene	.	2	.	.	.	.	.	.
1,2-Dichloroethane	.	2	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	2	.	.	.	.	.	.
1,2-Dichloropropane	.	2	.	.	.	.	.	.
2-Butanone	1	2	0	0	0	0	0	0
2-Hexanone	.	2	.	.	.	.	.	.
4-Methyl-2-pentanone	.	2	.	.	.	.	.	.
Benzene	.	2	.	.	.	.	.	.
Bromodichloromethane	.	2	.	.	.	.	.	.
Bromoform	.	2	.	.	.	.	.	.
Bromomethane	.	2	.	.	.	.	.	.
Carbon Tetrachloride	.	2	.	.	.	.	.	.
Carbon disulfide	.	2	.	.	.	.	.	.
Chlorobenzene	.	2	.	.	.	.	.	.
Chloroethane	.	2	.	.	.	.	.	.
Chloroform	.	2	.	.	.	.	.	.
Chloromethane	.	2	.	.	.	.	.	.
Dibromochloromethane	.	2	.	.	.	.	.	.
Ethylbenzene	.	2	.	.	.	.	.	.
Methylene chloride	.	2	.	.	.	.	.	.
Styrene	.	2	.	.	.	.	.	.
Tetrachloroethene	.	2	.	.	.	.	.	.
Toluene	.	2	.	.	.	.	.	.
Trichloroethene	.	2	.	.	.	.	.	.
Vinyl chloride	.	2	.	.	.	.	.	.
Xylenes, Total	.	2	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	2	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	CONCRETE CHIPS							
INORGANICS								
Aluminum	154	154	0	0	0	0	77	0
Antimony	26	130	9	0	0	0	24	0
Arsenic	145	152	145	0	0	0	90	0
Barium	154	154	1	1	0	0	99	0
Beryllium	67	149	67	0	0	0	8	0
Cadmium	38	154	1	1	0	0	11	0
Calcium	154	154	0	0	0	0	31	0
Chromium	135	154	5	5	0	0	103	0
Cobalt	83	154	0	0	0	0	49	0
Copper	128	152	1	0	0	0	78	0
Iron	154	154	0	0	0	0	36	0
Lead	144	154	0	13	0	0	134	0
Magnesium	154	154	0	0	0	0	17	0
Manganese	154	154	152	0	0	0	57	0
Mercury	26	144	0	1	0	0	25	0
Nickel	111	154	0	0	0	0	60	0
Potassium	118	154	0	0	0	0	88	0
Selenium	13	125	0	0	0	0	13	0
Silver	29	151	0	0	0	0	12	0
Sodium	137	154	0	0	0	0	96	0
Thallium	11	147	1	0	0	0	6	0
Vanadium	119	154	0	0	0	0	52	0
Zinc	145	154	1	0	0	0	116	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	13	.	.	.	.	.	.
4,4'-DDE	3	13	0	0	0	0	0	0
4,4'-DDT	.	13	.	.	.	.	.	.
Aldrin	.	13	.	.	.	.	.	.
alpha-BHC	.	13	.	.	.	.	.	.
alpha-Chlordane	2	13	1	0	0	0	0	0
Aroclor-1016	.	14	.	.	.	.	.	.
Aroclor-1221	.	14	.	.	.	.	.	.
Aroclor-1232	.	14	.	.	.	.	.	.
Aroclor-1242	.	14	.	.	.	.	.	.
Aroclor-1248	1	14	1	0	0	0	0	0
Aroclor-1254	2	14	2	0	0	0	0	0
Aroclor-1260	2	14	2	0	0	0	0	0
beta-BHC	.	13	.	.	.	.	.	.
Chlordane	.	2	.	.	.	.	.	.
delta-BHC	1	13	0	0	0	0	0	0
Dieldrin	4	13	2	0	0	0	0	0
Endosulfan II	2	13	0	0	0	0	0	0
Endosulfan sulfate	3	13	0	0	0	0	0	0
Endosulfan-I	1	13	0	0	0	0	0	0
Endrin	.	13	.	.	.	.	.	.
Endrin aldehyde	.	13	.	.	.	.	.	.
Endrin ketone	1	13	0	0	0	0	0	0
gamma-BHC (Lindane)	.	13	.	.	.	.	.	.
gamma-Chlordane	2	13	1	0	0	0	0	0
Heptachlor	.	13	.	.	.	.	.	.
Heptachlor epoxide	1	13	0	0	0	0	0	0
Methoxychlor	.	13	.	.	.	.	.	.
Toxaphene	.	13	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	45	142	23	NA [a]	0	0	36	0
Cesium-137	36	152	36	NA [a]	0	0	18	0
Gross Alpha	.	25	.	NA [a]	.	.	.	.
Gross Beta	.	25	.	NA [a]	.	.	.	.
Lead-210	89	149	89	NA [a]	0	0	56	0
Neptunium-237	42	148	42	NA [a]	0	0	27	0
Plutonium-238	54	150	21	NA [a]	0	0	37	0
Plutonium-239/240	52	150	15	NA [a]	0	0	30	0
Plutonium-241	27	85	3	NA [a]	0	0	15	0
Polonium-210	124	148	67	NA [a]	0	0	23	0
Radium-226	137	148	137	NA [a]	0	0	27	0
Radium-228	107	151	43	NA [a]	0	1	72	0
Strontium-90	35	150	6	NA [a]	0	0	0	0
Technetium-99	111	152	20	NA [a]	0	0	109	0
Thorium-227	8	10	8	NA [a]	0	0	4	0
Thorium-228	100	148	100	NA [a]	0	2	36	0
Thorium-230	122	148	32	NA [a]	0	0	72	0
Thorium-232	102	148	7	NA [a]	0	0	26	0
Uranium, Total	147	152	147	NA [a]	69	0	120	0
Uranium-234	127	158	99	NA [a]	57	1	91	0
Uranium-235/236	119	156	119	NA [a]	64	4	88	0
Uranium-236	.	2	.	NA [a]	.	.	.	.
Uranium-238	126	156	126	NA [a]	60	2	96	0

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a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	8	.	.	.	.	.	.
1,2-Dichlorobenzene	.	7	.	.	.	.	.	.
1,3-Dichlorobenzene	.	7	.	.	.	.	.	.
1,4-Dichlorobenzene	.	7	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	7	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	4	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	4	.	.	.	.	.	.
2,4-Dichlorophenol	.	4	.	.	.	.	.	.
2,4-Dimethylphenol	.	4	.	.	.	.	.	.
2,4-Dinitrophenol	.	2	.	.	.	.	.	.
2,4-Dinitrotoluene	.	8	.	.	.	.	.	.
2,6-Dinitrotoluene	.	8	.	.	.	.	.	.
2-Chloronaphthalene	.	8	.	.	.	.	.	.
2-Chlorophenol	.	4	.	.	.	.	.	.
2-Methylnaphthalene	.	8	.	.	.	.	.	.
2-Nitroaniline	.	8	.	.	.	.	.	.
2-Nitrophenol	.	4	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	7	.	.	.	.	.	.
3-Nitroaniline	.	8	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	4	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	8	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	4	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	8	.	.	.	.	.	.
4-Nitroaniline	.	8	.	.	.	.	.	.
4-Nitrophenol	.	4	.	.	.	.	.	.
Acenaphthene	.	8	.	.	.	.	.	.
Acenaphthylene	.	8	.	.	.	.	.	.
Anthracene	.	8	.	.	.	.	.	.
Benzo(a)anthracene	1	7	0	0	0	0	0	0
Benzo(a)pyrene	.	8	.	.	.	.	.	.
Benzo(b)fluoranthene	.	8	.	.	.	.	.	.
Benzo(g,h,i)perylene	.	8	.	.	.	.	.	.
Benzo(k)fluoranthene	.	8	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	8	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	7	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	1	7	0	0	0	0	0	0
Butyl benzyl phthalate	1	7	0	0	0	0	0	0
Carbazole	.	8	.	.	.	.	.	.
Chrysene	2	7	0	0	0	0	0	0
Di-n-butyl phthalate	1	8	0	0	0	0	0	0
Di-n-octyl phthalate	1	8	0	0	0	0	0	0
Dibenzo(a,h)anthracene	.	8	.	.	.	.	.	.
Dibenzofuran	.	8	.	.	.	.	.	.
Diethyl phthalate	.	8	.	.	.	.	.	.
Dimethyl phthalate	.	8	.	.	.	.	.	.
Fluoranthene	3	8	0	0	0	0	0	0
Fluorene	.	8	.	.	.	.	.	.
Hexachlorobenzene	.	8	.	.	.	.	.	.
Hexachlorobutadiene	.	8	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	8	.	.	.	.	.	.
Hexachloroethane	.	7	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	8	.	.	.	.	.	.
Isophorone	.	8	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	7	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	8	.	.	.	.	.	.
Naphthalene	.	8	.	.	.	.	.	.
Nitrobenzene	.	8	.	.	.	.	.	.
o-Methylphenol	.	4	.	.	.	.	.	.
p-Chloroaniline	.	8	.	.	.	.	.	.
p-Methylphenol (Cresol)	1	5	0	0	0	0	0	0
Pentachlorophenol	.	4	.	.	.	.	.	.
Phenanthrene	5	8	0	0	0	0	0	0
Phenol	.	4	.	.	.	.	.	.
Pyrene	2	7	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	2	8	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	8	.	.	.	.	.	.
1,1,2-Trichloroethane	.	8	.	.	.	.	.	.
1,1-Dichloroethane	.	8	.	.	.	.	.	.
1,1-Dichloroethene	.	8	.	.	.	.	.	.
1,2-Dichloroethane	.	8	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	8	.	.	.	.	.	.
1,2-Dichloropropane	.	8	.	.	.	.	.	.
2-Butanone	2	7	0	0	0	0	0	0
2-Hexanone	1	8	0	0	0	0	0	0
4-Methyl-2-pentanone	1	8	0	0	0	0	0	0
Acetone	.	7	.	.	.	.	.	.
Benzene	.	8	.	.	.	.	.	.
Bromodichloromethane	.	8	.	.	.	.	.	.
Bromoform	.	8	.	.	.	.	.	.
Bromomethane	.	8	.	.	.	.	.	.
Carbon disulfide	.	8	.	.	.	.	.	.
Carbon Tetrachloride	.	8	.	.	.	.	.	.
Chlorobenzene	.	8	.	.	.	.	.	.
Chloroethane	.	8	.	.	.	.	.	.
Chloroform	.	8	.	.	.	.	.	.
Chloromethane	.	8	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	8	.	.	.	.	.	.
Dibromochloromethane	.	8	.	.	.	.	.	.
Ethylbenzene	3	8	0	0	0	0	0	0
m,p-Xylene	1	1	0	0	0	0	0	0
Methylene chloride	.	7	.	.	.	.	.	.
o-Xylene	1	1	0	0	0	0	0	0
Styrene	.	8	.	.	.	.	.	.
Tetrachloroethene	1	8	0	0	0	0	0	0
Toluene	1	8	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	8	.	.	.	.	.	.
Trichloroethene	.	8	.	.	.	.	.	.
Trichlorofluoromethane	.	1	.	.	.	.	.	.
Vinyl chloride	.	8	.	.	.	.	.	.
Xylenes, Total	3	8	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	CONCRETE CORE (0.0" - 0.5")							
INORGANICS								
Aluminum	93	93	0	0	0	0	57	0
Antimony	9	72	4	0	0	0	9	0
Arsenic	82	91	82	0	0	0	46	0
Barium	93	93	5	4	0	0	72	0
Beryllium	27	90	27	0	0	0	3	0
Cadmium	36	93	0	0	0	0	11	0
Calcium	93	93	0	0	0	0	19	0
Chromium	79	93	1	5	0	0	60	0
Cobalt	60	93	0	0	0	0	44	0
Copper	78	92	0	0	0	0	63	0
Iron	93	93	0	0	0	0	21	0
Lead	86	93	0	16	0	0	85	0
Magnesium	93	93	0	0	0	0	16	0
Manganese	93	93	89	0	0	0	32	0
Mercury	35	91	1	1	0	0	33	0
Nickel	75	93	0	0	0	0	49	0
Potassium	76	93	0	0	0	0	47	0
Selenium	13	72	0	0	0	0	13	0
Silver	32	93	0	0	0	0	6	0
Sodium	77	93	0	0	0	0	49	0
Thallium	.	86	.	.	.	.	.	.
Vanadium	73	93	0	0	0	0	27	0
Zinc	87	93	0	0	0	0	69	0

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a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	2	.	.	.	.	.	.
4,4'-DDE	.	2	.	.	.	.	.	.
4,4'-DDT	.	1	.	.	.	.	.	.
Aldrin	.	1	.	.	.	.	.	.
alpha-BHC	.	2	.	.	.	.	.	.
alpha-Chlordane	.	2	.	.	.	.	.	.
Aroclor-1016	.	2	.	.	.	.	.	.
Aroclor-1221	.	2	.	.	.	.	.	.
Aroclor-1232	.	2	.	.	.	.	.	.
Aroclor-1242	.	2	.	.	.	.	.	.
Aroclor-1248	.	2	.	.	.	.	.	.
Aroclor-1254	2	2	2	0	0	0	0	0
Aroclor-1260	1	2	1	0	0	0	0	0
beta-BHC	.	2	.	.	.	.	.	.
delta-BHC	.	2	.	.	.	.	.	.
Dieldrin	.	1	.	.	.	.	.	.
Endosulfan II	.	2	.	.	.	.	.	.
Endosulfan sulfate	.	2	.	.	.	.	.	.
Endosulfan-I	.	2	.	.	.	.	.	.
Endrin	.	1	.	.	.	.	.	.
Endrin aldehyde	.	2	.	.	.	.	.	.
Endrin ketone	.	2	.	.	.	.	.	.
gamma-BHC (Lindane)	.	1	.	.	.	.	.	.
gamma-Chlordane	.	2	.	.	.	.	.	.
Heptachlor	.	1	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	.	2	.	.	.	.	.	.
Toxaphene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	36	85	17	NA [a]	0	0	29	0
Cesium-137	32	94	32	NA [a]	0	0	27	0
Gross Alpha	.	16	.	NA [a]	.	.	.	.
Gross Beta	.	16	.	NA [a]	.	.	.	.
Lead-210	62	93	62	NA [a]	0	0	47	0
Neptunium-237	30	89	30	NA [a]	0	0	23	0
Plutonium-238	44	89	19	NA [a]	0	0	30	0
Plutonium-239/240	52	89	23	NA [a]	0	0	39	0
Plutonium-241	19	69	7	NA [a]	0	0	14	0
Polonium-210	74	89	54	NA [a]	0	0	22	0
Radium-226	84	89	84	NA [a]	0	0	33	0
Radium-228	70	93	40	NA [a]	0	1	58	0
Strontium-90	24	93	6	NA [a]	0	0	0	0
Technetium-99	78	92	17	NA [a]	0	0	75	0
Thorium-227	8	11	8	NA [a]	0	0	5	0
Thorium-228	67	87	67	NA [a]	0	1	39	0
Thorium-230	72	87	31	NA [a]	0	0	55	0
Thorium-232	68	87	16	NA [a]	0	1	27	0
Uranium, Total	93	94	93	NA [a]	45	0	81	0
Uranium-234	79	91	67	NA [a]	34	0	64	0
Uranium-235/236	77	88	77	NA [a]	40	1	63	0
Uranium-238	80	88	80	NA [a]	37	0	65	0

000659

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

			Detects Above Given Criteria					
Parameter	# of Detects	# of Samples	Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	1	.	.	.	.	.	.
1,2-Dichlorobenzene	.	1	.	.	.	.	.	.
1,3-Dichlorobenzene	.	1	.	.	.	.	.	.
1,4-Dichlorobenzene	.	1	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	1	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	1	.	.	.	.	.	.
2,4-Dichlorophenol	.	1	.	.	.	.	.	.
2,4-Dimethylphenol	.	1	.	.	.	.	.	.
2,4-Dinitrophenol	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	1	.	.	.	.	.	.
2,6-Dinitrotoluene	.	1	.	.	.	.	.	.
2-Chloronaphthalene	.	1	.	.	.	.	.	.
2-Chlorophenol	.	1	.	.	.	.	.	.
2-Methylnaphthalene	.	1	.	.	.	.	.	.
2-Nitroaniline	.	1	.	.	.	.	.	.
2-Nitrophenol	.	1	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	1	.	.	.	.	.	.
3-Nitroaniline	.	1	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	1	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	1	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	1	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	1	.	.	.	.	.	.
4-Nitroaniline	.	1	.	.	.	.	.	.
4-Nitrophenol	.	1	.	.	.	.	.	.
Acenaphthene	.	1	.	.	.	.	.	.
Acenaphthylene	.	1	.	.	.	.	.	.
Anthracene	.	1	.	.	.	.	.	.
Benzo(a)anthracene	.	1	.	.	.	.	.	.
Benzo(a)pyrene	.	1	.	.	.	.	.	.
Benzo(b)fluoranthene	.	1	.	.	.	.	.	.
Benzo(g,h,i)perylene	.	1	.	.	.	.	.	.
Benzo(k)fluoranthene	.	1	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000700

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	1	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	.	1	.	.	.	.	.	.
Butyl benzyl phthalate	.	1	.	.	.	.	.	.
Carbazole	.	1	.	.	.	.	.	.
Chrysene	.	1	.	.	.	.	.	.
Di-n-butyl phthalate	.	1	.	.	.	.	.	.
Di-n-octyl phthalate	.	1	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	1	.	.	.	.	.	.
Dibenzofuran	.	1	.	.	.	.	.	.
Diethyl phthalate	.	1	.	.	.	.	.	.
Dimethyl phthalate	.	1	.	.	.	.	.	.
Fluoranthene	.	1	.	.	.	.	.	.
Fluorene	.	1	.	.	.	.	.	.
Hexachlorobenzene	.	1	.	.	.	.	.	.
Hexachlorobutadiene	.	1	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	1	.	.	.	.	.	.
Hexachloroethane	.	1	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	1	.	.	.	.	.	.
Isophorone	.	1	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	1	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	1	.	.	.	.	.	.
Naphthalene	.	1	.	.	.	.	.	.
Nitrobenzene	.	1	.	.	.	.	.	.
o-Methylphenol	.	1	.	.	.	.	.	.
p-Chloroaniline	.	1	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	1	.	.	.	.	.	.
Pentachlorophenol	.	1	.	.	.	.	.	.
Phenanthrene	.	1	.	.	.	.	.	.
Phenol	.	1	.	.	.	.	.	.
Pyrene	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	1	6	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	6	.	.	.	.	.	.
1,1,2-Trichloroethane	.	6	.	.	.	.	.	.
1,1-Dichloroethane	.	6	.	.	.	.	.	.
1,1-Dichloroethene	.	6	.	.	.	.	.	.
1,2-Dichloroethane	.	6	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	6	.	.	.	.	.	.
1,2-Dichloropropane	.	6	.	.	.	.	.	.
2-Butanone	.	6	.	.	.	.	.	.
2-Hexanone	.	6	.	.	.	.	.	.
4-Methyl-2-pentanone	1	6	0	0	0	0	0	0
Acetone	.	1	.	.	.	.	.	.
Benzene	.	6	.	.	.	.	.	.
Bromodichloromethane	.	6	.	.	.	.	.	.
Bromoform	.	6	.	.	.	.	.	.
Bromomethane	.	6	.	.	.	.	.	.
Carbon disulfide	.	6	.	.	.	.	.	.
Carbon Tetrachloride	.	6	.	.	.	.	.	.
Chlorobenzene	.	6	.	.	.	.	.	.
Chloroethane	.	6	.	.	.	.	.	.
Chloroform	.	6	.	.	.	.	.	.
Chloromethane	.	6	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	6	.	.	.	.	.	.
Dibromochloromethane	.	6	.	.	.	.	.	.
Ethylbenzene	2	6	0	0	0	0	0	0
Methylene chloride	.	6	.	.	.	.	.	.
Styrene	.	6	.	.	.	.	.	.
Tetrachloroethene	2	6	0	0	0	0	0	0
Toluene	3	6	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	6	.	.	.	.	.	.
Trichloroethene	.	6	.	.	.	.	.	.
Vinyl chloride	.	6	.	.	.	.	.	.
Xylenes, Total	3	6	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	CONCRETE CORE (0.5" - 1.0")							
INORGANICS								
Aluminum	86	86	0	0	0	0	38	0
Antimony	6	67	1	0	0	0	6	0
Arsenic	73	86	73	0	0	0	42	0
Barium	86	86	0	0	0	0	42	0
Beryllium	21	84	21	0	0	0	4	0
Cadmium	25	86	0	0	0	0	7	0
Calcium	86	86	0	0	0	0	26	0
Chromium	74	86	1	2	0	0	44	0
Cobalt	51	86	0	0	0	0	21	0
Copper	65	85	0	0	0	0	28	0
Iron	86	86	0	0	0	0	12	0
Lead	72	85	0	5	0	0	56	0
Magnesium	86	86	0	0	0	0	22	0
Manganese	86	86	86	0	0	0	32	0
Mercury	13	83	0	0	0	0	13	0
Nickel	60	86	0	0	0	0	19	0
Potassium	68	86	0	0	0	0	32	0
Selenium	9	68	0	0	0	0	9	0
Silver	30	86	0	0	0	0	5	0
Sodium	68	86	0	0	0	0	33	0
Thallium	1	80	0	0	0	0	0	0
Vanadium	68	86	0	0	0	0	20	0
Zinc	74	86	0	0	0	0	28	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	2	.	.	.	.	.	.
4,4'-DDE	.	2	.	.	.	.	.	.
4,4'-DDT	.	2	.	.	.	.	.	.
Aldrin	.	2	.	.	.	.	.	.
alpha-BHC	.	2	.	.	.	.	.	.
alpha-Chlordane	.	2	.	.	.	.	.	.
Aroclor-1016	.	2	.	.	.	.	.	.
Aroclor-1221	.	2	.	.	.	.	.	.
Aroclor-1232	.	2	.	.	.	.	.	.
Aroclor-1242	.	2	.	.	.	.	.	.
Aroclor-1248	.	2	.	.	.	.	.	.
Aroclor-1254	2	2	2	0	0	0	0	0
Aroclor-1260	1	2	1	0	0	0	0	0
beta-BHC	.	2	.	.	.	.	.	.
delta-BHC	.	2	.	.	.	.	.	.
Dieldrin	.	2	.	.	.	.	.	.
Endosulfan II	.	2	.	.	.	.	.	.
Endosulfan sulfate	.	2	.	.	.	.	.	.
Endosulfan-I	.	2	.	.	.	.	.	.
Endrin	.	2	.	.	.	.	.	.
Endrin aldehyde	.	2	.	.	.	.	.	.
Endrin ketone	.	2	.	.	.	.	.	.
gamma-BHC (Lindane)	.	2	.	.	.	.	.	.
gamma-Chlordane	.	2	.	.	.	.	.	.
Heptachlor	.	2	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	.	2	.	.	.	.	.	.
Toxaphene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	19	78	8	NA [a]	0	0	13	0
Cesium-137	15	85	15	NA [a]	0	0	11	0
Gross Alpha	.	15	.	NA [a]	.	.	.	.
Gross Beta	.	15	.	NA [a]	.	.	.	.
Lead-210	47	84	47	NA [a]	0	0	18	0
Neptunium-237	11	84	11	NA [a]	0	0	6	0
Plutonium-238	26	85	11	NA [a]	0	0	15	0
Plutonium-239/240	33	85	8	NA [a]	0	0	13	0
Plutonium-241	15	54	2	NA [a]	0	0	8	0
Polonium-210	72	85	40	NA [a]	0	0	9	0
Radium-226	81	82	81	NA [a]	0	0	10	0
Radium-228	53	85	19	NA [a]	0	0	33	0
Strontium-90	13	82	1	NA [a]	0	0	0	0
Technetium-99	63	84	2	NA [a]	0	0	55	0
Thorium-227	8	11	8	NA [a]	0	0	4	0
Thorium-228	65	84	65	NA [a]	0	1	20	0
Thorium-230	76	84	16	NA [a]	0	0	44	0
Thorium-232	72	84	6	NA [a]	0	1	15	0
Uranium, Total	85	85	85	NA [a]	15	0	55	0
Uranium-234	78	85	51	NA [a]	11	0	44	0
Uranium-235/236	66	83	66	NA [a]	16	0	41	0
Uranium-236	.	1	.	NA [a]	.	.	.	.
Uranium-238	77	82	77	NA [a]	14	0	48	0

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	1	.	.	.	.	.	.
1,2-Dichlorobenzene	.	1	.	.	.	.	.	.
1,3-Dichlorobenzene	.	1	.	.	.	.	.	.
1,4-Dichlorobenzene	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	1	.	.	.	.	.	.
2,6-Dinitrotoluene	.	1	.	.	.	.	.	.
2-Chloronaphthalene	.	1	.	.	.	.	.	.
2-Methylnaphthalene	.	1	.	.	.	.	.	.
2-Nitroaniline	.	1	.	.	.	.	.	.
3-Nitroaniline	.	1	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	1	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	1	.	.	.	.	.	.
4-Nitroaniline	.	1	.	.	.	.	.	.
Acenaphthene	.	1	.	.	.	.	.	.
Acenaphthylene	.	1	.	.	.	.	.	.
Anthracene	.	1	.	.	.	.	.	.
Benzo(a)anthracene	.	1	.	.	.	.	.	.
Benzo(a)pyrene	.	1	.	.	.	.	.	.
Benzo(b)fluoranthene	.	1	.	.	.	.	.	.
Benzo(g,h,i)perylene	.	1	.	.	.	.	.	.
Benzo(k)fluoranthene	.	1	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	1	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	.	1	.	.	.	.	.	.
Butyl benzyl phthalate	.	1	.	.	.	.	.	.
Carbazole	.	1	.	.	.	.	.	.
Chrysene	.	1	.	.	.	.	.	.
Di-n-butyl phthalate	.	1	.	.	.	.	.	.
Di-n-octyl phthalate	.	1	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	1	.	.	.	.	.	.
Dibenzofuran	.	1	.	.	.	.	.	.
Diethyl phthalate	.	1	.	.	.	.	.	.
Dimethyl phthalate	.	1	.	.	.	.	.	.
Fluoranthene	.	1	.	.	.	.	.	.
Fluorene	.	1	.	.	.	.	.	.
Hexachlorobenzene	.	1	.	.	.	.	.	.
Hexachlorobutadiene	.	1	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	1	.	.	.	.	.	.
Hexachloroethane	.	1	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	1	.	.	.	.	.	.
Isophorone	.	1	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	1	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	1	.	.	.	.	.	.
Naphthalene	.	1	.	.	.	.	.	.
Nitrobenzene	.	1	.	.	.	.	.	.
p-Chloroaniline	.	1	.	.	.	.	.	.
Phenanthrene	.	1	.	.	.	.	.	.
Pyrene	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000207

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	1	6	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	6	.	.	.	.	.	.
1,1,2-Trichloroethane	.	6	.	.	.	.	.	.
1,1-Dichloroethane	.	6	.	.	.	.	.	.
1,1-Dichloroethene	.	6	.	.	.	.	.	.
1,2-Dichloroethane	.	6	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	6	.	.	.	.	.	.
1,2-Dichloropropane	.	6	.	.	.	.	.	.
2-Butanone	.	6	.	.	.	.	.	.
2-Hexanone	.	6	.	.	.	.	.	.
4-Methyl-2-pentanone	1	6	0	0	0	0	0	0
Acetone	.	1	.	.	.	.	.	.
Benzene	.	6	.	.	.	.	.	.
Bromodichloromethane	.	6	.	.	.	.	.	.
Bromoform	.	6	.	.	.	.	.	.
Bromomethane	.	6	.	.	.	.	.	.
Carbon disulfide	.	6	.	.	.	.	.	.
Carbon Tetrachloride	.	6	.	.	.	.	.	.
Chlorobenzene	.	6	.	.	.	.	.	.
Chloroethane	.	6	.	.	.	.	.	.
Chloroform	.	6	.	.	.	.	.	.
Chloromethane	.	6	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	6	.	.	.	.	.	.
Dibromochloromethane	.	6	.	.	.	.	.	.
Ethylbenzene	2	6	0	0	0	0	0	0
Methylene chloride	.	6	.	.	.	.	.	.
Styrene	.	6	.	.	.	.	.	.
Tetrachloroethene	1	6	0	0	0	0	0	0
Toluene	3	6	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	6	.	.	.	.	.	.
Trichloroethene	.	6	.	.	.	.	.	.
Vinyl chloride	.	6	.	.	.	.	.	.
Xylenes, Total	3	6	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000708

7121

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	CONCRETE CORE (1.0" - 4.0")							
INORGANICS								
Aluminum	77	77	0	0	0	0	33	0
Antimony	4	59	1	0	0	0	3	0
Arsenic	63	76	63	0	0	0	31	0
Barium	77	77	0	0	0	0	34	0
Beryllium	14	75	14	0	0	0	6	0
Cadmium	31	77	0	0	0	0	8	0
Calcium	77	77	0	0	0	0	21	0
Chromium	62	77	0	1	0	0	32	0
Cobalt	46	77	0	0	0	0	20	0
Copper	56	76	0	0	0	0	17	0
Iron	77	77	0	0	0	0	9	0
Lead	60	77	0	0	0	0	35	0
Magnesium	77	77	0	0	0	0	24	0
Manganese	77	77	76	0	0	0	21	0
Mercury	11	74	0	0	0	0	9	0
Nickel	56	77	0	0	0	0	14	0
Potassium	59	77	0	0	0	0	28	0
Selenium	7	58	0	0	0	0	6	0
Silver	41	77	0	0	0	0	11	0
Sodium	59	77	0	0	0	0	21	0
Thallium	2	71	0	0	0	0	0	0
Vanadium	62	77	2	0	0	0	21	0
Zinc	64	77	0	0	0	0	15	0

a-There are no TCLP limits for radionuclides

Draft

000709

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	2	.	.	.	.	.	.
4,4'-DDE	.	2	.	.	.	.	.	.
4,4'-DDT	.	2	.	.	.	.	.	.
Aldrin	.	2	.	.	.	.	.	.
alpha-BHC	.	2	.	.	.	.	.	.
alpha-Chlordane	.	2	.	.	.	.	.	.
Aroclor-1016	.	2	.	.	.	.	.	.
Aroclor-1221	.	2	.	.	.	.	.	.
Aroclor-1232	.	2	.	.	.	.	.	.
Aroclor-1242	.	2	.	.	.	.	.	.
Aroclor-1248	.	2	.	.	.	.	.	.
Aroclor-1254	2	2	2	0	0	0	0	0
Aroclor-1260	1	2	1	0	0	0	0	0
beta-BHC	.	2	.	.	.	.	.	.
delta-BHC	.	2	.	.	.	.	.	.
Dieldrin	.	2	.	.	.	.	.	.
Endosulfan II	.	2	.	.	.	.	.	.
Endosulfan sulfate	.	2	.	.	.	.	.	.
Endosulfan-I	.	2	.	.	.	.	.	.
Endrin	.	2	.	.	.	.	.	.
Endrin aldehyde	.	2	.	.	.	.	.	.
Endrin ketone	.	2	.	.	.	.	.	.
gamma-BHC (Lindane)	.	2	.	.	.	.	.	.
gamma-Chlordane	.	2	.	.	.	.	.	.
Heptachlor	.	2	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	.	2	.	.	.	.	.	.
Toxaphene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000740

2121

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	9	81	1	NA [a]	0	0	6	0
Cesium-137	6	85	6	NA [a]	0	0	3	0
Gross Alpha	.	13	.	NA [a]	.	.	.	.
Gross Beta	.	13	.	NA [a]	.	.	.	.
Lead-210	56	84	56	NA [a]	0	0	10	0
Neptunium-237	8	83	8	NA [a]	0	0	4	0
Plutonium-238	16	82	4	NA [a]	0	0	10	0
Plutonium-239/240	16	81	3	NA [a]	0	0	6	0
Plutonium-241	8	43	1	NA [a]	0	0	4	0
Polonium-210	73	85	34	NA [a]	0	0	4	0
Radium-226	81	81	81	NA [a]	0	0	3	0
Radium-228	49	85	16	NA [a]	0	0	29	0
Strontium-90	10	82	3	NA [a]	0	0	0	0
Technetium-99	45	84	2	NA [a]	0	0	39	0
Thorium-227	8	11	8	NA [a]	0	0	2	0
Thorium-228	72	83	73	NA [a]	0	0	14	0
Thorium-230	74	83	5	NA [a]	0	0	26	0
Thorium-232	70	83	3	NA [a]	0	0	10	0
Uranium, Total	85	85	85	NA [a]	3	0	40	0
Uranium-234	75	82	37	NA [a]	3	0	31	0
Uranium-235/236	63	82	63	NA [a]	2	0	27	0
Uranium-238	76	82	76	NA [a]	2	0	32	0

a-There are no TCLP limits for radionuclides

000741

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	1	.	.	.	.	.	.
1,2-Dichlorobenzene	.	1	.	.	.	.	.	.
1,3-Dichlorobenzene	.	1	.	.	.	.	.	.
1,4-Dichlorobenzene	.	1	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	1	.	.	.	.	.	.
2,6-Dinitrotoluene	.	1	.	.	.	.	.	.
2-Chloronaphthalene	.	1	.	.	.	.	.	.
2-Methylnaphthalene	.	1	.	.	.	.	.	.
2-Nitroaniline	.	1	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	1	.	.	.	.	.	.
3-Nitroaniline	.	1	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	1	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	1	.	.	.	.	.	.
4-Nitroaniline	.	1	.	.	.	.	.	.
Acenaphthene	.	1	.	.	.	.	.	.
Acenaphthylene	.	1	.	.	.	.	.	.
Anthracene	.	1	.	.	.	.	.	.
Benzo(a)anthracene	.	1	.	.	.	.	.	.
Benzo(a)pyrene	.	1	.	.	.	.	.	.
Benzo(b)fluoranthene	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000742

2112

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
Benzo(g,h,i)perylene	.	1	.	.	.	.	.	.
Benzo(k)fluoranthene	.	1	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	1	.	.	.	.	.	.
bis(2-Chloroethyl)ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	.	1	.	.	.	.	.	.
Butyl benzyl phthalate	.	1	.	.	.	.	.	.
Carbazole	.	1	.	.	.	.	.	.
Chrysene	.	1	.	.	.	.	.	.
Di-n-butyl phthalate	.	1	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	1	.	.	.	.	.	.
Dibenzofuran	.	1	.	.	.	.	.	.
Diethyl phthalate	.	1	.	.	.	.	.	.
Dimethyl phthalate	.	1	.	.	.	.	.	.
Fluoranthene	.	1	.	.	.	.	.	.
Fluorene	.	1	.	.	.	.	.	.
Hexachlorobenzene	.	1	.	.	.	.	.	.
Hexachlorobutadiene	.	1	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	1	.	.	.	.	.	.
Hexachloroethane	.	1	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	1	.	.	.	.	.	.
Isophorone	.	1	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	1	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	1	.	.	.	.	.	.
Naphthalene	.	1	.	.	.	.	.	.
Nitrobenzene	.	1	.	.	.	.	.	.
p-Chloroaniline	.	1	.	.	.	.	.	.
Phenanthrene	.	1	.	.	.	.	.	.
Pyrene	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000213

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	5	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	5	.	.	.	.	.	.
1,1,2-Trichloroethane	.	5	.	.	.	.	.	.
1,1-Dichloroethane	.	5	.	.	.	.	.	.
1,1-Dichloroethene	.	5	.	.	.	.	.	.
1,2-Dichloroethane	.	5	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	5	.	.	.	.	.	.
1,2-Dichloropropane	.	5	.	.	.	.	.	.
2-Butanone	.	5	.	.	.	.	.	.
2-Hexanone	.	5	.	.	.	.	.	.
4-Methyl-2-pentanone	.	5	.	.	.	.	.	.
Acetone	.	1	.	.	.	.	.	.
Benzene	.	5	.	.	.	.	.	.
Bromodichloromethane	.	5	.	.	.	.	.	.
Bromoform	.	5	.	.	.	.	.	.
Bromomethane	.	5	.	.	.	.	.	.
Carbon disulfide	.	5	.	.	.	.	.	.
Carbon Tetrachloride	.	5	.	.	.	.	.	.
Chlorobenzene	.	5	.	.	.	.	.	.
Chloroethane	.	5	.	.	.	.	.	.
Chloroform	.	5	.	.	.	.	.	.
Chloromethane	.	5	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	5	.	.	.	.	.	.
Dibromochloromethane	.	5	.	.	.	.	.	.
Ethylbenzene	3	5	0	0	0	0	0	0
Methylene chloride	.	5	.	.	.	.	.	.
Styrene	.	5	.	.	.	.	.	.
Tetrachloroethene	3	5	0	0	0	0	0	0
Toluene	1	5	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	5	.	.	.	.	.	.
Trichloroethene	.	5	.	.	.	.	.	.
Vinyl chloride	.	5	.	.	.	.	.	.
Xylenes, Total	2	5	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	CONCRETE CORE (1.0" - 6.0")							
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	1	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	1	.	.	.	.	.	.
1,1,2-Trichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethene	.	1	.	.	.	.	.	.
1,2-Dichloroethane	.	1	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	1	.	.	.	.	.	.
1,2-Dichloropropane	.	1	.	.	.	.	.	.
2-Butanone	.	1	.	.	.	.	.	.
2-Hexanone	.	1	.	.	.	.	.	.
4-Methyl-2-pentanone	.	1	.	.	.	.	.	.
Benzene	.	1	.	.	.	.	.	.
Bromodichloromethane	.	1	.	.	.	.	.	.
Bromoform	.	1	.	.	.	.	.	.
Bromomethane	.	1	.	.	.	.	.	.
Carbon disulfide	.	1	.	.	.	.	.	.
Carbon Tetrachloride	.	1	.	.	.	.	.	.
Chlorobenzene	.	1	.	.	.	.	.	.
Chloroethane	.	1	.	.	.	.	.	.
Chloroform	.	1	.	.	.	.	.	.
Chloromethane	.	1	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Dibromochloromethane	.	1	.	.	.	.	.	.
Ethylbenzene	.	1	.	.	.	.	.	.
Methylene chloride	.	1	.	.	.	.	.	.
Styrene	.	1	.	.	.	.	.	.
Tetrachloroethene	.	1	.	.	.	.	.	.
Toluene	.	1	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Trichloroethene	.	1	.	.	.	.	.	.
Vinyl chloride	.	1	.	.	.	.	.	.
Xylenes, Total	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

Draft

000745

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	LOOSE MEDIA							
INORGANICS								
Aluminum	41	41	0	0	0	0	0	0
Antimony	23	38	10	0	0	0	0	0
Arsenic	38	41	38	4	0	0	0	0
Barium	41	41	2	2	0	0	0	0
Beryllium	7	40	7	0	0	0	0	0
Cadmium	33	41	11	4	0	0	0	0
Calcium	39	41	0	0	0	0	0	0
Chromium	39	41	19	21	0	0	0	0
Cobalt	38	41	0	0	0	0	0	0
Copper	40	41	7	0	0	0	0	0
Iron	41	41	0	0	0	0	0	0
Lead	41	41	0	34	0	0	0	0
Magnesium	41	41	0	0	0	0	0	0
Manganese	41	41	38	0	0	0	0	0
Mercury	27	40	4	5	0	0	0	0
Nickel	38	41	4	0	0	0	0	0
Potassium	34	41	0	0	0	0	0	0
Selenium	10	39	1	4	0	0	0	0
Silver	21	38	4	4	0	0	0	0
Sodium	35	41	0	0	0	0	0	0
Thallium	2	40	0	0	0	0	0	0
Vanadium	29	38	1	0	0	0	0	0
Zinc	40	41	2	0	0	0	0	0

a-There are no TCLP limits for radionuclides

Draft

000746

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	2	.	.	.	.	.	.
4,4'-DDE	.	2	.	.	.	.	.	.
4,4'-DDT	.	2	.	.	.	.	.	.
Aldrin	.	2	.	.	.	.	.	.
alpha-BHC	.	2	.	.	.	.	.	.
alpha-Chlordane	.	2	.	.	.	.	.	.
Aroclor-1016	.	2	.	.	.	.	.	.
Aroclor-1221	.	2	.	.	.	.	.	.
Aroclor-1232	.	2	.	.	.	.	.	.
Aroclor-1242	.	2	.	.	.	.	.	.
Aroclor-1248	.	2	.	.	.	.	.	.
Aroclor-1254	1	2	1	0	0	0	0	0
Aroclor-1260	1	2	1	0	0	0	0	0
beta-BHC	.	2	.	.	.	.	.	.
delta-BHC	.	2	.	.	.	.	.	.
Dieldrin	.	2	.	.	.	.	.	.
Endosulfan II	.	2	.	.	.	.	.	.
Endosulfan sulfate	.	2	.	.	.	.	.	.
Endosulfan-I	.	2	.	.	.	.	.	.
Endrin	.	2	.	.	.	.	.	.
Endrin aldehyde	.	2	.	.	.	.	.	.
Endrin ketone	.	2	.	.	.	.	.	.
gamma-BHC (Lindane)	.	2	.	.	.	.	.	.
gamma-Chlordane	.	2	.	.	.	.	.	.
Heptachlor	.	2	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	1	2	0	0	0	0	0	0
Toxaphene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000717

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	33	38	29	NA [a]	0	0	0	0
Cesium-137	24	39	24	NA [a]	0	0	0	0
Gross Alpha	.	2	.	NA [a]	.	.	.	.
Gross Beta	.	2	.	NA [a]	.	.	.	.
Lead-210	25	39	25	NA [a]	0	0	0	0
Neptunium-237	28	36	28	NA [a]	0	0	0	0
Plutonium-238	30	39	21	NA [a]	0	0	0	0
Plutonium-239/240	36	39	34	NA [a]	0	0	0	0
Plutonium-241	20	33	11	NA [a]	0	0	0	0
Polonium-210	35	36	32	NA [a]	0	0	0	0
Radium-226	31	35	31	NA [a]	0	0	0	0
Radium-228	31	35	28	NA [a]	0	1	0	0
Strontium-90	20	39	4	NA [a]	0	0	0	0
Technetium-99	39	39	23	NA [a]	0	0	0	0
Thorium-228	37	39	37	NA [a]	0	1	0	0
Thorium-230	39	39	34	NA [a]	0	0	0	0
Thorium-232	36	39	15	NA [a]	0	0	0	0
Uranium, Total	39	39	39	NA [a]	34	0	0	0
Uranium-234	39	39	38	NA [a]	31	4	0	0
Uranium-235/236	39	39	39	NA [a]	34	11	0	0
Uranium-238	39	39	39	NA [a]	34	7	0	0

a-There are no TCLP limits for radionuclides

Draft

000713

2121

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	1	40	0	0	0	0	0	0
1,2-Dichlorobenzene	.	40	.	.	.	.	.	.
1,3-Dichlorobenzene	.	40	.	.	.	.	.	.
1,4-Dichlorobenzene	1	40	1	0	0	0	0	0
2,2-oxybis(1-Chloropropane)	.	23	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	39	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	39	.	.	.	.	.	.
2,4-Dichlorophenol	4	39	0	0	0	0	0	0
2,4-Dimethylphenol	2	39	0	0	0	0	0	0
2,4-Dinitrophenol	.	34	.	.	.	.	.	.
2,4-Dinitrotoluene	1	39	1	1	0	0	0	0
2,6-Dinitrotoluene	.	40	.	.	.	.	.	.
2-Chloronaphthalene	.	40	.	.	.	.	.	.
2-Chlorophenol	1	39	0	0	0	0	0	0
2-Methylnaphthalene	12	40	0	0	0	0	0	0
2-Nitroaniline	.	40	.	.	.	.	.	.
2-Nitrophenol	.	39	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	34	.	.	.	.	.	.
3-Nitroaniline	.	37	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	39	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	40	.	.	.	.	.	.
4-Chloro-3-methylphenol	1	39	0	0	0	0	0	0
4-Chlorophenylphenyl ether	.	40	.	.	.	.	.	.
4-Nitroaniline	.	38	.	.	.	.	.	.
4-Nitrophenol	1	38	0	0	0	0	0	0
Acenaphthene	18	40	0	0	0	0	0	0
Acenaphthylene	5	40	0	0	0	0	0	0
Anthracene	17	40	0	0	0	0	0	0
Benzo(a)anthracene	25	40	24	0	0	0	0	0
Benzo(a)pyrene	23	39	23	0	0	0	0	0
Benzo(b)fluoranthene	27	39	26	0	0	0	0	0
Benzo(g,h,i)perylene	23	39	0	0	0	0	0	0
Benzo(k)fluoranthene	20	39	18	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	40	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	40	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	12	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	18	40	11	0	0	0	0	0
Butyl benzyl phthalate	15	40	0	0	0	0	0	0
Carbazole	17	40	3	0	0	0	0	0
Chrysene	31	40	12	0	0	0	0	0
Di-n-butyl phthalate	17	40	0	0	0	0	0	0
Di-n-octyl phthalate	12	40	0	0	0	0	0	0
Dibenzo(a,h)anthracene	6	39	6	0	0	0	0	0
Dibenzofuran	14	40	0	0	0	0	0	0
Diethyl phthalate	3	40	0	0	0	0	0	0
Dimethyl phthalate	2	40	0	0	0	0	0	0
Fluoranthene	33	40	0	0	0	0	0	0
Fluorene	14	40	0	0	0	0	0	0
Hexachlorobenzene	.	40	.	.	.	.	.	.
Hexachlorobutadiene	.	40	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	40	.	.	.	.	.	.
Hexachloroethane	.	40	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	23	39	22	0	0	0	0	0
Isophorone	1	40	0	0	0	0	0	0
N-Nitroso-di-n-propylamine	1	40	1	0	0	0	0	0
N-Nitrosodiphenylamine	.	40	.	.	.	.	.	.
Naphthalene	13	40	0	0	0	0	0	0
Nitrobenzene	.	40	.	.	.	.	.	.
o-Methylphenol	3	39	0	0	0	0	0	0
p-Chloroaniline	.	37	.	.	.	.	.	.
p-Methylphenol (Cresol)	2	39	0	0	0	0	0	0
Pentachlorophenol	1	38	1	0	0	0	0	0
Phenanthrene	33	40	0	0	0	0	0	0
Phenol	8	39	0	0	0	0	0	0
Pyrene	33	40	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	4	39	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	38	.	.	.	.	.	.
1,1,2-Trichloroethane	.	39	.	.	.	.	.	.
1,1-Dichloroethane	.	40	.	.	.	.	.	.
1,1-Dichloroethene	.	40	.	.	.	.	.	.
1,2-Dichloroethane	.	40	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	38	.	.	.	.	.	.
1,2-Dichloropropane	.	39	.	.	.	.	.	.
2-Butanone	3	39	0	0	0	0	0	0
2-Hexanone	.	35	.	.	.	.	.	.
4-Methyl-2-pentanone	4	37	0	0	0	0	0	0
Acetone	5	32	0	0	0	0	0	0
Benzene	3	39	1	0	0	0	0	0
Bromodichloromethane	.	39	.	.	.	.	.	.
Bromoform	2	39	0	0	0	0	0	0
Bromomethane	.	40	.	.	.	.	.	.
Carbon disulfide	.	40	.	.	.	.	.	.
Carbon Tetrachloride	.	39	.	.	.	.	.	.
Chlorobenzene	1	38	0	0	0	0	0	0
Chloroethane	.	40	.	.	.	.	.	.
Chloroform	.	40	.	.	.	.	.	.
Chloromethane	.	40	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	39	.	.	.	.	.	.
Dibromochloromethane	.	39	.	.	.	.	.	.
Ethylbenzene	8	38	0	0	0	0	0	0
m,p-Xylene	1	1	0	0	0	0	0	0
Methylene chloride	5	40	0	0	0	0	0	0
o-Xylene	1	1	0	0	0	0	0	0
Styrene	2	38	0	0	0	0	0	0
Tetrachloroethene	4	38	0	0	0	0	0	0
Toluene	7	38	0	0	0	0	0	0
trans-1,2-Dichloroethene	.	1	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	39	.	.	.	.	.	.
Trichloroethene	1	39	0	0	0	0	0	0
Trichlorofluoromethane	.	9	.	.	.	.	.	.
Vinyl chloride	.	40	.	.	.	.	.	.
Xylenes, Total	13	38	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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000221

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	MASONRY CHIPS							
INORGANICS								
Aluminum	60	60	0	0	0	0	7	0
Antimony	4	49	0	0	0	0	4	0
Arsenic	55	60	55	0	0	0	16	0
Barium	60	60	1	1	0	0	33	0
Beryllium	17	60	17	0	0	0	0	0
Cadmium	12	60	2	1	0	0	3	0
Calcium	60	60	0	0	0	0	3	0
Chromium	59	60	1	1	0	0	46	0
Cobalt	35	60	0	0	0	0	27	0
Copper	49	57	0	0	0	0	23	0
Iron	60	60	0	0	0	0	3	0
Lead	57	59	0	23	0	0	54	0
Magnesium	60	60	0	0	0	0	3	0
Manganese	60	60	55	0	0	0	7	0
Mercury	42	60	0	2	0	0	42	0
Nickel	40	60	0	0	0	0	12	0
Potassium	47	60	0	0	0	0	30	0
Selenium	3	53	0	0	0	0	3	0
Silver	5	60	0	0	0	0	1	0
Sodium	51	60	0	0	0	0	23	0
Thallium	5	57	0	0	0	0	0	0
Vanadium	46	60	0	0	0	0	8	0
Zinc	58	60	0	0	0	0	49	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	16	55	7	NA [a]	0	0	14	0
Cesium-137	10	58	10	NA [a]	0	0	9	0
Gross Alpha	.	11	.	NA [a]	.	.	.	.
Gross Beta	.	11	.	NA [a]	.	.	.	.
Lead-210	38	55	38	NA [a]	0	0	21	0
Neptunium-237	18	56	18	NA [a]	0	0	13	0
Plutonium-238	22	58	9	NA [a]	0	0	15	0
Plutonium-239/240	17	59	5	NA [a]	0	0	7	0
Plutonium-241	6	30	0	NA [a]	0	0	5	0
Polonium-210	51	57	28	NA [a]	0	0	9	0
Radium-226	58	58	58	NA [a]	0	2	9	0
Radium-228	45	57	16	NA [a]	0	0	33	0
Strontium-90	11	56	4	NA [a]	0	0	0	0
Technetium-99	38	58	1	NA [a]	0	0	32	0
Thorium-227	2	4	2	NA [a]	0	0	2	0
Thorium-228	47	58	47	NA [a]	0	0	19	0
Thorium-230	52	58	8	NA [a]	0	0	29	0
Thorium-232	47	58	3	NA [a]	0	0	11	0
Uranium, Total	58	58	58	NA [a]	11	0	43	0
Uranium-234	51	59	39	NA [a]	9	0	38	0
Uranium-235/236	48	56	48	NA [a]	14	0	32	0
Uranium-236	.	1	.	NA [a]	.	.	.	.
Uranium-238	51	56	51	NA [a]	9	0	37	0

a-There are no TCLP limits for radionuclides

000723

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	2	.	.	.	.	.	.
1,2-Dichlorobenzene	.	2	.	.	.	.	.	.
1,3-Dichlorobenzene	.	2	.	.	.	.	.	.
1,4-Dichlorobenzene	.	2	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	1	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	2	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	2	.	.	.	.	.	.
2,4-Dichlorophenol	.	2	.	.	.	.	.	.
2,4-Dimethylphenol	.	2	.	.	.	.	.	.
2,4-Dinitrophenol	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	2	.	.	.	.	.	.
2,6-Dinitrotoluene	.	2	.	.	.	.	.	.
2-Chloronaphthalene	.	2	.	.	.	.	.	.
2-Chlorophenol	.	2	.	.	.	.	.	.
2-Methylnaphthalene	.	2	.	.	.	.	.	.
2-Nitroaniline	.	2	.	.	.	.	.	.
2-Nitrophenol	.	2	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	2	.	.	.	.	.	.
3-Nitroaniline	.	2	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	2	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	2	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	2	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	2	.	.	.	.	.	.
4-Nitroaniline	.	2	.	.	.	.	.	.
4-Nitrophenol	.	2	.	.	.	.	.	.
Acenaphthene	.	2	.	.	.	.	.	.
Acenaphthylene	.	2	.	.	.	.	.	.
Anthracene	.	2	.	.	.	.	.	.
Benzo(a)anthracene	.	2	.	.	.	.	.	.
Benzo(a)pyrene	.	2	.	.	.	.	.	.
Benzo(b)fluoranthene	.	2	.	.	.	.	.	.
Benzo(g,h,i)perylene	.	2	.	.	.	.	.	.
Benzo(k)fluoranthene	.	2	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000224

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	2	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	.	2	.	.	.	.	.	.
Butyl benzyl phthalate	.	2	.	.	.	.	.	.
Carbazole	.	2	.	.	.	.	.	.
Chrysene	.	2	.	.	.	.	.	.
Di-n-butyl phthalate	.	2	.	.	.	.	.	.
Di-n-octyl phthalate	.	2	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	2	.	.	.	.	.	.
Dibenzofuran	.	2	.	.	.	.	.	.
Diethyl phthalate	.	2	.	.	.	.	.	.
Dimethyl phthalate	.	2	.	.	.	.	.	.
Fluoranthene	.	2	.	.	.	.	.	.
Fluorene	.	2	.	.	.	.	.	.
Hexachlorobenzene	.	2	.	.	.	.	.	.
Hexachlorobutadiene	.	2	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	2	.	.	.	.	.	.
Hexachloroethane	.	2	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	2	.	.	.	.	.	.
Isophorone	.	2	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	2	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	2	.	.	.	.	.	.
Naphthalene	.	2	.	.	.	.	.	.
Nitrobenzene	.	2	.	.	.	.	.	.
o-Methylphenol	.	2	.	.	.	.	.	.
p-Chloroaniline	.	2	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	2	.	.	.	.	.	.
Pentachlorophenol	.	2	.	.	.	.	.	.
Phenanthrene	.	2	.	.	.	.	.	.
Phenol	.	2	.	.	.	.	.	.
Pyrene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000723

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	1	2	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	2	.	.	.	.	.	.
1,1,2-Trichloroethane	.	2	.	.	.	.	.	.
1,1-Dichloroethane	.	2	.	.	.	.	.	.
1,1-Dichloroethene	.	2	.	.	.	.	.	.
1,2-Dichloroethane	.	2	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	2	.	.	.	.	.	.
1,2-Dichloropropane	.	2	.	.	.	.	.	.
2-Butanone	.	2	.	.	.	.	.	.
2-Hexanone	.	2	.	.	.	.	.	.
4-Methyl-2-pentanone	.	2	.	.	.	.	.	.
Acetone	.	2	.	.	.	.	.	.
Benzene	.	2	.	.	.	.	.	.
Bromodichloromethane	.	2	.	.	.	.	.	.
Bromoform	.	2	.	.	.	.	.	.
Bromomethane	.	2	.	.	.	.	.	.
Carbon disulfide	.	2	.	.	.	.	.	.
Carbon Tetrachloride	.	2	.	.	.	.	.	.
Chlorobenzene	.	2	.	.	.	.	.	.
Chloroethane	.	2	.	.	.	.	.	.
Chloroform	.	2	.	.	.	.	.	.
Chloromethane	.	2	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	2	.	.	.	.	.	.
Dibromochloromethane	.	2	.	.	.	.	.	.
Ethylbenzene	1	2	0	0	0	0	0	0
m,p-Xylene	1	1	0	0	0	0	0	0
Methylene chloride	.	2	.	.	.	.	.	.
o-Xylene	1	1	0	0	0	0	0	0
Styrene	.	2	.	.	.	.	.	.
Tetrachloroethene	.	2	.	.	.	.	.	.
Toluene	.	2	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	2	.	.	.	.	.	.
Trichloroethene	.	2	.	.	.	.	.	.
Vinyl chloride	.	2	.	.	.	.	.	.
Xylenes, Total	2	2	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	SEDIMENT							
INORGANICS								
Aluminum	28	29	0	0	0	0	0	0
Antimony	4	25	2	0	0	0	0	0
Arsenic	27	28	27	1	0	0	0	0
Barium	29	29	1	1	0	0	0	0
Beryllium	7	29	7	0	0	0	0	0
Cadmium	11	29	1	1	0	0	0	0
Calcium	28	29	0	0	0	0	0	0
Chromium	28	29	5	9	0	0	0	0
Cobalt	17	29	0	0	0	0	0	0
Copper	28	29	2	0	0	0	0	0
Iron	29	29	0	0	0	0	0	0
Lead	22	29	0	18	0	0	0	0
Magnesium	28	29	0	0	0	0	0	0
Manganese	29	29	27	0	0	0	0	0
Mercury	18	29	2	6	0	0	0	0
Nickel	24	29	0	0	0	0	0	0
Potassium	24	29	0	0	0	0	0	0
Selenium	11	27	0	0	0	0	0	0
Silver	19	29	1	1	0	0	0	0
Sodium	25	29	0	0	0	0	0	0
Thallium	2	26	0	0	0	0	0	0
Vanadium	19	29	0	0	0	0	0	0
Zinc	26	29	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000227

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	15	28	10	NA [a]	0	0	0	0
Cesium-137	26	29	26	NA [a]	0	0	0	0
Lead-210	25	29	25	NA [a]	0	0	0	0
Neptunium-237	20	27	20	NA [a]	0	0	0	0
Plutonium-238	18	27	12	NA [a]	0	0	0	0
Plutonium-239/240	18	27	16	NA [a]	0	0	0	0
Plutonium-241	7	20	1	NA [a]	0	0	0	0
Polonium-210	29	29	29	NA [a]	0	0	0	0
Radium-226	28	28	28	NA [a]	0	0	0	0
Radium-228	28	28	28	NA [a]	0	0	0	0
Strontium-90	16	29	3	NA [a]	0	0	0	0
Technetium-99	25	28	14	NA [a]	0	0	0	0
Thorium-227	.	5	.	NA [a]	.	.	.	.
Thorium-228	28	29	28	NA [a]	0	0	0	0
Thorium-230	28	28	25	NA [a]	0	0	0	0
Thorium-232	28	28	5	NA [a]	0	0	0	0
Uranium, Total	29	29	29	NA [a]	15	0	0	0
Uranium-234	28	28	28	NA [a]	15	0	0	0
Uranium-235/236	28	28	28	NA [a]	17	1	0	0
Uranium-238	28	28	28	NA [a]	16	0	0	0

a-There are no TCLP limits for radionuclides

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000228

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	30	.	.	.	.	.	.
1,2-Dichlorobenzene	.	30	.	.	.	.	.	.
1,3-Dichlorobenzene	.	30	.	.	.	.	.	.
1,4-Dichlorobenzene	.	30	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	22	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	30	.	.	.	.	.	.
2,4,6-Trichlorophenol	1	30	0	0	0	0	0	0
2,4-Dichlorophenol	.	30	.	.	.	.	.	.
2,4-Dimethylphenol	.	30	.	.	.	.	.	.
2,4-Dinitrophenol	.	30	.	.	.	.	.	.
2,4-Dinitrotoluene	.	30	.	.	.	.	.	.
2,6-Dinitrotoluene	.	30	.	.	.	.	.	.
2-Chloronaphthalene	.	30	.	.	.	.	.	.
2-Chlorophenol	.	30	.	.	.	.	.	.
2-Methylnaphthalene	10	30	0	0	0	0	0	0
2-Nitroaniline	.	30	.	.	.	.	.	.
2-Nitrophenol	.	30	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	29	.	.	.	.	.	.
3-Nitroaniline	.	29	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	30	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	30	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	30	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	30	.	.	.	.	.	.
4-Nitroaniline	.	29	.	.	.	.	.	.
4-Nitrophenol	.	30	.	.	.	.	.	.
Acenaphthene	8	30	0	0	0	0	0	0
Acenaphthylene	2	30	0	0	0	0	0	0
Anthracene	13	30	0	0	0	0	0	0
Benzo(a)anthracene	22	30	22	0	0	0	0	0
Benzo(a)pyrene	18	30	18	0	0	0	0	0
Benzo(b)fluoranthene	24	30	24	0	0	0	0	0
Benzo(g,h,i)perylene	13	30	0	0	0	0	0	0
Benzo(k)fluoranthene	19	30	17	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	30	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	30	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	6	30	4	0	0	0	0	0
Butyl benzyl phthalate	4	30	0	0	0	0	0	0
Carbazole	13	29	4	0	0	0	0	0
Chrysene	24	30	9	0	0	0	0	0
Di-n-butyl phthalate	12	30	0	0	0	0	0	0
Di-n-octyl phthalate	11	30	0	0	0	0	0	0
Dibenzo(a,h)anthracene	4	30	4	0	0	0	0	0
Dibenzofuran	10	30	0	0	0	0	0	0
Diethyl phthalate	5	30	0	0	0	0	0	0
Dimethyl phthalate	.	30	.	.	.	.	.	.
Fluoranthene	27	30	0	0	0	0	0	0
Fluorene	12	30	0	0	0	0	0	0
Hexachloro-1,3-butadiene	.	1	.	.	.	.	.	.
Hexachlorobenzene	.	30	.	.	.	.	.	.
Hexachlorobutadiene	.	29	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	30	.	.	.	.	.	.
Hexachloroethane	.	30	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	21	30	21	0	0	0	0	0
Isophorone	.	30	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	30	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	30	.	.	.	.	.	.
Naphthalene	15	30	0	0	0	0	0	0
Nitrobenzene	1	30	0	0	0	0	0	0
o-Methylphenol	2	30	0	0	0	0	0	0
p-Chloroaniline	1	29	0	0	0	0	0	0
p-Methylphenol (Cresol)	18	30	0	0	0	0	0	0
Pentachlorophenol	1	30	1	0	0	0	0	0
Phenanthrene	26	30	0	0	0	0	0	0
Phenol	4	30	0	0	0	0	0	0
Pyrene	27	30	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	1	28	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	.	27	.	.	.	.	.	.
1,1,2-Trichloroethane	.	28	.	.	.	.	.	.
1,1-Dichloroethane	.	30	.	.	.	.	.	.
1,1-Dichloroethene	.	30	.	.	.	.	.	.
1,2-Dichloroethane	.	30	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	30	.	.	.	.	.	.
1,2-Dichloropropane	.	28	.	.	.	.	.	.
2-Butanone	6	30	0	0	0	0	0	0
2-Hexanone	.	24	.	.	.	.	.	.
4-Chloroaniline	.	1	.	.	.	.	.	.
4-Methyl-2-pentanone	1	27	0	0	0	0	0	0
Acetone	3	19	0	0	0	0	0	0
Benzene	.	28	.	.	.	.	.	.
Bromodichloromethane	.	28	.	.	.	.	.	.
Bromoform	.	28	.	.	.	.	.	.
Bromomethane	.	30	.	.	.	.	.	.
Carbon disulfide	1	30	0	0	0	0	0	0
Carbon Tetrachloride	.	28	.	.	.	.	.	.
Chlorobenzene	.	27	.	.	.	.	.	.
Chloroethane	.	30	.	.	.	.	.	.
Chloroform	.	30	.	.	.	.	.	.
Chloromethane	.	30	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	28	.	.	.	.	.	.
Dibromochloromethane	.	28	.	.	.	.	.	.
Ethylbenzene	3	27	0	0	0	0	0	0
Methylene chloride	.	30	.	.	.	.	.	.
Styrene	6	27	1	0	0	0	0	0
Tetrachloroethene	2	27	0	0	0	0	0	0
Toluene	7	27	0	0	0	0	0	0
trans-1,3-Dichloropropene	.	28	.	.	.	.	.	.
Trichloroethene	.	28	.	.	.	.	.	.
Vinyl chloride	.	30	.	.	.	.	.	.
Xylenes, Total	5	27	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	SLUDGE							
INORGANICS								
Aluminum	1	1	0	0	0	0	0	0
Antimony	1	1	0	0	0	0	0	0
Arsenic	1	1	1	0	0	0	0	0
Barium	1	1	0	0	0	0	0	0
Beryllium	1	1	1	0	0	0	0	0
Cadmium	1	1	0	0	0	0	0	0
Calcium	1	1	0	0	0	0	0	0
Chromium	1	1	0	1	0	0	0	0
Cobalt	1	1	0	0	0	0	0	0
Copper	1	1	0	0	0	0	0	0
Iron	1	1	0	0	0	0	0	0
Lead	1	1	0	1	0	0	0	0
Magnesium	1	1	0	0	0	0	0	0
Manganese	1	1	1	0	0	0	0	0
Mercury	.	1	.	.	.	.	.	.
Nickel	1	1	1	0	0	0	0	0
Potassium	1	1	0	0	0	0	0	0
Selenium	.	1	.	.	.	.	.	.
Silver	1	1	0	0	0	0	0	0
Sodium	1	1	0	0	0	0	0	0
Thallium	.	1	.	.	.	.	.	.
Vanadium	.	1	.	.	.	.	.	.
Zinc	1	1	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	1	1	0	NA [a]	0	0	0	0
Cesium-137	1	1	1	NA [a]	0	0	0	0
Lead-210	1	1	1	NA [a]	0	0	0	0
Neptunium-237	.	1	.	NA [a]	.	.	.	.
Plutonium-238	1	1	1	NA [a]	0	0	0	0
Plutonium-239/240	1	1	1	NA [a]	0	0	0	0
Plutonium-241	1	1	0	NA [a]	0	0	0	0
Polonium-210	1	1	1	NA [a]	0	0	0	0
Radium-226	1	1	1	NA [a]	0	0	0	0
Radium-228	1	1	1	NA [a]	0	0	0	0
Strontium-90	1	1	1	NA [a]	0	0	0	0
Technetium-99	1	1	1	NA [a]	0	0	0	0
Thorium-228	1	1	1	NA [a]	0	0	0	0
Thorium-230	1	1	1	NA [a]	0	0	0	0
Thorium-232	1	1	1	NA [a]	0	0	0	0
Uranium, Total	1	1	1	NA [a]	1	0	0	0
Uranium-234	1	1	1	NA [a]	1	0	0	0
Uranium-235/236	1	1	1	NA [a]	1	0	0	0
Uranium-238	1	1	1	NA [a]	1	0	0	0

000733

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	1	.	.	.	.	.	.
1,2-Dichlorobenzene	.	1	.	.	.	.	.	.
1,3-Dichlorobenzene	.	1	.	.	.	.	.	.
1,4-Dichlorobenzene	.	1	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	1	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	1	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	1	.	.	.	.	.	.
2,4-Dichlorophenol	.	1	.	.	.	.	.	.
2,4-Dimethylphenol	.	1	.	.	.	.	.	.
2,4-Dinitrophenol	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	1	.	.	.	.	.	.
2,6-Dinitrotoluene	.	1	.	.	.	.	.	.
2-Chloronaphthalene	.	1	.	.	.	.	.	.
2-Chlorophenol	.	1	.	.	.	.	.	.
2-Methylnaphthalene	1	1	0	0	0	0	0	0
2-Nitroaniline	.	1	.	.	.	.	.	.
2-Nitrophenol	.	1	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	1	.	.	.	.	.	.
3-Nitroaniline	.	1	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	1	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	1	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	1	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	1	.	.	.	.	.	.
4-Nitroaniline	.	1	.	.	.	.	.	.
4-Nitrophenol	.	1	.	.	.	.	.	.
Acenaphthene	1	1	0	0	0	0	0	0
Acenaphthylene	.	1	.	.	.	.	.	.
Anthracene	.	1	.	.	.	.	.	.
Benzo(a)anthracene	1	1	1	0	0	0	0	0
Benzo(a)pyrene	1	1	1	0	0	0	0	0
Benzo(b)fluoranthene	1	1	1	0	0	0	0	0
Benzo(g,h,i)perylene	1	1	0	0	0	0	0	0
Benzo(k)fluoranthene	1	1	1	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	1	1	1	0	0	0	0	0
Butyl benzyl phthalate	1	1	0	0	0	0	0	0
Carbazole	.	1	.	.	.	.	.	.
Chrysene	1	1	1	0	0	0	0	0
Di-n-butyl phthalate	1	1	0	0	0	0	0	0
Di-n-octyl phthalate	1	1	0	0	0	0	0	0
Dibenzo(a,h)anthracene	.	1	.	.	.	.	.	.
Dibenzofuran	1	1	0	0	0	0	0	0
Diethyl phthalate	.	1	.	.	.	.	.	.
Dimethyl phthalate	1	1	0	0	0	0	0	0
Fluoranthene	1	1	0	0	0	0	0	0
Fluorene	1	1	0	0	0	0	0	0
Hexachlorobenzene	.	1	.	.	.	.	.	.
Hexachlorobutadiene	.	1	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	1	.	.	.	.	.	.
Hexachloroethane	.	1	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	1	1	1	0	0	0	0	0
Isophorone	.	1	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	1	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	1	.	.	.	.	.	.
Naphthalene	1	1	0	0	0	0	0	0
Nitrobenzene	.	1	.	.	.	.	.	.
o-Methylphenol	.	1	.	.	.	.	.	.
p-Chloroaniline	.	1	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	1	.	.	.	.	.	.
Pentachlorophenol	.	1	.	.	.	.	.	.
Phenanthrene	1	1	0	0	0	0	0	0
Phenol	.	1	.	.	.	.	.	.
Pyrene	1	1	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	1	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	1	.	.	.	.	.	.
1,1,2-Trichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethene	.	1	.	.	.	.	.	.
1,2-Dichloroethane	.	1	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	1	.	.	.	.	.	.
1,2-Dichloropropane	.	1	.	.	.	.	.	.
2-Butanone	.	1	.	.	.	.	.	.
2-Hexanone	.	1	.	.	.	.	.	.
4-Methyl-2-pentanone	.	1	.	.	.	.	.	.
Acetone	.	1	.	.	.	.	.	.
Benzene	.	1	.	.	.	.	.	.
Bromodichloromethane	.	1	.	.	.	.	.	.
Bromoform	.	1	.	.	.	.	.	.
Bromomethane	.	1	.	.	.	.	.	.
Carbon disulfide	.	1	.	.	.	.	.	.
Carbon Tetrachloride	.	1	.	.	.	.	.	.
Chlorobenzene	.	1	.	.	.	.	.	.
Chloroethane	.	1	.	.	.	.	.	.
Chloroform	.	1	.	.	.	.	.	.
Chloromethane	.	1	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Dibromochloromethane	.	1	.	.	.	.	.	.
Ethylbenzene	.	1	.	.	.	.	.	.
Methylene chloride	.	1	.	.	.	.	.	.
Styrene	.	1	.	.	.	.	.	.
Tetrachloroethene	.	1	.	.	.	.	.	.
Toluene	.	1	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Trichloroethene	.	1	.	.	.	.	.	.
Vinyl chloride	.	1	.	.	.	.	.	.
Xylenes, Total	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	SOIL (1st DEPTH)							
INORGANICS								
Aluminum	9	9	0	0	0	0	0	0
Antimony	.	9	.	.	.	.	.	.
Arsenic	9	9	9	0	0	0	0	0
Barium	9	9	0	0	0	0	0	0
Beryllium	6	9	6	0	0	0	0	0
Cadmium	.	9	.	.	.	.	.	.
Calcium	9	9	0	0	0	0	0	0
Chromium	9	9	0	0	0	0	0	0
Cobalt	9	9	0	0	0	0	0	0
Copper	9	9	0	0	0	0	0	0
Iron	9	9	0	0	0	0	0	0
Lead	9	9	0	1	0	0	0	0
Magnesium	9	9	0	0	0	0	0	0
Manganese	9	9	9	0	0	0	0	0
Mercury	.	9	.	.	.	.	.	.
Nickel	9	9	0	0	0	0	0	0
Potassium	8	9	0	0	0	0	0	0
Selenium	1	9	0	0	0	0	0	0
Silver	.	9	.	.	.	.	.	.
Sodium	9	9	0	0	0	0	0	0
Thallium	.	9	.	.	.	.	.	.
Vanadium	9	9	0	0	0	0	0	0
Zinc	9	9	0	0	0	0	0	0

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a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	8	.	.	.	.	.	.
4,4'-DDE	.	8	.	.	.	.	.	.
4,4'-DDT	.	8	.	.	.	.	.	.
Aldrin	.	8	.	.	.	.	.	.
alpha-BHC	.	8	.	.	.	.	.	.
alpha-Chlordane	.	8	.	.	.	.	.	.
Aroclor-1016	.	9	.	.	.	.	.	.
Aroclor-1221	.	9	.	.	.	.	.	.
Aroclor-1232	.	9	.	.	.	.	.	.
Aroclor-1242	.	9	.	.	.	.	.	.
Aroclor-1248	.	9	.	.	.	.	.	.
Aroclor-1254	3	9	3	0	0	0	0	0
Aroclor-1260	1	9	1	0	0	0	0	0
beta-BHC	.	8	.	.	.	.	.	.
delta-BHC	.	8	.	.	.	.	.	.
Dieldrin	.	8	.	.	.	.	.	.
Endosulfan II	.	8	.	.	.	.	.	.
Endosulfan sulfate	.	8	.	.	.	.	.	.
Endosulfan-I	.	8	.	.	.	.	.	.
Endrin	.	8	.	.	.	.	.	.
Endrin aldehyde	.	8	.	.	.	.	.	.
Endrin ketone	.	8	.	.	.	.	.	.
gamma-BHC (Lindane)	.	8	.	.	.	.	.	.
gamma-Chlordane	.	8	.	.	.	.	.	.
Heptachlor	.	8	.	.	.	.	.	.
Heptachlor epoxide	.	8	.	.	.	.	.	.
Methoxychlor	.	8	.	.	.	.	.	.
Toxaphene	.	8	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

			Detects Above Given Criteria					
Parameter	# of Detects	# of Samples	Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	.	5	.	NA [a]	.	.	.	.
Cesium-137	3	5	3	NA [a]	0	0	0	0
Gross Alpha	.	4	.	NA [a]	.	.	.	.
Gross Beta	.	4	.	NA [a]	.	.	.	.
Lead-210	5	5	5	NA [a]	0	0	0	0
Neptunium-237	.	5	.	NA [a]	.	.	.	.
Plutonium-238	1	5	0	NA [a]	0	0	0	0
Plutonium-239/240	3	5	0	NA [a]	0	0	0	0
Plutonium-241	.	5	.	NA [a]	.	.	.	.
Polonium-210	4	4	4	NA [a]	0	0	0	0
Radium-226	5	5	5	NA [a]	0	0	0	0
Radium-228	5	5	5	NA [a]	0	0	0	0
Strontium-90	.	5	.	NA [a]	.	.	.	.
Technetium-99	5	5	0	NA [a]	0	0	0	0
Thorium-227	.	5	.	NA [a]	.	.	.	.
Thorium-228	5	5	5	NA [a]	0	0	0	0
Thorium-230	5	5	1	NA [a]	0	0	0	0
Thorium-232	5	5	0	NA [a]	0	0	0	0
Uranium, Total	5	5	5	NA [a]	0	0	0	0
Uranium-234	5	5	4	NA [a]	0	0	0	0
Uranium-235/236	5	5	5	NA [a]	0	0	0	0
Uranium-238	5	5	5	NA [a]	0	0	0	0

a-There are no TCLP limits for radionuclides

000239

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	9	.	.	.	.	.	.
1,2-Dichlorobenzene	.	9	.	.	.	.	.	.
1,3-Dichlorobenzene	.	9	.	.	.	.	.	.
1,4-Dichlorobenzene	.	9	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	9	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	9	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	9	.	.	.	.	.	.
2,4-Dichlorophenol	.	9	.	.	.	.	.	.
2,4-Dimethylphenol	.	9	.	.	.	.	.	.
2,4-Dinitrophenol	.	9	.	.	.	.	.	.
2,4-Dinitrotoluene	.	9	.	.	.	.	.	.
2,6-Dinitrotoluene	.	9	.	.	.	.	.	.
2-Chloronaphthalene	.	9	.	.	.	.	.	.
2-Chlorophenol	.	9	.	.	.	.	.	.
2-Methylnaphthalene	1	9	0	0	0	0	0	0
2-Nitroaniline	.	9	.	.	.	.	.	.
2-Nitrophenol	.	9	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	9	.	.	.	.	.	.
3-Nitroaniline	.	9	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	9	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	9	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	9	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	9	.	.	.	.	.	.
4-Nitroaniline	.	9	.	.	.	.	.	.
4-Nitrophenol	.	9	.	.	.	.	.	.
Acenaphthene	2	9	0	0	0	0	0	0
Acenaphthylene	2	9	0	0	0	0	0	0
Anthracene	3	9	0	0	0	0	0	0
Benzo(a)anthracene	7	9	5	0	0	0	0	0
Benzo(a)pyrene	6	9	6	0	0	0	0	0
Benzo(b)fluoranthene	6	9	5	0	0	0	0	0
Benzo(g,h,i)perylene	5	9	0	0	0	0	0	0
Benzo(k)fluoranthene	5	9	4	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	9	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000740

2121

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	9	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	6	9	0	0	0	0	0	0
Butyl benzyl phthalate	.	9	.	.	.	.	.	.
Carbazole	2	9	0	0	0	0	0	0
Chrysene	7	9	0	0	0	0	0	0
Di-n-butyl phthalate	1	9	0	0	0	0	0	0
Di-n-octyl phthalate	.	9	.	.	.	.	.	.
Dibenzo(a,h)anthracene	4	9	4	0	0	0	0	0
Dibenzofuran	.	9	.	.	.	.	.	.
Diethyl phthalate	.	9	.	.	.	.	.	.
Dimethyl phthalate	.	9	.	.	.	.	.	.
Fluoranthene	8	9	0	0	0	0	0	0
Fluorene	1	9	0	0	0	0	0	0
Hexachlorobenzene	.	9	.	.	.	.	.	.
Hexachlorobutadiene	.	9	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	9	.	.	.	.	.	.
Hexachloroethane	.	9	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	5	9	5	0	0	0	0	0
Isophorone	.	9	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	9	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	9	.	.	.	.	.	.
Naphthalene	.	9	.	.	.	.	.	.
Nitrobenzene	.	9	.	.	.	.	.	.
o-Methylphenol	.	9	.	.	.	.	.	.
p-Chloroaniline	.	9	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	9	.	.	.	.	.	.
Pentachlorophenol	.	9	.	.	.	.	.	.
Phenanthrene	7	9	0	0	0	0	0	0
Phenol	.	9	.	.	.	.	.	.
Pyrene	8	9	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000741

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	9	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	9	.	.	.	.	.	.
1,1,2-Trichloroethane	.	9	.	.	.	.	.	.
1,1-Dichloroethane	.	9	.	.	.	.	.	.
1,1-Dichloroethene	.	9	.	.	.	.	.	.
1,2-Dichloroethane	.	9	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	9	.	.	.	.	.	.
1,2-Dichloropropane	.	9	.	.	.	.	.	.
2-Butanone	.	9	.	.	.	.	.	.
2-Hexanone	.	9	.	.	.	.	.	.
4-Methyl-2-pentanone	.	9	.	.	.	.	.	.
Acetone	2	5	0	0	0	0	0	0
Benzene	.	9	.	.	.	.	.	.
Bromodichloromethane	.	9	.	.	.	.	.	.
Bromoform	.	9	.	.	.	.	.	.
Bromomethane	.	9	.	.	.	.	.	.
Carbon disulfide	.	9	.	.	.	.	.	.
Carbon Tetrachloride	.	9	.	.	.	.	.	.
Chlorobenzene	.	9	.	.	.	.	.	.
Chloroethane	.	9	.	.	.	.	.	.
Chloroform	.	9	.	.	.	.	.	.
Chloromethane	.	9	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	9	.	.	.	.	.	.
Dibromochloromethane	.	9	.	.	.	.	.	.
Ethylbenzene	.	9	.	.	.	.	.	.
Methylene chloride	.	9	.	.	.	.	.	.
Styrene	.	9	.	.	.	.	.	.
Tetrachloroethene	.	9	.	.	.	.	.	.
Toluene	.	9	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	9	.	.	.	.	.	.
Trichloroethene	.	9	.	.	.	.	.	.
Vinyl chloride	.	9	.	.	.	.	.	.
Xylenes, Total	.	9	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

Draft

000242

2121

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	SOIL (2nd DEPTH)							
INORGANICS								
Aluminum	2	2	0	0	0	0	0	0
Antimony	.	1	.	.	.	.	.	.
Arsenic	2	2	2	0	0	0	0	0
Barium	2	2	0	0	0	0	0	0
Beryllium	1	2	1	0	0	0	0	0
Cadmium	1	2	0	0	0	0	0	0
Calcium	2	2	0	0	0	0	0	0
Chromium	2	2	0	0	0	0	0	0
Cobalt	2	2	0	0	0	0	0	0
Copper	2	2	0	0	0	0	0	0
Iron	2	2	0	0	0	0	0	0
Lead	2	2	0	0	0	0	0	0
Magnesium	2	2	0	0	0	0	0	0
Manganese	2	2	2	0	0	0	0	0
Mercury	.	2	.	.	.	.	.	.
Nickel	2	2	0	0	0	0	0	0
Potassium	1	2	0	0	0	0	0	0
Selenium	1	2	0	0	0	0	0	0
Silver	.	2	.	.	.	.	.	.
Sodium	2	2	0	0	0	0	0	0
Thallium	.	2	.	.	.	.	.	.
Vanadium	2	2	0	0	0	0	0	0
Zinc	2	2	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000243

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	1	3	0	0	0	0	0	0
4,4'-DDE	.	3	.	.	.	.	.	.
4,4'-DDT	.	3	.	.	.	.	.	.
Aldrin	.	3	.	.	.	.	.	.
alpha-BHC	.	3	.	.	.	.	.	.
alpha-Chlordane	.	3	.	.	.	.	.	.
Aroclor-1016	.	3	.	.	.	.	.	.
Aroclor-1221	.	3	.	.	.	.	.	.
Aroclor-1232	.	3	.	.	.	.	.	.
Aroclor-1242	.	3	.	.	.	.	.	.
Aroclor-1248	1	3	1	0	0	0	0	0
Aroclor-1254	2	3	2	0	0	0	0	0
Aroclor-1260	1	3	1	0	0	0	0	0
beta-BHC	.	3	.	.	.	.	.	.
delta-BHC	.	3	.	.	.	.	.	.
Dieldrin	1	3	0	0	0	0	0	0
Endosulfan II	1	3	0	0	0	0	0	0
Endosulfan sulfate	.	3	.	.	.	.	.	.
Endosulfan-I	.	3	.	.	.	.	.	.
Endrin	1	3	0	0	0	0	0	0
Endrin aldehyde	.	3	.	.	.	.	.	.
Endrin ketone	1	3	0	0	0	0	0	0
gamma-BHC (Lindane)	.	3	.	.	.	.	.	.
gamma-Chlordane	1	3	0	0	0	0	0	0
Heptachlor	.	3	.	.	.	.	.	.
Heptachlor epoxide	.	3	.	.	.	.	.	.
Methoxychlor	.	3	.	.	.	.	.	.
Toxaphene	.	3	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000744

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	.	8	.	NA [a]	.	.	.	.
Cesium-137	6	7	6	NA [a]	0	0	0	0
Gross Alpha	.	2	.	NA [a]	.	.	.	.
Gross Beta	.	2	.	NA [a]	.	.	.	.
Lead-210	7	8	7	NA [a]	0	0	0	0
Neptunium-237	2	8	2	NA [a]	0	0	0	0
Plutonium-238	1	5	0	NA [a]	0	0	0	0
Plutonium-239/240	1	7	0	NA [a]	0	0	0	0
Plutonium-241	.	7	.	NA [a]	.	.	.	.
Polonium-210	7	8	7	NA [a]	0	0	0	0
Radium-226	7	7	7	NA [a]	0	0	0	0
Radium-228	7	7	7	NA [a]	0	0	0	0
Strontium-90	2	8	0	NA [a]	0	0	0	0
Technetium-99	7	8	0	NA [a]	0	0	0	0
Thorium-227	.	6	.	NA [a]	.	.	.	.
Thorium-228	7	8	7	NA [a]	0	0	0	0
Thorium-230	7	8	1	NA [a]	0	0	0	0
Thorium-232	6	8	0	NA [a]	0	0	0	0
Uranium, Total	7	8	7	NA [a]	0	0	0	0
Uranium-234	7	8	7	NA [a]	0	0	0	0
Uranium-235/236	7	8	7	NA [a]	0	0	0	0
Uranium-238	6	6	6	NA [a]	0	0	0	0

a-There are no TCLP limits for radionuclides

000245

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	3	.	.	.	.	.	.
1,2-Dichlorobenzene	.	3	.	.	.	.	.	.
1,3-Dichlorobenzene	.	3	.	.	.	.	.	.
1,4-Dichlorobenzene	.	3	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	3	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	3	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	3	.	.	.	.	.	.
2,4-Dichlorophenol	.	3	.	.	.	.	.	.
2,4-Dimethylphenol	.	3	.	.	.	.	.	.
2,4-Dinitrophenol	.	3	.	.	.	.	.	.
2,4-Dinitrotoluene	.	3	.	.	.	.	.	.
2,6-Dinitrotoluene	.	3	.	.	.	.	.	.
2-Chloronaphthalene	.	3	.	.	.	.	.	.
2-Chlorophenol	.	3	.	.	.	.	.	.
2-Methylnaphthalene	.	3	.	.	.	.	.	.
2-Nitroaniline	.	3	.	.	.	.	.	.
2-Nitrophenol	.	3	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	2	.	.	.	.	.	.
3-Nitroaniline	.	2	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	3	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	3	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	3	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	3	.	.	.	.	.	.
4-Nitroaniline	.	2	.	.	.	.	.	.
4-Nitrophenol	.	3	.	.	.	.	.	.
Acenaphthene	.	3	.	.	.	.	.	.
Acenaphthylene	.	3	.	.	.	.	.	.
Anthracene	.	3	.	.	.	.	.	.
Benzo(a)anthracene	1	3	1	0	0	0	0	0
Benzo(a)pyrene	1	3	1	0	0	0	0	0
Benzo(b)fluoranthene	1	3	1	0	0	0	0	0
Benzo(g,h,i)perylene	.	3	.	.	.	.	.	.
Benzo(k)fluoranthene	.	3	.	.	.	.	.	.
bis(2-Chloroethoxy)methane	.	3	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

Draft

000246

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	3	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	1	3	0	0	0	0	0	0
Butyl benzyl phthalate	.	3	.	.	.	.	.	.
Carbazole	.	2	.	.	.	.	.	.
Chrysene	1	3	0	0	0	0	0	0
Di-n-butyl phthalate	.	3	.	.	.	.	.	.
Di-n-octyl phthalate	.	3	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	3	.	.	.	.	.	.
Dibenzofuran	.	3	.	.	.	.	.	.
Diethyl phthalate	.	3	.	.	.	.	.	.
Dimethyl phthalate	.	3	.	.	.	.	.	.
Fluoranthene	1	3	0	0	0	0	0	0
Fluorene	.	3	.	.	.	.	.	.
Hexachlorobenzene	.	3	.	.	.	.	.	.
Hexachlorobutadiene	.	3	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	3	.	.	.	.	.	.
Hexachloroethane	.	3	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	1	3	1	0	0	0	0	0
Isophorone	.	3	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	3	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	3	.	.	.	.	.	.
Naphthalene	.	3	.	.	.	.	.	.
Nitrobenzene	.	3	.	.	.	.	.	.
o-Methylphenol	.	3	.	.	.	.	.	.
p-Chloroaniline	.	3	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	3	.	.	.	.	.	.
Pentachlorophenol	.	3	.	.	.	.	.	.
Phenanthrene	1	3	0	0	0	0	0	0
Phenol	.	3	.	.	.	.	.	.
Pyrene	1	3	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

Draft

000247

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	3	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	3	.	.	.	.	.	.
1,1,2-Trichloroethane	.	3	.	.	.	.	.	.
1,1-Dichloroethane	.	3	.	.	.	.	.	.
1,1-Dichloroethene	.	3	.	.	.	.	.	.
1,2-Dichloroethane	.	3	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	2	.	.	.	.	.	.
1,2-Dichloropropane	.	3	.	.	.	.	.	.
2-Butanone	.	3	.	.	.	.	.	.
2-Hexanone	.	3	.	.	.	.	.	.
4-Methyl-2-pentanone	.	3	.	.	.	.	.	.
Acetone	.	1	.	.	.	.	.	.
Benzene	.	3	.	.	.	.	.	.
Bromodichloromethane	.	3	.	.	.	.	.	.
Bromoform	.	3	.	.	.	.	.	.
Bromomethane	.	3	.	.	.	.	.	.
Carbon disulfide	.	3	.	.	.	.	.	.
Carbon Tetrachloride	.	3	.	.	.	.	.	.
Chlorobenzene	.	3	.	.	.	.	.	.
Chloroethane	.	3	.	.	.	.	.	.
Chloroform	.	3	.	.	.	.	.	.
Chloromethane	.	3	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	3	.	.	.	.	.	.
Dibromochloromethane	.	3	.	.	.	.	.	.
Ethylbenzene	.	3	.	.	.	.	.	.
Methylene chloride	.	3	.	.	.	.	.	.
Styrene	.	3	.	.	.	.	.	.
Tetrachloroethene	.	3	.	.	.	.	.	.
Toluene	.	3	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	1	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	3	.	.	.	.	.	.
Trichloroethene	.	3	.	.	.	.	.	.
Vinyl chloride	.	3	.	.	.	.	.	.
Xylenes, Total	.	3	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
			STEEL COATINGS					
INORGANICS								
Aluminum	131	139	0	0	0	0	0	31
Antimony	70	113	47	0	0	0	0	17
Arsenic	115	138	115	5	0	0	0	32
Barium	133	139	25	24	0	0	0	22
Beryllium	29	128	29	0	0	0	0	13
Cadmium	109	138	47	37	0	0	0	13
Calcium	129	139	0	0	0	0	0	13
Chromium	133	139	118	123	0	0	0	33
Cobalt	132	139	0	0	0	0	0	4
Copper	130	139	7	0	0	0	0	31
Iron	134	139	0	0	0	0	0	33
Lead	134	139	0	131	0	0	0	4
Magnesium	129	139	0	0	0	0	0	39
Manganese	134	139	123	0	0	0	0	28
Mercury	109	137	23	32	0	0	0	11
Nickel	127	139	3	0	0	0	0	19
Potassium	104	139	0	0	0	0	0	38
Selenium	23	107	0	3	0	0	0	14
Silver	69	137	0	0	0	0	0	13
Sodium	117	139	0	0	0	0	0	50
Thallium	13	118	1	0	0	0	0	0
Vanadium	74	133	0	0	0	0	0	17
Zinc	134	139	41	0	0	0	0	3

a-There are no TCLP limits for radionuclides

000749

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	47	83	34	NA [a]	0	0	0	45
Cesium-137	12	83	12	NA [a]	0	0	0	11
Gross Alpha	.	31	.	NA [a]	.	.	.	.
Gross Beta	.	31	.	NA [a]	.	.	.	.
Lead-210	28	83	28	NA [a]	0	0	0	28
Neptunium-237	61	81	61	NA [a]	0	0	0	42
Plutonium-238	64	83	39	NA [a]	0	0	0	41
Plutonium-239/240	76	83	53	NA [a]	0	0	0	61
Plutonium-241	26	78	7	NA [a]	0	0	0	11
Polonium-210	83	83	75	NA [a]	0	0	0	17
Radium-226	57	83	57	NA [a]	0	2	0	26
Radium-228	64	83	62	NA [a]	0	2	0	49
Strontium-90	27	82	3	NA [a]	0	0	0	6
Technetium-99	70	83	27	NA [a]	0	0	0	68
Thorium-227	21	28	21	NA [a]	0	0	0	18
Thorium-228	82	83	82	NA [a]	0	0	0	47
Thorium-230	82	83	64	NA [a]	0	0	0	48
Thorium-232	82	83	34	NA [a]	0	0	0	43
Uranium, Total	83	83	83	NA [a]	62	0	0	74
Uranium-234	73	75	72	NA [a]	62	0	0	65
Uranium-235/236	73	73	73	NA [a]	64	5	0	64
Uranium-238	73	73	73	NA [a]	63	1	0	66

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	SWIPE SAMPLES							
RADIONUCLIDES								
Americium-241	.	14	.	NA [a]	.	.	.	.
Cesium-137	2	14	2	NA [a]	0	0	0	0
Lead-210	4	14	4	NA [a]	0	0	0	0
Plutonium-238	1	14	1	NA [a]	0	0	0	0
Plutonium-239/240	2	14	2	NA [a]	0	0	0	0
Plutonium-241	.	3	.	NA [a]	.	.	.	.
Polonium-210	.	14	.	NA [a]	.	.	.	.
Radium-226	4	14	4	NA [a]	0	0	0	0
Radium-228	1	13	1	NA [a]	0	0	0	0
Strontium-90	.	14	.	NA [a]	.	.	.	.
Technetium-99	6	16	3	NA [a]	0	0	0	0
Thorium-228	3	14	3	NA [a]	0	0	0	0
Thorium-230	3	14	2	NA [a]	0	0	0	0
Thorium-232	4	14	1	NA [a]	0	0	0	0
Uranium, Total	21	25	21	NA [a]	4	0	0	0
Uranium-234	8	14	7	NA [a]	3	0	0	0
Uranium-235/236	5	14	5	NA [a]	3	0	0	0
Uranium-238	8	14	8	NA [a]	3	0	0	0

a-There are no TCLP limits for radionuclides

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
	UNKNOWN LIQUID							
INORGANICS								
Aluminum	54	91	0	0	0	0	0	0
Antimony	7	90	4	0	0	0	0	0
Arsenic	29	91	29	0	0	0	0	0
Barium	79	90	3	3	0	0	0	0
Beryllium	15	87	15	0	0	0	0	0
Cadmium	25	91	12	11	0	0	0	0
Calcium	90	91	0	0	0	0	0	0
Chromium	32	91	16	16	0	0	0	0
Cobalt	23	91	0	0	0	0	0	0
Copper	58	91	10	0	0	0	0	0
Iron	72	91	0	0	0	0	0	0
Lead	53	89	0	20	0	0	0	0
Magnesium	87	91	1	0	0	0	0	0
Manganese	70	91	36	0	0	0	0	0
Mercury	26	90	5	5	0	0	0	0
Nickel	36	91	12	0	0	0	0	0
Potassium	83	91	0	0	0	0	0	0
Selenium	15	86	0	3	0	0	0	0
Silver	23	84	4	5	0	0	0	0
Sodium	85	91	0	0	0	0	0	0
Thallium	4	88	1	0	0	0	0	0
Vanadium	15	89	3	0	0	0	0	0
Zinc	60	91	4	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

			Detects Above Given Criteria					
Parameter	# of Detects	# of Samples	Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	1	.	.	.	.	.	.
4,4'-DDE	.	1	.	.	.	.	.	.
4,4'-DDT	.	1	.	.	.	.	.	.
Aldrin	.	1	.	.	.	.	.	.
alpha-BHC	.	1	.	.	.	.	.	.
alpha-Chlordane	.	1	.	.	.	.	.	.
Aroclor-1016	.	1	.	.	.	.	.	.
Aroclor-1221	.	1	.	.	.	.	.	.
Aroclor-1232	.	1	.	.	.	.	.	.
Aroclor-1242	.	1	.	.	.	.	.	.
Aroclor-1248	.	1	.	.	.	.	.	.
Aroclor-1254	.	1	.	.	.	.	.	.
Aroclor-1260	.	1	.	.	.	.	.	.
beta-BHC	.	1	.	.	.	.	.	.
Chlordane	.	1	.	.	.	.	.	.
delta-BHC	.	1	.	.	.	.	.	.
Dieldrin	.	1	.	.	.	.	.	.
Endosulfan II	.	1	.	.	.	.	.	.
Endosulfan sulfate	.	1	.	.	.	.	.	.
Endosulfan-I	.	1	.	.	.	.	.	.
Endrin	.	2	.	.	.	.	.	.
Endrin aldehyde	.	1	.	.	.	.	.	.
Endrin ketone	.	1	.	.	.	.	.	.
gamma-BHC (Lindane)	.	2	.	.	.	.	.	.
gamma-Chlordane	.	1	.	.	.	.	.	.
Heptachlor	.	2	.	.	.	.	.	.
Heptachlor epoxide	.	2	.	.	.	.	.	.
Methoxychlor	.	2	.	.	.	.	.	.
Toxaphene	.	2	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

000253

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	24	80	17	NA [a]	0	0	0	0
Cesium-137	10	88	10	NA [a]	0	0	0	0
Lead-210	43	86	43	NA [a]	0	0	0	0
Neptunium-237	20	88	20	NA [a]	0	0	0	0
Plutonium-238	25	85	12	NA [a]	0	0	0	0
Plutonium-239/240	34	85	19	NA [a]	0	0	0	0
Plutonium-241	10	39	3	NA [a]	0	0	0	0
Polonium-210	43	83	32	NA [a]	0	0	0	0
Radium-226	61	88	61	NA [a]	0	0	0	0
Radium-228	37	87	37	NA [a]	0	2	0	0
Strontium-90	34	88	17	NA [a]	0	0	0	0
Technetium-99	76	88	59	NA [a]	0	0	0	0
Thorium-228	51	82	51	NA [a]	0	2	0	0
Thorium-230	51	82	20	NA [a]	0	1	0	0
Thorium-232	48	82	10	NA [a]	0	1	0	0
Uranium, Total	87	89	87	NA [a]	64	0	0	0
Uranium-234	77	84	72	NA [a]	52	10	0	0
Uranium-235/236	74	81	74	NA [a]	57	13	0	0
Uranium-238	78	81	78	NA [a]	52	10	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	1	92	0	0	0	0	0	0
1,2-Dichlorobenzene	.	93	.	.	.	.	.	.
1,3-Dichlorobenzene	.	93	.	.	.	.	.	.
1,4-Dichlorobenzene	1	92	0	0	0	0	0	0
2,2-oxybis(1-Chloropropane)	.	75	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	91	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	91	.	.	.	.	.	.
2,4-Dichlorophenol	1	91	0	0	0	0	0	0
2,4-Dimethylphenol	5	92	0	0	0	0	0	0
2,4-Dinitrophenol	2	82	0	0	0	0	0	0
2,4-Dinitrotoluene	.	92	.	.	.	.	.	.
2,6-Dinitrotoluene	.	93	.	.	.	.	.	.
2-Chloronaphthalene	.	93	.	.	.	.	.	.
2-Chlorophenol	.	91	.	.	.	.	.	.
2-Methylnaphthalene	3	93	0	0	0	0	0	0
2-Nitroaniline	.	93	.	.	.	.	.	.
2-Nitrophenol	2	91	0	0	0	0	0	0
3,3'-Dichlorobenzidine	.	73	.	.	.	.	.	.
3-Nitroaniline	.	90	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	91	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	93	.	.	.	.	.	.
4-Chloro-3-methylphenol	1	90	0	0	0	0	0	0
4-Chlorophenylphenyl ether	.	93	.	.	.	.	.	.
4-Nitroaniline	.	91	.	.	.	.	.	.
4-Nitrophenol	3	88	0	0	0	0	0	0
Acenaphthene	1	92	0	0	0	0	0	0
Acenaphthylene	.	93	.	.	.	.	.	.
Anthracene	4	93	0	0	0	0	0	0
Benzo(a)anthracene	4	93	0	0	0	0	0	0
Benzo(a)pyrene	2	92	0	0	0	0	0	0
Benzo(b)fluoranthene	3	92	0	0	0	0	0	0
Benzo(g,h,i)perylene	.	92	.	.	.	.	.	.
Benzo(k)fluoranthene	2	92	0	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	93	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	93	.	.	.	.	.	.
bis(2-Chloroisopropyl) ether	.	16	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	21	93	0	0	0	0	0	0
Butyl benzyl phthalate	6	93	0	0	0	0	0	0
Carbazole	1	91	0	0	0	0	0	0
Chrysene	5	93	0	0	0	0	0	0
Di-n-butyl phthalate	5	92	0	0	0	0	0	0
Di-n-octyl phthalate	9	93	0	0	0	0	0	0
Dibenzo(a,h)anthracene	.	92	.	.	.	.	.	.
Dibenzofuran	1	93	0	0	0	0	0	0
Diethyl phthalate	7	93	0	0	0	0	0	0
Dimethyl phthalate	3	93	0	0	0	0	0	0
Fluoranthene	14	92	0	0	0	0	0	0
Fluorene	1	93	0	0	0	0	0	0
Hexachlorobenzene	.	93	.	.	.	.	.	.
Hexachlorobutadiene	.	93	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	93	.	.	.	.	.	.
Hexachloroethane	.	93	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	92	.	.	.	.	.	.
Isophorone	.	93	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	92	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	93	.	.	.	.	.	.
Naphthalene	7	93	0	0	0	0	0	0
Nitrobenzene	.	93	.	.	.	.	.	.
o-Methylphenol	4	92	0	0	0	0	0	0
p-Chloroaniline	.	86	.	.	.	.	.	.
p-Methylphenol (Cresol)	7	91	0	0	0	0	0	0
Pentachlorophenol	.	90	.	.	.	.	.	.
Phenanthrene	11	93	0	0	0	0	0	0
Phenol	10	90	0	0	0	0	0	0
Pyrene	12	92	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	9	92	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	1	93	0	0	0	0	0	0
1,1,2-Trichloroethane	.	93	.	.	.	.	.	.
1,1-Dichloroethane	10	93	0	0	0	0	0	0
1,1-Dichloroethene	.	93	.	.	.	.	.	.
1,2-Dichloroethane	.	93	.	.	.	.	.	.
1,2-Dichloroethene (Total)	1	86	0	0	0	0	0	0
1,2-Dichloropropane	.	93	.	.	.	.	.	.
2-Butanone	11	89	0	0	0	0	0	0
2-Hexanone	1	87	0	0	0	0	0	0
4-Methyl-2-pentanone	4	92	0	0	0	0	0	0
Acetone	15	67	0	0	0	0	0	0
Benzene	1	93	0	0	0	0	0	0
Bromodichloromethane	.	93	.	.	.	.	.	.
Bromoform	.	93	.	.	.	.	.	.
Bromomethane	.	93	.	.	.	.	.	.
Carbon disulfide	1	93	0	0	0	0	0	0
Carbon Tetrachloride	.	93	.	.	.	.	.	.
Chlorobenzene	.	93	.	.	.	.	.	.
Chloroethane	.	93	.	.	.	.	.	.
Chloroform	.	93	.	.	.	.	.	.
Chloromethane	.	93	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	93	.	.	.	.	.	.
Dibromochloromethane	.	93	.	.	.	.	.	.
Ethylbenzene	5	93	0	0	0	0	0	0
m,p-Xylene	.	3	.	.	.	.	.	.
Methylene chloride	2	93	0	0	0	0	0	0
o-Xylene	.	3	.	.	.	.	.	.
Pyridine	.	2	.	.	.	.	.	.
Styrene	3	93	0	0	0	0	0	0
Tetrachloroethene	12	93	1	0	0	0	0	0
Toluene	14	93	0	0	0	0	0	0
trans-1,2-Dichloroethene	.	7	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	93	.	.	.	.	.	.
Trichloroethene	3	93	0	0	0	0	0	0
Trichlorofluoromethane	.	14	.	.	.	.	.	.
Vinyl chloride	1	93	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000757

TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
Xylenes, Total	8	93	0	0	0	0	0	0
				WOOD				
INORGANICS								
Aluminum	2	2	0	0	0	0	0	0
Antimony	1	2	1	0	0	0	0	0
Arsenic	1	2	1	1	0	0	0	0
Barium	2	2	0	0	0	0	0	0
Beryllium	.	2	.	.	.	.	.	.
Cadmium	.	2	.	.	.	.	.	.
Calcium	2	2	0	0	0	0	0	0
Chromium	1	2	1	1	0	0	0	0
Cobalt	.	2	.	.	.	.	.	.
Copper	2	2	1	0	0	0	0	0
Iron	2	2	0	0	0	0	0	0
Lead	2	2	0	0	0	0	0	0
Magnesium	2	2	0	0	0	0	0	0
Manganese	2	2	0	0	0	0	0	0
Mercury	.	2	.	.	.	.	.	.
Nickel	1	2	0	0	0	0	0	0
Potassium	1	2	0	0	0	0	0	0
Selenium	.	2	.	.	.	.	.	.
Silver	.	2	.	.	.	.	.	.
Sodium	2	2	0	0	0	0	0	0
Thallium	.	2	.	.	.	.	.	.
Vanadium	.	2	.	.	.	.	.	.
Zinc	2	2	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

000758

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
PESTICIDES/PCBs								
4,4'-DDD	.	1	.	.	.	.	.	.
4,4'-DDE	.	1	.	.	.	.	.	.
4,4'-DDT	.	1	.	.	.	.	.	.
Aldrin	.	1	.	.	.	.	.	.
alpha-BHC	.	1	.	.	.	.	.	.
alpha-Chlordane	.	1	.	.	.	.	.	.
Aroclor-1016	.	1	.	.	.	.	.	.
Aroclor-1221	.	1	.	.	.	.	.	.
Aroclor-1232	.	1	.	.	.	.	.	.
Aroclor-1242	.	1	.	.	.	.	.	.
Aroclor-1248	.	1	.	.	.	.	.	.
Aroclor-1254	.	1	.	.	.	.	.	.
Aroclor-1260	.	1	.	.	.	.	.	.
beta-BHC	.	1	.	.	.	.	.	.
delta-BHC	.	1	.	.	.	.	.	.
Dieldrin	.	1	.	.	.	.	.	.
Endosulfan II	.	1	.	.	.	.	.	.
Endosulfan sulfate	.	1	.	.	.	.	.	.
Endosulfan-I	1	1	0	0	0	0	0	0
Endrin	1	1	0	0	0	0	0	0
Endrin aldehyde	.	1	.	.	.	.	.	.
Endrin ketone	.	1	.	.	.	.	.	.
gamma-BHC (Lindane)	.	1	.	.	.	.	.	.
gamma-Chlordane	.	1	.	.	.	.	.	.
Heptachlor	.	1	.	.	.	.	.	.
Heptachlor epoxide	.	1	.	.	.	.	.	.
Methoxychlor	.	1	.	.	.	.	.	.
Toxaphene	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
RADIONUCLIDES								
Americium-241	1	2	0	NA [a]	0	0	0	0
Cesium-137	.	2	.	NA [a]	.	.	.	.
Lead-210	2	2	2	NA [a]	0	0	0	0
Neptunium-237	1	2	1	NA [a]	0	0	0	0
Plutonium-238	1	2	1	NA [a]	0	0	0	0
Plutonium-239/240	1	2	0	NA [a]	0	0	0	0
Plutonium-241	.	1	.	NA [a]	.	.	.	.
Polonium-210	1	1	1	NA [a]	0	0	0	0
Radium-226	2	2	2	NA [a]	0	0	0	0
Radium-228	1	2	1	NA [a]	0	0	0	0
Strontium-90	1	2	0	NA [a]	0	0	0	0
Technetium-99	1	2	0	NA [a]	0	0	0	0
Thorium-228	2	2	2	NA [a]	0	0	0	0
Thorium-230	1	2	0	NA [a]	0	0	0	0
Thorium-232	1	2	0	NA [a]	0	0	0	0
Uranium, Total	2	2	2	NA [a]	1	0	0	0
Uranium-234	2	2	1	NA [a]	1	0	0	0
Uranium-235/236	1	2	1	NA [a]	1	0	0	0
Uranium-238	2	2	2	NA [a]	1	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS								
1,2,4-Trichlorobenzene	.	1	.	.	.	.	.	.
1,2-Dichlorobenzene	.	1	.	.	.	.	.	.
1,3-Dichlorobenzene	.	1	.	.	.	.	.	.
1,4-Dichlorobenzene	.	1	.	.	.	.	.	.
2,2-oxybis(1-Chloropropane)	.	1	.	.	.	.	.	.
2,4,5-Trichlorophenol	.	1	.	.	.	.	.	.
2,4,6-Trichlorophenol	.	1	.	.	.	.	.	.
2,4-Dichlorophenol	.	1	.	.	.	.	.	.
2,4-Dimethylphenol	.	1	.	.	.	.	.	.
2,4-Dinitrophenol	.	1	.	.	.	.	.	.
2,4-Dinitrotoluene	.	1	.	.	.	.	.	.
2,6-Dinitrotoluene	.	1	.	.	.	.	.	.
2-Chloronaphthalene	.	1	.	.	.	.	.	.
2-Chlorophenol	.	1	.	.	.	.	.	.
2-Methylnaphthalene	.	1	.	.	.	.	.	.
2-Nitroaniline	.	1	.	.	.	.	.	.
2-Nitrophenol	.	1	.	.	.	.	.	.
3,3'-Dichlorobenzidine	.	1	.	.	.	.	.	.
3-Nitroaniline	.	1	.	.	.	.	.	.
4,6-Dinitro-2-methylphenol	.	1	.	.	.	.	.	.
4-Bromophenyl phenyl ether	.	1	.	.	.	.	.	.
4-Chloro-3-methylphenol	.	1	.	.	.	.	.	.
4-Chlorophenylphenyl ether	.	1	.	.	.	.	.	.
4-Nitroaniline	.	1	.	.	.	.	.	.
4-Nitrophenol	.	1	.	.	.	.	.	.
Acenaphthene	.	1	.	.	.	.	.	.
Acenaphthylene	.	1	.	.	.	.	.	.
Anthracene	.	1	.	.	.	.	.	.
Benzo(a)anthracene	1	1	1	0	0	0	0	0
Benzo(a)pyrene	1	1	1	0	0	0	0	0
Benzo(b)fluoranthene	1	1	1	0	0	0	0	0
Benzo(g,h,i)perylene	.	1	.	.	.	.	.	.
Benzo(k)fluoranthene	1	1	0	0	0	0	0	0
bis(2-Chloroethoxy)methane	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
SEMIVOLATILE ORGANICS (cont.)								
bis(2-Chloroethyl)ether	.	1	.	.	.	.	.	.
bis(2-Ethylhexyl)phthalate	.	1	.	.	.	.	.	.
Butyl benzyl phthalate	.	1	.	.	.	.	.	.
Carbazole	1	1	0	0	0	0	0	0
Chrysene	1	1	0	0	0	0	0	0
Di-n-butyl phthalate	.	1	.	.	.	.	.	.
Dibenzo(a,h)anthracene	.	1	.	.	.	.	.	.
Dibenzofuran	1	1	0	0	0	0	0	0
Diethyl phthalate	.	1	.	.	.	.	.	.
Dimethyl phthalate	.	1	.	.	.	.	.	.
Fluoranthene	1	1	0	0	0	0	0	0
Fluorene	.	1	.	.	.	.	.	.
Hexachlorobenzene	.	1	.	.	.	.	.	.
Hexachlorobutadiene	.	1	.	.	.	.	.	.
Hexachlorocyclopentadiene	.	1	.	.	.	.	.	.
Hexachloroethane	.	1	.	.	.	.	.	.
Indeno(1,2,3-cd)pyrene	.	1	.	.	.	.	.	.
Isophorone	.	1	.	.	.	.	.	.
N-Nitroso-di-n-propylamine	.	1	.	.	.	.	.	.
N-Nitrosodiphenylamine	.	1	.	.	.	.	.	.
Naphthalene	.	1	.	.	.	.	.	.
Nitrobenzene	.	1	.	.	.	.	.	.
o-Methylphenol	.	1	.	.	.	.	.	.
p-Chloroaniline	.	1	.	.	.	.	.	.
p-Methylphenol (Cresol)	.	1	.	.	.	.	.	.
Pentachlorophenol	.	1	.	.	.	.	.	.
Phenanthrene	1	1	0	0	0	0	0	0
Phenol	.	1	.	.	.	.	.	.
Pyrene	1	1	0	0	0	0	0	0

a-There are no TCLP limits for radionuclides

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TABLE A.III-2
DETECTS EXCEEDING REFERENCE CRITERIA FOR ALL ANALYTES BY SAMPLE MEDIA

Parameter	# of Detects	# of Samples	Detects Above Given Criteria: Part B Soil	20 Times TCLP	Source Material	Envirocare WAC	Concrete Baseline	Paint Baseline
VOLATILE ORGANICS								
1,1,1-Trichloroethane	.	1	.	.	.	.	.	.
1,1,2,2-Tetrachloroethane	.	1	.	.	.	.	.	.
1,1,2-Trichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethane	.	1	.	.	.	.	.	.
1,1-Dichloroethene	.	1	.	.	.	.	.	.
1,2-Dichloroethane	.	1	.	.	.	.	.	.
1,2-Dichloroethene (Total)	.	1	.	.	.	.	.	.
1,2-Dichloropropane	.	1	.	.	.	.	.	.
2-Butanone	.	1	.	.	.	.	.	.
2-Hexanone	.	1	.	.	.	.	.	.
4-Methyl-2-pentanone	.	1	.	.	.	.	.	.
Acetone	.	1	.	.	.	.	.	.
Benzene	.	1	.	.	.	.	.	.
Bromodichloromethane	.	1	.	.	.	.	.	.
Bromoform	.	1	.	.	.	.	.	.
Bromomethane	.	1	.	.	.	.	.	.
Carbon disulfide	.	1	.	.	.	.	.	.
Carbon Tetrachloride	.	1	.	.	.	.	.	.
Chlorobenzene	.	1	.	.	.	.	.	.
Chloroethane	.	1	.	.	.	.	.	.
Chloroform	.	1	.	.	.	.	.	.
Chloromethane	.	1	.	.	.	.	.	.
cis-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Dibromochloromethane	.	1	.	.	.	.	.	.
Ethylbenzene	.	1	.	.	.	.	.	.
Methylene chloride	.	1	.	.	.	.	.	.
Styrene	.	1	.	.	.	.	.	.
Tetrachloroethene	.	1	.	.	.	.	.	.
Toluene	.	1	.	.	.	.	.	.
trans-1,3-Dichloropropene	.	1	.	.	.	.	.	.
Trichloroethene	.	1	.	.	.	.	.	.
Vinyl chloride	.	1	.	.	.	.	.	.
Xylenes, Total	.	1	.	.	.	.	.	.

a-There are no TCLP limits for radionuclides

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Component Name	Process Name	Number of Samples	Min	Max	Units
MATERIAL NAME ACID BRICK								
Chromium	3	2A	Ore Refinery Plant	Denitration	1		189	mg/kg
Chromium	3	9A	Special Products Plant	Triple Beta Heat Treating	1		404	mg/kg
Chromium	3	9A	Special Products Plant	Zirnlo Decladding	1		407	mg/kg
Chromium	3	13A	Pilot Plant Wet Side	Northern	1		127	mg/kg
Lead	3	2A	Ore Refinery Plant	Denitration	1		518	mg/kg
Lead	3	2A	Ore Refinery Plant	Digestion	2	153	169	mg/kg
Lead	3	2A	Ore Refinery Plant	Extraction	1		268	mg/kg
Lead	3	2D	Metal Dissolver Building	West Metal Dissolution	1		390	mg/kg
Mercury	4	12A	Main Maintenance Building	Decontamination and Emergency Generator Rooms	2	5.2	7	mg/kg
MATERIAL NAME CONCRETE CHIPS								
Barium	3	8A	Recovery Plant	Ball Mill	1		5890	mg/kg
Cadmium	3	8A	Recovery Plant	Muffle Furnace	1		29.4	mg/kg
Chromium	3	8A	Recovery Plant	Ball Mill	1		169	mg/kg
Chromium	4	10A	Boiler Plant	Steam Production	2	271	640	mg/kg
Chromium	5	13D	Pilot Plant Thorium Tank Farm	Tank Storage	1		322	mg/kg
Chromium	9	20C	Cooling Towers	Cooling Towers	1		261	mg/kg
Lead	3	4A	Green Salt Plant	Hydrofluorination	2	1440	1680	mg/kg
Lead	3	5A	Metals Production Plant	Graphite Machining	1		1030	mg/kg
Lead	3	6A	Metals Fabrication Plant	Rolling Mill	1		165	mg/kg
Lead	3	6A	Metals Fabrication Plant	Vacuum Outgas Furnace	1		1100	mg/kg
Lead	3	8A	Recovery Plant	Ball Mill	1		508	mg/kg
Lead	3	8A	Recovery Plant	UAP Furnace	1		185	mg/kg
Lead	3	9A	Special Products Plant	Uranium Machining	1		184	mg/kg
Lead	1	11	Service Building	Pistol Range	1		792	mg/kg
Lead	3	37	Pilot Plant Annex	Outside Areas	1		130	mg/kg
Lead	3	37	Pilot Plant Annex	P-2 Furnace	1		2730	mg/kg
Lead	3	37	Pilot Plant Annex	West Wall Processes	1		357	mg/kg
Lead	3	39A	Incinerator Building	Solid Waste Incinerator	1		182	mg/kg
Mercury	4	3L	Electrical Power Center Building	Electrical Distribution	1		4.8	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
MATERIAL NAME CONCRETE CORE, TOP DEPTH								
Barium	3	8A	Recovery Plant	Oil Centrifuge	2	3000	3840	mg/kg
Barium	3	9A	Special Products Plant	Triple Beta Heat Treating	1		4800	mg/kg
Barium	3	13C	Sump Pump House	Sump Pump	1		4210	mg/kg
Chromium	3	2A	Ore Refinery Plant	Drum Digestion	1		104	mg/kg
Chromium	5	2E	NFS Storage & Pump House	NFS Storage	1		121	mg/kg
Chromium	4	3B	Ozone Building	Acid Bleaching	1		105	mg/kg
Chromium	10	3K	Old Cooling Water Tower	Process Water Cooling	1		424	mg/kg
Lead	3	2A	Ore Refinery Plant	Drum Digestion	2	515	554	mg/kg
Lead	3	2A	Ore Refinery Plant	Extraction	1		130	mg/kg
Lead	4	3B	Ozone Building	Acid Bleaching	1		120	mg/kg
Lead	4	3G	Refrigeration Building	Refrigeration	1		250	mg/kg
Lead	3	5A	Metals Production Plant	Hilco Oil Reclaimer	1		1210	mg/kg
Lead	3	5A	Metals Production Plant	Water Treatment	1		119	mg/kg
Lead	3	6A	Metals Fabrication Plant	Pickling	1		247	mg/kg
Lead	3	9A	Special Products Plant	Uranium Reduction and Derby Cleaning	1		106	mg/kg
Lead	4	12A	Main Maintenance Building	Decontamination and Emergency Generator Rooms	1		119	mg/kg
Lead	4	12A	Main Maintenance Building	Instrument Shops	1		104	mg/kg
Lead	3	13A	Pilot Plant Wet Side	Central	1		105	mg/kg
Lead	5	19D	Old North Tank Farm	Bulk Storage	1		127	mg/kg
Lead	5	19D	Old North Tank Farm	Sump	1		124	mg/kg
Lead	3	39A	Incinerator Building	Liquid Waste Incinerator	1		101	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	DHF Recovery	1		322	mg/kg
Lead	3	69	Decontamination Building	Decontamination	1		203	mg/kg
Mercury	4	26C	Main Electrical Strainer House	Electrical Deluge System	1		12.6	mg/kg
MATERIAL NAME CONCRETE CORE, MIDDLE DEPTH								
Chromium	5	2E	NFS Storage & Pump House	NFS Storage	1		115	mg/kg
Chromium	10	3K	Old Cooling Water Tower	Process Water Cooling	1		280	mg/kg
Chromium	3	6A	Metals Fabrication Plant	Old Water Treatment	1		102	mg/kg
Lead	3	1A	Preparation Plant	Solvent Reclaimation	1		135	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
Lead	10	3K	Old Cooling Water Tower	Process Water Cooling	1		265	mg/kg
Lead	3	6A	Metals Fabrication Plant	Pickling	1		275	mg/kg
Lead	3	13A	Pilot Plant Wet Side	Central	1		128	mg/kg
Lead	3	13A	Pilot Plant Wet Side	Northern	1		111	mg/kg
MATERIAL NAME CONCRETE CORE, BOTTOM DEPTH								
Chromium	3	54A	Six to Four Reduction Facility #1	DHF Recovery	1		105	mg/kg
MATERIAL NAME LOOSE MEDIA								
Arsenic	3	2A	Ore Refinery Plant	Denitration	1		171	mg/kg
Arsenic	3	2D	Metal Dissolver Building	Charcoal Treatment	1		110	mg/kg
Arsenic	3	4A	Green Salt Plant	Hydrofluoric Acid Recovery	1		220	mg/kg
Arsenic	3	4A	Green Salt Plant	Hydrofluorination	1		246	mg/kg
Barium	3	8A	Recovery Plant	Old Rotary Kiln	1		2850	mg/kg
Barium	5	18B	General Sump	Wastewater Treatment	1		4080	mg/kg
Cadmium	3	2A	Ore Refinery Plant	Denitration	1		31.9	mg/kg
Cadmium	9	6D	Plant 6 Electrostatic Precipitator (Ce	Electrostatic Precipitator	1		20.5	mg/kg
Cadmium	3	9A	Special Products Plant	Uranium Reduction and Derby Cleaning	1		62.4	mg/kg
Cadmium	8	74T	Plant 1 Storage Pad	New Drum Storage	1		23.4	mg/kg
Chromium	3	2A	Ore Refinery Plant	Denitration	1		1160	mg/kg
Chromium	4	2B	General/Refinery Sump Control Bldg	Storage	1		1880	mg/kg
Chromium	3	2D	Metal Dissolver Building	Charcoal Treatment	1		356	mg/kg
Chromium	10	2H	Conveyor Tunnel (From Plant 1)	Ore Conveyor	1		231	mg/kg
Chromium	3	4A	Green Salt Plant	Hydrofluoric Acid Recovery	1		259	mg/kg
Chromium	3	4A	Green Salt Plant	Hydrofluorination	1		285	mg/kg
Chromium	3	5A	Metals Production Plant	Casting (Remelt)	2	229	1190	mg/kg
Chromium	3	5A	Metals Production Plant	Reduction	1		511	mg/kg
Chromium	3	5A	Metals Production Plant	Water Treatment	2	350	379	mg/kg
Chromium	3	6A	Metals Fabrication Plant	Rolling Mill	1		3210	mg/kg
Chromium	3	8A	Recovery Plant	Hydrometallurgical System, WINLO, & Water Treat	1		187	mg/kg
Chromium	3	8A	Recovery Plant	Old Rotary Kiln	1		235	mg/kg
Chromium	3	9A	Special Products Plant	Enriched Uranium Casting	1		190	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
Chromium	3	9A	Special Products Plant	Zirnlo Decladding	1		1860	mg/kg
Chromium	4	12A	Main Maintenance Building	Decontamination and Emergency Generator Rooms	1		111	mg/kg
Chromium	3	13A	Pilot Plant Wet Side	Northern	1		207	mg/kg
Chromium	4	54C	Pilot Plant Dissociator Shelter	Ammonia Dissociation	1		113	mg/kg
Chromium	3	66	Drum Reconditioning Building	Painting	1		359	mg/kg
Chromium	8	74N	Building 12 North Pad	Storage	1		389	mg/kg
Lead	3	2A	Ore Refinery Plant	Denitration	1		3350	mg/kg
Lead	4	2B	General/Refinery Sump Control Bldg	Storage	1		3860	mg/kg
Lead	3	2D	Metal Dissolver Building	Charcoal Treatment	1		316	mg/kg
Lead	10	2H	Conveyor Tunnel (From Plant 1)	Ore Conveyor	1		3340	mg/kg
Lead	5	3H	Refinery Sump	Wastewater Treatment	1		309	mg/kg
Lead	3	4A	Green Salt Plant	Hydrofluoric Acid Recovery	1		348	mg/kg
Lead	3	4A	Green Salt Plant	Hydrofluorination	1		521	mg/kg
Lead	3	5A	Metals Production Plant	Casting (Remelt)	2	1580	2470	mg/kg
Lead	3	5A	Metals Production Plant	Reduction	1		10300	mg/kg
Lead	3	5A	Metals Production Plant	Water Treatment	2	964	1090	mg/kg
Lead	3	6A	Metals Fabrication Plant	Rolling Mill	1		117	mg/kg
Lead	9	6D	Plant 6 Electrostatic Precipitator (Ce	Electrostatic Precipitator	1		966	mg/kg
Lead	3	8A	Recovery Plant	Bulk Storage Tanks	1		731	mg/kg
Lead	3	8A	Recovery Plant	Hydrometallurgical System, WINLO, & Water Treat	1		256	mg/kg
Lead	3	8A	Recovery Plant	Old Rotary Kiln	1		1370	mg/kg
Lead	3	8A	Recovery Plant	Oxidation Furnace #2	1		294	mg/kg
Lead	3	9A	Special Products Plant	Enriched Uranium Casting	1		1450	mg/kg
Lead	3	9A	Special Products Plant	Uranium Reduction and Derby Cleaning	1		991	mg/kg
Lead	3	9A	Special Products Plant	Zirnlo Decladding	1		453	mg/kg
Lead	4	12A	Main Maintenance Building	Decontamination and Emergency Generator Rooms	1		130	mg/kg
Lead	3	13A	Pilot Plant Wet Side	Northern	1		7100	mg/kg
Lead	3	13A	Pilot Plant Wet Side	Southern Extraction	1		1490	mg/kg
Lead	5	18B	General Sump	Wastewater Treatment	2	312	436	mg/kg
Lead	3	31A	Engine House/Garage	Garage	1		285	mg/kg
Lead	3	39B	Waste Oil Decant Shelter	Oil-Water Separation	1		436	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
Lead	4	54C	Pilot Plant Dissociator Shelter	Ammonia Dissociation	1		734	mg/kg
Lead	3	55B	Slag Recycling Pit/Elevator	Slag Processing	1		137	mg/kg
Lead	8	74C	Plant 8 East Pad	Storage	1		210	mg/kg
Lead	8	74G	Plant 5 East Pad	Storage	1		245	mg/kg
Lead	8	74N	Building 12 North Pad	Storage	1		270	mg/kg
Lead	8	74T	Plant 1 Storage Pad	New Drum Storage	1		359	mg/kg
Mercury	4	2B	General/Refinery Sump Control Bldg	Storage	1		12.4	mg/kg
Mercury	3	4A	Green Salt Plant	Hydrofluoric Acid Recovery	1		11.7	mg/kg
Mercury	3	4A	Green Salt Plant	Hydrofluorination	1		18	mg/kg
Mercury	3	5A	Metals Production Plant	Casting (Remelt)	1		9.8	mg/kg
Mercury	3	5A	Metals Production Plant	Reduction	1		6.2	mg/kg
Selenium	3	2A	Ore Refinery Plant	Denitration	1		49.8	mg/kg
Selenium	3	4A	Green Salt Plant	Hydrofluoric Acid Recovery	1		56.3	mg/kg
Selenium	3	4A	Green Salt Plant	Hydrofluorination	1		84.7	mg/kg
Selenium	3	6A	Metals Fabrication Plant	Rolling Mill	1		157	mg/kg
Silver	3	2D	Metal Dissolver Building	Charcoal Treatment	1		165	mg/kg
Silver	3	8A	Recovery Plant	Oxidation Furnace #2	1		285	mg/kg
Silver	3	9A	Special Products Plant	Uranium Reduction and Derby Cleaning	1		143	mg/kg
Silver	3	9A	Special Products Plant	Zirnlo Decladding	1		1360	mg/kg
2,4-Dinitrotoluene	3	4A	Green Salt Plant	Hydrofluorination	1		50000	ug/kg
MATERIAL NAME MASONRY CHIPS								
Barium	3	31A	Engine House/Garage	Garage	1		3820	mg/kg
Cadmium	1	11	Service Building	Cafeteria/Kitchen	1		21	mg/kg
Chromium	3	8A	Recovery Plant	Hydrometallurgical System, WINLO, & Water Treat	1		306	mg/kg
Lead	4	3A	Maintenance Building	Maintenance	1		158	mg/kg
Lead	3	8A	Recovery Plant	Hydrometallurgical System, WINLO, & Water Treat	1		1670	mg/kg
Lead	4	8B	Plant 8 Maintenance Building	Maintenance	2	725	1030	mg/kg
Lead	3	9B	Plant 9 Sump Treatment Facility	Sump Treatment	1		112	mg/kg
Lead	4	12A	Main Maintenance Building	Decontamination and Emergency Generator Rooms	1		212	mg/kg
Lead	4	12A	Main Maintenance Building	Electrical and Scale Shops	1		113	mg/kg
Lead	4	25E	Digester & Control Building	Digester	1		153	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
Lead	3	31A	Engine House/Garage	Garage	1		258	mg/kg
Lead	3	37	Pilot Plant Annex	East Wall Processes	1		148	mg/kg
Lead	3	37	Pilot Plant Annex	P-2 Furnace	1		267	mg/kg
Lead	3	37	Pilot Plant Annex	Plasma Furnace	1		182	mg/kg
Lead	3	37	Pilot Plant Annex	West Wall Processes	1		355	mg/kg
Lead	3	39A	Incinerator Building	Drum Dryer	2	108	205	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	Autoclave Area	2	13000	16300	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	Derby/Saw Sampling	1		140	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	DHF Recovery	1		170	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	P-1 Furnace Room	1		101	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	PLT Furnace	1		107	mg/kg
Lead	3	54A	Six to Four Reduction Facility #1	UF6 Reduction Reactors	1		192	mg/kg
Lead	3	69	Decontamination Building	Decontamination	1		262	mg/kg
Mercury	4	25E	Digester & Control Building	Digester	1		4.6	mg/kg
Mercury	4	26C	Main Electrical Strainer House	Electrical Deluge System	1		5.2	mg/kg
MATERIAL NAME	SEDIMENT							
Arsenic	11	18C	Coal Pile Runoff Basin	Runoff Collection	1		140	mg/kg
Barium	10	22E	Utility Trench to Pit Area	Material Handling	1		2690	mg/kg
Cadmium	3	15A	Laboratory	Western Restricted Access	1		28.4	mg/kg
Chromium	4	2C	Bulk Lime Handling Building	Bulk Lime Handling	1		125	mg/kg
Chromium	10	2H	Conveyor Tunnel (From Plant 1)	Ore Conveyor	1		131	mg/kg
Chromium	3	15A	Laboratory	Western Restricted Access	1		857	mg/kg
Chromium	11	18A	BDN Surge Lagoon	Wastewater Treatment	4	114	712	mg/kg
Chromium	11	18K	Low Nitrate Tank	Wastewater Storage	1		407	mg/kg
Chromium	11	25F	Sludge Drying Beds	Sludge Drying	1		149	mg/kg
Lead	4	2C	Bulk Lime Handling Building	Bulk Lime Handling	1		1010	mg/kg
Lead	10	2H	Conveyor Tunnel (From Plant 1)	Ore Conveyor	1		12500	mg/kg
Lead	3	8A	Recovery Plant	Box Furnace	1		491	mg/kg
Lead	3	15A	Laboratory	Western Restricted Access	1		784	mg/kg
Lead	11	18A	BDN Surge Lagoon	Wastewater Treatment	8	107	1850	mg/kg
Lead	11	18C	Coal Pile Runoff Basin	Runoff Collection	1		129	mg/kg

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TABLE A.III-3

Summary of Samples Exceeding 20 Times the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
Lead	11	18E	Storm Water Retention Basin	Stormwater Storage	2	135	146	mg/kg
Lead	11	18K	Low Nitrate Tank	Wastewater Storage	1		1340	mg/kg
Lead	4	46	Heavy Equipment Building	Heavy Equipment Storage	1		626	mg/kg
Lead	8	74T	Plant 1 Storage Pad	New Drum Storage	1		383	mg/kg
Mercury	3	15A	Laboratory	Western Restricted Access	1		223	mg/kg
Mercury	11	18A	BDN Surge Lagoon	Wastewater Treatment	4	4.2	4.4	mg/kg
Mercury	11	18K	Low Nitrate Tank	Wastewater Storage	1		26	mg/kg
Silver	3	15A	Laboratory	Western Restricted Access	1		435	mg/kg
MATERIAL NAME: SLUDGE								
Chromium	3	69	Decontamination Building	Decontamination	1		125	mg/kg
Lead	3	69	Decontamination Building	Decontamination	1		1290	mg/kg

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TABLE A.III-4

Samples That Exceed the TCLP Limit

Parameter	Category	Component ID	Compnent Name	Process Name	Number of Samples	Min	Max	Units
MATERIAL NAME TRANSITE								
Chromium	3	3E	Hot Raffinate Building	Filtering	1		5.963	mg/L
1,4-Dichlorobenzene	3	9A	Special Products Plant	Uranium Machining	1		17.2	mg/L
Hexachlorobutadiene	3	9A	Special Products Plant	Uranium Machining	1		14.9	mg/L
Nitrobenzene	3	9A	Special Products Plant	Uranium Machining	1		28.3	mg/L
Tetrachloroethene	3	2A	Ore Refinery Plant	Digestion	1		59	mg/L
MATERIAL NAME UNKNOWN LIQUID								
Lead	3	9A	Special Products Plant	Zirnlo Decladding	1		13500	ug/L
Tetrachloroethene	3	6A	Metals Fabrication Plant	Machining	1		6800	ug/L

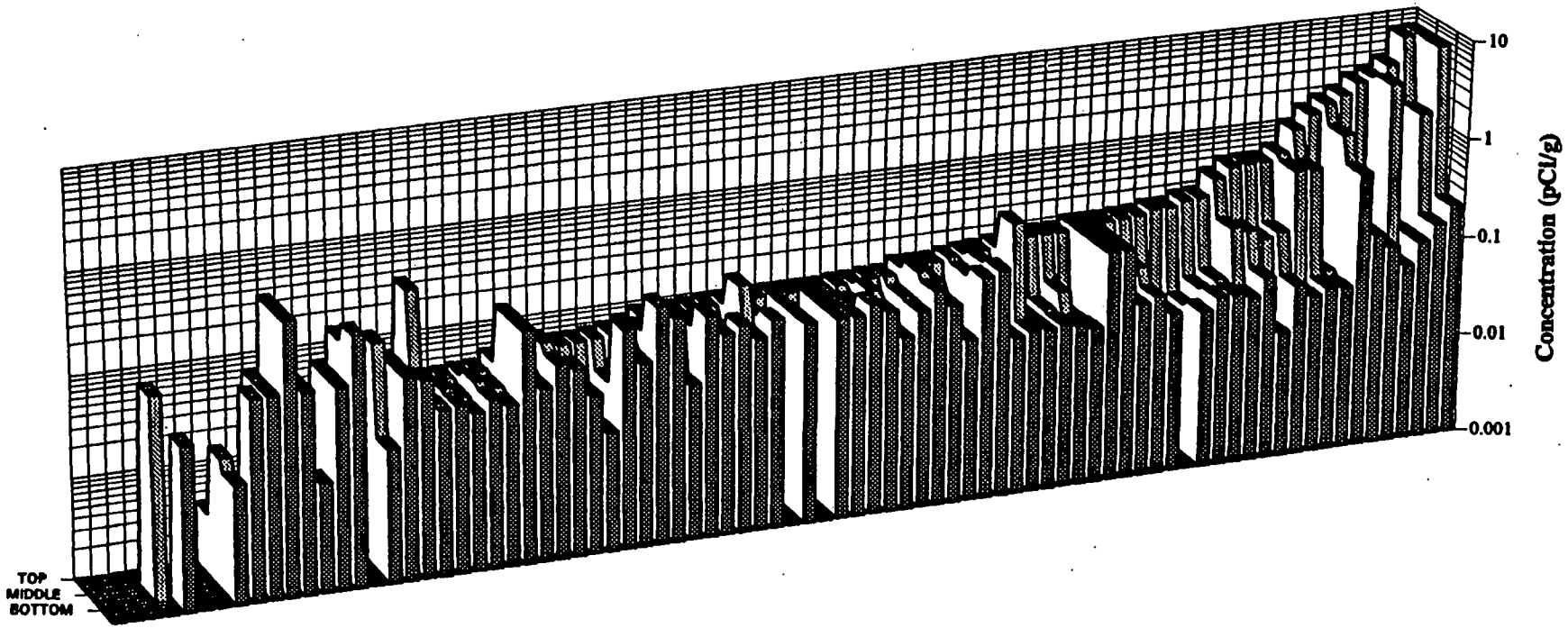

FIGURE A.III-1
AMERICIUM-241 CONCENTRATION VERSUS DEPTH

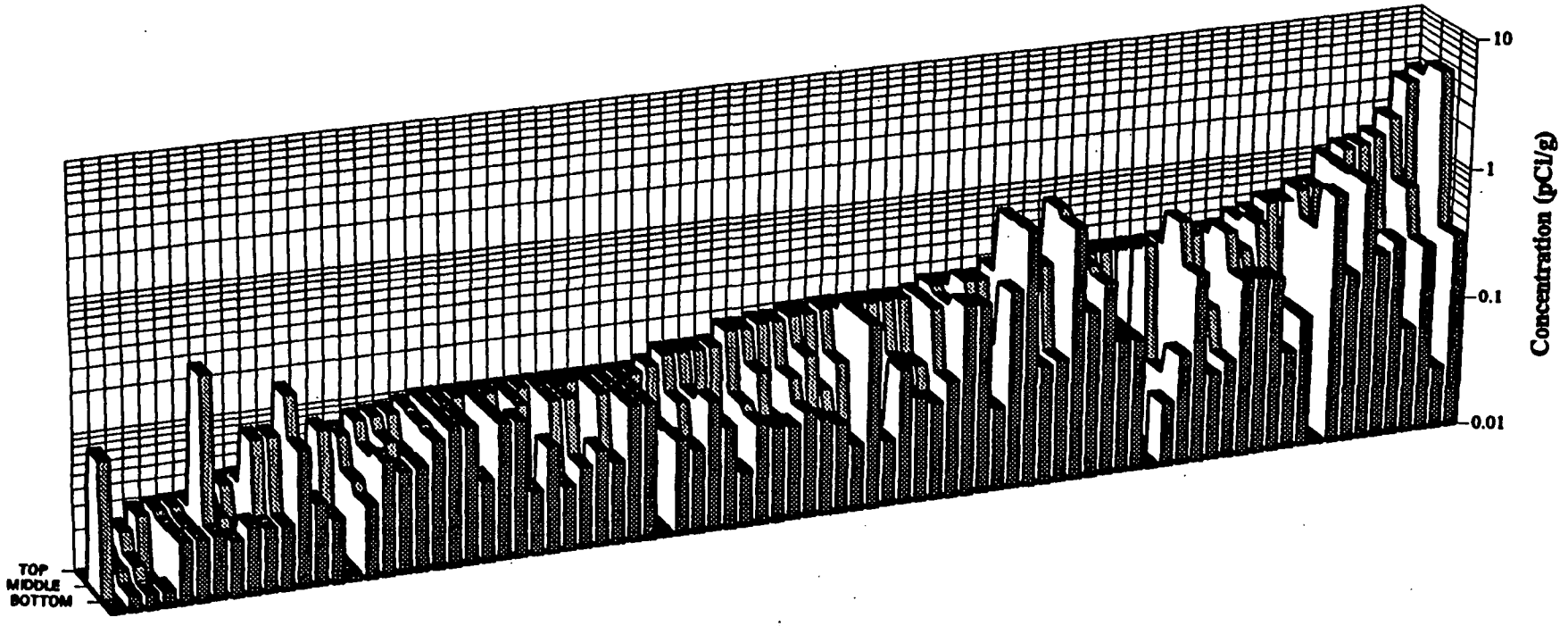

FIGURE A.III-2
CESIUM-137 CONCENTRATION VERSUS DEPTH

000723

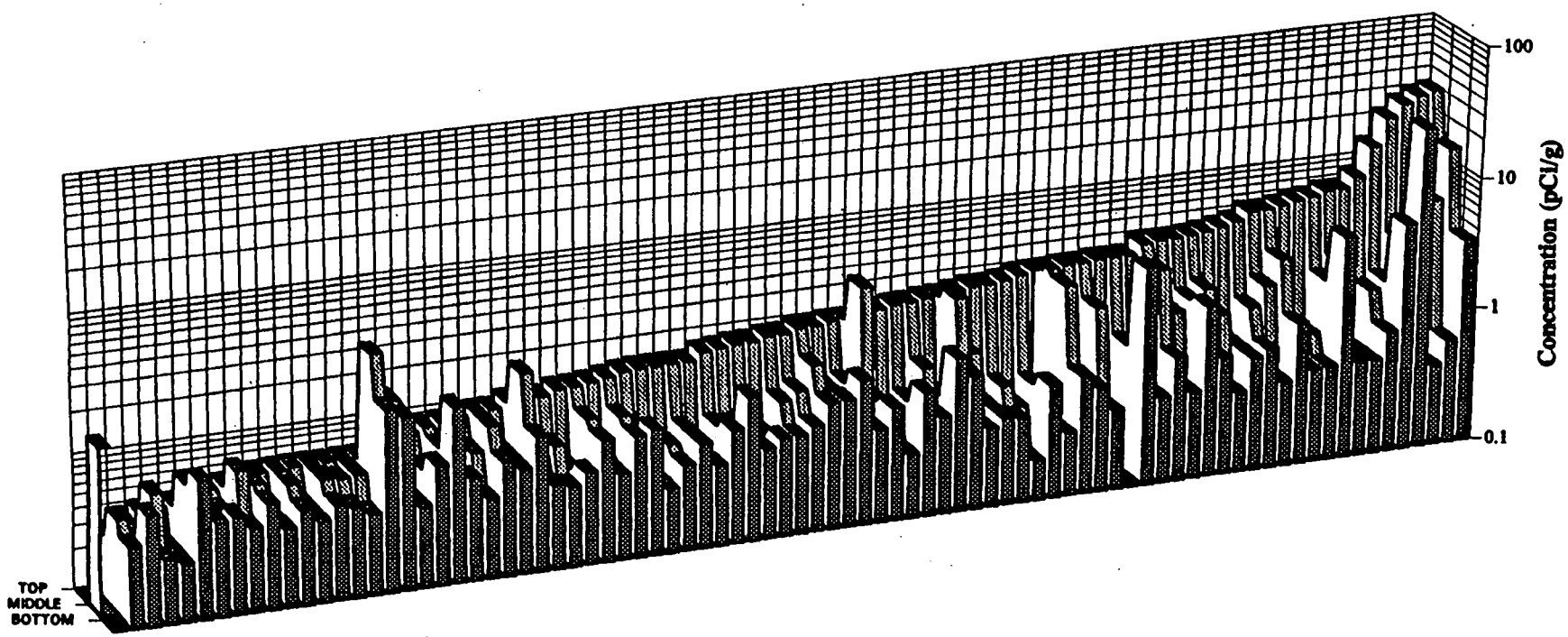

FIGURE A.III-3
LEAD-210 CONCENTRATION VERSUS DEPTH

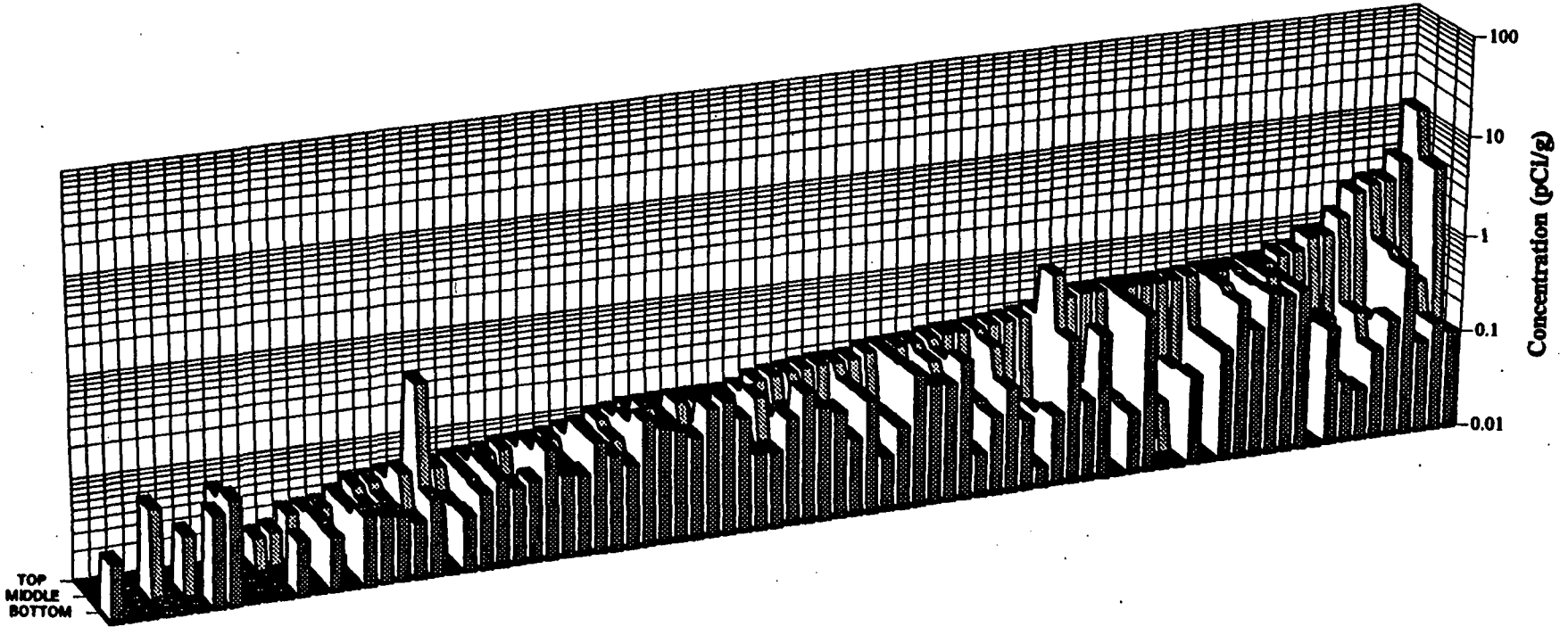

FIGURE A.III-4
NEPTUNIUM-237 CONCENTRATION VERSUS DEPTH

000775

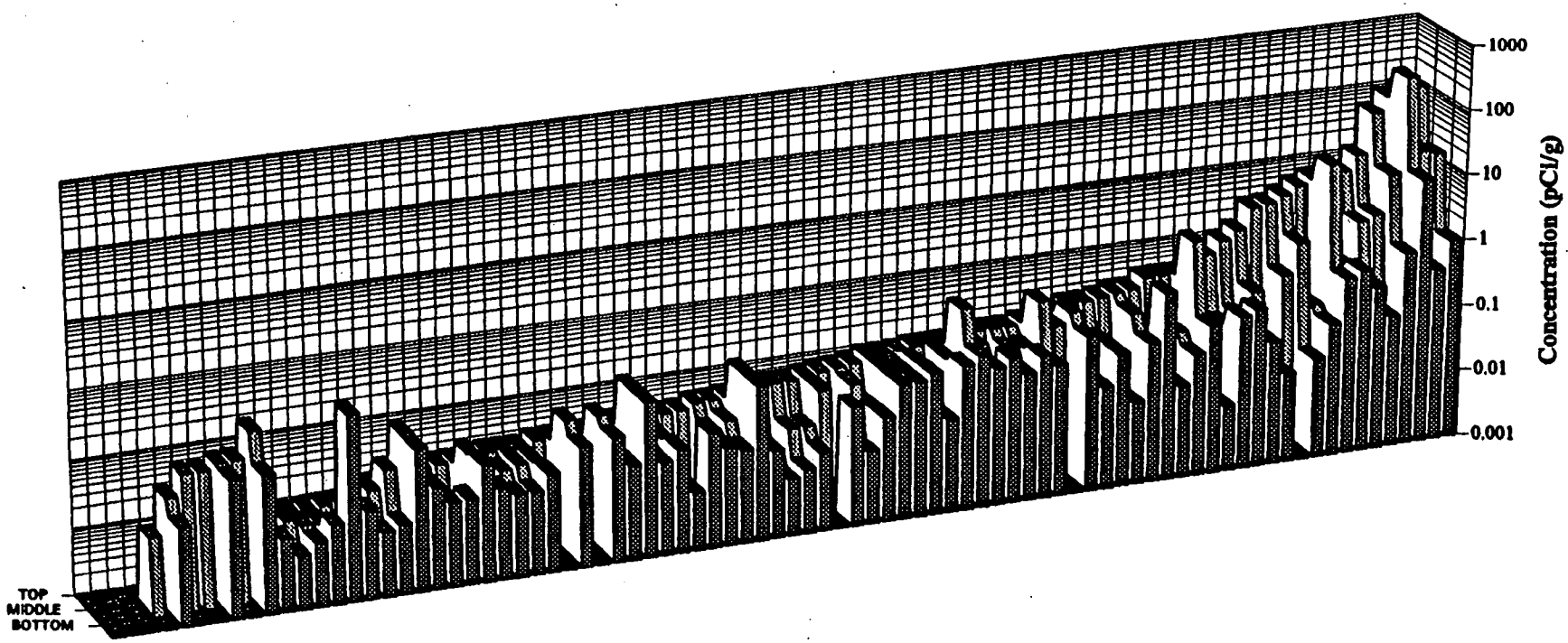

FIGURE A.III-5
PLUTONIUM-238 CONCENTRATION VERSUS DEPTH

000776

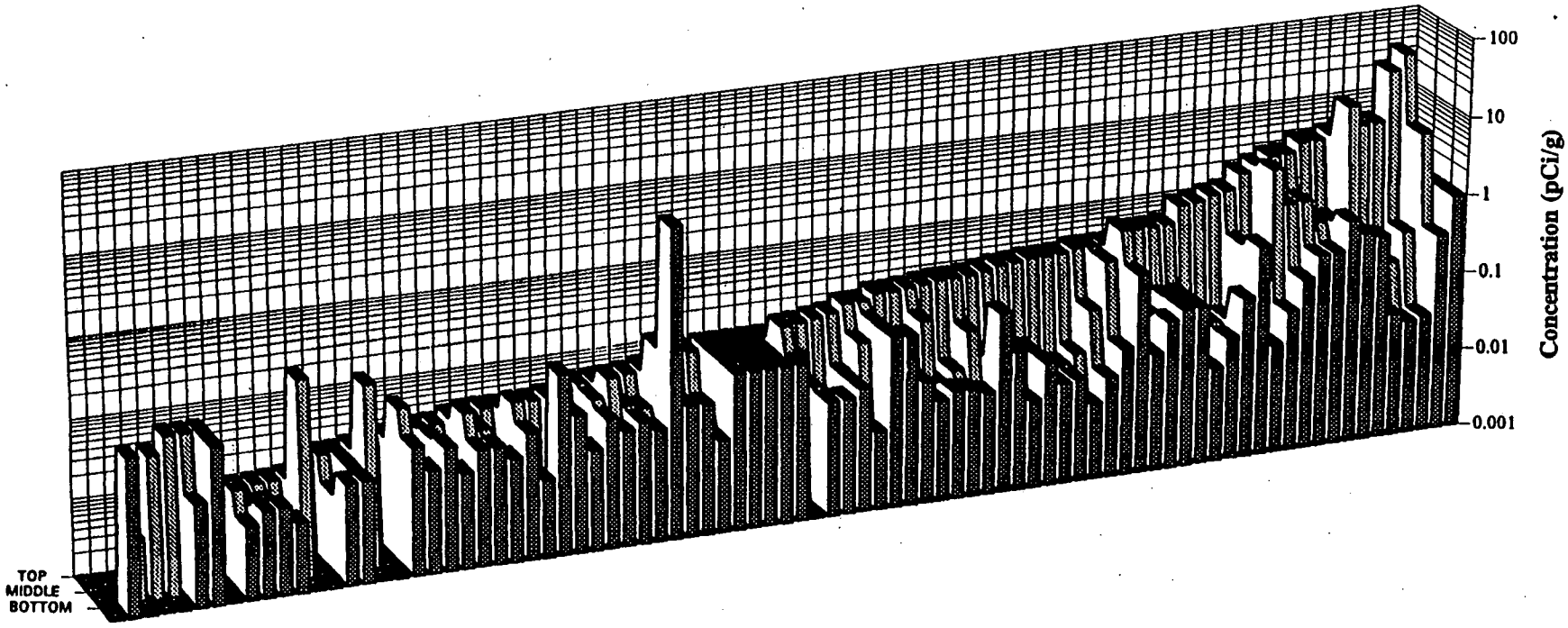

FIGURE A.III-6
PLUTONIUM-239/240 CONCENTRATION VERSUS DEPTH

000277

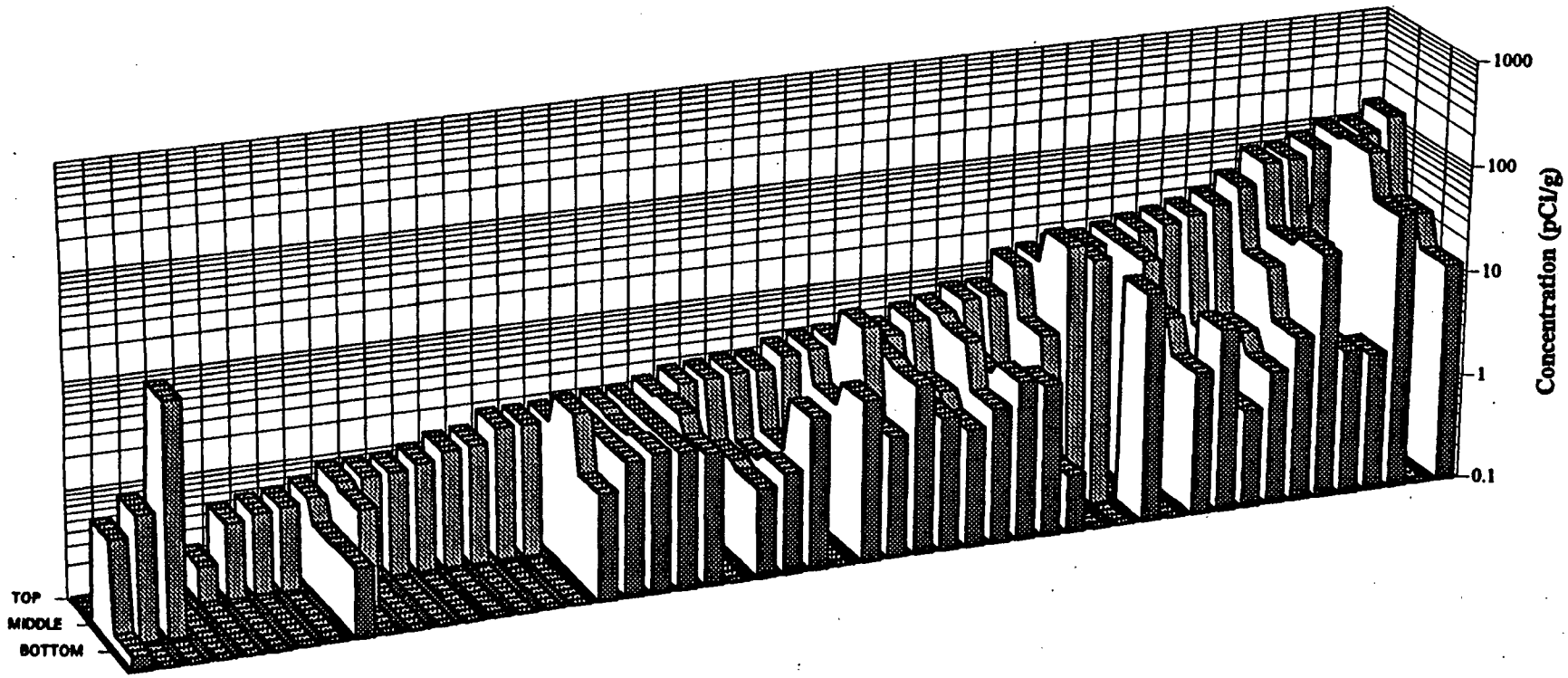

FIGURE A.III-7
PLUTONIUM-241 CONCENTRATION VERSUS DEPTH

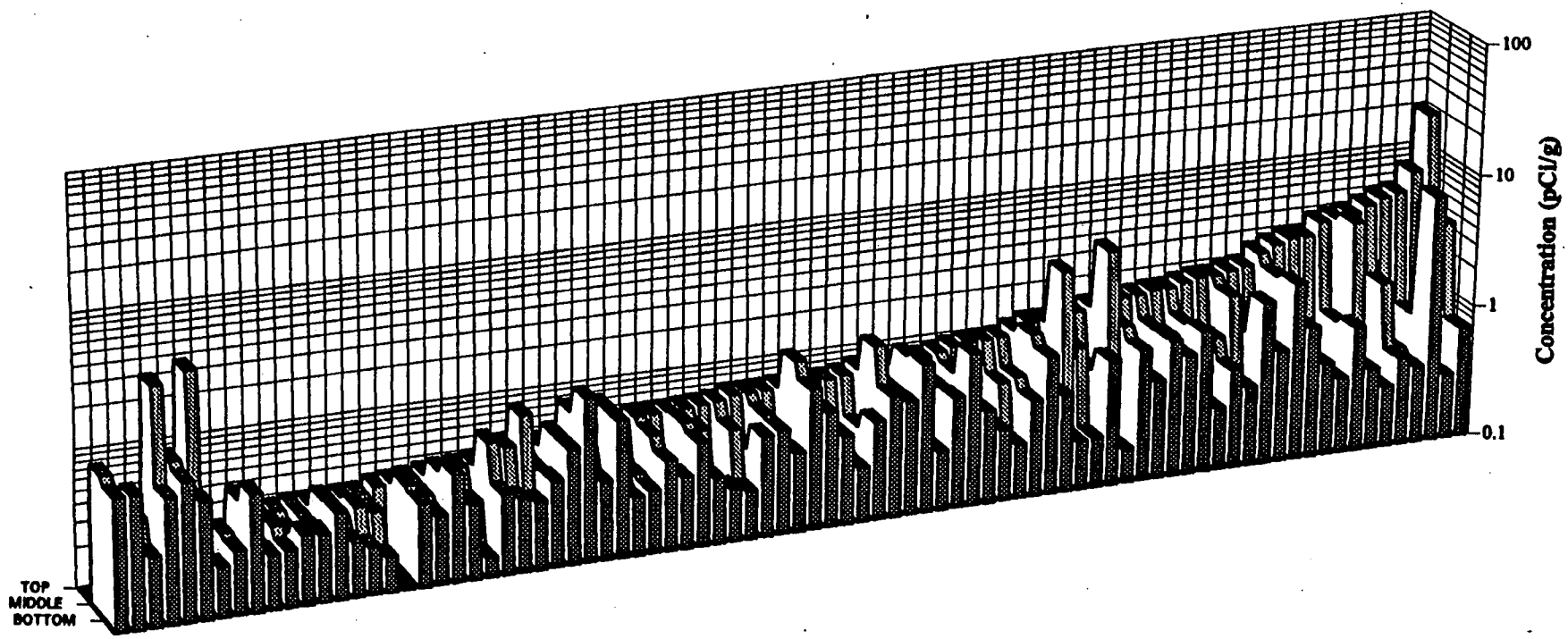

FIGURE A.III-8
POLONIUM-210 CONCENTRATION VERSUS DEPTH

000779

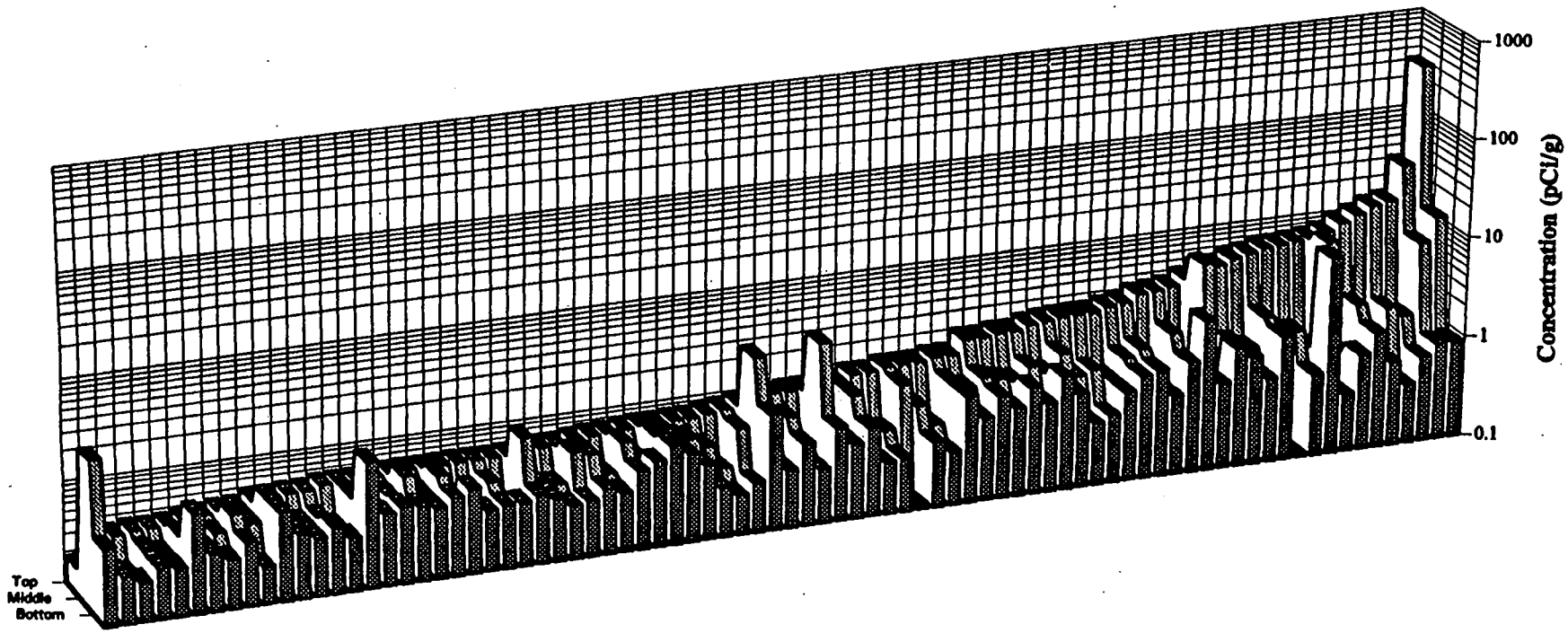

FIGURE A.III-9
RADIUM-226 CONCENTRATION VERSUS DEPTH

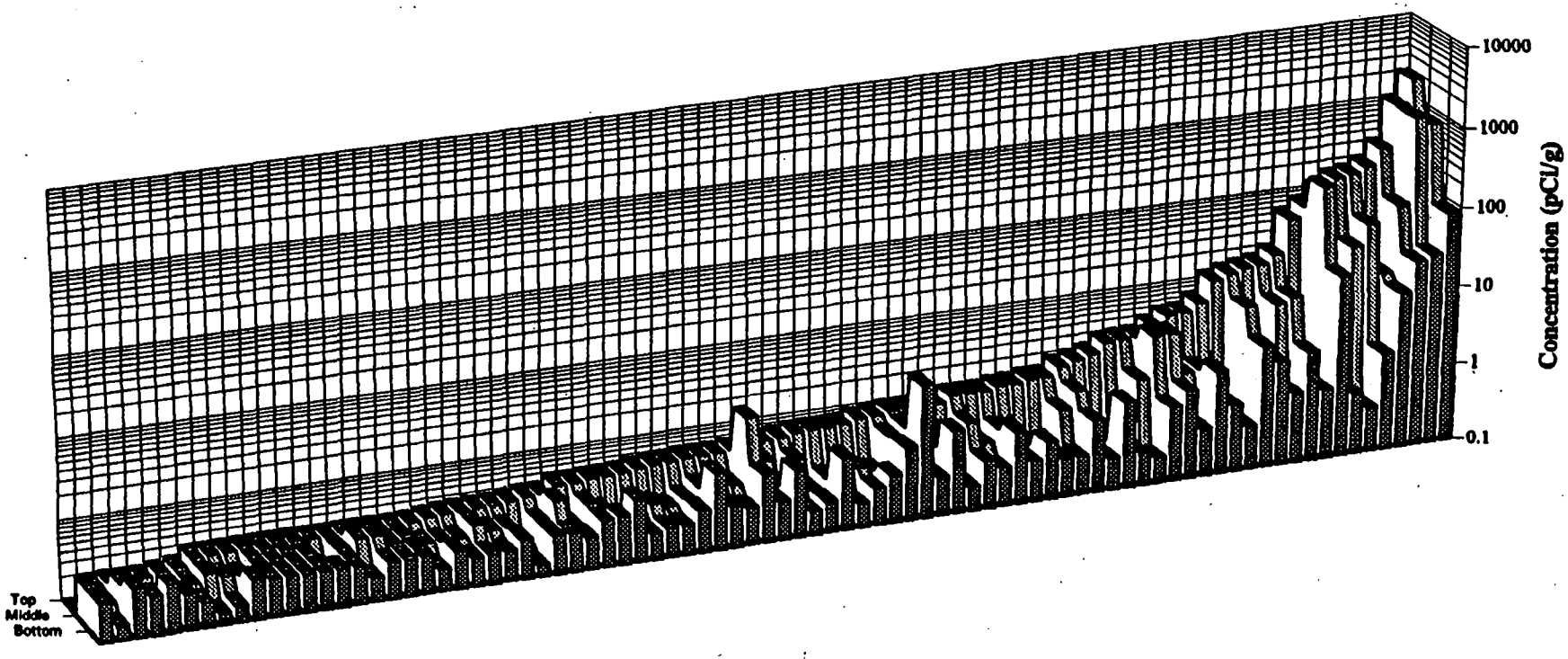

FIGURE A. III-10
RADIUM-228 CONCENTRATION VERSUS DEPTH

000781

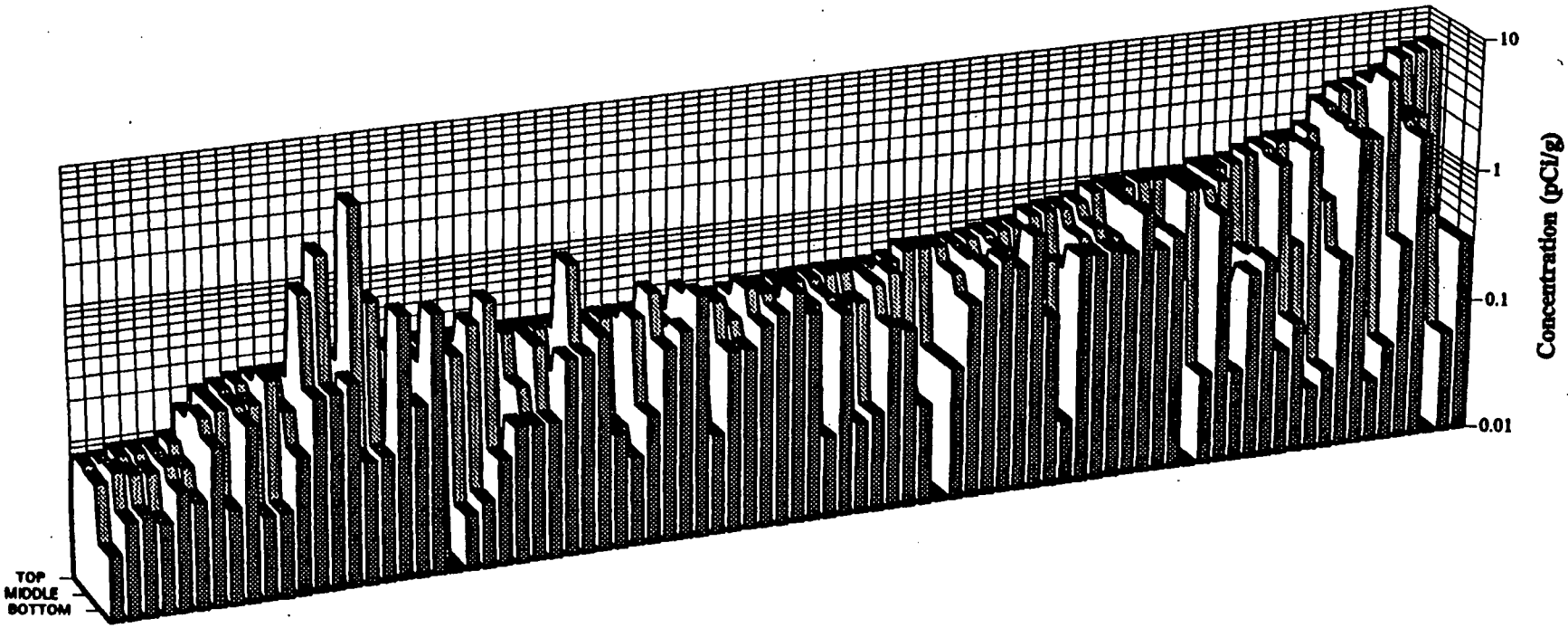

FIGURE A.III-11
STRONTIUM-90 CONCENTRATION VERSUS DEPTH

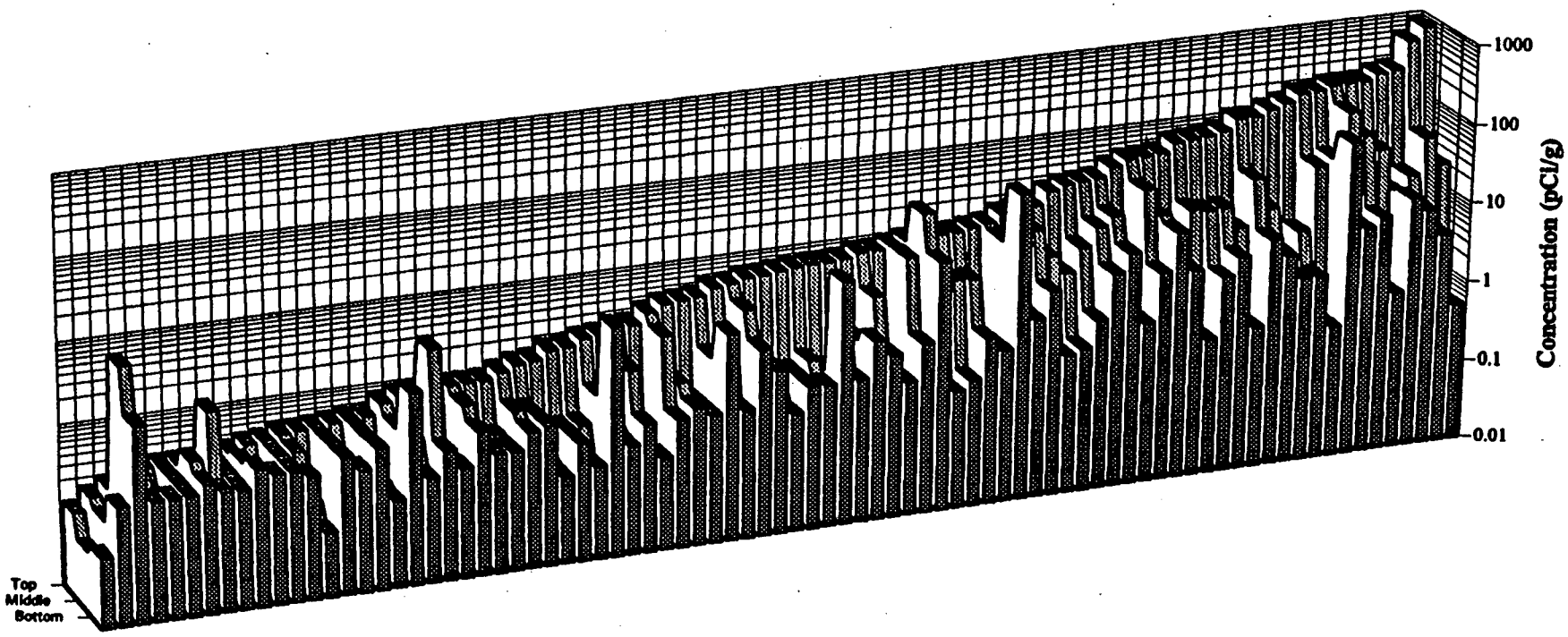

FIGURE A.III-12
TECHNETIUM-99 CONCENTRATION VERSUS DEPTH

000783

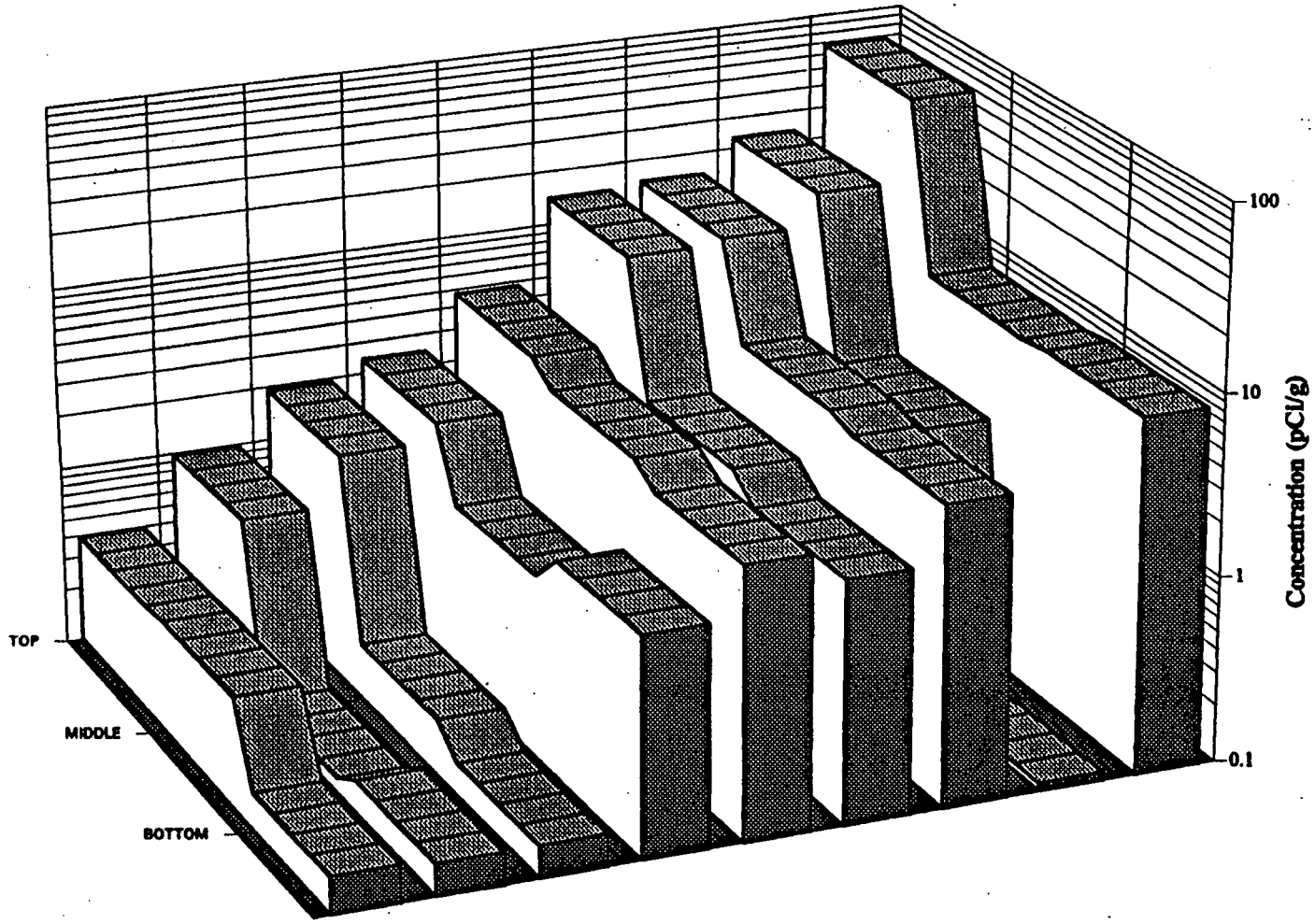

FIGURE A.III-13
THORIUM-227 CONCENTRATION VERSUS DEPTH

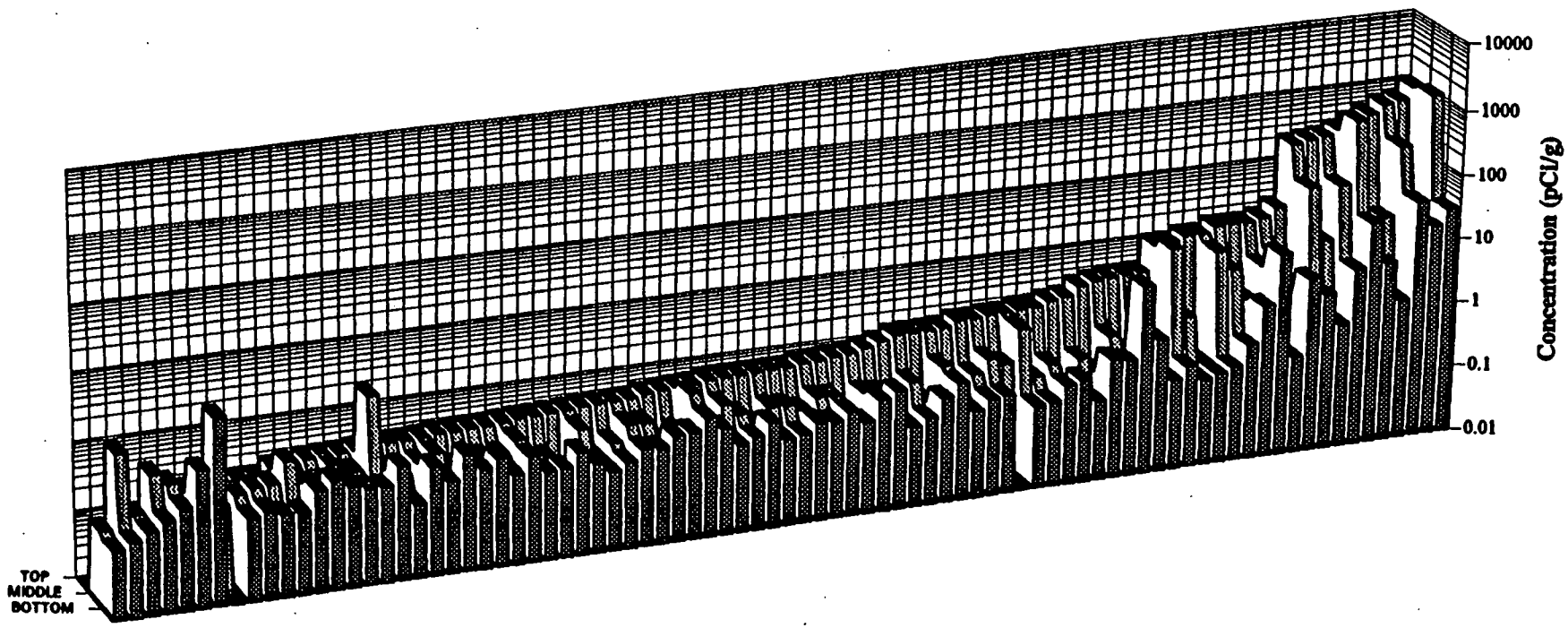

FIGURE A.III-14
THORIUM-228 CONCENTRATION VERSUS DEPTH

000785

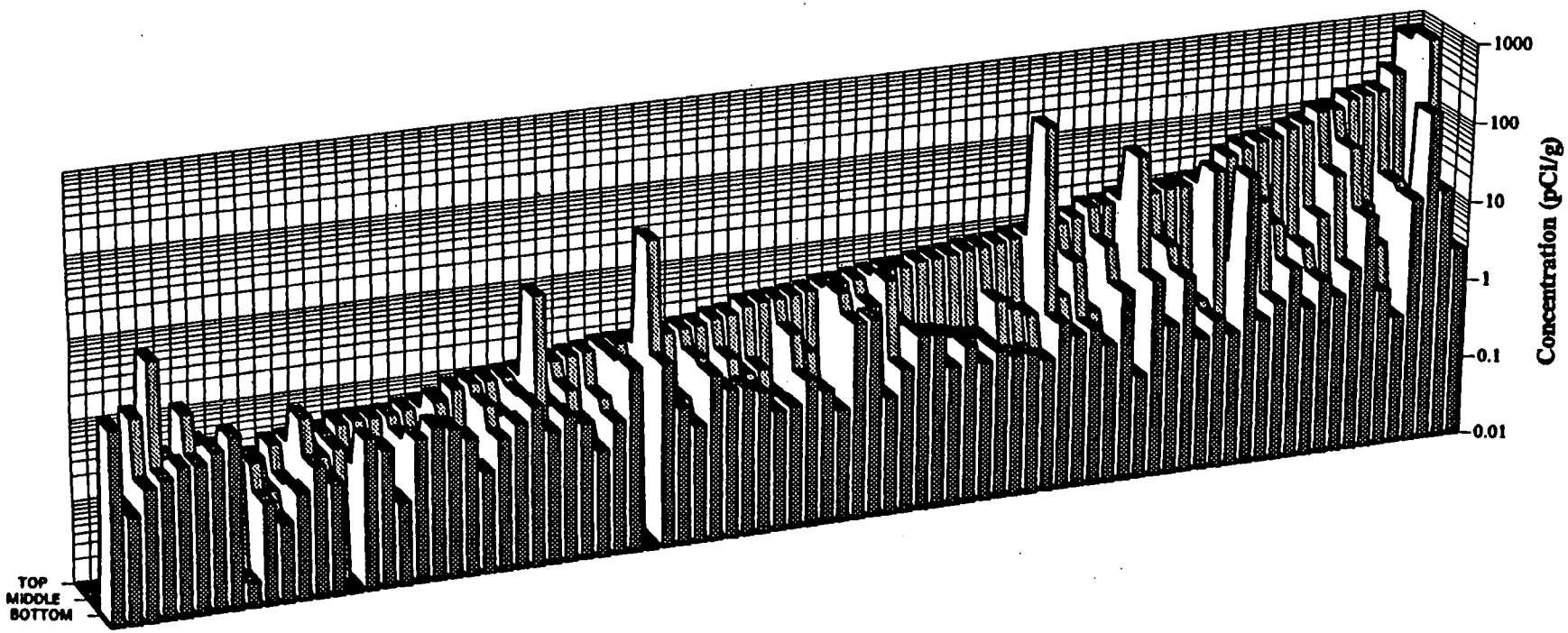

FIGURE A.III-15
THORIUM-230 CONCENTRATION VERSUS DEPTH

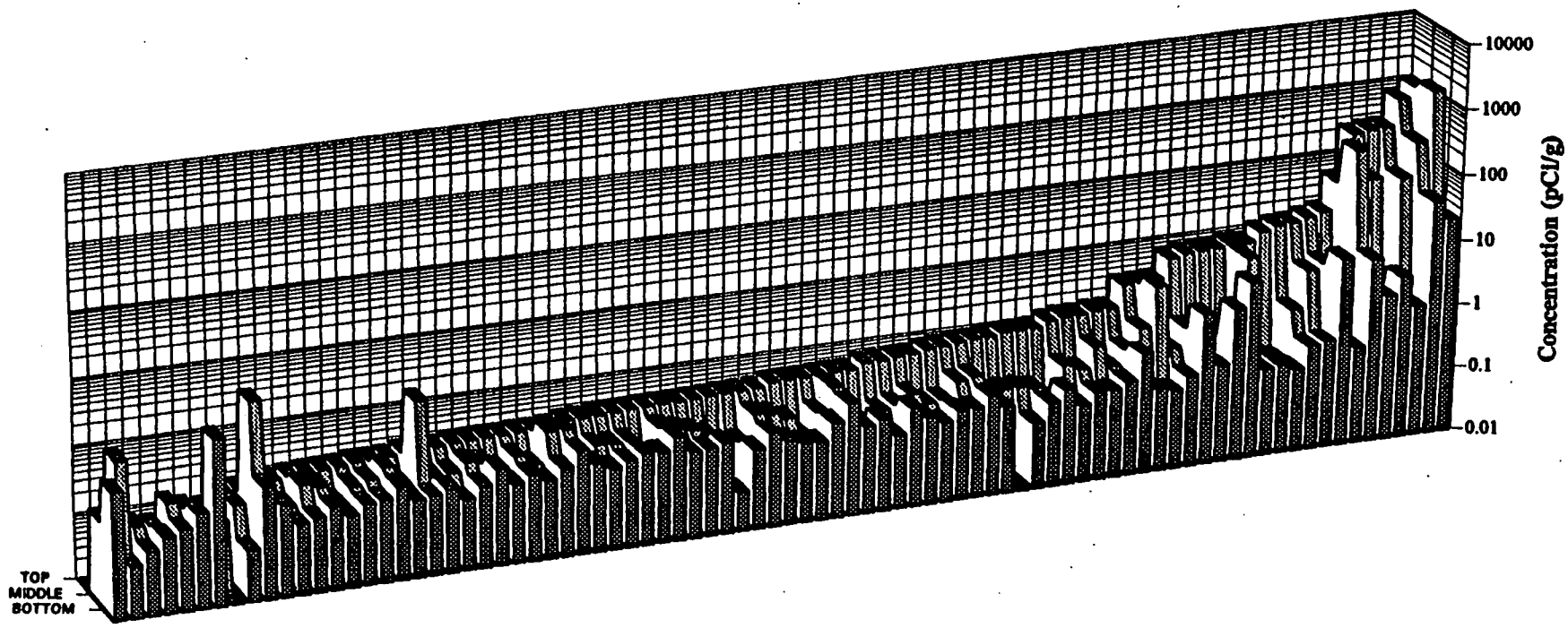

FIGURE A.III-16
THORIUM-232 CONCENTRATION VERSUS DEPTH

000287

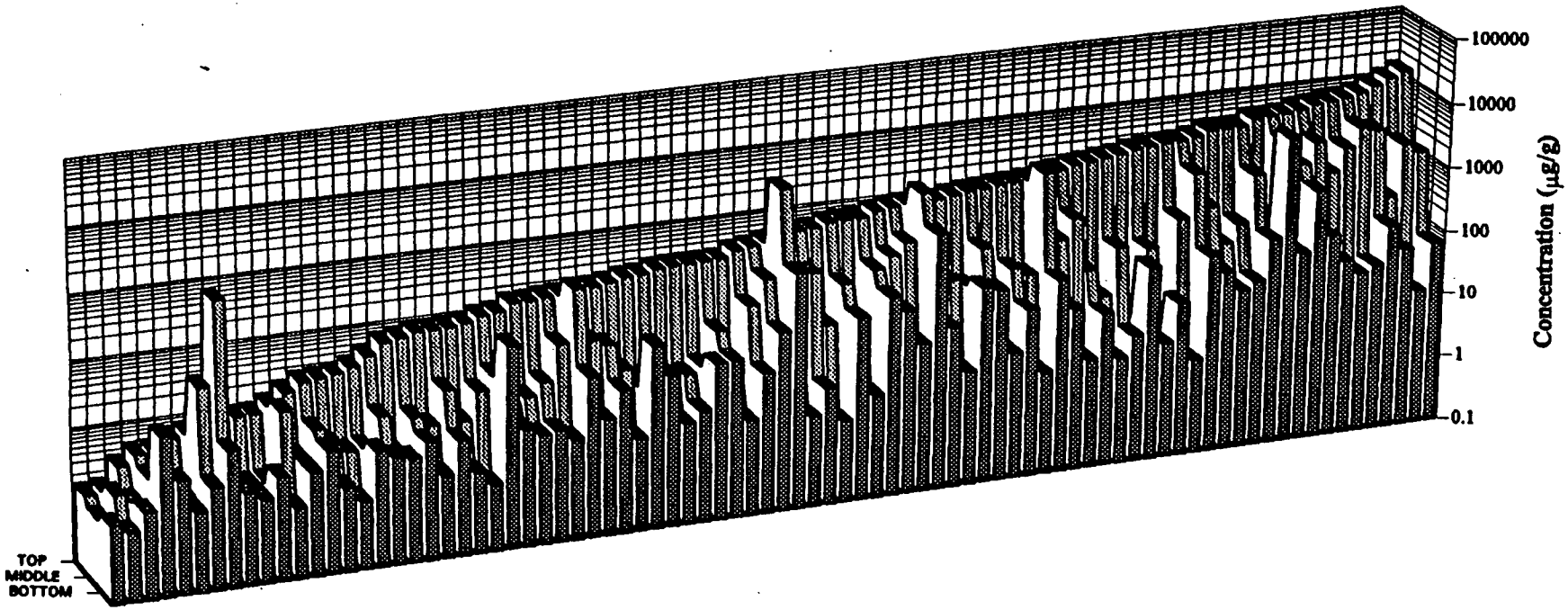

FIGURE A.III-17
ELEMENTAL URANIUM CONCENTRATION VERSUS DEPTH

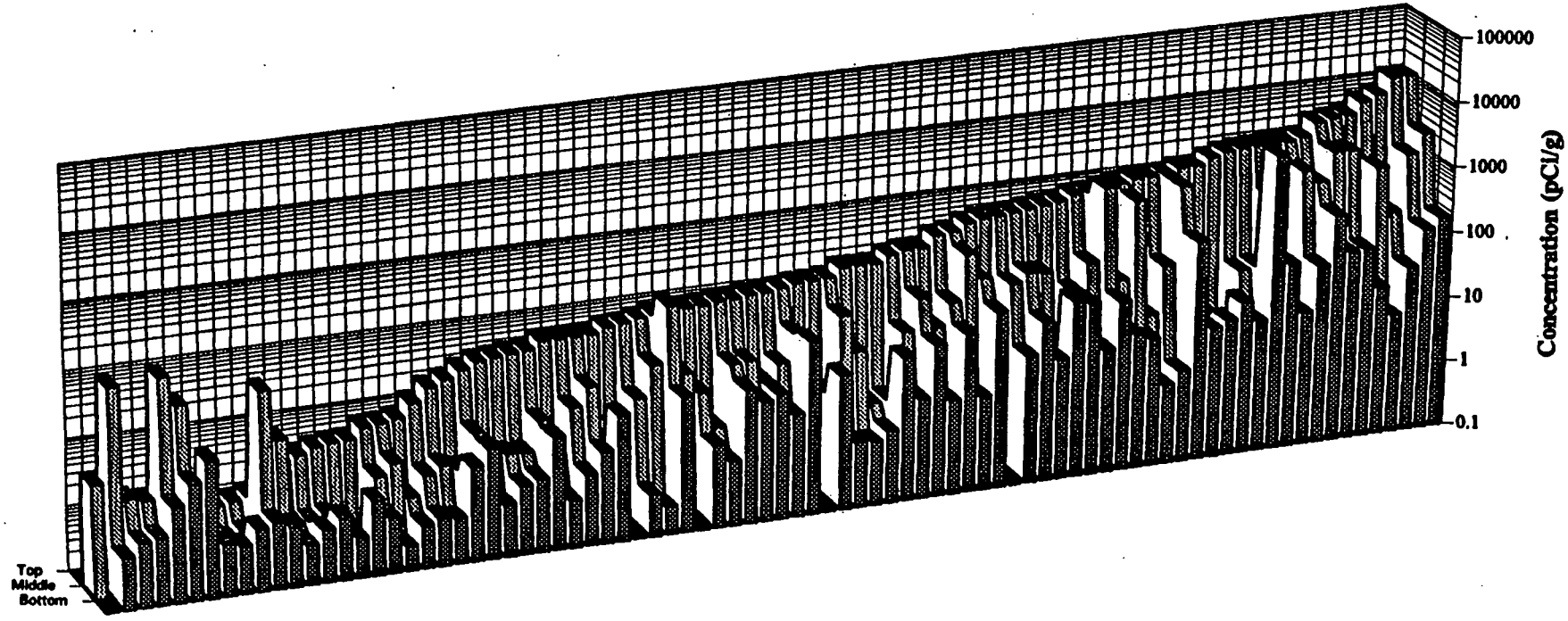

FIGURE A.III-18
URANIUM-234 CONCENTRATION VERSUS DEPTH

000789

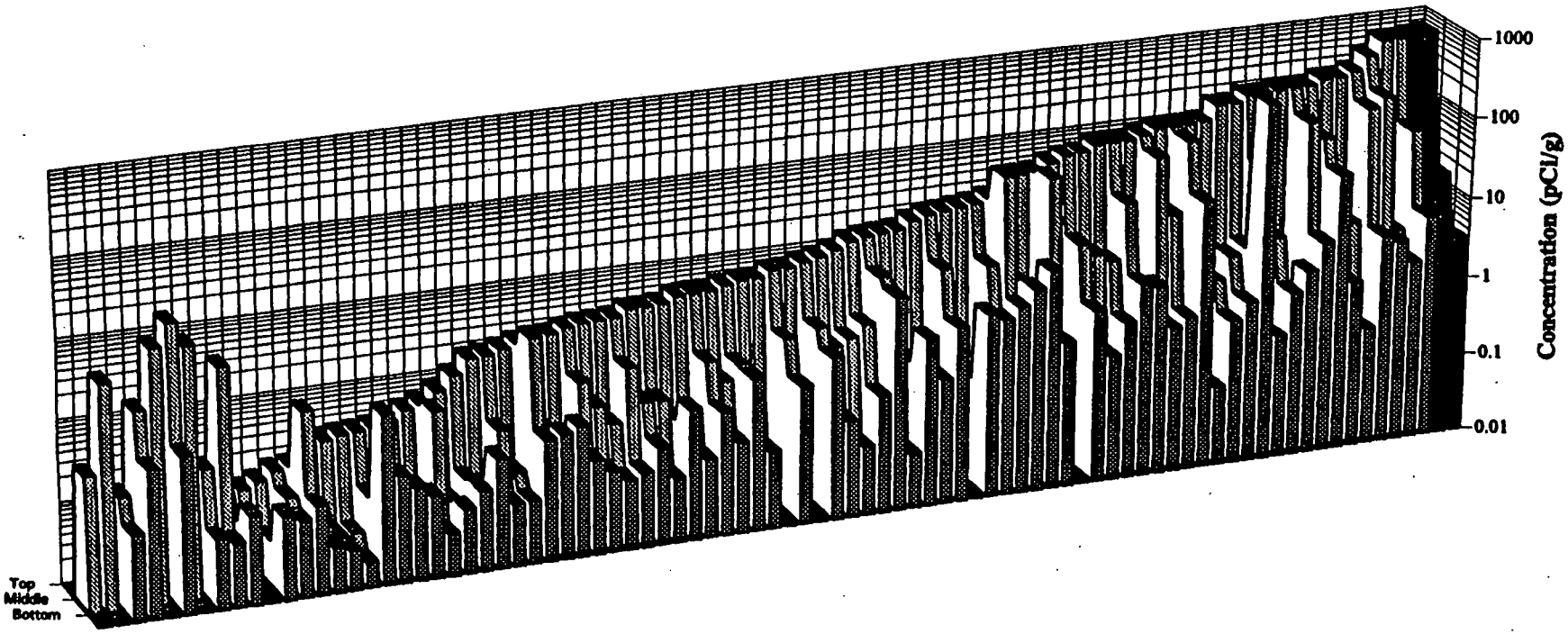

FIGURE A.III-19
URANIUM-235/236 CONCENTRATION VERSUS DEPTH

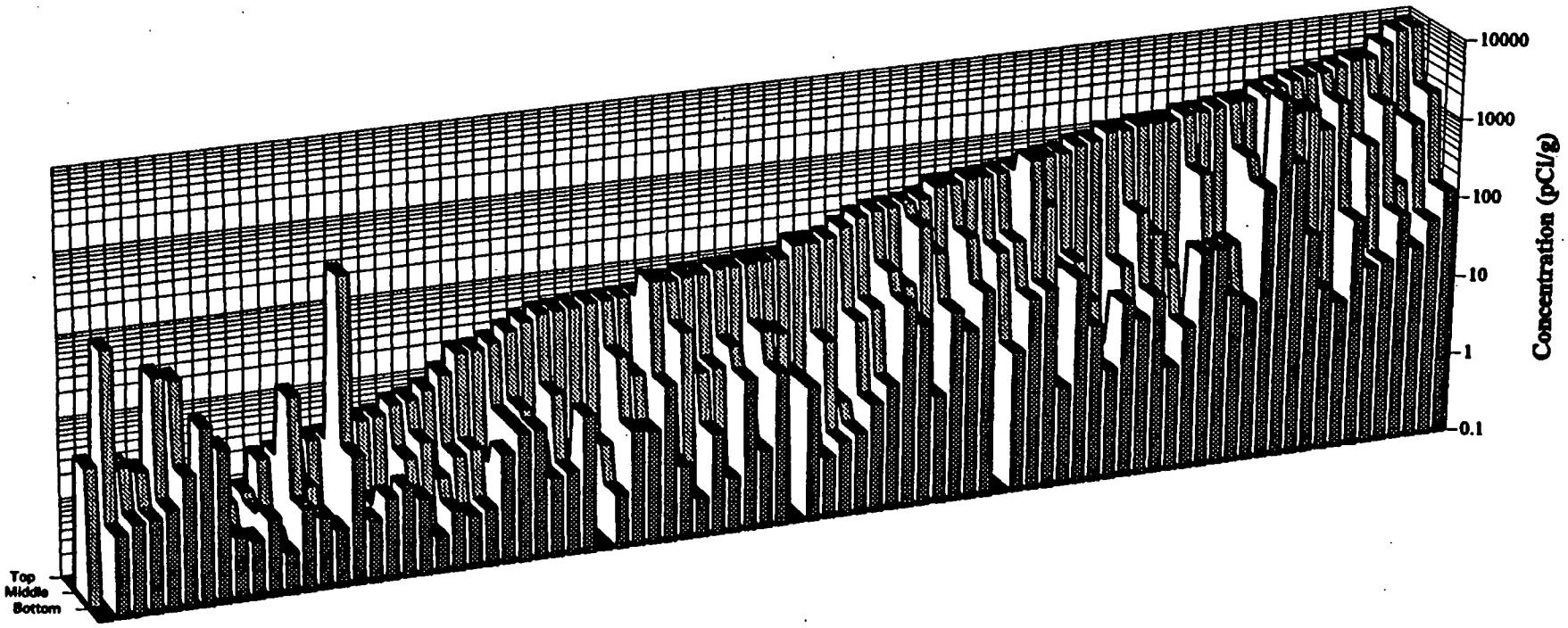

FIGURE A.III-20
URANIUM-238 CONCENTRATION VERSUS DEPTH

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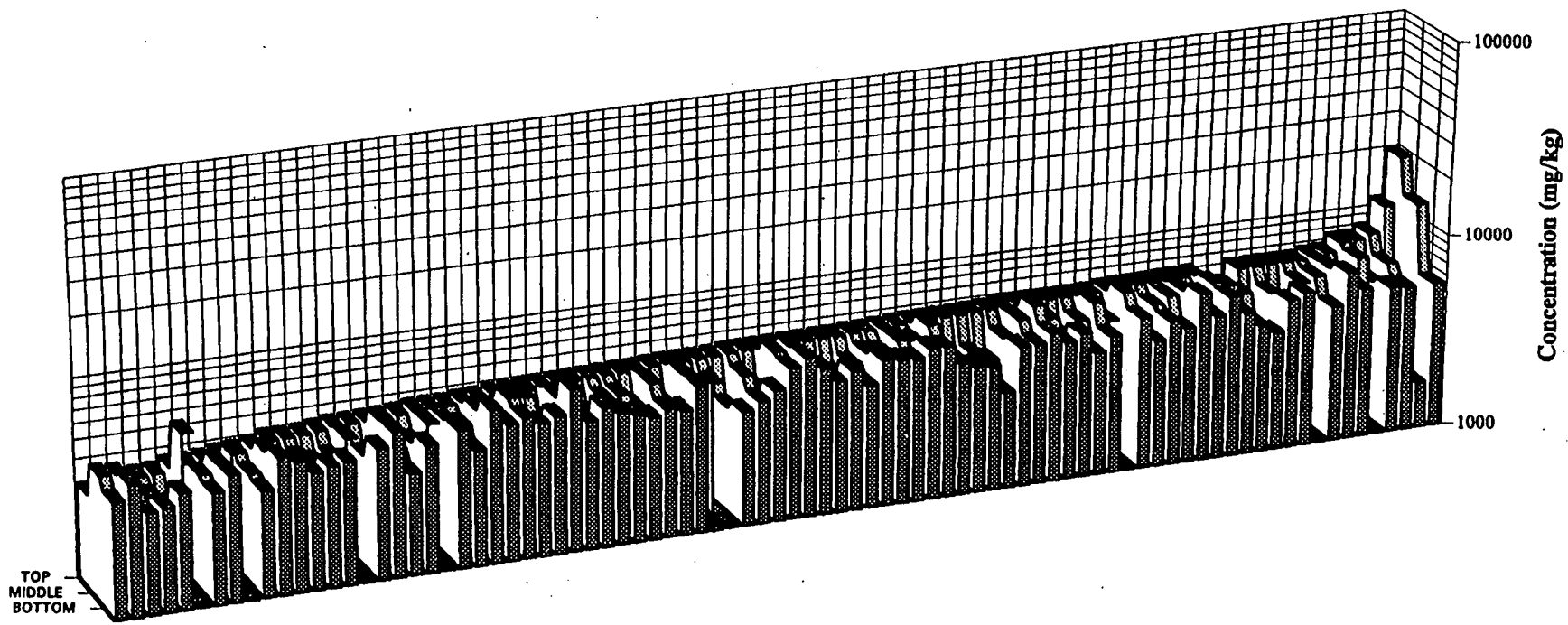

FIGURE A.III-21
ALUMINUM CONCENTRATION VERSUS DEPTH

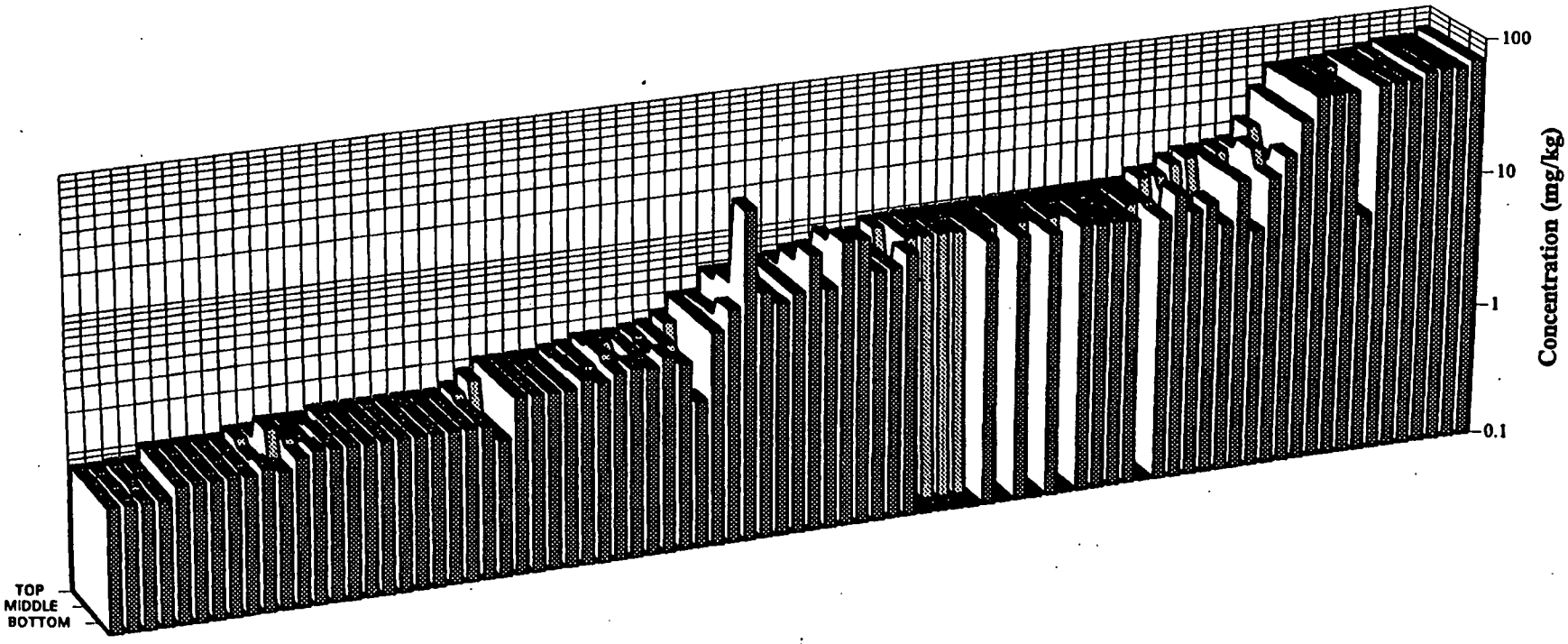

FIGURE A.III-22
ANTIMONY CONCENTRATION VERSUS DEPTH

000793

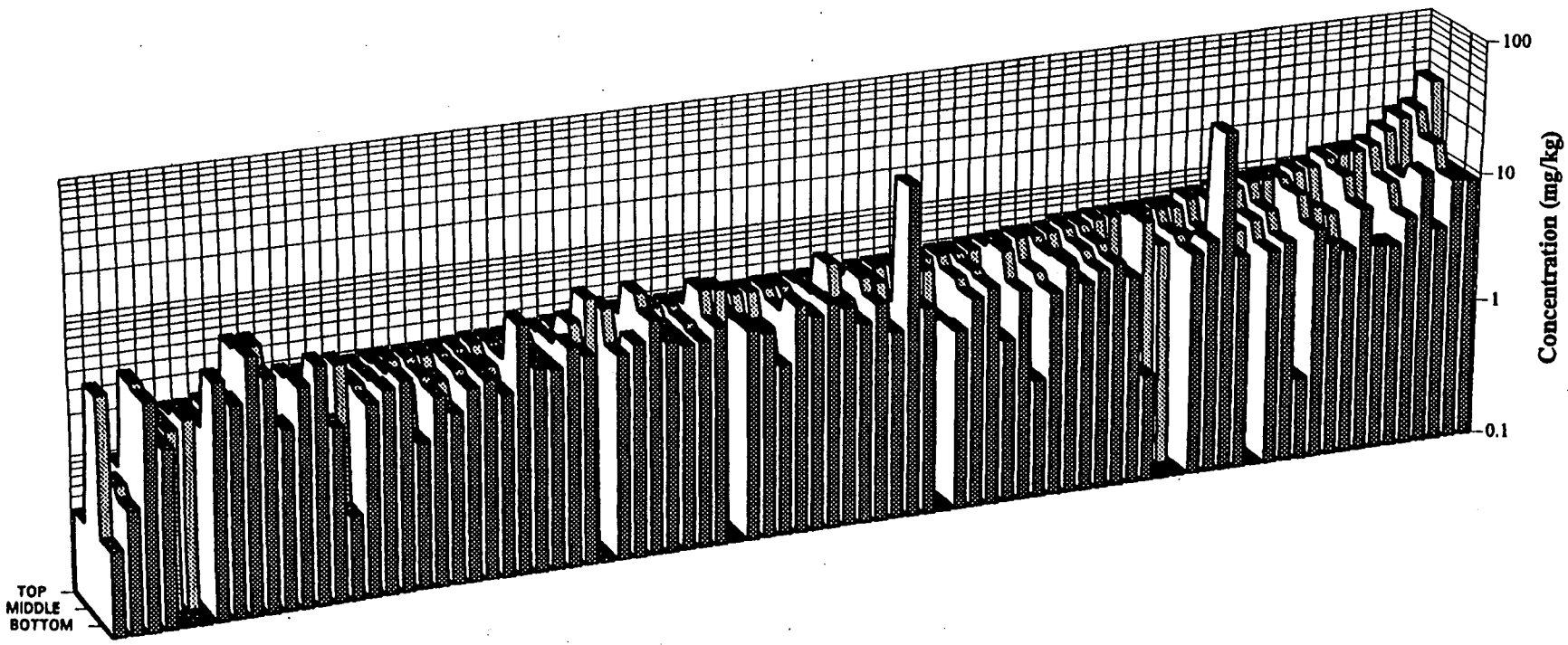

FIGURE A.III-23
ARSENIC CONCENTRATION VERSUS DEPTH

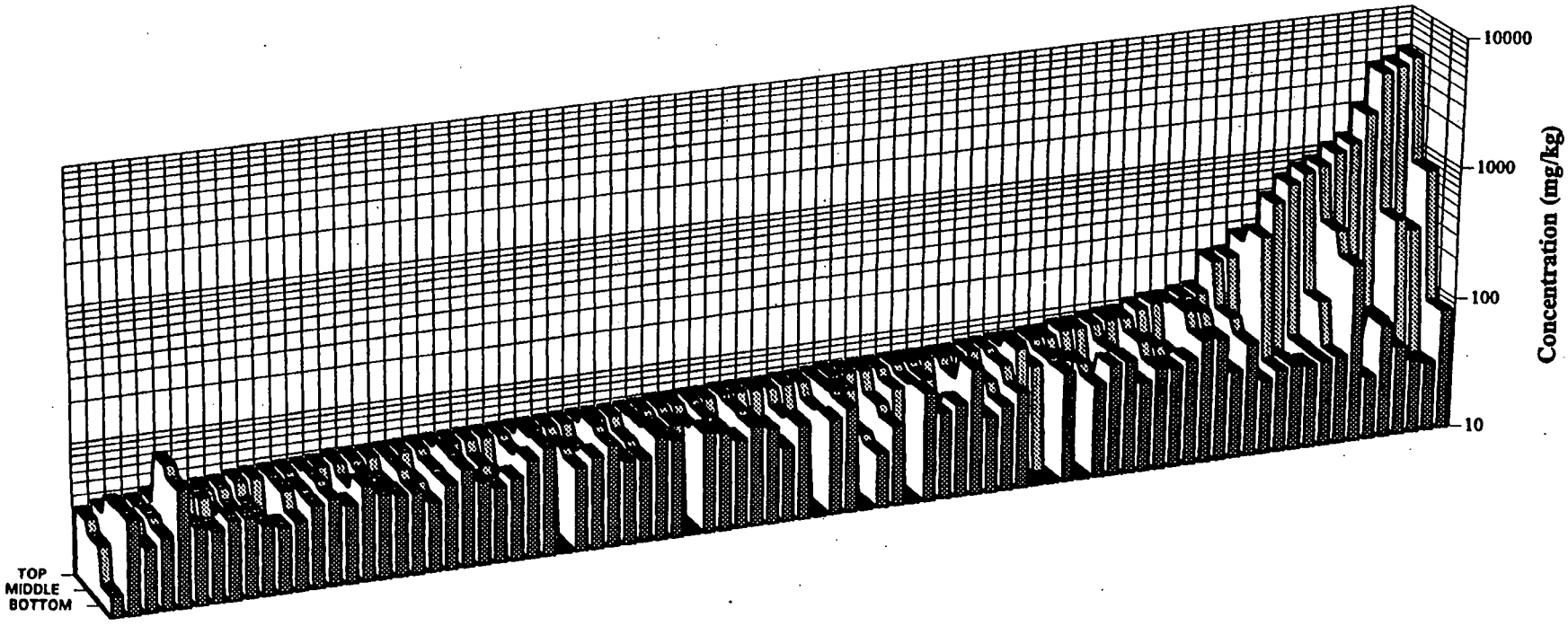

FIGURE A.III-24
BARIUM CONCENTRATION VERSUS DEPTH

000793

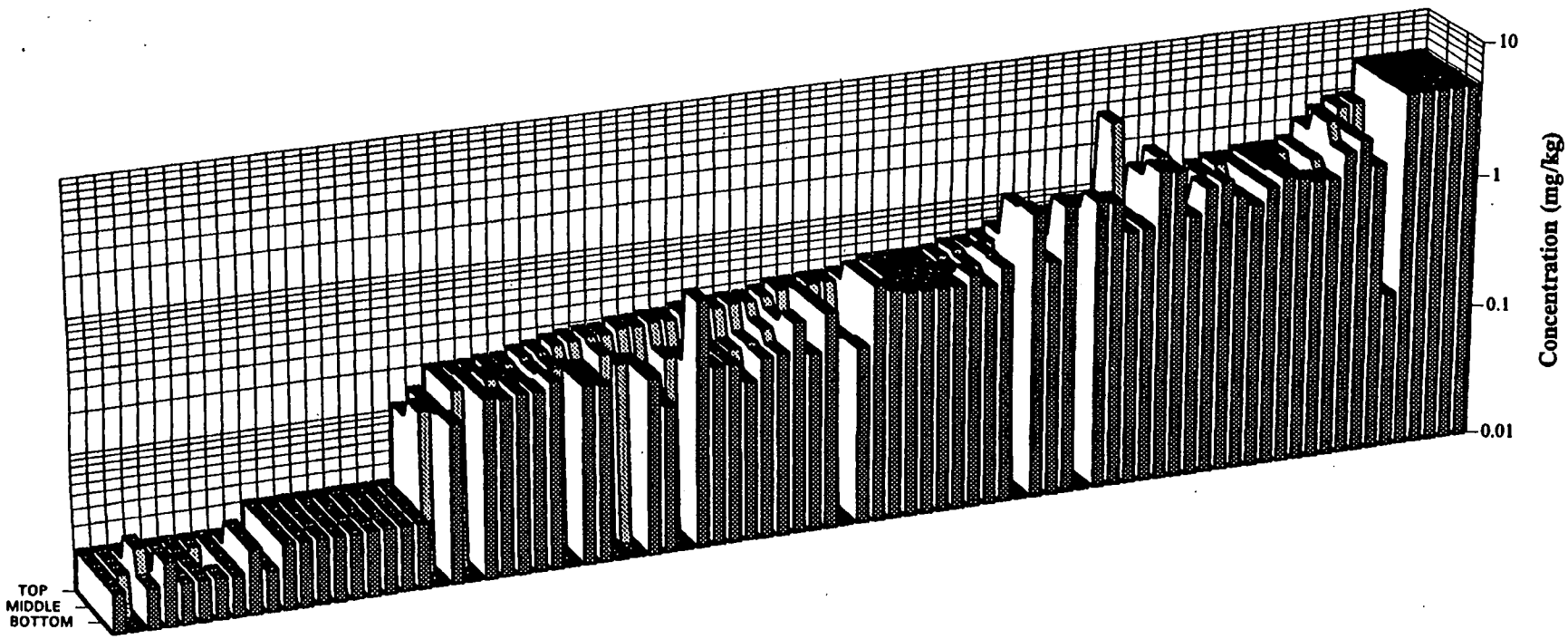

FIGURE A.III-25
BERYLLIUM CONCENTRATION VERSUS DEPTH

000296

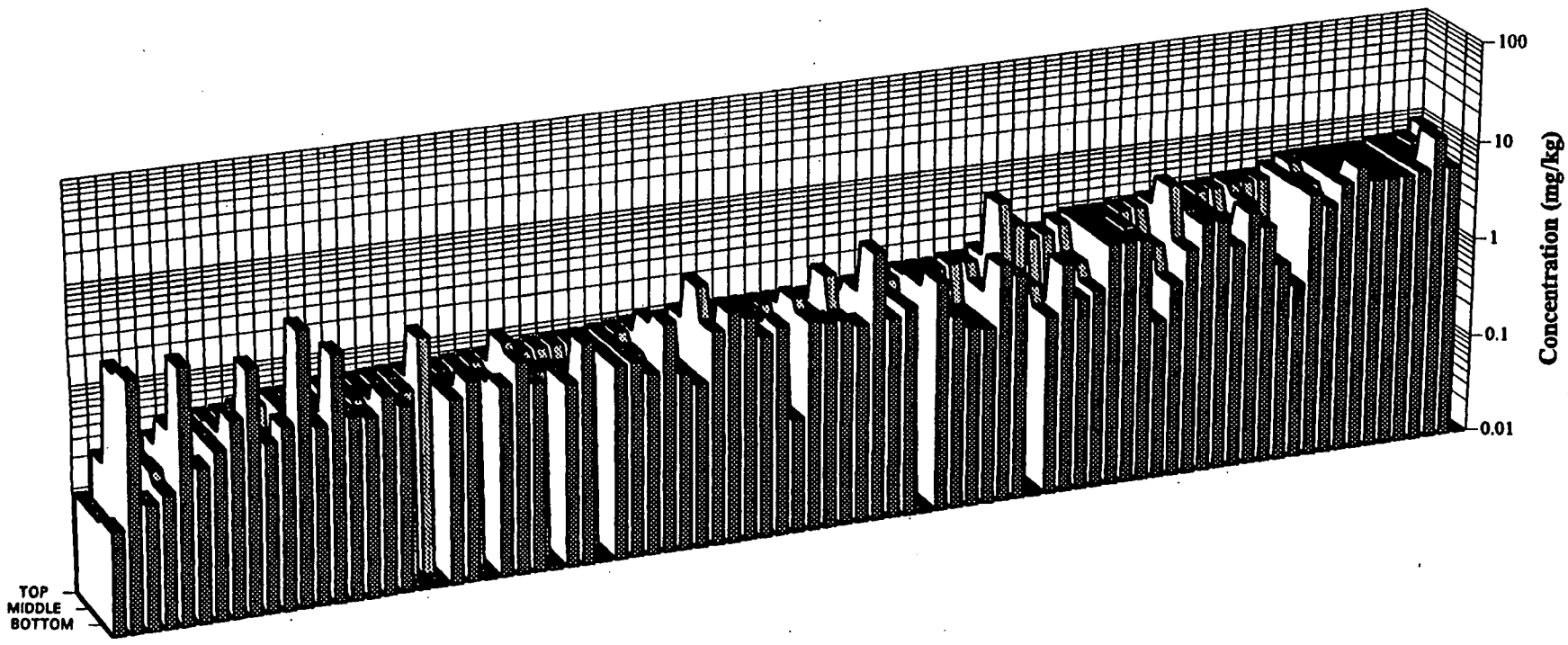

FIGURE A.III-26
CADMIUM CONCENTRATION VERSUS DEPTH

000797

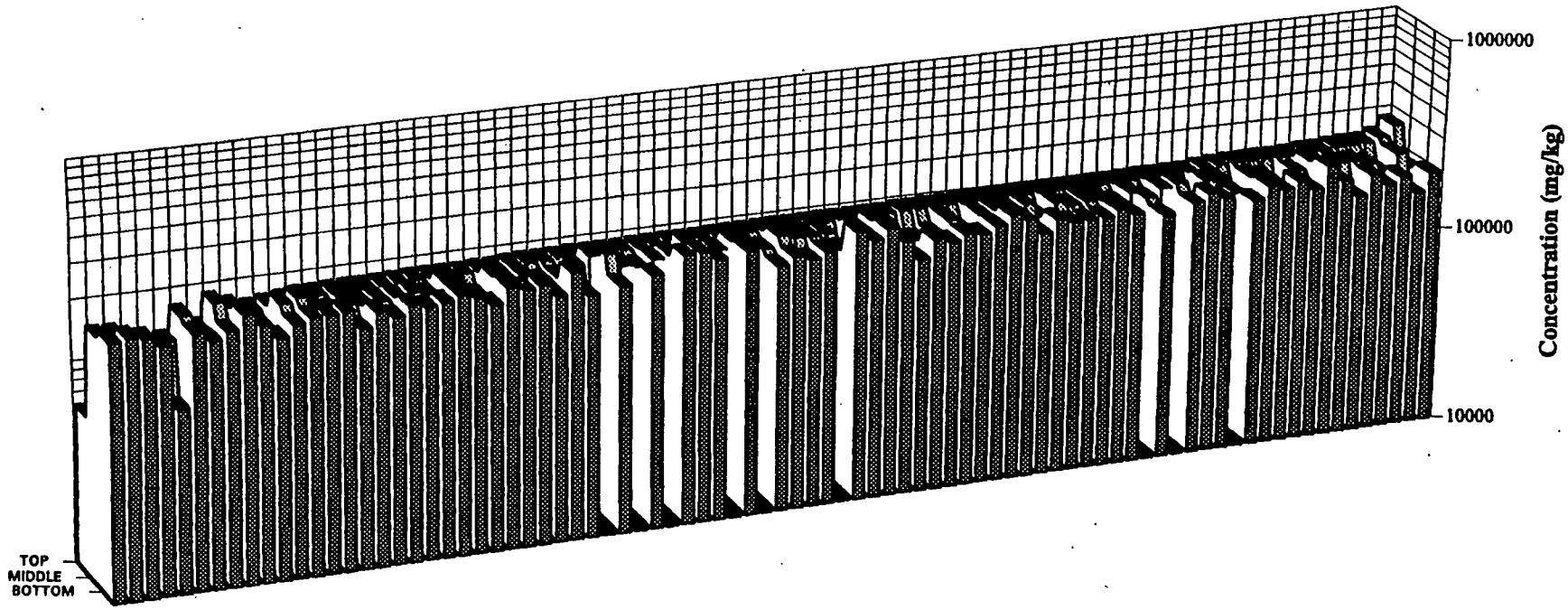

FIGURE A.III-27
CALCIUM CONCENTRATION VERSUS DEPTH

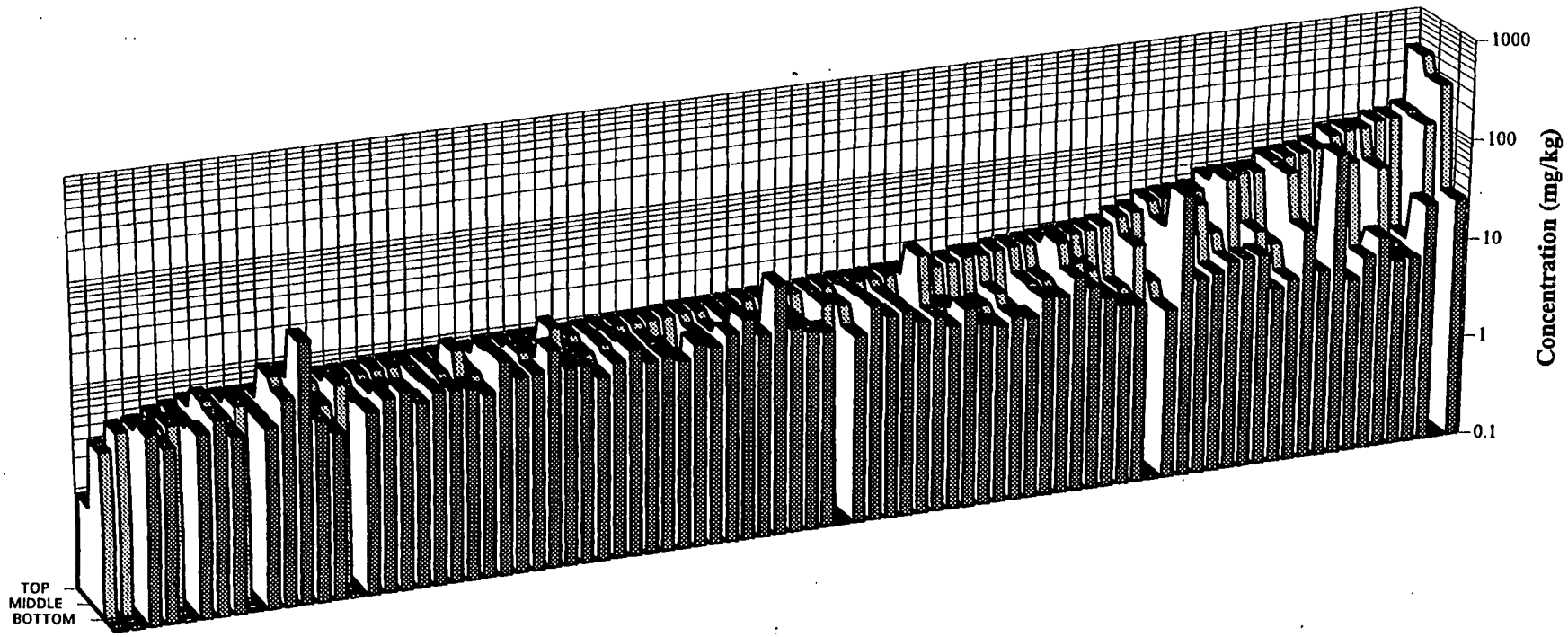

FIGURE A.III-28
CHROMIUM CONCENTRATION VERSUS DEPTH

662000

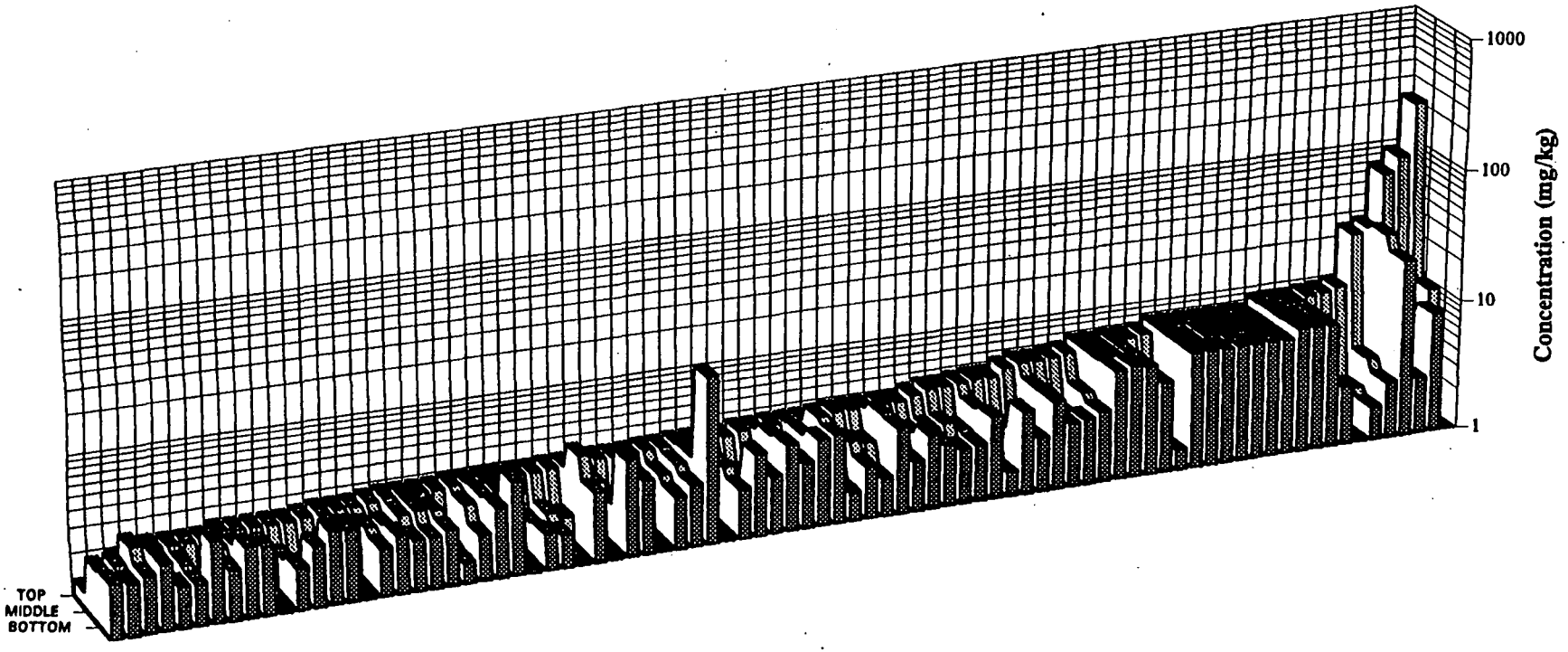

FIGURE A.III-29
COBALT CONCENTRATION VERSUS DEPTH

008000

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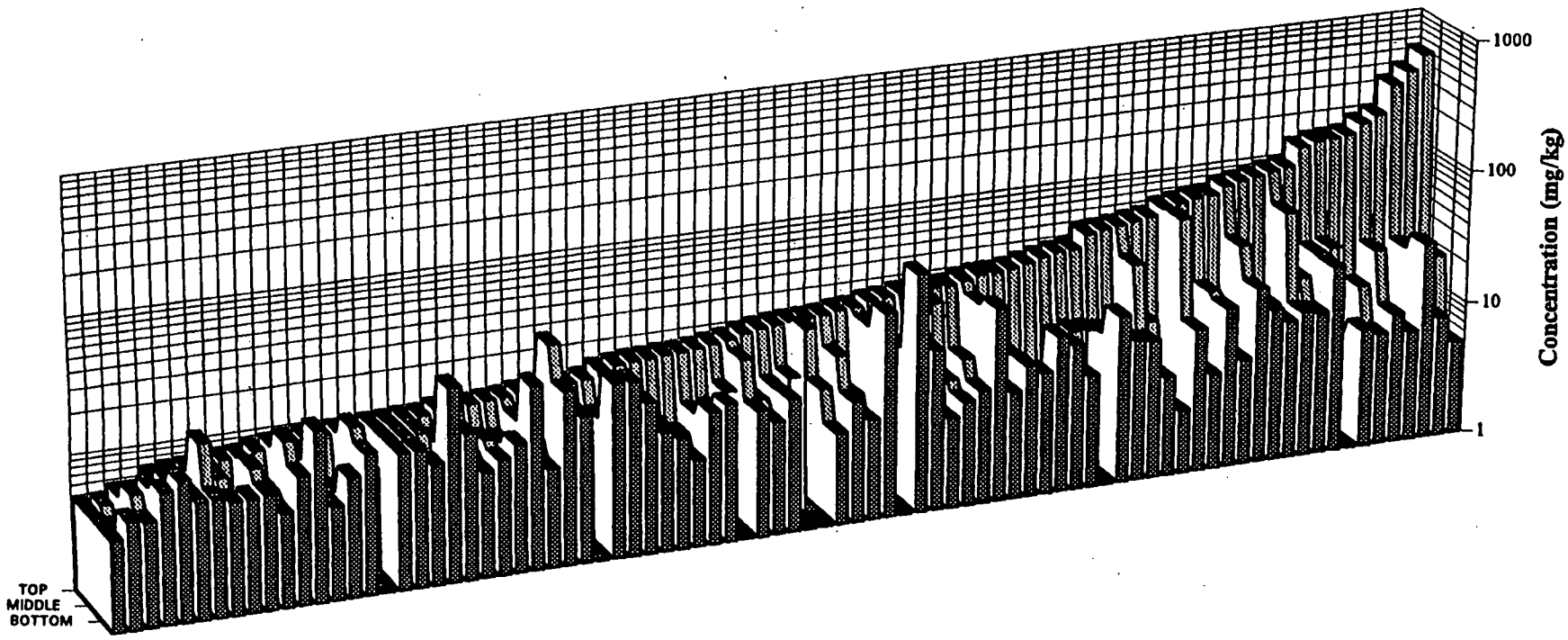

FIGURE A.III-30
COPPER CONCENTRATION VERSUS DEPTH

008001

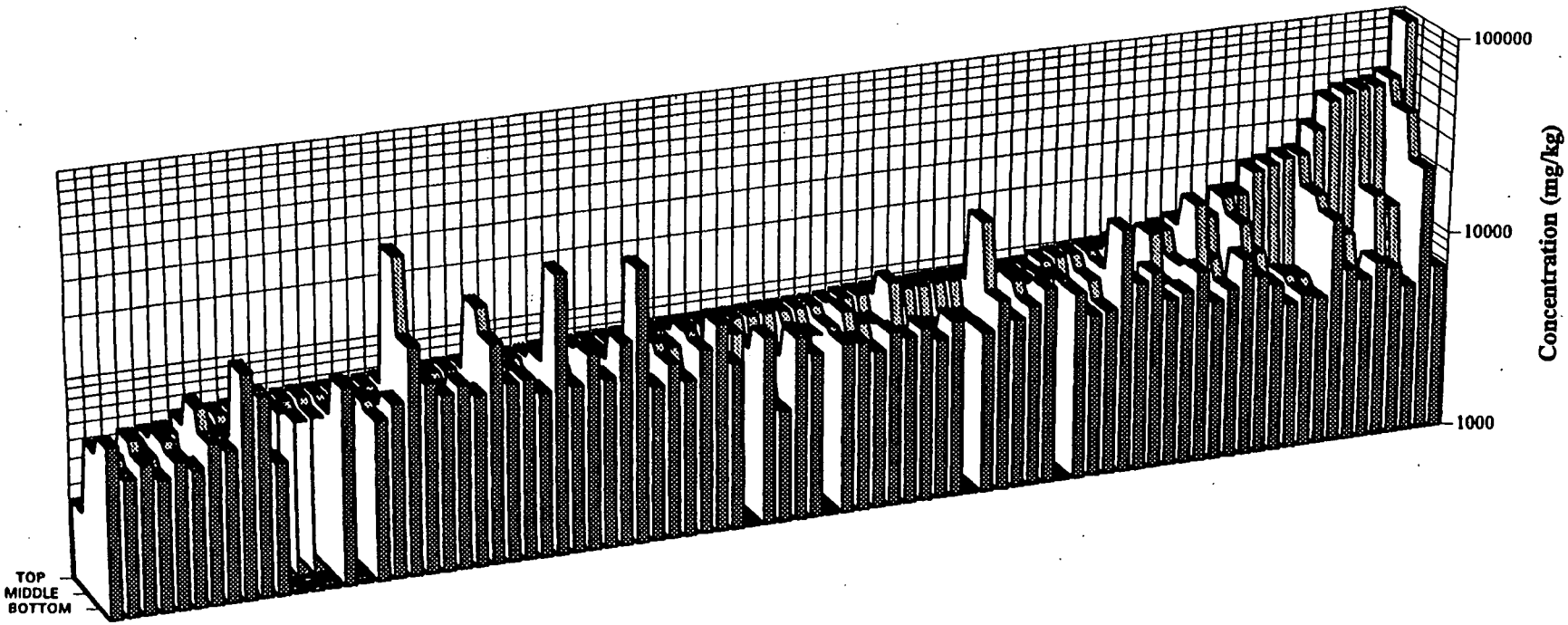

FIGURE A.III-31
IRON CONCENTRATION VERSUS DEPTH

000802

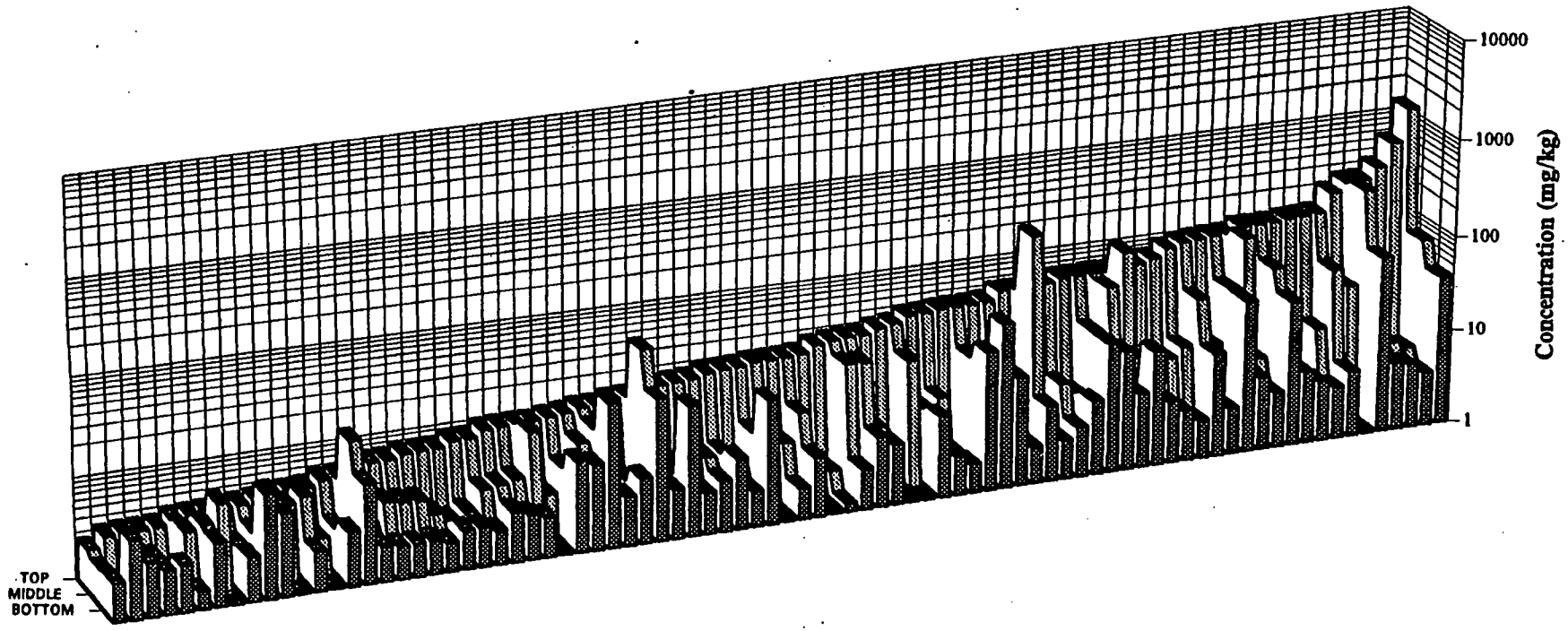

FIGURE A.III-32
LEAD CONCENTRATION VERSUS DEPTH

000803

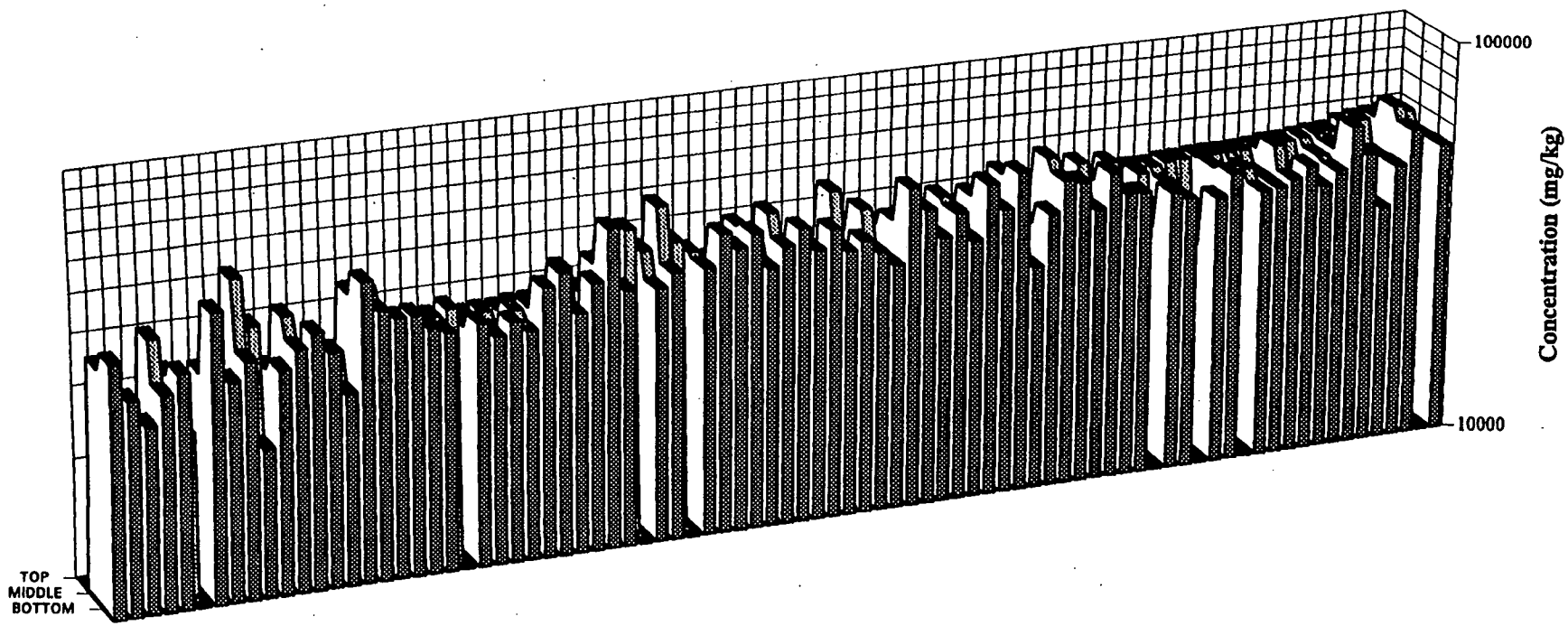

FIGURE A.III-33
MAGNESIUM CONCENTRATION VERSUS DEPTH

008004

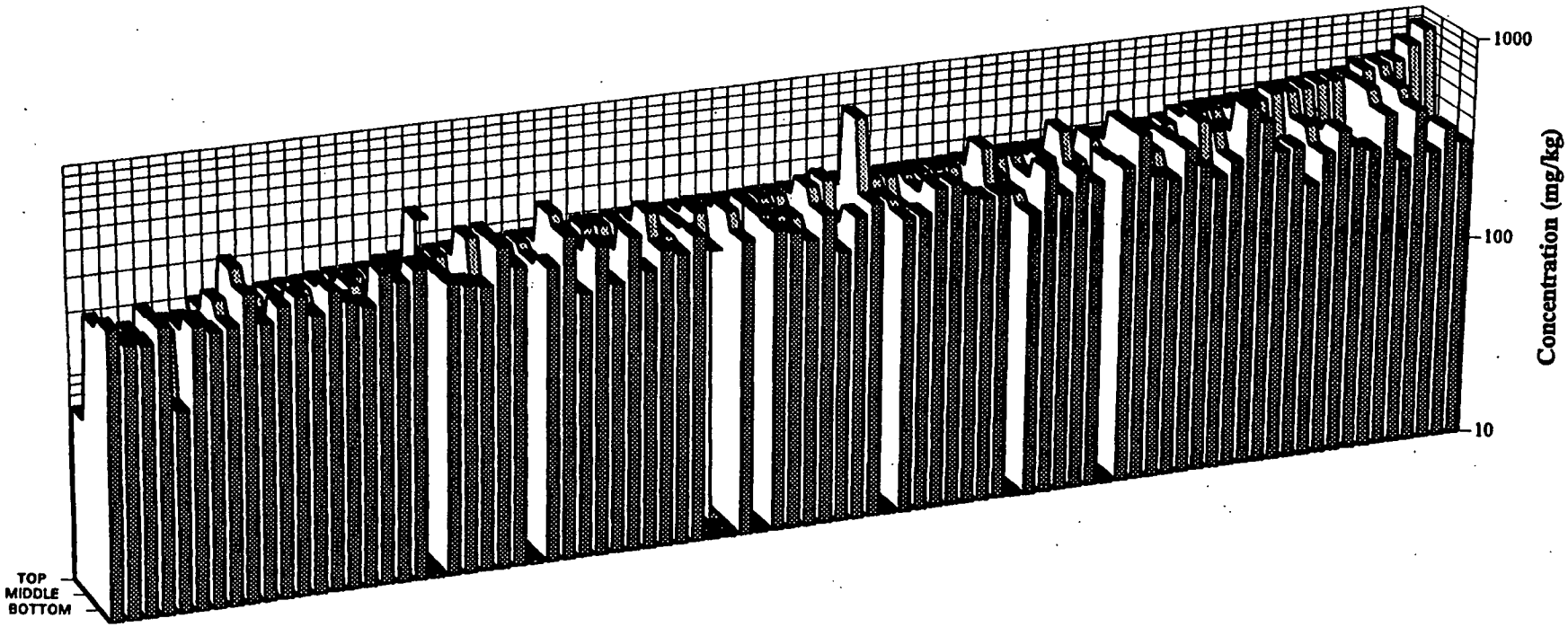

FIGURE A.III-34
MANGANESE CONCENTRATION VERSUS DEPTH

000803

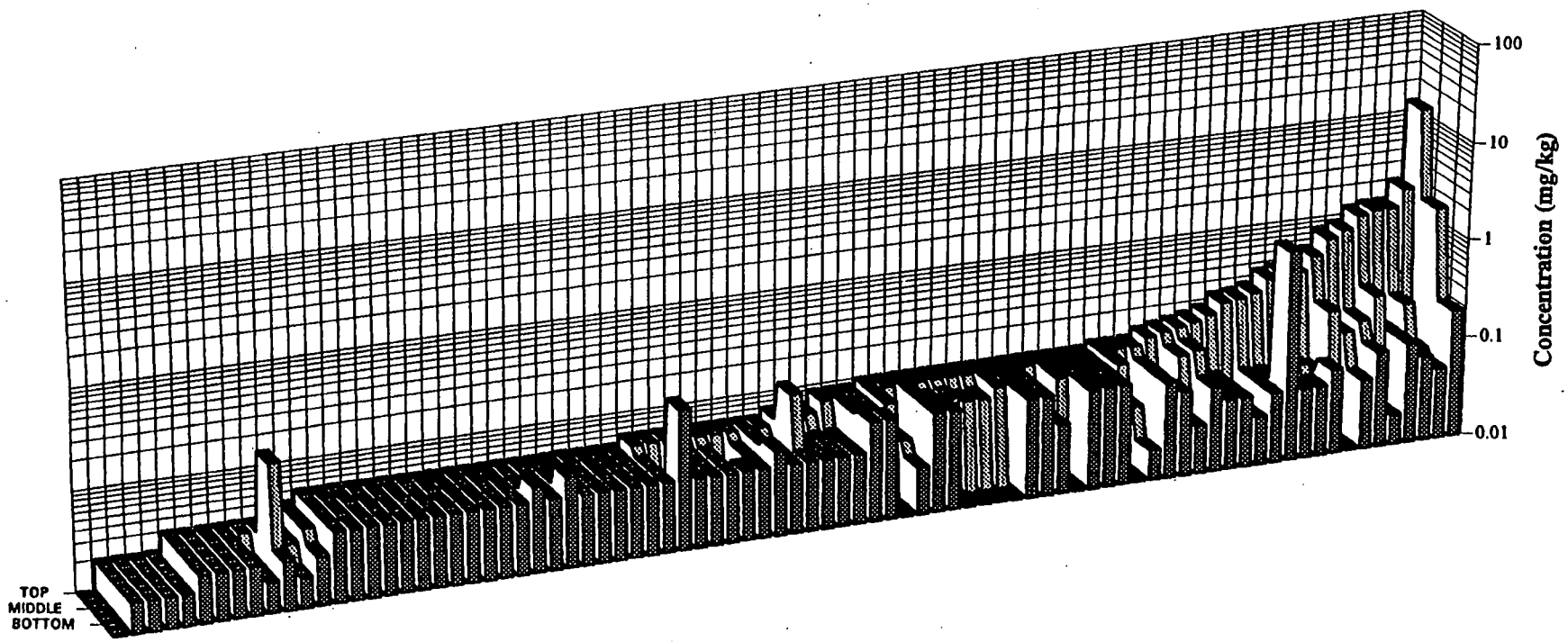

FIGURE A.III-35
MERCURY CONCENTRATION VERSUS DEPTH

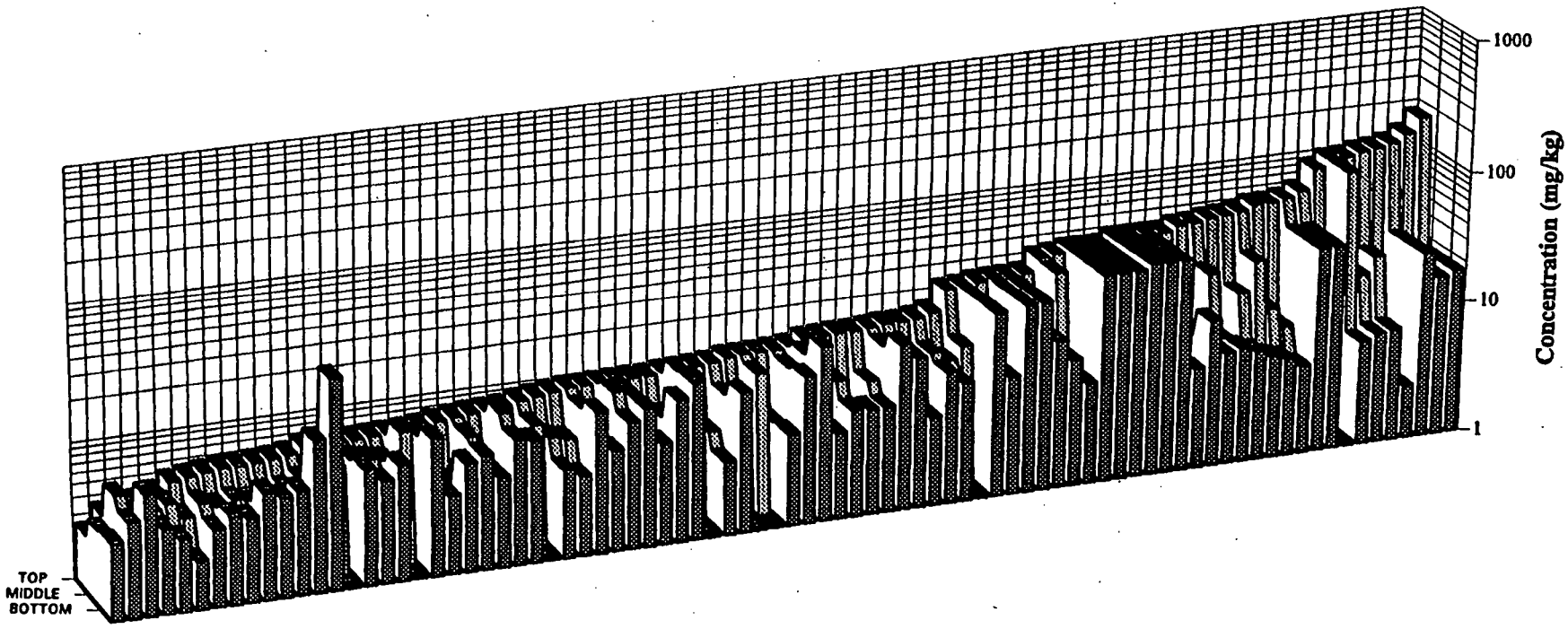

FIGURE A.III-36
NICKEL CONCENTRATION VERSUS DEPTH

000807

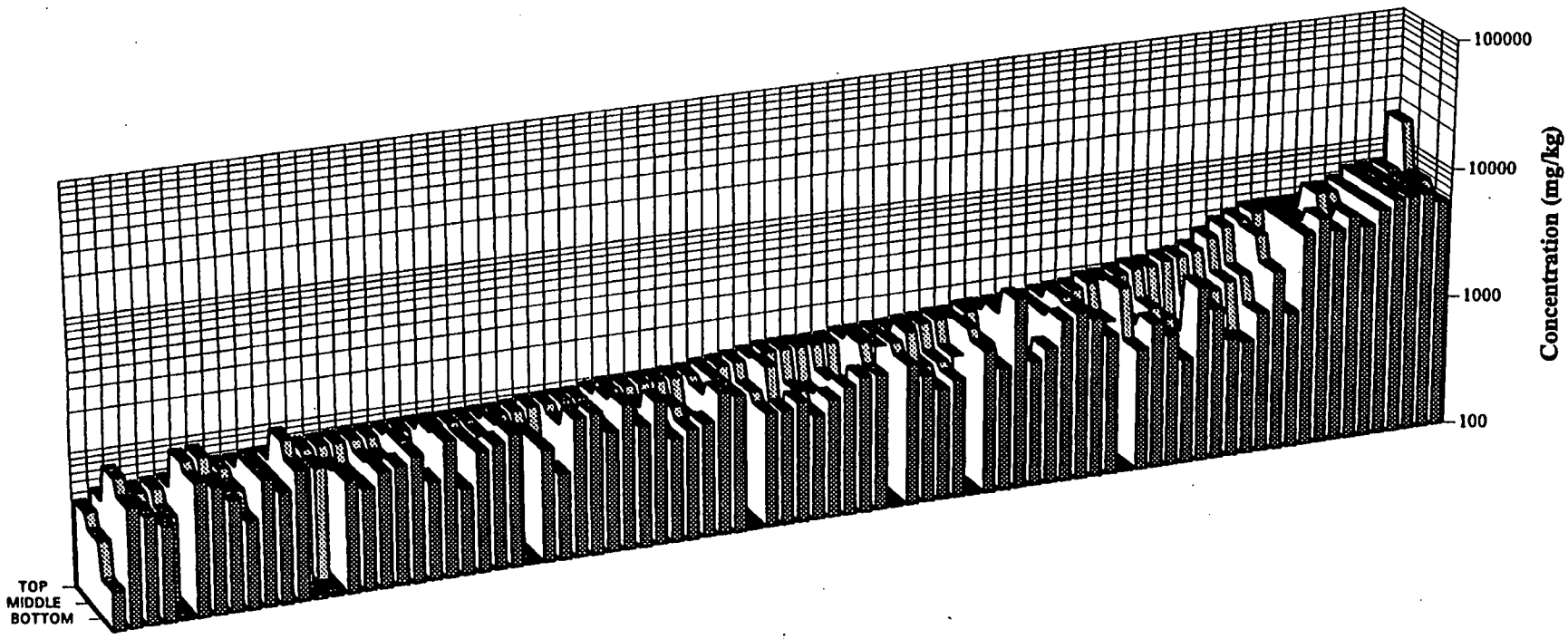

FIGURE A.III-37
POTASSIUM CONCENTRATION VERSUS DEPTH

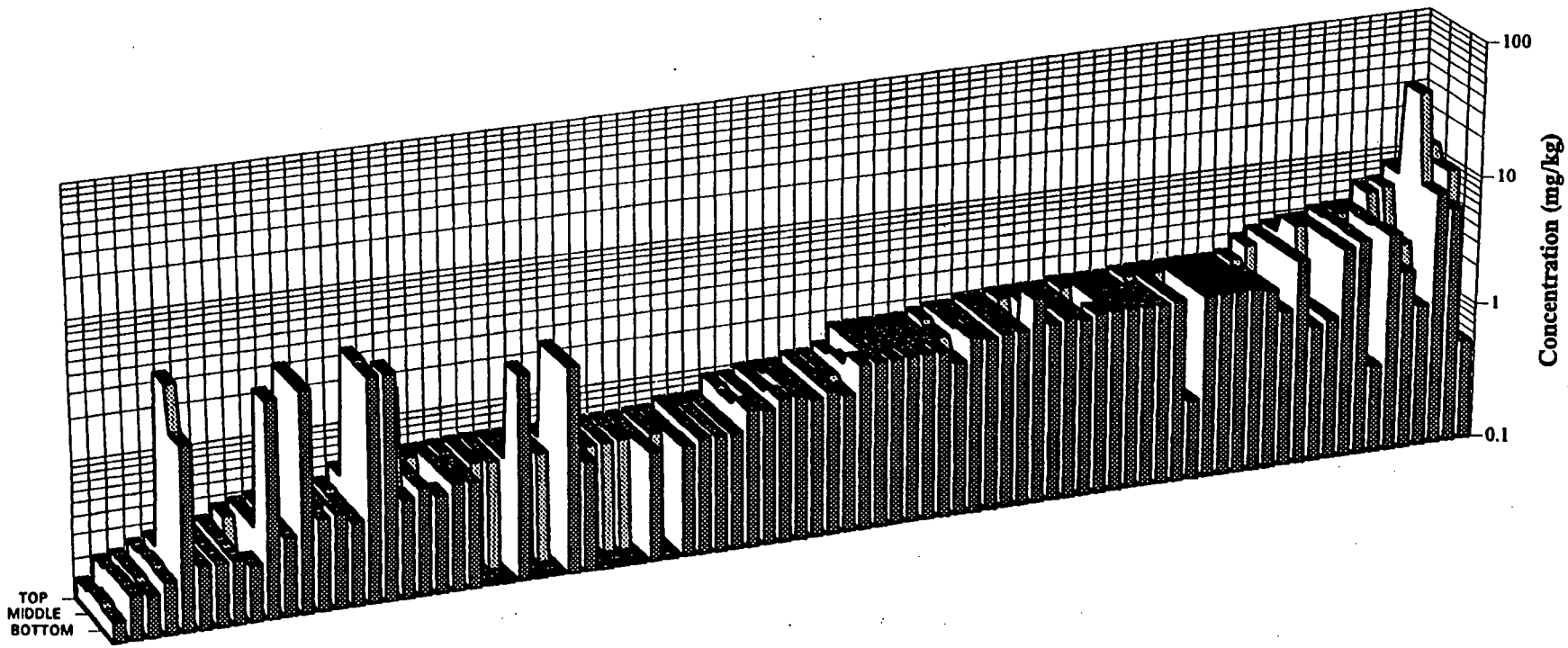

FIGURE A.III-38
SELENIUM CONCENTRATION VERSUS DEPTH

008003

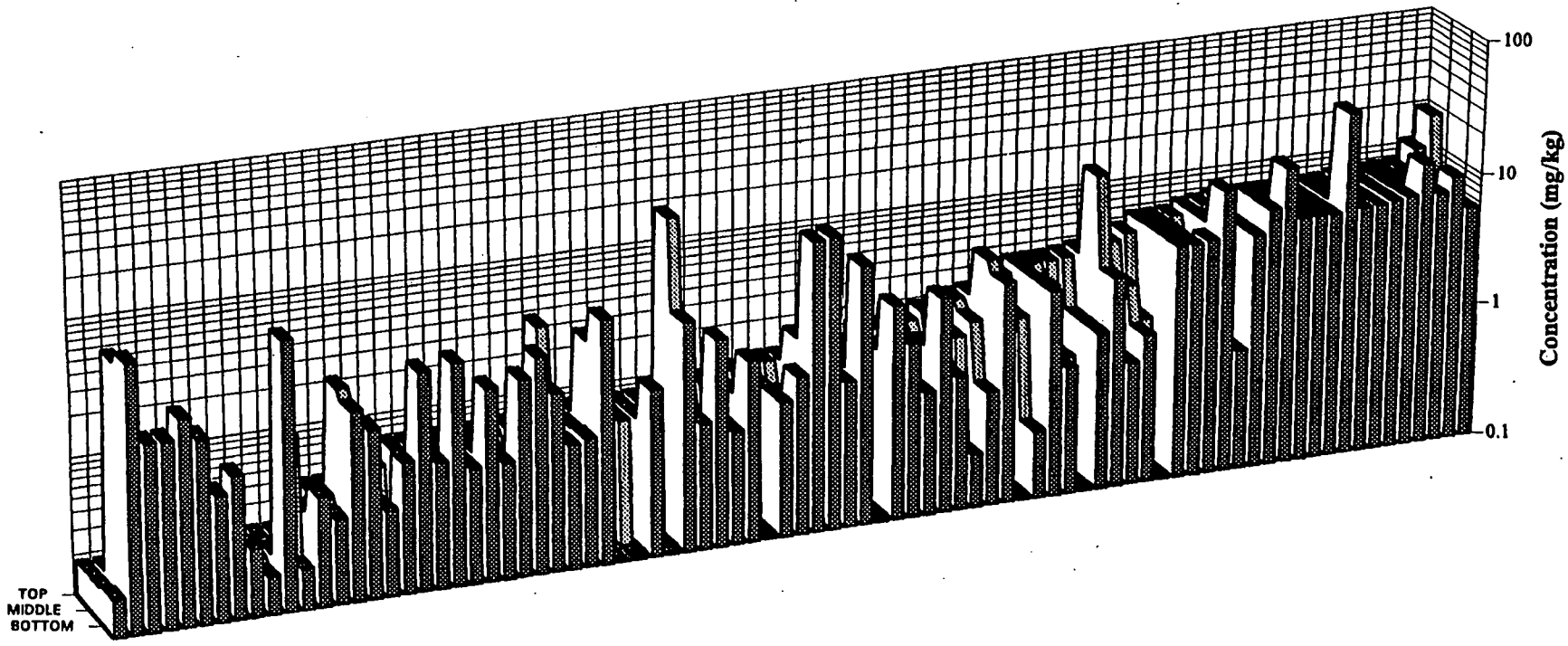

FIGURE A.III-39
SILVER CONCENTRATION VERSUS DEPTH

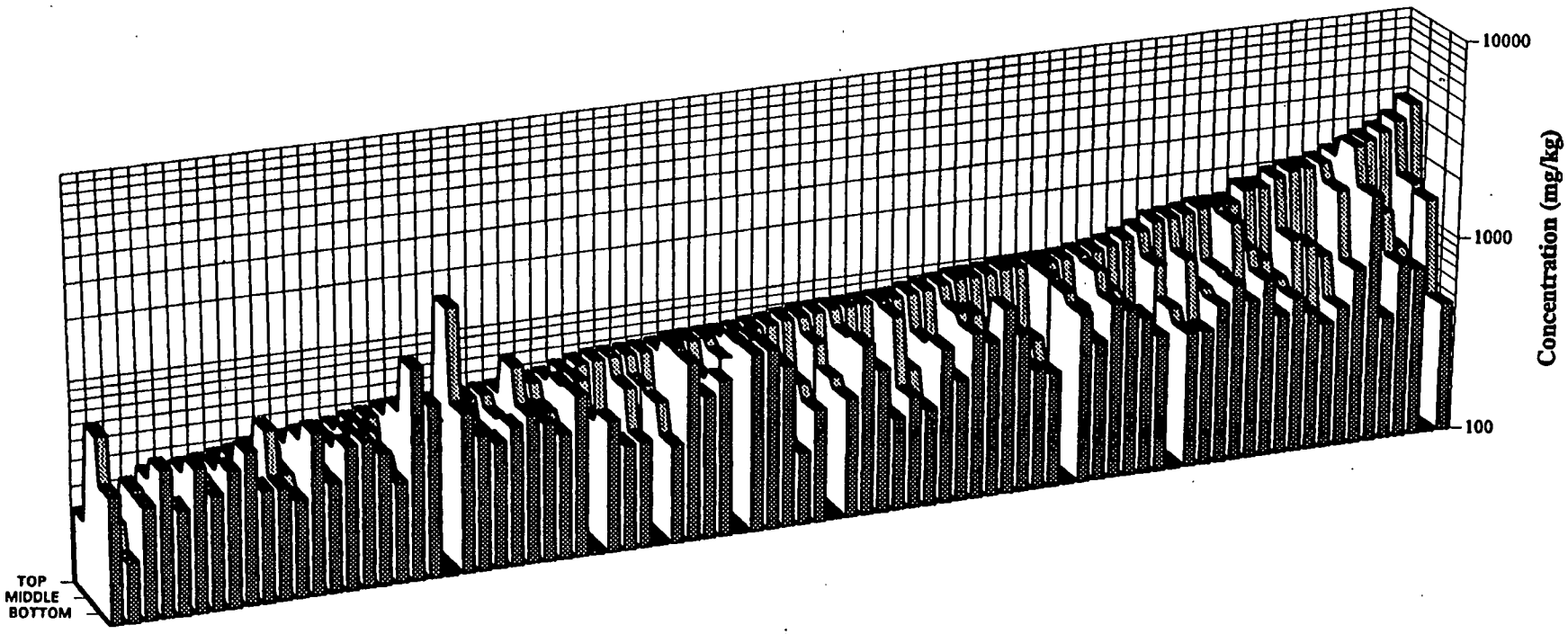

FIGURE A.III-40
SODIUM CONCENTRATION VERSUS DEPTH

000841

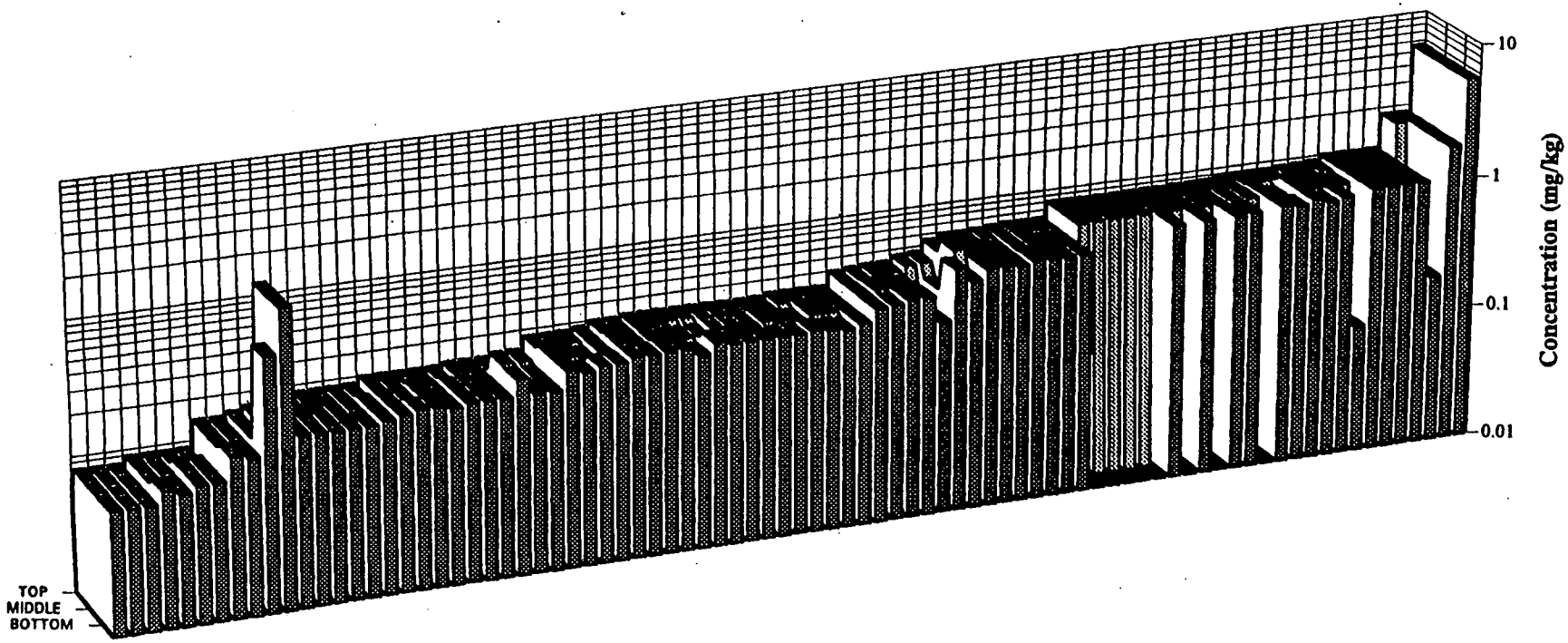

FIGURE A.III-41
THALLIUM CONCENTRATION VERSUS DEPTH

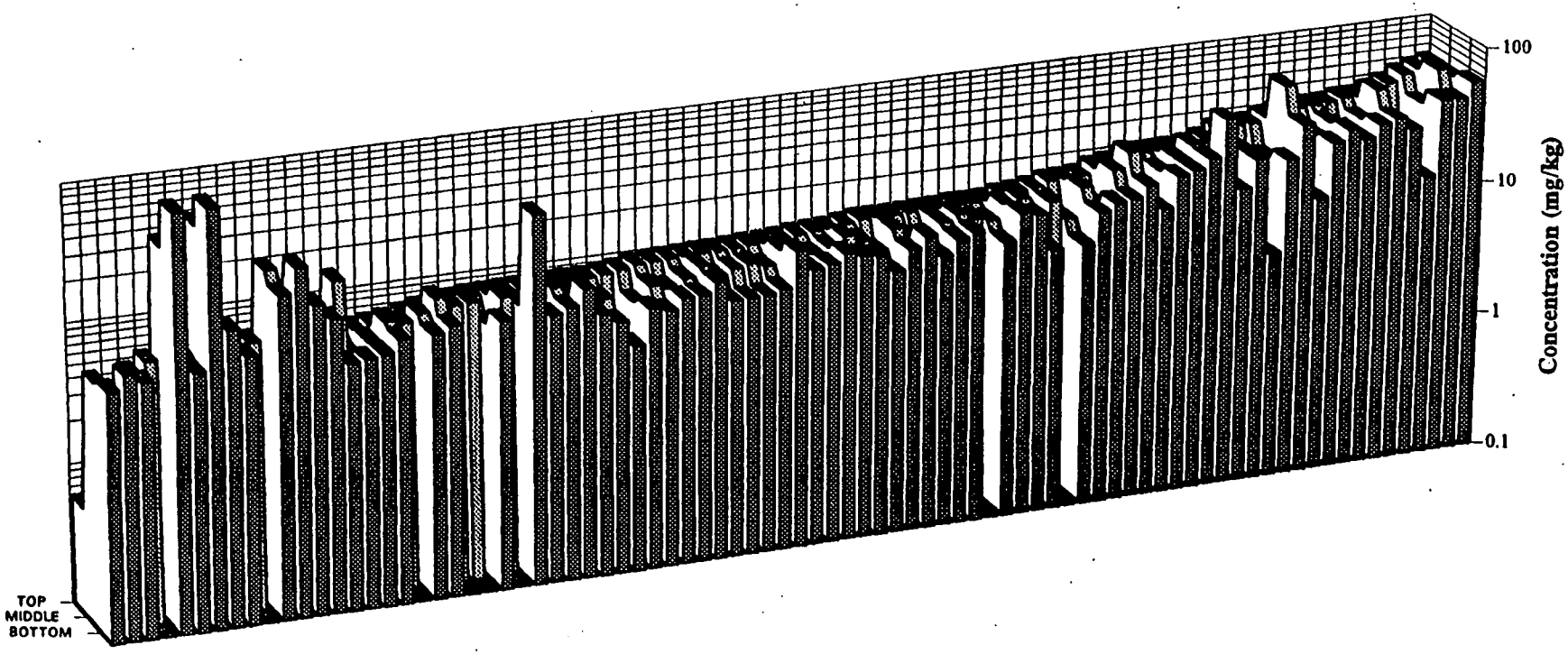

FIGURE A.III-42
VANADIUM CONCENTRATION VERSUS DEPTH

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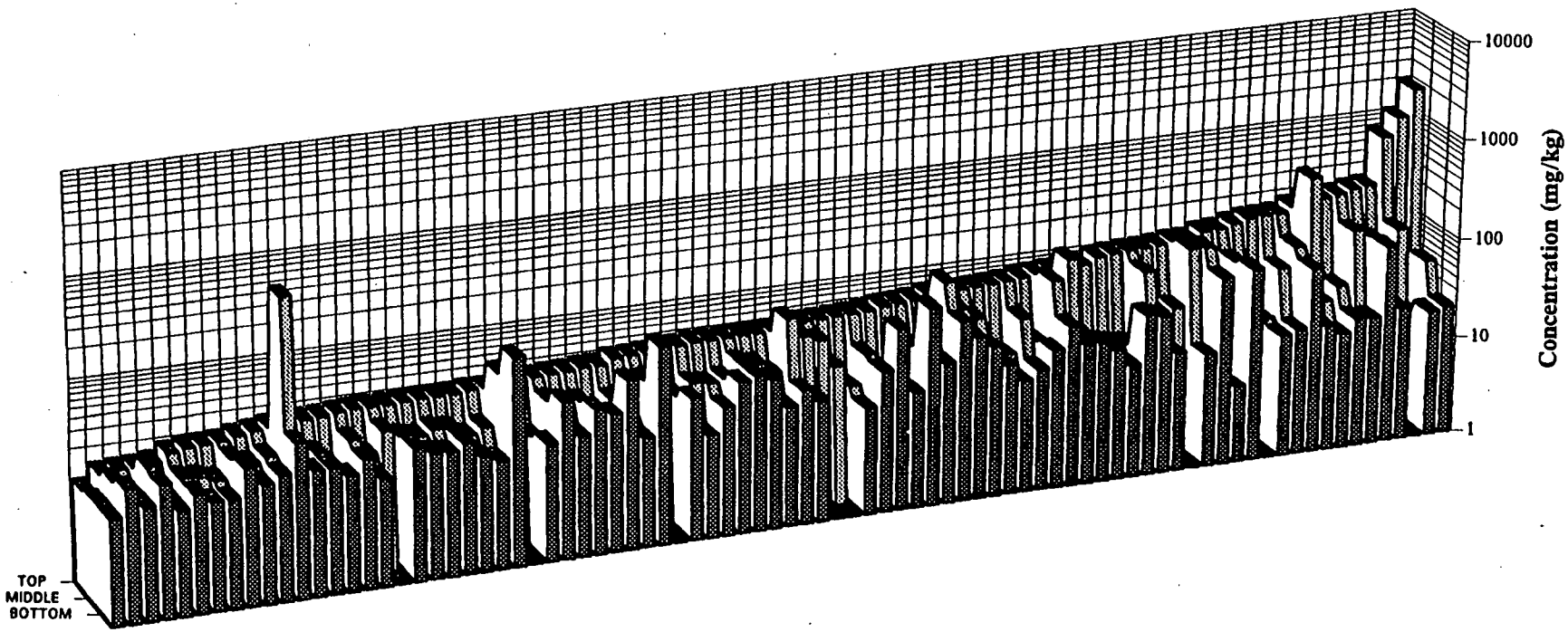

FIGURE A.III-43
ZINC CONCENTRATION VERSUS DEPTH

A.IV

ATTACHMENT A.IV
SUMMARY OF CONTAMINATION BY COMPONENT

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A.IV SUMMARY OF CONTAMINATION BY COMPONENT

Components were classified into eleven categories by level of surface radiological contamination based on the criteria and guidelines described in Tables 2.3 and 2.4 of the CRU3 WPA. The components within each category and the associated contaminants by media type are described in the following sections. Radiological contamination is described first followed by chemical contamination.

Much of the data results were rejected for radiological analysis. Therefore, if an analyte is not mentioned in the description of the component, it is assumed that those results are rejected. If an analyte is not mentioned in the component description it is either a non-detected or a rejected result.

A.IV.1 Administrative and Support Buildings

Administrative and support buildings were determined by the criteria referenced above to contain no significant levels of radiological contamination. Based on this information, sampling activities were confirmatory in nature and limited in scope.

A.IV.1.1 NAR Control House (3C)

The Nitric Acid Recovery Building (NAR) is a single story building located just north of 101st Street and west of the Maintenance Building (3A). The building is rectangular. The NAR Control House is constructed with a structural steel frame and transite panels on a poured concrete base. Electrical control panels for the nitric acid recovery system (3D), a conference room, offices, and a restroom are present in this building. No process activities occurred within this building, however, this building serves as the radiological control point for entry into the NAR Towers and Drum Storage Building (72) areas. Routine surveys for removable alpha contamination and total beta-gamma contamination are conducted in this building to identify any "hot spots" which may be present. There are no anticipated contaminants for this component.

From this component, one concrete chip sample and two steel coatings samples were collected.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, and strontium-90) were detected. For six of the detected radioactive constituents (technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 6.8, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, plutonium-238, plutonium-241, and strontium-90) were detected. For six of the detected radioactive constituents (technetium-99, thorium-227, thorium-230, elemental uranium, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 31, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 16 of the 22 inorganics for which analyses were performed were detected. Not detected are antimony, cadmium, cobalt, mercury, silver, and thallium. The concentrations of 7 detected analytes (arsenic, barium, chromium, copper, lead, iron, and nickel) exceeded OU3 baseline values. The most significant of these was lead, which exceeded the concrete baseline by a factor of 23. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 18 of the 22 inorganics for which analyses were performed were detected. Not detected are antimony, beryllium, thallium, and vanadium. Chromium and lead were greater than 20 times their respective TCLP limits.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination..

A.IV.1.2 Service Building (11)

Service Building (11) is a two-story, rectangular structure consisting of cinder block construction on reinforced poured concrete footers, with reinforced concrete floors, glass windows, and a flat reinforced concrete roof. Numerous floor drains are throughout the building. Building 11 includes five process areas: the FEMP cafeteria and kitchen, locker rooms, maintenance department offices, laundry facilities, and the pistol range. Only the laundry facility is considered a wet process. Intrusive samples were taken from all five process areas.

Laundry

Since being refurbished and enlarged in 1987, this process area provides cleaning services for on-property process clothing using washers, dryers, and dry cleaning equipment. Historically, the laundry also serviced articles from off-site operations. Before entry into the process area, clothes are

monitored to ensure that all articles are radiologically clean. Tetrachloroethylene was used in the cleaning process in previous years but has not been used in the operation in several years.

Maintenance

The maintenance shop, located near the southwestern corner of the first floor, handles malfunctions associated with laundry facilities and provides storage for small items used for any maintenance or repair work on the administrative side of the FEMP. Service fluids are stored in one area of the maintenance office. Although this storage area has a concrete floor, it does not have a dike or any other form of containment. Very little work on equipment is done within the room itself; any equipment must be radiologically clean upon entry.

Locker Rooms

Changing rooms are located on most of the first floor. Separate rooms are available according to sex, employment status (visitor or permanent employee), and radiological contamination. This area provides lockers and shower facilities. Numerous drainage pipes carry wastewater to the laundry sump. Like the laundry area, these facilities were refurbished and enlarged in 1987.

Cafeteria/Kitchen

The kitchen and cafeteria provided lunchroom service for FEMP employees and subcontractors. Its services stopped in September 1993. Now this area is used mainly as a break area.

Pistol Range

The pistol range is located next to the west hallway on the first floor of the Services Building. Access can be gained from the fitness room. This area was used for target practice by security personnel when the site was in operation.

Anticipated contaminants include uranium, trichloroethylene, perchloroethylene, lead, magnesium, vinyl chloride, and lead.

From this component, three concrete chip samples, four concrete core samples (three depths), and four masonry chip samples. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its

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respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.3, a larger margin than any other radioactive constituent.

Concrete Cores

A total of four concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 1.5, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Masonry Chips

A total of four masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, strontium-90 and technetium-99) were detected. For two of the detected radioactive constituents (lead-210 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chip samples were analyzed for inorganic constituents. Of the 23 inorganic analytes, 17 were detected. Those not detected were antimony, cobalt, potassium, selenium, silver, and thallium. The maximum of the validated data exceeded the respective OU3 concrete baselines for

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13 of the analytes. The most significant was lead, exceeding the baseline by a factor of 190. One sample from the pistol range exceeded 20 times the TCLP limit for lead (greater than 100 mg/kg).

Concrete Cores

A total of four samples at the 0 - 1/2 inch level were analyzed for inorganic constituents. Of the 23 inorganic constituents, 19 were detected. Those not detected were antimony, beryllium, mercury, and thallium. The maximum of the validated results exceeded the respective OU3 concrete baselines for eight of the analytes. The most significant was selenium, exceeding the baseline by a factor of 16. There were no detections at greater than 20 times TCLP limits.

A total of three samples at the 1/2 - 1 inch level were analyzed for inorganic constituents. Of the 23 inorganic constituents, 19 were detected. Those not detected were antimony, beryllium, mercury, and thallium. The maximum of the validated results exceeded the respective OU3 concrete baselines for 11 of the analytes. The most significant was selenium, exceeding the baseline by a factor of 9.8. There were no detections at greater than 20 times the TCLP limits.

A total of three samples at the 1 - 4 inch level were analyzed for inorganic constituents. Of the 23 inorganic constituents, 18 were detected. Those not detected were antimony, beryllium, lead, mercury, and thallium. the maximum of the validated results exceeded the respective OU3 concrete baselines for six of the analytes. The most significant was silver, exceeding the baseline by a factor of 1.7. There were no detections at greater than 20 times the TCLP limits.

Masonry Chips

A total of four masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, selenium, silver, and thallium) were detected. For nine (barium, cadmium, chromium, cobalt, lead, mercury, potassium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 77. The concentration of cadmium in one sample from the cafeteria/kitchen area exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.1.3 Administration Building (14A)

The Administration Building (14A) is an irregularly shaped, two-level structure located south of the Service Building (Building 11) and the 10-Plex Trailer Complex. The Administration Building is constructed of cinder block walls supported on reinforced concrete footers with concrete floors. The

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building consists of a central hallway with east and west wings, with a partial basement under the west wing.

The Administration Building houses the main offices for site management, the main mailroom, central reproduction and drafting, central computing, file storage, and the Emergency Operations Center (EOC). The building is also equipped with several restrooms/locker rooms. There are no anticipated contaminants.

Two concrete chip sample and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For five of the detected radioactive constituents (americium-241, technetium-99, elemental uranium, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 6.1, a larger margin than any other radioactive constituent.

Masonry Chips

A total of one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, strontium-90, and technetium-99) were detected. For two of the detected radioactive constituents (lead-210 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (sodium and potassium) exceeded OU3 concrete baseline values. The most significant of these was sodium which exceeded the concrete baseline by a factor of 7.2. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

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Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For four (cobalt, lead, potassium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 15. The concentration of inorganics in the sample from this component did not exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.1.4 Security Building (28A)

The Security Building (28A) is an irregularly shaped, single-level structure located south of the Health and Safety Building (53A). The building is constructed of cinder block walls supported on reinforced concrete footers with poured concrete floors. The Security Building includes a turnstile area that separates it from the Human Resources Building (28B).

The Security Building is the headquarters for on-property security. The building is equipped with several security offices, a communications center, and a classified document vault. Security turnstiles staffed by security personnel and located between the Security Building and the Human Resources Building (28B) are the main access to the site. A site truck entrance is located immediately east of the Security Building, and this site access is also controlled by security personnel. There are no anticipated contaminants.

One concrete chip sample and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (polonium-210), the maximum concentration of each exceeded its respective concrete baseline value. Polonium-210 exceeded its baseline concentration by a factor of 5.7, a larger margin than any other radioactive constituent.

Masonry Chip

One masonry chip sample was collected from the top half inch of masonry surface. Strontium-90 and elemental uranium were both reported at levels at or below background levels. No activities of isotopic uranium are available for comparison of enrichment status or for verification of the measurement of elemental uranium. Cesium-137 and technetium-99 were not detected.

Summary of Inorganic Contamination

Concrete Chips

One concrete chip sample was analyzed for inorganic constituents. Of the 23 inorganic analytes, 17 were detected. Those not detected were antimony, cadmium, mercury, selenium, silver, and thallium. The maximum of the validated results exceeded the OU3 concrete baselines for 13 analytes. The most significant was copper, exceeding its baseline by a factor of 15.2. There were no detections in this sample for greater than 20 times the TCLP limits.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, mercury, selenium, silver, and thallium) were detected. For seven (barium, cadmium, chromium, cobalt, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, cadmium was the most significant, exceeding the concrete baseline by a factor of 4.9. The concentration of inorganics in the sample from this component did not exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.1.5 Human Resources Building (28B)

Human Resources (28B) is a single-story building located adjacent to and west of the Security Building. The building is irregularly shaped and is constructed from a combination of concrete and cinder blocks. This building provides office space for human resources employees and for the DOE Inspector General. Several services for the facility's employees were conducted in this building.

Based on process knowledge, there is no anticipated contamination associated with the building. Furthermore, since there is little or no evidence of contamination and since the building is outside of radiologically contaminated areas, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 351 dpm/100 cm^2 (beta-gamma), well below the

sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 20 dpm/100 m^2 (alpha), well below the sampling criteria of 1000 dpm/100 m^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.6 Guard Post on South End of D St. (28C)

The Guard Post on the South End of D Street (28C) has recently been removed as part of Operations and Maintenance activities; therefore, no sampling was conducted. Baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.7 Guard Post East of T-81 (28E)

The Guard Post East of T-81 (28E) is a small building located west of the Parking Lot (89). This guard post is occupied by security guards, who use the building as a checkpoint area to provide access control to the western side of the FEMP Administration.

The Guard Post East of T-81 was not considered in the RI/FS WPA, since it was under construction at the time of writing. Since no intrusive samples were collected at the guard post and it is not expected to have elevated levels of contamination, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.8 Skeet Range Building (28F)

The Skeet Range Building (originally building 90), which is located along the south side of the Waste Treatment Plant Access Road, is a single-story structure consisting of a steel frame with metal siding and roofing. The Skeet Range Building was used to support skeet range activities (i.e., storing clay pigeons and pigeon-launching equipment). The only anticipated contaminant is lead.

An inspection indicated no visible chemical contamination. Furthermore, the facility is located outside of radiologically controlled areas and is of insignificant size (approximately 15 ft square and 9 feet high). Therefore, no intrusive samples were taken from this component, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.9 Guard Post South of Building 51 (28G)

The Guard Post South of Building 51 (28G) is located south of Building 51 (28G). This component was used briefly as a security checkpoint to provide access control to Building 45A. The need for this checkpoint was removed with the construction of the new western expansion parking lot west of Building 45A. This guard post was relocated to the northeast corner of the expansion parking lot.

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The Guard Post South of Building 51 was not considered in the RI/FS WPA, since it was under construction at the time of writing. This component is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.10 Rust Engineering Building (45A)

The Rust Engineering Building (45A) is a single-story, rectangular building consisting of a structural steel frame with corrugated metal siding and a concrete base and floor. The building was used to develop techniques, machines, and machining tools for the machining of uranium and thorium. The facility also housed an experimental rolling mill in the south bay and induction heat treating equipment in the center bay. Potential contaminants related to the machining operation include uranium metal, uranium carbide, ammonium sulfate, U_3O_8, and oil. In 1988, the building was thoroughly decontaminated and converted into office space. Currently, the building contains offices and stores small tools and equipment. Potential contaminants for this component include: uranium metal, uranium carbide, ammonium sulfate, U_3O_8, and oil.

One concrete chip sample and two steel coatings samples were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (lead-210, neptunium-237, plutonium-241, and thorium-228) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 41, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-226, radium-228, strontium-90, technetium-99, and thorium-228) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

One concrete chip was taken from the top half inch of concrete. Of the 23 inorganic analytes, 10 were detected. This includes aluminum, arsenic, barium, calcium, iron, lead, magnesium, manganese, silver, and zinc. The maximum results from 4 of (barium, lead, silver, and zinc) were greater than the respective concrete baselines. The most significant of these was zinc, which exceeded the baseline by a factor of 17. No concentrations of any of these inorganic were greater than 20 times the respective TCLP limits.

Steel Coatings

One steel coatings sample was collected for analyses of inorganic constituents. Of the 23 inorganic analytes, 11 (arsenic, barium, cadmium, calcium, chromium, cobalt, iron, lead, manganese, mercury, and zinc) were detected. The maximum of the validated results exceeded the OU3 paint baseline for two analytes. The most significant was barium, exceeding the baseline by a factor of 1.4. Barium, chromium, and lead concentrations were detected at greater than 20 times the respective TCLP limits.

Supplemental Media

One air filter was collected from the HVAC system and analyzed for inorganic constituents. Fourteen of the 23 inorganic constituents for which analysis was performed were detected. These were aluminum, arsenic, cadmium, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, and zinc. Chromium was the only inorganic detected that exceeded 20 times the TCLP limit (i.e., greater than 100 mg/kg), with a concentration of 200 mg/kg.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.1.11 Health & Safety Building (53A)

The Health and Safety Building (53A) is a multilevel, rectangular building with two floors and a partial basement under the west section. The building consists of cinder block construction on reinforced concrete footers and floors, flat reinforced concrete roofs, and glass windows.

The Health & Safety Building currently contains three process areas: 1) medical services, 2) offices, and 3) site security communication headquarters. Offices and conference rooms exist on both the first and second floors. The medical services area of the building houses equipment for emergency medical attention, routine examination and testing, X-ray testing, a medical laboratory, and offices. Site security uses much of the basement floor as a communication headquarters. Potential contaminants relating to medical service's operations include mercury and silver.

From this component, one concrete chip was collected.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, uranium-234, uranium-235/236, and uranium-238) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chip

One concrete chip sample was collected for analyses of inorganic constituents. Of the 23 inorganic analytes, 15 were detected. Those not detected were antimony, cadmium, cobalt, copper, mercury, potassium, selenium, silver, and thallium. The maximum validated results from 3 of the analytes were greater than the respective OU3 concrete baselines. The most significant of these was nickel, which exceeded the baseline by a factor of 2.7. No concentrations of any inorganic were greater than 20 times the respective TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.1.12 In-Vivo Building (53B)

The In-Vivo Building (53B) is located on the south side of the Health and Safety Building (53A). The In-Vivo Building consists of a cement block wall and concrete floor. The building is a radiologically shielded structure housing highly sensitive radiation detection equipment. A tank of liquid nitrogen is located directly west of the building. The In-Vivo Building is used to obtain internal radiation measurements of site employees. The only anticipated contaminant is germanium.

Since an inspection indicated no visible chemical contamination and the facility is outside of radiologically controlled areas, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 114 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.13 Fire Brigade Training Center Building (73A)

Final demolition of the Fire Training Center Building (73A) occurred in September 1994 as part of Removal Action 28. (For a complete list and description of Removal Actions, see Table 1-2.) The building was a multilevel structure located near the northern boundary of the FEMP site, along B Street. The building consisted of cinder blocks, a poured concrete base and floor, and a reinforced, poured concrete roof. The Fire Brigade Training Center Building was used for training fire brigade members. Materials such as straw, wood, and tires were burned to create "hot" and "smoky" situations for use during training. Anticipated contaminants include uranium and waste solvents and oils used to start fires.

The Fire Training Facility, which consists of Components 73A, 73B, 73C, 73D, and 73E, was considered one HWMU. It is inactive and is considered a HWMU because it is reported to have handled various solvents (EPA waste codes F001, F002, and F005); lead; benzene; carbon tetrachloride; and 1,1-dichloroethylene. The facility will be closed through CERCLA response. Metal, construction debris, sludge, and soils are the materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Because it was outside of radiologically controlled areas and the suspected contaminants were not highly toxic and were anticipated in only trace amounts, no intrusive samples were planned for the component. Before demolition, a survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1935 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 445 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.14 Skeet Range Building (90)

See writeup under "Skeet Range Building (28F) above.

A.IV.1.15 Process Trailers (G-006)

The Process Trailers (G-006) are temporary office and storage space used by site employees and subcontractors. The trailers contain office equipment such as desks, computers, file cabinets, etc., or they contain construction equipment such as miscellaneous tools, personal protective equipment, cleaning supplies, sampling equipment, etc. The quantity of trailers varies significantly over time, and most trailers are linked through multiplex units.

Because there are no known contaminants and little or no evidence of contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface

contamination of 1143 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 270 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.1.16 Non-process Trailers (G-007)

The Non-Process Trailers (G-007) are mobile, temporary office space for site employees and subcontractors. The trailers contain office equipment, such as desks, computers, and file cabinets. The quantity of trailers varies significantly over time, and most trailers are linked through multiplex units.

Because there are no known contaminants and all trailers are located outside of radiologically controlled areas, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of more than 490 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 37 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2 Warehouse and Storage Buildings

This component category includes 34 structures used to store containerized waste materials. These structures act as secondary containment for the waste, and any contamination results from leakage from the waste containers.

The following sections detail the results of analyses of samples collected from the Warehouse and Storage Buildings.

A.IV.2.1 Plant 1 Storage Shelter (1B)

The Plant 1 Storage Shelter (1B), an 18-foot-high, steel roof structure that covers a portion of the Plant 1 Pad (74T), is located just north of the Preparation Plant (1A). Potential contaminants included those associated with ores and ore concentrates; those associated with uncharacterized, low-level, radioactive and RCRA drummed wastes; 1,1,1-trichloroethane; trichloroethylene; perchloroethylene; copper; and asbestos.

There was little or no visual evidence of contamination, and contamination was not expected to exceed the sampling criteria contained in the OU3 RI/FS WPA. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of

1875 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 56 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, intrusive samples were not taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.2 Plant 4 Warehouse (4B)

The Plant 4 Warehouse (4B) is a single-level warehouse (60 ft x 202 ft x 13 ft high) located east of the Plant 4 Maintenance Building (4C) along C Street. The Plant 4 Warehouse is a pre-engineered structure consisting of a structural steel frame with steel siding panels and sloped steel-roof panels. The building is supported on a reinforced concrete base. The Plant 4 Warehouse was used for the covered storage of uranium tetrafluoride (UF_4), which was used in Plant 4 and Pilot Plant operations for conversion of uranium hexafluoride (UF_6) to (UF_4). Anticipated contaminants included UF_4 and uranium trioxide (UO_3).

Contamination was not expected to exceed the sampling criteria contained in the WPA. Therefore, no intrusive samples were planned for the component. A survey was planned to confirm the absence of significant radiological surface contamination. However, background readings in the Plant 4 Warehouse were too high and the survey could not be completed. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.3 Plant 5 Filter Building (5E)

Plant 5 Filter Building (5E) is an unused facility located directly adjacent to the west side of the Metals Production Plant (5A) and directly south of Plant 5 Ingot Pickling (5B). The single-story Plant 5 Filter Building (54 ft x 70 ft x 22 ft high) was originally constructed to house dust collection equipment expected from the renovation of the Metals Fabrication Plant. The equipment inside the filter building ranges from storage containers of miscellaneous items (i.e. laundry, lithium carbonate, magnesium oxide, and clay products) to excess dust collecting equipment. Currently, the component is being used for storage of miscellaneous equipment. A visual inspection of the facility indicated that half of the building was designated as a radiologically controlled area. Several large pieces of process machinery were located in the controlled area. No visible signs of chemical contamination were present. There were no anticipated contaminants.

One concrete chip sample was collected from this component. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, plutonium-239/240, and thorium-232) were detected. For seven of the detected radioactive constituents (lead-210, plutonium-238, radium-228, technetium-99, elemental uranium, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 3.4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chip

In the concrete chip sample, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of 9 detected (aluminum, chromium, copper, lead, manganese, potassium, sodium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 2.2. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.2.4 Plant 5 Covered Storage Pad (5F)

The Plant 5 Covered Storage Pad (5F), which is located on the northwest corner of the Metals Production Plant (5A), is a structural steel construction with a steel roof. The Plant 5 Pad was originally an earthen, uncovered storage area. A concrete pad was poured and the steel structure installed to cover the pad. Several utility lines run through the storage pad on the north side and run east and west. These lines include insulated steam and process piping. This installation currently stores drummed uranium residue waste. The only anticipated contaminant for the storage pad was uranium.

Since an inspection indicated no visible chemical contamination and the results of radiological surveys did not exceed sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was planned to confirm the absence of significant radiological surface contamination. However, background readings on the pad were too high, and the survey could not be completed. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.5 Plant 5 Ingot Storage Shelter (5G)

Plant 5 Ingot Storage Shelter (5G) is a single-story building located east of Plant 5. The building covers a storage pad east of Plant 5 and consists of a structural steel frame with no sides and a metal roof on a reinforced concrete base. The Plant 5 Shelter is only used for temporary storage of Plant 5 metal products (ingots and derbies), feed stock (scrap and briquettes), and excess materials. The only anticipated contaminant is uranium (depleted) from storage areas.

One concrete chip and one steel coatings sample was collected from this component. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, plutonium-241, and radium-228) were detected. For seven of the detected radioactive constituents (neptunium-237, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 50, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

One concrete chip sample and one field duplicate were taken from the top half inch of concrete. For these samples, detections were reported for 18 of the 23 inorganic analytes. Those not detected were cobalt, mercury, silver, selenium, and vanadium. The maximum of the validated results exceeded the OU3 concrete baseline for 10 of the inorganic analytes. The most significant was zinc, which exceeded the baseline by a factor of 18.7. The average of the validated results exceeded the baseline for seven of the analytes. The most significant was zinc, which exceeded the baseline by a factor of 15.5. There were no detections for 20 times TCLP.

Steel Coating

For the steel coating sample, 16 of the 23 inorganic analytes were detected. Those not detected were arsenic, beryllium, mercury, selenium, silver, thallium and vanadium. The maximum of the validated results exceeded the OU3 paint baseline for five of the inorganic analytes. The most significant was barium, exceeding the baseline by a factor of 2.4. Three analytes were detected at 20 times TCLP, barium (200 mg/kg), chromium (100 mg/kg), and lead (100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.6 Plant 6 Covered Storage Area (6B)

Plant 6 covered storage area (6B) is a rectangular, single-story building (42 ft x 60 ft x 12 ft high) located east of Plant 6. The Plant 6 Covered Storage Area covers a storage pad east of the Metals Fabrication Plant (6A) and consists of a structural steel frame with no sides and a metal roof on a reinforced concrete base. The Plant 6 Covered Storage Area was used to store drummed uranium chips, turnings, briquettes, and residues for processing in the Metals Fabrication Plant or shipment to the Recovery Plant (8A). Currently, construction wastes are being stored in the area in metal shipping containers. Potential contaminants relating to storage on the east side of the area include uranium metal as well as low- and high- grade residues.

From this component, one concrete chip sample, one steel coating sample, and one unknown liquid sample were collected form this component. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For four of the detected radioactive constituents (cesium-137, lead-210, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 93, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, strontium-90, thorium-228, thorium-230, and thorium-232) were detected.

Summary of Inorganic Contamination

Concrete Chip

In the concrete chip sample, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of five detected (arsenic, barium, copper, lead, and zinc) exceeded OU3

concrete baseline values. The most significant of these was zinc which exceeded the concrete baseline by a factor of 15. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coating

In steel coatings, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of four detected (aluminum, barium, magnesium, and manganese) exceeded paint baseline values. The most significant of these was barium concrete baseline by a factor of 3.7. The concentrations of three inorganics (barium, chromium, and lead) exceeded 20 times the limit. The most significant being lead by a factor of 130.

Supplemental Media

One unknown liquid sample collected was analyzed for inorganic constituents. For this sample, seven of the 23 inorganic analytes were detected. Those detected were barium, calcium, iron, manganese, potassium, sodium, and zinc. There were no detections for 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

The one unknown liquid sample was analyzed for semivolatile constituents. For this sample, one detection was reported out of the 66 semivolatile organic analytes. The detection was for phenol. This detection did not exceed 20 times the TCLP limit.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

The one unknown liquid sample was analyzed for volatile organic constituents. There were no detections reported.

Summary of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCB contamination.

A.IV.2.7 Plant 7 (7A)

Final demolition of Plant 7 (7A) occurred in September 1994 as part of Removal Action No. 19. (For a complete list and description of Removal Actions, Table 1-2.) Plant 7 was an irregularly shaped

building. The building consisted of a poured concrete base and a structural steel frame covered with transite siding and roofing panels. It consisted of seven floors (concrete and diamond plate steel grating) with a two-story annex extending on the southwestern side and a small penthouse above the top floor.

The processes that occurred in Plant 7 were designed to convert uranium hexafluoride (UF_6) into uranium tetrafluoride (UF_4) using a gas-gas reaction with hydrogen. The plant was shut down in 1956, and the process equipment was removed in the early 1970s.

UF6 to UF4

From autoclaves on the west side of the Plant 7 location, UF_6 cylinders were heated to sublime UF_6 for processing in the building processes. The gas was contacted with hydrogen gas in the six to four reactor tubes to produce UF_4 and hydrogen fluoride (HF) gas. The HF was fed to the HF recovery system, and the UF_4 was processed through the UF_4 packaging systems. The process ceased operation in 1956. UF_4 packaging operations in Plant 7 reportedly continued through the late 1950s. This was the only portion of the six to four process that operated past 1956. The HF recovery system received HF vapors from the process and condensed and scrubbed the vapors to recover anhydrous HF (AHF) and dilute HF (DHF), respectively. This process also ceased operation in 1956.

HF Recovery System

Hydrogen fluoride (HF) gas was produced as a by-product from the UF_6 to UF_4 reduction process by contacting UF_6 gas with hydrogen gas. The HF gas was fed to the HF recovery system on the fifth floor of Plant 7, and the UF_4 was processed through the UF_4 packaging systems. After receiving HF vapors from the reduction process, the HF recovery system condensed and scrubbed the vapors to recover anhydrous HF (AHF) and dilute HF (DHF), respectively. The reduction and HF recovery processes ceased operation in 1956.

Nitrogen Generator

The Plant 7 nitrogen (N_2) generator was operated until 1967 to supplement N_2 gas production for operations in the Green Salt Plant. This process was discontinued following a hydrogen explosion and pipeline release at Plant 7 in early 1967.

Storage

Since the shutdown of the plant and before its demolition, the facility had been used for various storage activities. In mid-1968, most of the remaining Plant 7 process and support equipment was sold as salvage to a vendor and removed from the plant site.

Because plans for demolition had begun for Plant 7, no intrusive samples were scheduled. Baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.8 Cylinder Storage Building (12B)

The Cylinder Storage Building (12B) is a single-story structure located directly north of the Main Maintenance Building (12A). The structure consists of an exterior loading and staging platform and an interior storage area. Access to the inner storage area was restricted, since both routes of entry were locked. The Cylinder Storage Building stored pressurized cylinders containing such gases as argon and chlorine, which were required for on-property processes. There were no anticipated contaminants associated with the Cylinder Storage Building.

Since an inspection indicated no visible chemical contamination and the results of radiological surveys were below the sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 4079 dpm/100 cm^2 (beta-gamma), below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 400 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.9 Lumber Storage Building (12C)

Lumber Storage Building (12C) is a single story structure located directly north of the Main Maintenance Building (12A). This building has concrete flooring and steel framing, roofing, and siding. The east and south walls of the structure consist of chainlink fencing. This facility was used to store lumber and plywood sheets used for on-property construction projects. Small motors and miscellaneous construction materials also were stored in the structure. There were no anticipated contaminants for the component. Since preliminary radiological surveys indicated no exceedance of the sampling criteria contained in the WPA and an inspection revealed no visible chemical contamination present, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicated an average total surface contamination of 8953 dpm/100 cm^2 (beta-gamma), well above the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 46 dpm/100 cm^2 (beta-gamma and alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Because the total surface contamination was higher than the sampling criteria, an intrusive sample was taken.

From this component, one concrete chip sample was collected. The following is a description of contamination.

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Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99, and thorium-230) were detected. For six of the detected radioactive constituents (thorium-228, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 39, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chip

for the concrete sample, 14 of the 23 inorganics for which analyses were performed were detected. The concentrations of nine detected (aluminum, arsenic, barium, calcium, lead, manganese, potassium, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was zinc which exceeded the concrete baseline by a factor of 31. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.2.10 Maintenance Building Warehouse (12D)

The Maintenance Building Warehouse (12D) is located north of the Building 12 North Pad (74N). This component was designed and installed as a warehouse but has been used for several years to house, clean, and distribute portable, high-efficiency particulate air (HEPA) vacuums.

The Maintenance Building Warehouse was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.11 Laboratory Chemical Storage Building (15B)

The Laboratory Chemical Storage Building (15B) is located between the Laboratory (15A) and the Pilot Plant Shelter (54B). This component houses stored chemicals used in the Laboratory (15A).

The Laboratory Chemical Storage Building was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination,

therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.12 Chemical Warehouse (30A)

The Chemical Warehouse (30A) is a single-level structure north of the Ore Refinery Plant (2A) at the northwestern corner of the intersection of 2nd Street and B Street. The building is constructed of a structural steel frame supported on a reinforced, poured concrete base with a reinforced concrete floor and transite siding panels and roof. It is equipped with two loading docks.

The Chemical Warehouse was originally constructed as a warehouse and is currently operated by Site Services. The building stores operating supplies used at the FEMP. The warehouse has been divided into three process areas: process area 1 - northern restricted access area, process area 2 - southern unrestricted access area, and process area 3 - loading docks. No floor sumps were visible during the inspection although in some areas the concrete floor joints were cracked and stained. Areas of the west loading dock were discolored with "rusty" stains.

Northern Restricted Access Portion

The northern portion of the Chemical Warehouse is a restricted access area used to access the Plant 1 Pad (74T) and to store operating supplies (i.e. herculite, supplies for white metal boxes, paper towels, polyvinyl chloride [PVC] piping and fittings, storage cabinets, and absorbent materials) used routinely in and around the Plant 1 Pad. An access control point and steel cage/gate separate the restricted northern portion from the unrestricted southern portion of the Chemical Warehouse. A small office area, constructed mainly of cinder block, and an X-ray room are located in the northeastern corner of the building within the restricted access area. The X-ray machine will eventually be used for examining bundled process area trash prepared for off-site shipment.

During the winter of 1990, the northeastern corner of the Chemical Warehouse was used mainly for three activities: visual inspection of drums for Resource Conservation and Recovery Act (RCRA) determination, drum reconditioning (i.e. scraping rust, painting, and labeling), and over-packing low-level waste. During a 1992 inspection, the Site Services staff indicated that 1) drums did not remain in the building for more than 24 to 48 hours; 2) once reconditioning was complete, drums were returned to the appropriate storage facility; 3) no drum sampling was conducted; and 4) no spills occurred during the drum activities. After completion of the drum reconditioning activities, the northeastern corner of the building was cleaned (i.e. removal of trash and paint supplies) to make room for the X-ray machine and ancillary equipment.

Southern Unrestricted Access Portion

A large storage area and restrooms are located in the unrestricted southern portion of the building. The storage area stores operating supplies that are currently used on the FEMP site and excess materials (i.e. materials that have been sold or are on the market for sale). A wide variety of

operating supplies and excesses materials are stored in the southern portion of the Chemical Warehouse, including lime, Poly-Floc, aluminum sulfate, dicalite, caustic soda, rock salt, disodium phosphate, sweeping compound, silica sand, graphite, barium carbonate, lithium carbonate, heat treatment salts, and zirconium.

Loading Docks

The Chemical Warehouse is equipped with two loading docks. The first is located along the outside southwest wall of the Chemical Warehouse and stored T-Hoppers as recently as August 1992. The second loading dock is located along the outside east wall of the building and is storing white metal boxes filled with construction-related waste and unused furnace pots that were intended for use in derby production.

Several blue Sea/land boxes are located on gravel south of the Chemical Warehouse. These Sea/land boxes were empty according to the August 1992 inspection but are currently used to store dicalite and lime.

The anticipated contaminants for the Chemical Warehouse include paint, lime (calcium oxide [CaO]), magnesium oxide (MgO), diatomaceous earth (primarily silicone dioxide [SiO_2]), lithium carbonate ($LiCO_3$), and potassium carbonate (KCO_3).

From the chemical warehouse component, three concrete chip samples and two steel coatings samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-241, and strontium-90) were detected. For eight of the detected radioactive constituents (cesium-137, lead-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 34, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip samples, 17 of the 23 inorganic analytes were detected. Those not detected were antimony, beryllium, cadmium, mercury, silver, and thallium. The maximum of the validated results for 10 of the detected analytes exceeded the OU3 concrete baseline value. The most

significant was selenium, exceeding the value by a factor of 7.7. The average of the validated results for 8 of the detected analytes exceeded the baseline. The most significant was potassium, exceeding the baseline by a factor of 2.2. All concentrations of detected analytes were below 20 times the TCLP limit.

Steel Coatings

For the steel coatings samples, 18 of the 23 inorganic analytes were detected. Those not detected were beryllium, selenium, silver, thallium, and vanadium. The maximum of the validated results for six of the detected analytes exceeded the OU3 paint baseline value. The most significant was antimony, exceeding the baseline by a factor of 2.1. The average of the validated results for five of the detected analytes exceeded the baseline value. The most significant was antimony, exceeding the baseline by a factor of 1.6. Three detected analytes exceeded their 20 times TCLP limit, cadmium (greater than 20 mg/kg), chromium (greater than 100 mg/kg), and lead (greater than 100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.13 Drum Storage Warehouse (30B)

The Drum Storage Warehouse (30B) is a single-level building (20 ft x 33 ft x 12 ft high) located south of the General In-Process Warehouse (71). It consists of a structural steel frame on a poured concrete base and floor with transite siding and roofing. The Drum Storage Warehouse was formerly used for a truck dock office and scale house. Additionally, it was used for RCRA sampling of drums. Currently, it is a radiological clothing change area. Since there were no anticipated contaminants and since contamination levels were not expected to exceed sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicated an average total surface contamination of 8761 dpm/100 cm^2 (beta-gamma), well above the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 159 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. However, since the concrete floor was covered with Herculite and therefore inaccessible, no intrusive samples were taken. Baseline values were used to estimate the source term associated with the Drum Storage Warehouse.

A.IV.2.14 Magnesium Storage Building (32A)

The Magnesium Storage Building (32A) is located directly northeast of the Plant 9 Warehouse (81). This component consists of a concrete block wall and reinforced concrete floor construction. The Magnesium Storage Building housed drummed or bagged magnesium metal turnings used in the reduction process in the Metals Production Plant (5A). The building is currently being used for storage of excess equipment from the CP Storage Warehouse (56A), including computers, office

furniture, and miscellaneous equipment. Anticipated contaminants are uranium, asbestos, lead, polychlorinated biphenyls (PCBs), diuron, mercury, and magnesium.

Since an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicated an average total surface contamination of 3433 dpm/100 cm^2 (beta-gamma), below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 45 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.15 Building 32 Covered Loading Dock (32B)

The Building 32 Covered Loading Dock (32B) is a single-story shelter. It is rectangular and consists of a structural steel frame on a reinforced poured concrete floor with metal roofing.

The loading dock Is considered one process area. It is a covered railroad loading dock with a ramp for vehicle access. The dock was used for loading and unloading materials, primarily drummed or bagged magnesium metal turnings for use in the Metals Production Plant (5A), which were stored in the Magnesium Storage Building (32A). The anticipated contaminants for the Magnesium Storage Covered Loading Dock include uranium, thorium, and magnesium.

From this component, one concrete chip sample and one steel coating sample were collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of ten concrete chips samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (cesium-137) was detected. Seventeen of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 730, a larger margin than any other radioactive constituent.

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Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 10 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results exceeded the OU3 concrete baseline for only three (potassium, vanadium, and zinc) exceed the OU3 concrete baseline. The most significant of these was zinc, which exceeds the concrete baseline value by a factor of 12. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coating sample, 16 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results of three analytes detected (antinomy, copper, and magnesium) exceed the OU3 paint baseline values. The most significant was copper, which exceeded the baseline by a factor of 3.3. The following analytes were detected at 20 times TCLP: Chromium (greater than 100 mg/kg), lead (greater than 100 mg/kg), and mercury (greater than 4 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.16 Pilot Plant Shelter (54B)

The Pilot Plant Shelter (54B) is a single-level building south of First Street in the northeastern corner of the Pilot Plant complex. The shelter is rectangular and has a steel frame with a reinforced concrete foundation and floor and a metal roof. The shelter has an open south side, combination metal and transite east and west sides (the lower panels are steel while the upper panels in the roof gables are transite), and a steel north wall. The shelter stored Pilot Plant materials and was used to process hydrocarbon materials containing green salt (UF4).

The Pilot Plant Shelter originally provided temporary storage of green salt, which was produced by the reduction process housed in the Six to Four Reduction Facility (54A) and stored other Pilot Plant materials. The shelter also previously housed a heating and centrifuging process designed to remove UF_4 from paraffin. All the paraffin processing equipment has been removed. The shelter is currently used exclusively to store palleted drums that are stacked two-high and contain green salt and freon. It has no sumps or trenches for spill control. Anticipated contaminants for the Pilot Plant Shelter were: UF_4, kerosene, and uranium in the main area, and UF_4, ThF_4, thorium oxalate, and thorium hydroxide in the storage areas.

From this component, one concrete chip sample and one steel coatings sample were collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

For the concrete sample, 16 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results reported six detected analytes (aluminum, chromium, cobalt, lead, potassium, and zinc) which exceeded OU3 concrete baseline values. The most significant of these was lead, which exceeded the concrete baseline by a factor of 2.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 19 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, beryllium, selenium, and thallium. The maximum of the validated results report magnesium as the only analyte exceeding the OU3 paint baseline, which exceeded it by a factor of 1.7. Chromium and lead concentrations exceeded the 20 times TCLP (both greater than 100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.2.17 CP Storage Warehouse (56A)

The CP Warehouse (56A) is a single-story, rectangular building consisting of a structural steel frame with noninsulated, corrugated metal siding and roofing on a reinforced concrete base and floor. The warehouse is located north of the Temporary Storage Structures in the northwest quadrant of the Process Area.

The CP Storage Warehouse was formerly used for electrical transformer storage. More recently, it provided excess furniture and supplies. Currently, it is being used for low-level waste RCRA drum storage and is to be permitted as an approved RCRA storage unit.

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The CP Storage Warehouse houses one HWMU located in the southeast corner of the building. This HWMU is active. According to process knowledge, this unit handles hazardous waste and is considered a HWMU. Closure is to be attained through CERCLA response. Hold-up materials and PPE are the only materials expected to be generated by closure of this unit. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include potassium hydroxide, acetic acid, silver nitrate, and oil.

From this component, one concrete chip sample and one steel coatings sample were collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, lead-210, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 2.5, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of four detected (arsenic, lead, potassium, and sodium) exceeded OU3 concrete baseline values. The most significant of these was sodium which exceeded the concrete baseline by a factor of 3.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 18 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (arsenic and iron) exceeded OU3 paint baseline values. The most significant of these was iron which exceeded the paint baseline by a factor of 1.7. The concentrations two inorganics (chromium and lead) exceeded the 20 times TCLP limit, which is 100 mg/kg for both analytes.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.2.18 Storage Shed (West) (56B)

The West Storage Shed (56B) is located directly north of the Plant 1 Storage Pad (74T) and is a steel-framed structure with metal sides and roof on a reinforced concrete pad. Two large wooden doors are located on the north end of the shed. The West Storage Shed houses tools for on-property construction activities and also currently contains construction and general rubble. A fenced-in storage area with more construction rubble and an old process trailer are located adjacent to the building on the west side.

Since there are no anticipated contaminants and no visual signs of chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2067 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 105 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.19 Storage Shed (East) (56C)

The East Storage Shed (56C) is located directly east of the West Storage Shed (56B) and consists of a steel frame, metal siding, and roofing constructed on a reinforced concrete floor. Two large wooden doors are located on the north end of the shed. The East Storage Shed is used to store tools for on-property construction activities and also currently contains construction and general rubble.

Since there are no anticipated contaminants and no visible signs of chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicated an average total surface contamination of 1965 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 156 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.20 Quonset Hut 1 (60)

Quonset Hut 1 (60), is a pre-engineered facility consisting of a structural steel frame on a reinforced poured-concrete base, with reinforced poured-concrete floor, sloped steel roof panels, steel siding panels, and glass windows. It is located west of the KC-2 Warehouse (63).

Originally, Quonset Hut 1 stored equipment, materials, and miscellaneous items. Currently, it stores drums containing thorium compounds from the Recovery Plant (8A). No drains or floor sumps exist at this location. A single process area is identified. Anticipated contaminants for Quonset Hut 1 are thorium oxide, thorium hydroxide, and thorium oxalate.

No sampling occurred in this facility, since thorium compounds are stored there. The WPA (Section D.0.9.4) states that sample locations may be deemed inaccessible if higher radiation doses would violate As Low As Reasonably Achievable (ALARA) principles. It also states that buildings would not be sampled if thorium wastes were still stored within. Media sampling results from the Thorium Warehouse (64) (see Appendix A.IV) have been used to characterize Quonset Hut 1.

A.IV.2.21 Quonset Hut 2 (61)

Quonset Hut 2 (61) is a pre-engineered, single-level structure. It is located on the north end of the FEMP production area past Third Street, adjacent to Quonset Hut 3 (62). The facility is constructed of a structural steel frame supported on a reinforced poured-concrete base. The structural steel frame is covered by corrugated steel panels that form the walls of the building, although the base of each wall is constructed of concrete approximately 2 feet in height. Two large sliding doors are located at the east and west ends of Quonset Hut 2.

Quonset Hut 2 has functioned as a storage area for thorium-contaminated equipment from the Bettis operation.

No sampling occurred in the facility, since thorium compounds are stored there. The WPA (Section D.0.9.4) states that sample locations may be deemed inaccessible if higher radiation doses would violate As Low As Reasonably Achievable (ALARA) principles. It also states that buildings would not be sampled if thorium wastes were still stored within. Media sampling results from the Thorium Warehouse (64) have been used to characterize Quonset Hut 2.

A.IV.2.22 Quonset Hut 3 (62)

Quonset Hut 3 (62) is a pre-engineered, single-level structure located at the north end of the FEMP production area past Third Street adjacent to Quonset Hut 2 (61). Quonset Hut 3 is constructed of a structural steel frame supported on a reinforced concrete base. The frame is covered by corrugated steel panels that form the walls of the building. The base of each wall is concrete, approximately two feet high. Two large sliding doors are located at the east and west ends of the building.

Quonset Hut 3 has functioned primarily as a maintenance storage area for spare parts and miscellaneous items of bulk size. Currently the building stores archived drummed samples from the OU4 K-65 silo sampling programs and equipment for the Pilot Plant vitrification facility. Some areas of the concrete floor were slightly stained with "oily-looking" materials. There were no anticipated contaminants for this building.

From this component, one concrete chip sample was collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chip

For the concrete sample, 14 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results of five detected (arsenic, lead, potassium, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these were sodium and zinc, both exceeding the concrete baseline by a factor of 1.7. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Semivolatile Organic Contamination

No major media was sampled for semivolatile organic contamination.

Summary of Volatile Organic Contamination

No major media was sampled for volatile organic contamination.

Summary of Pesticides/PCB Contamination

For the concrete chip sample, two of the 26 pesticide/PCB constituents were detected, alpha-chlordane and gamma-chlordane. Neither of these detections exceeded the TSCA limit of 50 ppm.

A.IV.2.23 KC-2 Warehouse (63)

KC-2 Warehouse (63) is a single-level structure located at the north end of the FEMP production area north of the Boiler Plant (10A). The KC-2 Warehouse is constructed of cinder blocks supported on reinforced poured concrete footers, with a reinforced poured concrete floor, and a roof. It comprises eight storage bays (Bays 1 through 8) of various sizes. The walls separating the bays are cinder

block, as are the north and south walls of Bays 1 through 4. The north and south walls of Bays 5, 6, and 7 are chain-link with a corrugated steel-siding overlay. Bays 1 through 4 are equipped with roll-up doors located along the southern wall of each bay; Bays 5, 6, and 7 are equipped with chain-link swing-gates (also with a corrugated steel-siding overlay) along the northern and southern chain-link wall of each bay. Bay 8, which is also equipped with chain-link swing-type gates, is approximately half the size of the other bays.

Although the warehouse mainly has functioned as a storage area, the uses of the eight bays have changed with time. During 1991, Bay 1 provided maintenance storage of materials for work order requests; Bays 2, 3, and 4 were used for stores and the inventory control storage of bulk items; Bays 5 and 6 stored RCRA waste; Bay 7 stored RCRA waste and PCB-contaminated equipment and waste oils; and Bay 8 provided maintenance storage of landscaping and snow removal equipment. Currently, most of the bays are undergoing renovation (cleaning, sealing of concrete floors, and construction of containment berms) for eventual use as RCRA storage areas. Bay 1, which has been renovated but is not equipped with containment berms, is a sample disposition area; RCRA drums are being stored in Bays 5, 6, and 7. PCB-contaminated equipment and oils are no longer stored at the KC-2 Warehouse. Additional roofing material has recently been added to prevent the spread of radiological contamination from the radiologically contaminated roof.

The KC-2 Warehouse houses one HWMU which is active and is located in the east central portion of the building. According to process knowledge, the unit handles hazardous materials and is therefore a HWMU. Closure is to be attained through CERCLA response. Concrete and PPE are the only materials expected to be generated by the closure of this HWMU. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include: 1,1,1-trichloroethane; perchloroethylene; fuel oil; acetone; kerosene; and PCBs from the storage of oils and organic material in drums.

From this component, one concrete chip and two masonry samples (one a duplicate) was collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For seven of the detected radioactive constituents (lead-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective

concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 46, a larger margin than any other radioactive constituent.

Masonry Chips

A total of two masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238 and plutonium-239/240) were detected. For four of the detected radioactive constituents (thorium-228, elemental uranium, uranium-234 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 2.4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 17 out of the 23 inorganic analytes were detected. Those that were not detected were beryllium, cadmium, mercury, selenium, and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for six of the analytes. The most significant was lead, exceeding the baseline by a factor of 3.5. No detects exceeded 20 times the TCLP limit.

Masonry Chips

A total of two masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, mercury, nickel, selenium, silver, and thallium) were detected. For five (arsenic, lead, magnesium, potassium, and sodium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 5. The concentration of inorganics in samples from this component did not exceed 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.24 Thorium Warehouse (64)

Thorium Warehouse (64) is a rectangular, single-story building constructed of corrugated metal walls and roofing supported by steel beams and columns on concrete slabs. The building is divided into three sections: the north, center, and south bays. These bays have no drains and no air purifying systems such as HEPA filters or Hoffman vacuums. The roof has rotating peak vents.

The Thorium Warehouse was originally referred to as the Plant 9 Warehouse. It stored pallets and drums full of 2.1 percent-enriched uranium in the form of ingots, billets, top crops, and Zirnlo scrap

from Hanford. The current Plant 9 Warehouse (81) replaced the Thorium Warehouse in function. The warehouse was then converted for thorium repackaging operations. For example, a 16 ft concrete barrier has been added in the center of the Thorium Warehouse for shielding purposes.

The building has been divided into two process functions. The first, overpacking, was done in two areas. Higher enriched thorium material was overpacked in the north bay, while low-level thorium and mixed waste overpacking occurred in part of the south bay. The second process, which involved the temporary storage of mixed waste, occurred in the center bay and part of the south bay. The warehouse consists of a single process area.

Thorium Overpacking

The north bay was used for overpacking higher radioactive thorium compounds. Equipment was set up to allow the overpacking of thorium drums to occur automatically from a remote control point behind a concrete block wall from which cameras were used to observe the thorium overpack activities.

The south bay was used for repackaging low-level thorium compounds and some RCRA mixed wastes. This area also was used to recondition drums and to overpack drums of trash and uranium materials; both waste streams are nonhazardous. Reconditioning included painting and labeling the containers.

Drum Storage

The center and south bays have stored overpacked thorium wastes and product and temporarily stored uncharacterized mixed wastes. Thorium materials originally came from repackaging operations and/or storage in the Thorium Warehouse, the Plant 1 Thorium Warehouse (67), and the Pilot Plant Warehouse (68).

Anticipated contaminants are uranium metal (up to 1.25 percent E), U_3O_8, uranyl nitrate, thorium compounds and metal, and hydraulic oil.

From this component, one concrete chip sample and one steel coatings sample were collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, neptunium-237, plutonium-239/240, and plutonium-241) were detected. For 13 of the detected radioactive constituents (americium-241, lead-210, plutonium-238, radium-226, radium-228, technetium-99,

thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 460, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of 13 detected (aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, nickel, potassium, sodium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was nickel which exceeded the concrete baseline by a factor of 2.8. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coating sample, 19 of the 23 inorganics for which analyses were performed were detected. Those which were not detected were antimony, selenium, thallium, and vanadium. The maximum of the validated results of only sodium exceeded paint baseline values, which exceeded the baseline by a factor of 1.3. The concentrations of two inorganics (chromium and lead) exceeded the 20 times TCLP (both greater than 100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.25 (Old) Plant 5 Warehouse (65)

The Plant 5 Warehouse (65) is a single-story building. It consists of a structural steel frame with noninsulated, corrugated metal siding and roofing on a reinforced poured-concrete base and floor.

The Plant 5 Warehouse is considered to contain one process area, which currently stores drummed thorium compounds. The building is shielded with concrete blocks (2 ft thick by 6 ft tall) around the south and west sides of the building.

No sampling occurred in the Plant 5 Warehouse, since thorium compounds are stored there. The WPA (Section D.0.9.4) states that sample locations may be deemed inaccessible if higher radiation doses would violate As Low As Reasonably Achievable (ALARA) principles. It also states that buildings would not be sampled if thorium wastes were still stored within. Media sampling results from the Thorium Warehouse (64) (see Appendix A.IV) have been used to characterize the (Old) Plant 5 Warehouse.

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A.IV.2.26 Plant 1 Thorium Warehouse (67)

Plant 1 Thorium Warehouse (67) is a single-story, rectangular building consisting of a structural steel frame on a reinforced concrete base and floor, noninsulated, corrugated metal siding and roofing, and glass windows. The building is used for thorium storage and is considered a hazardous waste management unit (HWMU) because 35 cans of thorium material have been stored inside for longer than 12 months to avoid risk to human health and safety during handling of the thorium. Damaged and unused white metal boxes (WMBs) are stored around the building (as well as a concrete block wall on the east end) to protect personnel from radiation originating from the thorium material inside.

Plant 1 Thorium Warehouse has one inactive HWMU located in the northwest corner of the warehouse. According to process knowledge, this unit is reported to have handled hazardous material and is therefore a HMWU. It is planned to be closed through CERCLA response. Hold-up material, concrete, and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include uranium compounds, thorium oxides, silver, cadmium, and lead.

From this component, one concrete chip sample and one duplicate was collected. The following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, lead-210, neptunium-237, plutonium-241, strontium-90, uranium-234, uranium-235/236, and uranium-238) were detected. For 11 of the detected radioactive constituents (americium-241, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 50000, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete samples, 14 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results of 10 detected analytes, (aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these were arsenic and zinc, which exceeded the concrete baseline by a factor

of 1.4. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.27 Pilot Plant Warehouse (68)

Pilot Plant Warehouse (68) is single-level, rectangular structure with an attached enclosure at its northwestern corner, located south of the Pilot Plant Complex. The Pilot Plant Warehouse consists of reinforced, concrete footings and floor, a structural steel frame, and transite walls and roof panels. The walls are of a dual-panel construction with an insulation layer between the inner and outer panels. The building interior is an open bay, except for a small radiographic control booth in the northwestern corner. A concrete apron on the north side of the warehouse is fenced. The attached structure is within the barbed-wire-topped fenced area. The building is flanked on the east and south sides with a soil berm and concrete walls, respectively, to shield personnel with offices in nearby trailers from radiation. No trenches or sumps are in the building or within the concrete-based fenced area.

The warehouse stores thorium compounds, Pilot Plant equipment, and RCRA-mixed waste in drums; the attached structure housed a cobalt-60 radiographic source.

The Pilot Plant Warehouse houses one HWMU which is active and is located in the southwest corner of the building. According to process knowledge, the unit handles hazardous materials and is therefore a HWMU. Closure is to be attained through CERCLA response. Concrete and PPE are the only materials to be generated by the closure of this HWMU. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants relating to its past and present storage history include: uranium compounds and metal, and thorium compounds, and metals.

From this component, one concrete chip sample and one steel coatings sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, neptunium-237, and uranium-238) were detected. For 13 of the detected radioactive constituents (lead-210,

plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, and uranium-235/236), the maximum concentration of each exceeded its respective concrete baseline value. Radium-226 exceeded its baseline concentration by a factor of 870, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chip

For the concrete chip sample, 10 of the 23 inorganics for which analyses were performed were detected. Those detected were aluminum, arsenic, barium, calcium iron, lead, magnesium, manganese, vanadium, and zinc. The maximum of the validated results for eight detected analytes (aluminum, arsenic, barium, lead, manganese, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 7.1. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 18 of the 23 inorganics for which analyses were performed were detected. Those not detected were beryllium, selenium, silver, thallium, and vanadium. The concentrations of eight detected (antinomy, arsenic, magnesium, manganese, mercury, potassium, sodium, and zinc) exceeded OU3 paint baseline values. The most significant of these was arsenic, which exceeded the baseline by a factor of 7.7. The concentrations of five inorganics (arsenic (greater than 100 mg/kg), cadmium (greater than 20 mg/kg), chromium (greater than 100 mg/kg), lead (greater than 100 mg/kg), and mercury (greater than 4 mg/kg)) exceeded the 20 times TCLP limits, as listed.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.28 General In-Process Warehouse (71)

General In-Process Warehouse (71), was built in 1964 and historically housed dry processes. It is a single-story, rectangular building located west of B Street and north of 2nd Street. The building consists of concrete block walls, which rest directly on a concrete floor, and a bar-joist truss roof system. The inside is a large open area except for the Isotopic Verification Room in the southwestern corner of the building.

The General In-Process Warehouse contains two process areas, the Storage Area and the Isotopic Verification Room. Anticipated contaminants are summarized below for each process area

Storage Area

Most of the building is used for storage (including unused fuel rods) and staging for shipping drums of fissile materials to other facilities. Non-irradiated fuel assemblies also were disassembled manually in the main building area to feed recycle processes in the Preparation Plant (1A).

Isotopic Verification Room

The Isotopic Verification Room was used to verify various enrichments of uranium materials. Although this area now serves as a radiological "frisking" area, it still contains an unused lab bench with a hood and HEPA filter, as well as a container.

Anticipated contaminants include uranium (up to 20 percent E), U_3O_8, thorium oxides, oil and uranium (up to 4.6 percent E).

From this component, two concrete chip samples and two masonry samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, strontium-90, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 860, a larger margin than any other radioactive constituent.

Masonry Chips

A total of two masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236 and uranium-238) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

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Concrete Chips

For the concrete chip samples, 16 of the 23 inorganic analytes were detected. Those not detected were antimony, cadmium, cobalt, mercury, nickel, selenium, and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for nine inorganic analytes. The most significant was lead, exceeding the baseline by a factor of 9.6. The average of the validated results exceeded the baseline for eight of the analytes. The most significant was lead, exceeding the baseline by a factor of 3.2. There were no detections for 20 times the TCLP limit.

Masonry Chips

A total of two masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, cobalt, nickel, selenium, silver, and thallium) were detected. For eight (arsenic, chromium, copper, lead, mercury, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 18. The concentration of inorganics in samples from this component did not exceed 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was sampled for organic constituents.

A.IV.2.29 Drum Storage Building (72)

The Drum Storage Building (72) is a single-story building consisting of a structural steel frame on a reinforced concrete base, reinforced concrete floor, and transite siding and roofing. The Drum Storage Building historically has been a storage facility. Originally, it contained industrial cleaning equipment and control panels for ore silo operation. It later was used to store drums of enriched and normal fuel rods. It then was emptied and cleaned for future uses. Today it is used as a dress-out control point for worker entry and exit of workers into and out of the Removal Action 13 (Plant 1 Ore Silos - see Section 1) work area. It is posted as a lead work area and is a potential thorium contaminated area due to the contamination identified from the work inside the Plant 1 Ore Silo Complex. The anticipated contaminant relating to the building's past storage history is uranium. Also, thorium and lead may be potential contaminants due to more recent operations within the building.

From this component, two concrete chip samples and one steel coatings sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238, and radium-228) were detected. For nine of the detected radioactive constituents (lead-210, polonium-210, radium-226, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 6, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 17 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, cadmium, mercury, selenium, silver, and thallium. The concentrations of 10 analytes detected exceeded OU3 concrete baseline values. The most significant of these was lead, which exceeded the concrete baseline by a factor of 5.4. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 19 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, selenium, thallium, and vanadium. The concentrations of five detected (aluminum, arsenic, iron, potassium and sodium) exceeded the OU3 paint baseline values. The most significant of these was sodium which exceeded the baseline by a factor of 5.2. The following analytes were detected at greater than 20 times the TCLP limit: cadmium (greater than 20 mg/kg), chromium and lead (both greater than 100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.30 Finished Products Warehouse (77)

Finished Products Warehouse (77) is a single-story rectangular building consisting of a structural steel frame on a reinforced concrete base and floor with noninsulated, corrugated metal siding and roofing. The building was constructed as a storage warehouse for flat uranium ingot products awaiting shipment and miscellaneous reject products, as well as the interim storage of uranium materials awaiting processing. Uranium metal is the only anticipated contaminant.

From this component, one concrete chip sample and one steel coating sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, lead-210, plutonium-239/240, plutonium-241, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

For the concrete sample, 15 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, beryllium, cadmium, lead, mercury, selenium, silver, and thallium. The concentrations of two detected (cobalt and potassium) exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 1.3. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 18 of the 23 inorganics for which analyses were performed were detected. Those not detected were beryllium, mercury, potassium, selenium, and thallium. The concentrations of two detected (chromium and cobalt) exceeded OU3 paint baseline values. The most significant of these was chromium which exceeded the paint baseline by a factor of 1.7. The concentrations of chromium exceeded the 20 times TCLP limit, which is greater than 100 mg/kg.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.31 Plant 6 Warehouse (79)

Plant 6 Warehouse (79) is a single-story, rectangular building consisting of a structural steel frame with noninsulated, corrugated metal siding and roofing on a reinforced poured concrete base and floor. It is located directly east of Plant 6. The Plant 6 Warehouse functions as an interim status RCRA storage facility. Hazardous wastes have been stored in excess of 90 days in the building.

The Plant 6 Warehouse has one HWMU, which is active, located in the southeast corner of the warehouse. According to process knowledge, this unit handled hazardous material and is therefore a HWMU. Closure of this HWMU will be attained through CERCLA response. Concrete and PPE are the only materials expected to be generated by closure of this unit. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include: drummed uranium, hazardous wastes, and mixed wastes.

From this component, two concrete chip samples and two steel coatings samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and technetium-99) were detected. For one of the detected radioactive constituents (polonium-210), the maximum concentration of each exceeded its respective concrete baseline value. Polonium-210 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 15 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, arsenic, beryllium, copper, mercury, selenium, silver, and thallium. The maximum of the validated results of 10 detected analytes exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 2.9. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 17 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, beryllium, cadmium, mercury, selenium, and thallium.

The maximum of the validated results for three detected (calcium, chromium, and magnesium) exceeded OU3 paint baseline values. The most significant of these was chromium, which exceeded the paint baseline by a factor of 3.3. The concentrations of two inorganics, chromium and lead, exceeded the 20 times the TCLP limit, which is greater than 100 mg/kg for both analytes.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.32 Plant 8 Warehouse (80)

Plant 8 Warehouse (80) is a single-story building located southwest of the Recovery Plant (8A). The rectangular building consists of a structural steel frame on a reinforced concrete base and floor with noninsulated corrugated metal siding and roofing. It is located on the north side of First Street across from the Pilot Plant Warehouse (13B). The warehouse was built in 1989 for use as a drum storage unit for non-liquid RCRA hazardous wastes. A small office trailer has been placed in the southwestern corner of the building.

The Plant 8 Warehouse functions as an interim status RCRA storage facility. All dikes, berms, and floors have been coated with an epoxy sealant to resist penetration and chemical attack by any spilled material. The building has a capacity of 2,580 (55-gal) drums and currently contains solid wastes.

Plant 8 Warehouse houses one HWMU in the southwest corner that is active. According to process knowledge, this unit handles hazardous material and is therefore a HWMU. Closure is to be attained through CERCLA response. Concrete and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants for the Plant 8 Warehouse include drummed uranium, hazardous wastes, and mixed wastes.

From this component, two concrete chip samples and two steel coatings samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, neptunium-237, plutonium-239/240, plutonium-241, and strontium-90) were detected. For two of the detected radioactive constituents (plutonium-238 and polonium-210), the maximum concentration of each

exceeded its respective concrete baseline value. Polonium-210 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, plutonium-241, radium-228, and technetium-99) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 16 of the 23 inorganics for which analyses were performed were detected. Those not detected were cadmium, copper, mercury, selenium, silver, and thallium. The maximum of the validated results for 10 detected analytes exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 3.7. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coatings sample, 15 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, arsenic, beryllium, cadmium, mercury, selenium, silver, and thallium. The maximum of the validated results for one analyte, calcium, exceeded OU3 paint baseline values by a factor of 4.6. The concentrations of chromium exceeded the 20 times the TCLP limit, which for chromium is greater than 100 mg/kg.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.33 Plant 9 Warehouse (81)

Plant 9 Warehouse (81) is a single-story, rectangular building consisting of a steel frame with noninsulated, corrugated metal siding and roofing on a reinforced poured concrete base and floor, located directly north of Plant 9. It was originally constructed as a storage warehouse for uranium materials (i.e. primary ingots, derbies, cores, and green salt) and currently functions as an interim status RCRA storage facility. In 1990, the warehouse was modified to meet site standards for hazardous waste storage. All dikes, berms, and floors have been coated with an epoxy sealant. Neither of the two collection sumps leads to the wastewater treatment system. The Plant 9 Warehouse has a capacity of 1,704 (55-gal) drums and currently contains both liquid and solid wastes.

Plant 9 Warehouse has one HWMU which is active and is located in the southwest corner of the building. According to process knowledge, the unit handles hazardous material and is therefore a HWMU. Closure of this HWMU will be attained through CERCLA response. Concrete and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include drummed uranium, hazardous wastes, and mixed wastes.

From this component, two concrete chip samples and two steel coatings samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For two of the detected radioactive constituents (polonium-210 and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 2, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, lead-210, and strontium-90) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

For the concrete chip sample, 18 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results for nine detected analytes exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 3.0. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

For the steel coating sample, 19 of the 23 inorganics for which analyses were performed were detected. The maximum of the validated results of one analyte, calcium, exceeded OU3 paint

baseline values by 4.5. The concentrations of chromium exceeded the 20 times the TCLP limit, which for chromium is greater than 100 mg/kg.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.2.34 Tension Support Structure 1 (TS-001)

The Tension Support Structure 1 (TS-001) was located north of the General In-Process Warehouse (71) and was a steel-tube framed structure enclosed within a synthetic covering. Final removal of the structure occurred as part of Removal Action 7. (For a complete list and description of Removal Actions, see Table 1-2.) This "sprung" structure was installed to protect drums stored on the Plant 1 Pad (74T) from the natural elements. Concrete anchors were installed to provide stability to the structure. The anchors and the concrete beneath the former structure are considered part of the Plant 1 Pad (74T).

Since there were no anticipated contaminants and an inspection indicated no visible chemical contamination, no intrusive samples were taken from the component. Baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.35 Tension Support Structure 2 (TS-002)

Tension Support Structure 2 (TS-002) is located north of the General In-Process Warehouse (71) and is a steel-tube framed structure enclosed within a synthetic covering. Final removal of the structure occurred as part of Removal Action 7. (For a complete list and description of Removal Actions, see Table 1-2.) This "sprung" structure was installed to protect drums stored on the Plant 1 Pad (74T) from the natural elements. Concrete anchors were installed to provide stability to the structure. The anchors and the concrete beneath the former structure are considered part of the Plant 1 Pad.

Since there were no anticipated contaminants and an inspection indicated no visible chemical contamination, no intrusive samples were taken of the component. Baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.36 Tension Support Structure 3 (TS-003)

Tension Support Structure 3 (TS-003) is located north of the Chemical Warehouse (30A) and is a steel-tube framed structure enclosed within a synthetic covering. Final removal of the structure occurred as part of Removal Action 7. (For a complete list and description of Removal Actions, see Table 1-2.) This "sprung" structure was installed to protect drums stored on the Plant 1 Pad (74T)

from the natural elements. Concrete anchors were installed to provide stability to the structure. The anchors and the concrete beneath the former structure are considered part of the Plant 1 Pad.

Since there were no anticipated contaminants and an inspection indicated no visible chemical contamination, no intrusive samples were taken of the component. Baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.37 Tension Support Structure 4 (TS-004)

TS-004 is located on the northwest area of the Plant 1 Pad (74T). This tension support structure, as well as Tension Support Structures 5 and 6 (TS-005, -006), was installed as part of Phase III of Removal Action 7 for the purpose of providing a covered drum storage area. (For a complete list and description of Removal Actions, see Table 1-2.)

Tension Support Structure 4 was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.38 Tension Support Structure 5 (TS-005)

Tension Support Structure 5 (TS-005) is located on the northwest area of the Plant 1 Pad (74T). This tension support structure, as well as Tension Support Structures 4 and 6 (TS-004, -006), was installed as part of Phase III of Removal Action 7 for the purpose of providing a covered drum storage area. (For a complete list and description of Removal Actions, see Table 1-2.)

Tension Support Structure 5 was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.2.39 Tension Support Structure 6 (TS-006)

Tension Support Structure 6 (TS-006) is located on the northwest area of the Plant 1 Pad (74T). This tension support structure, as well as Tension Support Structures 4 and 5 (TS-004, -005), was installed as part of Phase III of Removal Action 7 for the purpose of providing a covered drum storage area. (For a complete list and description of Removal Actions, see Table 1-2.)

Tension Support Structure 6 was not considered in the RI/FS WPA (DOE 1993a), since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.3 Process Buildings

This component category is comprised of 31 buildings and areas where potential contaminants have been used as part of plant operations. These components currently contain significant quantities of waste material (radiological and chemical) in equipment, pipes, and ducts, as well as contamination associated with the building construction materials. These buildings are expected to be the most significant sources of contamination for OU3.

A.IV.3.1 Preparation Plant (1A)

Preparation Plant (1A) is located north of 2nd Street and east of A street. The building consists of a structural steel frame with transite panels and a concrete base. All enriched uranium materials to be processed at the facility were received in the Preparation Plant. Ore concentrates and recycled materials were weighed, sampled, and milled in this plant for distribution to other processes. Uranyl nitrate (UNH) solution was also prepared in Plant 1 for use in the Ore Refinery Plant (2A). Several other supporting operations were performed in the plant, including drum sampling and washing, solvent recovery, repackaging, and wastewater treatment.

The Preparation Plant contains two inactive HWMUs, both of which are located in the north central portion of the plant. These are considered HWMUs base the first handles solvents (EPA waste code F002) and the second handles lead. Closure for both of these is planned under RCRA. Metal, water, concrete, and PPE are the materials expected to be generated by the closure of the first unit, and rinsate and hold-up materials are expected to be generated by the closure of the second. For more information on HWMUs, see Appendix K, Table K-1.

The Preparation Plant has seven process areas. Three are dry: drum sampling, crushing/milling, and repackaging. The other process areas are wet: enriched materials reclamation, drum washing, solvent reclamation, and wastewater handling. Anticipated contaminants from these processes are summarized below for each process area.

Drum Sampling

A main function of the Preparation Plant was to sample and weigh recycle and feed materials, both those produced by the facility and those from off-site vendors. The level of enrichment of these materials was then determined. Sampling of materials contained in 55- and 30-gallon drums occurred at the sampling station located in the northwestern corner of this facility. The automatic sampling facilities consisted of a "U"-shaped roller drum conveyor, two drum pushers, a set of in-line scales, an automatic closed auger sampling station, a dust enclosure and collector, an air-capping device, and a drum roller/mixer. Materials received in large quantities were sampled with this automatic sampling unit. Smaller lot sizes and wet materials were sampled manually on the sampling pad outside the northwestern corner of the Preparation Plant. Anticipated contaminants include: Uranium (up to 20 percent enriched), UO_3, UF_4, U_3O_8, thorium, thorium oxalate, ore concentrates, MgF_2, and HF.

Crushing/Milling

The Preparation Plant housed six milling operations to produce smaller-sized particles. Enriched uranium materials, magnesium fluoride (MgF_2), and orange oxide (UO_3) were among the materials milled.

The Thor Mill was used to prepare spent uranium dioxide (UO_2) for recovery. The uranium dioxide arrived as spent fuel pellets, encased in tubes, that originated from other nuclear facilities. The tubes were run through the Pincutter, which divided the tubes into manageable sections. The sections were then processed through the Thor Mill, and the spent uranium pellets were removed. The Sly dust collector controlled dust generated during this process.

The Fitzpatrick Hammer Mill milled uranium materials with enrichment less than 20 percent. The material to be milled was fed into the mill through twin screw feeders, milled, and discharged to the safe geometry digester unit. The Fitzpatrick Hammer Mill has been replaced, and the new mill was never operated. The Sly dust collector also serviced this process.

The Williams-Titan Mill processed magnesium fluoride (MgF_2) slag leach from the Metals Production Plant (5A). Other materials that contained uranium enrichments of 2.1 percent or less also were periodically processed. The mill facilitated several pieces of equipment for receiving raw material, feeding the material to the mill, pulverizing, classifying, discharging product, product packaging, dust collection, and explosion suppression. Among the equipment used were the pulverizer, hopper, and cyclone system. All processed material from this mill was either sent back to the Metals Production Plant for reuse as reduction pot liner material or digested for uranium recovery in the Ore Refinery Plant.

Three smaller mills also were historically associated with the Preparation Plant. The Zenith Mill, located on the second floor, was used to process UO_3. The jaw crusher and Hammer Mill, both located on the third floor, were used to process ore materials.

Anticipated contaminants include Halon 1301, MgF_2, ore, and ore concentrates.

Enriched Materials Reclamation

The safe geometry digestion unit was used in the Preparation Plant to digest uranium enriched up to ten percent. Uranyl nitrate was produced by adding nitric acid to uranium compounds such as UO_2, UO_3, and U_3O_8. The resulting UNH slurry was pumped to the Ore Refinery Plant for processing. The safe geometry digestion unit was used to prevent concentrations of enriched product from reaching nuclear criticality levels during the process. As the name suggests, the machine was designed with thick steel walls to protect personnel working in the area. A sump was operated with this system. The enriched materials reclamation unit process ceased in the early 1980s. Anticipated

contaminants include: uranium (U-235 up to 20 percent enriched), ammonia, cesium-137, radium-226, americium-241, arsenic, cadmium, chromium, lead, uranyl nitrite, and nitric acid.

Drum Washing

Drum washers were used to clean ore concentrate drums for reuse. Most of the ore received in the Preparation Plant was delivered in drums. The drums were lifted to the fourth floor, where a series of rinsers and washers were located. The wastewater generated during the process was transferred to the wastewater treatment system on the first floor. Anticipated contaminants include NaOH, solvent residues, ore, and ore concentrates.

Solvent Reclamation

Solvents were reclaimed in the Detrex Still located on the first floor of the Preparation Plant. Spent dry-cleaning solvents were entered into the still to be purified for reuse in other processing plants. The Detrex Still is considered a HWMU under RCRA regulations. Anticipated contaminants include: still bottoms; 1,1,1-trichloroethane; trichloroethylene; perchloroethylene; carbon tetrachloride; chlordane; chloroform; 1,2-dichloroethane; 1,1-dichloroethylene; and vinyl chloride.

Wastewater Handling

Two liquid waste treatment facilities served the Preparation Plant. The systems were identical except for their sources of influence. One system collected wastes from the eastern half of the building, and the other collected from the western half of the building. Liquid wastes were collected in sumps and transferred by pumps to the settling tanks until the tanks became full. At this point, the water was recirculated through a filter using slurry pumps. When the filtrate appeared clear, recirculation of the wastewater through the filter was discontinued and the filtrate was discharged to the General Sump (18B). The filter cake that was generated was spread into drying pans, dried in the drying oven, and reprocessed through the system. Anticipated contaminants include nitric acid and sump cakes.

Repackaging

A repackaging system for two types of materials was used in the Preparation Plant. One type of repackaging pertained to those materials from the building, and the other pertained to materials associated with the Plant 1 Pad (74T). The materials requiring repackaging included materials milled in the Preparation Plant and materials received from off-site vendors. Materials with varying uranium enrichments required repackaging to meet feed specifications of the plant or process where further processing was to be done. Only enriched materials to be used in other plant processes were handled in this area. The materials associated with the Plant 1 Pad (74T) that required repackaging were leaking drums found on the pad. These drums were overpacked in this area with a barrel-turning truck. During repackaging operations, any damaged containers were emptied of all materials before disposal. Anticipated contaminants include nitric acid and sump cakes.

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From this component three concrete chip samples, six concrete core samples (three depths), 12 steel coatings samples, one transite sample, and one unknown liquid sample were collected. Following is a summary of the results of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, strontium-90, thorium-228, and thorium-232) were detected. For ten of the detected radioactive constituents (lead-210, plutonium-238, radium-226, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 100, a larger margin than any other radioactive constituent.

Concrete Cores

A total of three concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, plutonium-238, and plutonium-241) were detected. For 13 of the detected radioactive constituents (cesium-137, lead-210, neptunium-237, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 120, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and plutonium-241) were detected. For two of the detected radioactive constituents (technetium-99 and thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 18, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90) were detected. For six of the detected radioactive constituents (radium-228, technetium-99, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 26, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (neptunium-237, plutonium-238, plutonium-241, strontium-90, and thorium-230) were detected.

Summary of Inorganic Contamination

Concrete Chips

A total of three concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, mercury, silver, and thallium) were detected. For 12 (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, nickel, potassium, selenium, and sodium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 15.6. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

A total of three concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, mercury, and thallium) were detected. For 14 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, nickel, potassium, selenium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 18. There were no detections at greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, mercury, and thallium) were detected. For five of the detected inorganics (arsenic, barium, cobalt, lead, and selenium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 40. The concentration of lead in one sample of concrete cores from a depth of ½ to 1-inch from the solvent reclamation area exceeded 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, arsenic, cadmium, mercury, and thallium) were detected. For six of the detected inorganics (aluminum, barium, cobalt, lead, potassium, and selenium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater

than baseline, selenium was the most significant, exceeding the concrete baseline by a factor of 6.8. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (selenium) was detected. For six of the detected inorganics (aluminum, arsenic, chromium, copper, iron, and magnesium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the steel coating baseline by a factor of 4.8. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: arsenic, cadmium, chromium, lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

One transite sample, collected from the Crushing/Milling process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, only two (barium and chromium) were detected. Both results were below their respective TCLP limits of 100 mg/L and 5.0 mg/L.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 15 (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, thallium, vanadium, and zinc) were detected. The concentration of inorganics in this sample exceeded the TCLP limit for the following: cadmium.

Summary of Semivolatile Organic Contamination

Transite

One transite sample, collected from the Crushing/Milling process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only one (bis(2-ethylhexyl)phthalate) was detected. There is no TCLP limit for this material.

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Summary of Volatile Organic Contamination

Transite

One transite sample, collected from the Crushing/Milling process area, was collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two (1,1,1-trichloroethane and 2-butanone) were detected. There is a TCLP limit for 2-butanone, which was detected at 34 mg/L, well below the TCLP limit of 200,000 mg/L.

Summary of Pesticides/PCB Contamination

No samples were analyzed for pesticides/PCBs.

A.IV.3.2 Ore Refinery Plant (2A)

Ore Refinery Plant (2A) consists of a structural steel frame with transite panel outside walls and roof. It is a multilevel building with five levels and a penthouse. It is located on the south side of 2nd Street across from Plant 1 (1A). The interior of the building is divided into three areas separated by transite walls. The building floor is a combination of acid brick and concrete. The building is located south of 2nd Street, east of A Street, and west of B Street. The Ore Refinery Plant operations used nitric acid digestion processes to convert uranium ores, oxides, metal, and residues into uranyl nitrate solutions, which were then purified.

The Ore Refinery Plant contains four inactive HWMUs. The first is located in the center of the west third of the plant, the second is north of the plant, the third is located southeast of Plant 2, and the fourth is in the northwest section of the main plant. they are considered HWMUs because the first reportedly handled strong acids and chromium and the last three reportedly handled strong acids, barium, lead, chromium, and mercury. Closure for all four is planned through CERCLA response. Acids are the only waste materials expected to be generated by closure of the first unit. Hold-up material is the only material expected to be generated by the closure of the other three. For more information on HWMUs, see Appendix K, Table K-1.

Five processes have been identified in this facility: digestion, drum digestion, extraction, denitration, and enriched calcining. The anticipated contaminants from these five processes summarized below.

Digestion

The digestion area is located in the west portion of the Ore Refinery Plant and is divided into two distinct processions. The northern half of the plant was used for digesting uranium ores and residues

that had a high radium content (the "hot" side). The southern half of the building handled uranium materials with little to no radium (the "cold" side). Uranium ores and residues were received on the top floor of the building from the bucket elevators associated with the Cold Side Ore Conveyor (2F) and the Hot Side Ore Conveyor (2G). The digestion process prepared dilute uranyl nitrate (UNH) by dissolving these uranium ores and uranium-bearing residues in nitric acid. The UNH was then transferred to the extraction area for purification processing. Anticipated contaminants include: uranium (up to five percent enrichment), uranyl nitrate, Al_2O_3, ore concentrates, ores, high and low grade residues, ammonia, silver, lead, chromium, arsenic, and tetrachloroethylene.

Drum Digestion

The drum digestion area, also known as the mini-digestion area, is located in the middle of the first floor of the ore refinery digestion area. It is a diked area, with a metal floor and stations for eight drum digester tanks. The drum digestion area was used to digest highly enriched uranium materials (up to 2.5 percent U235) received from the Preparation Plant (1A).

Pre-measured batches of specified materials were received in the drum digester tanks from the Preparation Plant. Nitric acid and water were added to the tanks and then thoroughly mixed. When the digestion process was complete, the material was recycled through a plate-and-frame filter or through a cartridge filter until it was clear. Then the material was pumped through one of two polishing cartridges filters and into tank F1-12, located in the middle of the drum digestion area. The material was then pumped into other tanks for storage or into tanks to be blended with other digestion products for extraction feed. The drum digestion process occurred until the early 1980s. Anticipated contaminants include: uranium (5 percent enriched), uranyl nitrate, ores, high grade residues, and ammonia.

Extraction

The extraction area is located in the central portion of the Ore Refinery Plant. The extraction process is carried out with equipment located on the north side of the building. The south side of the extraction area is totally abandoned except for the deionizer equipment, which is located in the southeastern corner of the first floor. The purpose of the liquid-liquid countercurrent solvent extraction operation was to purify uranyl nitrate solution. This was accomplished by contacting the solution with organic solvent (tributyl phosphate in kerosene) in stainless steel, perforated plate pulse columns. In so doing, uranyl nitrate transfers to the solvent phase, leaving most of the impurities in the aqueous raffinate. The solvent phase was then scrubbed by contacting it with a small amount of deionized water to remove residual contaminants. Degraded solvent is recovered through an acid-charcoal treatment. A black-extraction process is used to return the uranyl nitrate to an aqueous solution by contacting the uranium-rich solvent with hot, deionized water, yielding a solution of uranyl nitrate. Anticipated contaminants include: uranyl nitrate, ammonia, H_2SO_4, kerosene, tributyl phosphate, NaOH, soda ash, nitric acid, and extraction impurities.

Denitration

The denitration area is located in the eastern portion of the Ore Refinery Plant. Purified aqueous uranyl nitrate solution was thermally decomposed into uranium trioxide (UO_3) powder in the denitration area. The main elements of denitration equipment are two boildown tanks, three sparge tanks, and 14 denitration pots. Feed material was cascaded from the boildown tanks, through the sparge tanks, and to the denitration pots by gravity. Concentration of pure uranyl nitrate solution was accomplished in the boildown tanks and sparge tanks. Molten uranyl nitrate hydride was fed to denitration pots for conversion to UO_3. From the denitration pot, UO_3 was gulped and packaged for further processing. Anticipated contaminants include uranium (up to two percent enriched), uranyl nitrate, UO_3, H_2SO_4, nitric acid, and thorium nitrate.

Enriched Calcining

The safe geometry rotary calciner, in which up to ten percent enriched UNH solution was calcined to produce black oxide (U_3O_8) for use as sweetener, is located on the southern side of the third level in the denitration area. Anticipated contaminants include uranium (up to ten percent enriched), U_3O_8, and uranyl nitrate.

Seven acid brick, one concrete chip, 12 concrete cores depths (three depths), eight steel coatings, two transite samples, one loose media, and three unknown liquid samples. The following is a summary of the results of these samples.

Summary of Radiological Contamination

Acid Brick

A total of three acid brick samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (plutonium-238, plutonium-239/240, and plutonium-241) were detected. For 15 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 970, a larger margin than any other radioactive constituent.

Concrete Cores

A total of six concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective

concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 980, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (plutonium-241) were detected. For 16 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 300, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and strontium-90) were detected. For 12 of the detected radioactive constituents (americium-241, cesium-137, lead-210, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 34, a larger margin than any other radioactive constituent.

Steel Coatings

A total of five steel coating samples was collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 280, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and four unknown liquid samples were collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected in both media.

Summary of Inorganic Contamination

Acid Brick

A total of five acid brick samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For 13 of the detected inorganics (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead,

mercury, nickel, selenium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 150. The lead concentration in four samples from this component exceeded 20 times the TCLP limit. Two of these samples were collected from the Digestion area, and one was collected each from the Extraction Area and the Denitration Area. The chromium concentration in one sample from this component exceeded 20 times the TCLP limit in the Denitration Area.

One acid brick sample from this component was also analyzed for inorganics using the TCLP test (see Appendix A.II for complete results). Only one TCLP metal, lead (at 170 mg/kg) in one sample, was detected at greater than 20 times the TCLP limit. Lead was detected in the TCLP leachate at 0.07 mg/L, well below the TCLP limit of 5.0 mg/L and indicating that only one percent of available lead leached from the solid sample. The other results from these analyses indicate a wide variation in the leachability of inorganics from acid brick, from 0.9 percent (lead) to 33 percent (calcium) of the TAL inorganics, and a maximum of 0.9 percent (lead) of any TCLP metal, leached out in the TCLP test.

Concrete Cores

A total of five concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, selenium, thallium, and vanadium) were detected. For 18 of the detected inorganics (aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 160. The concentration of inorganics in four samples of the top ½-inch of concrete cores from this component exceeded 20 times the TCLP limit. One sample from the drum digestion exceeded the limit for chromium, two samples from the drum digestion area and one from the extraction area exceeded the limit for lead.

A total of four concrete core samples from a depth of ½ to 1-inch were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (beryllium, mercury, potassium, selenium, and thallium) were detected. For 16 of the detected inorganics (aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 13. There were no detections at greater than 20 times the TCLP limit.

A total of four concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony,

beryllium, mercury, potassium, selenium, silver, and thallium) were detected. For 13 of the detected inorganics (aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, nickel, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 37. There were no detections at greater than 20 times the TCLP limit.

Supplemental Media

One loose media and four unknown liquid samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected in loose media and all except six (antimony, beryllium, selenium, silver, thallium and vanadium) were detected in the liquids. The concentration of inorganics in the loose media sample exceeded 20 times the TCLP limit for the following: arsenic, cadmium, chromium, lead, selenium. The concentration of inorganics in one or more of the liquid samples exceeded 20 times the TCLP limit for lead.

Transite

One transite sample, collected from the Digestion process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, only two (barium and chromium) were detected. Both results were below their respective TCLP limits of 100 mg/L and 5.0 mg/L, respectively.

Summary of Semivolatile Organic Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only four (benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, and chrysene) were detected. There are no TCLP limits for any of these semivolatiles.

Transite

One transite sample, collected from the Digestion process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

One loose media and four unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only six (benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, phenol, and pyrene) were detected in the loose media and only three (bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and diethyl phthalate) in the unknown liquids. There are no TCLP limits for any of these detected semivolatiles.

Summary of Volatile Organic Contamination

Acid Brick

A total of two acid brick samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (2-butanone, toluene, and trichlorofluoromethane) were detected. There is a TCLP limit for 2-butanone, which was detected in two samples at a maximum concentration of 8 mg/kg, well below the 20 times TCLP value of 4,000,000 mg/kg.

Transite

One transite sample, collected from the Digestion process area, was collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, only one was detected. Tetrachloroethene was detected at 59 mg/L, well above the TCLP limit of 0.7 mg/L.

Supplemental Media

One loose media and four unknown liquid samples were collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only five (4-methyl-2-pentanone, benzene, ethylbenzene, methylene chloride, and total xylenes) were detected in the loose media and only two (2-butanone and acetone) in the liquids. Of these, there are TCLP limits for only benzene and 2-butanone. Benzene was detected in the loose media sample at a concentration of 2800 mg/kg, well below the 20 times TCLP value of 10,000 mg/kg, and 2-butanone was detected in all four samples of liquids at a maximum concentration of 41 mg/L, well below the 20 times TCLP value of 4,000,000 mg/kg.

Summary of Pesticides/PCB Contamination

No samples from this component were analyzed for pesticides/PCBs.

A.IV.3.3 Metal Dissolver Building (2D)

The Metal Dissolver Building (2D) is a two-story, irregularly shaped building located near the northwest corner of the Ore Refinery Plant. The building consists of a structural steel frame with transite panels on a concrete base. The interior of the building is essentially one room with a diamond plate mezzanine. The Metal Dissolver Building housed operations that digested or dissolved uranium-containing materials. Three dissolution processes have been identified in the building: metal dissolution, west metal dissolution, and charcoal treatment.

The operations practiced in this facility used nitric acid solution to promote dissolution of uranium or other metal contaminants. Anticipated contaminants from these processes are summarized below, as each process is described.

Metal Dissolution

The metal dissolver tank received solid uranium scrap metal from the metal production plant (5A). Top crops, derbies, slugs, and out-of-specification ingots and fuel rods were among the products received. The scrap metal was sprayed with nitric acid in the metal dissolver tank to dissolve the uranium into uranyl nitrate (UNH). Temperature controls were used to optimize the performance of the nitric acid to reach the specified concentration of 250 to 400 g/L U required before the solution was diverted to the digestion process in the Ore Refinery Plant (2A). The nitric oxide fumes were routed through a condenser, and the acid was reformed. The nitric gases went through the Venturi fume scrubber and on to the NAR Towers (3D). The metal dissolver tank was replaced in 1990 with a new tank, which was never used. The original metal dissolver tank was located in the southwestern section of the Metal Dissolver Building; the new metal dissolver tank is located in the north-central section. An electrical control room is also included as part of this process area. Anticipated contaminants include uranium metal (up to 1.25 percent enriched), ammonia, tetrachloroethane, nitric acid, uranyl nitrate, chromium, and barium.

West Metal Dissolution

The west metal dissolver tank received various end products, primarily black oxides and calcium uranate, from the Recovery Plant (8A). The west metal dissolver tank was filled with heated UNH solution from the digestion process in the Ore Refinery Plant. Additional nitric acid was added to dissolve the metal oxides. If fluorine was known to be present, alumina was also added to the solution. The solution was required to reach 200 g/L U for use as product solution. Anticipated contaminants include uranium oxides (up to five percent enriched), nitric acid, uranyl nitrate, chromium, and barium.

Charcoal Treatment

Contaminated solvents from the extraction process in the Ore Refinery Plant were reclaimed through the charcoal treatment process. The spent material was composed of tributyl phosphate (TBP) and kerosene. The spent solvents were mixed with nitric acid in the east metal dissolver tank. Charcoal was added to adsorb the solvent contaminants. The resulting slurry was filtered through a small rotary drum vacuum filter located on the second floor. The filtrate was routed through an in-line carbon polishing system and reused. The filtered solids were disposed of in drums. During the building inspection, oil was found collecting in the tray beneath the filter. Anticipated contaminants include kerosene, tributyl phosphate, and nitric acid.

Two concrete chip samples, nine concrete core samples (a total of three concrete core locations), one loose media sample, and one unknown liquid sample were collected from this component to characterize the contamination. The following represents the results of the analyses of these samples.

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Summary of Radiological Contamination

Concrete Cores

A total of three concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, neptunium-237, plutonium-238, plutonium-241, radium-228, and strontium-90) were detected. For 11 of the detected radioactive constituents (cesium-137, lead-210, plutonium-239/240, radium-226, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 130, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, plutonium-241, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 63, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, and strontium-90) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 9.5, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. None of these 20 constituents were detected in the loose media and all except five (cesium-137, neptunium-237, plutonium-238, polonium-210, and strontium-90) in the liquid.

Summary of Inorganic Contamination

Acid Brick

Two acid brick samples were collected from this component for inorganic analyses. Of 23 inorganic constituents, all except seven (antimony, cadmium, chromium, cobalt, selenium, thallium, and vanadium) were detected. The maximum concentrations of six of the detected metals were greater

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than the respective concrete baselines (barium, copper, lead, mercury, silver, and zinc). Lead was the most significant, exceeding the baseline by a factor of 110. Lead concentration was greater than 20 times the TCLP limit in one sample collected from the West Metal Dissolution Area.

Concrete Cores

A total of three concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (mercury, selenium, and thallium) were detected. For 11 of the detected inorganics (aluminum, antimony, barium, cobalt, copper, lead, magnesium, manganese, nickel, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 9.9. No concentrations were greater than 20 times the TCLP limit.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, mercury, nickel, selenium, and thallium) were detected. For nine of the detected inorganics (arsenic, barium, cadmium, chromium, copper, lead, manganese, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 5.6. No concentrations were greater than 20 times the TCLP limit.

No concrete core samples from below a depth of 1-inch from this component were analyzed for inorganics.

Supplemental Media

One loose media and one unknown liquid sample were collected and analyzed for inorganic constituents. All 23 constituents were detected in the loose media sample. All but nine (antimony, arsenic, beryllium, chromium, cobalt, mercury, selenium, thallium, and vanadium) were detected in the liquid. The loose media sample, which was collected in the Charcoal Treatment Area, had concentrations of arsenic, chromium, lead, and silver which exceeded 20 times the respective TCLP limits. No metal in the liquid that had a concentration which exceeded the respective TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media one unknown liquid samples was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 15 (2-methylnaphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and

pyrene) were detected in the loose media and one (bis(2-ethylhexyl)phthalate) in the liquid. There are no TCLP limits for any of these detected semivolatiles.

Summary of Volatile Organic Contamination

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, none were detected in either sample.

Summary of Pesticide/PCB Contamination

No major or supplemental media were sampled for pesticide/PCBs in the Metal Dissolver Building.

A.IV.3.4 Hot Raffinate Building (3E)

The Hot Raffinate Building (3E) is a three-story, irregularly shaped building consisting of a structural steel frame with a concrete base. The building's architectural features, such as heavy concrete walls and dividers, and double-pane, water-filled windows, protected operators from radiological dose from high-radium raffinate streams. The Hot Raffinate Building housed one process ¾ filtration ¾ that used a combination of several filters, pumps, and tanks used to filter insolubles from raffinate solutions, uranyl nitrate solutions (UNH), and slag leaching solutions.

This facility received raffinate solutions from the Ore Refinery Plant (2A) following the extraction process. Originally, raffinates from natural uranium ores and ore concentrates were processed in the filtering process. Later, the process equipment was used for other purposes, including slightly enriched UNH solution filtration. Currently, the filter feed tanks are used as storage tanks for UNH. In the process, the initial solution was held in the filter feed tanks located on the first floor along the east wall. The solution was filtered through two separate filtering systems. The first system was the Oliver rotary drum vacuum filters; dicalite was used as the filter aid. From the combined filtrate holding tanks, the solution was transferred through porocarbon polishing filters for final filtering. The filter cake, containing the filtered insolubles from both filtering processes, was deposited in the cake slurry holding tanks. Initial processing during the early 1950s involved pumping high-radium raffinate slurry to K-65 Silos 1 and 2 through the utility trench (22E). Decant from the K-65 Silos was returned through the trench and collected in the tank located on the northwestern corner of the Hot Raffinate Building before being transferred for treatment. Subsequently, low-radium raffinate slurry was pumped to the Building 39A Pad (74W) for drying in a spray calciner. The solids were then pneumatically conveyed out to Silo 3. In later years, the raffinate slurry was neutralized with lime before being pumped out for storage in the pit area.

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Another solution that was filtered through the Hot Raffinate Building originated from the slag leaching process. Magnesium fluoride slag from the Metals Production Plant (5A) reduction process, containing up to five percent uranium by weight, was milled by the Preparation Plant (1A) and digested in acid in the Ore Refinery Plant (2A) before arriving at the Hot Raffinate Building where the filtering process began.

The filtering process used a scrubber system to neutralize nitric acid fumes generated by the filtrate coming from the Oliver filters. The scrubber system used sodium hydroxide (NaOH) as the neutralizing agent; the NaOH was stored in a 250-gallon tank on the first floor of the facility. Anticipated contaminants include: tributyl phosphate; sodium hydroxide; kerosene; magnesium fluoride; low grade residue; ore raffinate; uranyl nitrate; tetrachloroethylene; 1,1,1-trichloroethane; barium; chromium; and nitric acid.

The Hot Raffinate Building houses one inactive HWMU located in the southeast section of the building. This unit is considered a HWMU because it reportedly handled strong acids, barium, lead, chromium, and mercury. Closure will be attained through CERCLA response. hold-up material is the only material expected to be generated by the closure of this unit. For more information on HMWUs, see Appendix K, Table K-1.

One acid brick sample, six concrete core samples, one steel coating sample, one transite sample, and two unknown liquid samples were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, lead-210, strontium-90, and thorium-228) were detected. For 14 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-226, radium-228, technetium-99, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 120, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected. For 19 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228,

technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 170, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, neptunium-237, plutonium-238, plutonium-241, polonium-210, and strontium-90) were detected. For ten of the detected radioactive constituents (americium-241, plutonium-239/240, radium-228, technetium-99, thorium-227, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 30, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, polonium-210, radium-228, and strontium-90) were detected. For eight of the detected radioactive constituents (lead-210, technetium-99, thorium-227, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 15, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For 13 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Plutonium-239/240 exceeded its baseline concentration by a factor of 37, a larger margin than any other radioactive constituent.

Supplemental Media

Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and lead-210) were detected.

Summary of Inorganic Contamination

Acid Brick

One acid brick sample was collected from this component for inorganic analyses. Of 23 inorganic constituents, all except 10 (antimony, beryllium, cadmium, cobalt, mercury, selenium, silver, thallium, vanadium, and zinc) were detected. The concentrations of seven of the detected inorganics (arsenic, chromium, copper, lead, nickel, potassium, and sodium) were greater than the respective concrete baselines. Sodium was the most significant of these, exceeding the concrete baseline by a factor of 6.0. No concentrations of any inorganics in acid brick were greater than 20 times the respective TCLP limits.

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, cadmium, selenium, and thallium) were detected. For eight of the detected inorganics (barium, cobalt, copper, lead, mercury, nickel, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, cobalt was the most significant, exceeding the concrete baseline by a factor of 8.5. There were no detections greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For two of the detected inorganics (cobalt and lead), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.3. There were no detections greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, mercury, selenium, and thallium) were detected. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (selenium and vanadium) were detected. For one of the detected inorganics (barium), the maximum concentration of exceeded its steel coating baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the steel coating baseline by a factor of 3.2. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following:

barium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

One transite sample, collected from the Filtering process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, only one metal was detected. Chromium was detected at 5.96 mg/L, exceeding the TCLP limit of 5.0 mg/L.

Supplemental Media

Two unknown liquid samples were collected from this component for inorganic analyses. Of 23 inorganic constituents, 19 were detected. Those not detected are antimony, cadmium, cobalt, and selenium. Chromium was detected at a level greater than 20 times the TCLP limit in both samples, while lead and silver concentrations exceeded 20 times their respective TCLP limits in one sample each.

Summary of Semivolatile Organic Contamination

Transite

One transite sample, collected from the Filtering process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

Two unknown liquid samples were analyzed for semivolatile constituents, yet none were detected.

Summary of Volatile Organic Contamination

Transite

One transite sample was collected from this component for analyses of TCLP volatiles. 2-Butanone was the only volatile organic detected, but this was well below the TCLP limit.

Supplemental Media

Two unknown liquid samples were analyzed for volatile constituents, yet none were detected.

Summary of PCB/Pesticide Contamination

No major or supplemental media were analyzed for PCB/pesticide contaminants in the Hot Raffinate Building.

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A.IV.3.5 Green Salt Plant (4A)

The Green Salt Plant (4A) is a seven-level, five-story, rectangular structure. It is constructed of a structural steel frame enclosed by transite siding and roofing panels and is supported on a reinforced poured concrete base. The floors of the first level (ground floor) of the Green Salt Plant are concrete. The floors of the other six levels are either steel diamond plating or steel catwalks.

The Green Salt Plant housed the hydrofluorination process at Fernald and was used until 1988 for the conversion of uranium trioxide (UO_3, orange oxide) to uranium tetrafluoride (UF_4, green salt). Production of metal-grade UF_4 was initially only possible with the UO_3 produced at the Ore Refinery Plant (2A). As processes were optimized around the FEMP site and the hydrofluorination process was adjusted to compensate for lower-quality feeds, UO_3 feeds from the Port Hope Refinery, Richland Operations, and the Savannah River Plant were received and processed. During the mid-1960s, the Green Salt Plant was able to handle many different feed types simultaneously, with as many as five different isotopic levels run in parallel without significant crossover. The Green Salt Plant was also used during 1954 for the hydrofluorination of thorium oxide.

This building contained 11 processes, some of which were in use for a limited time. The building also is equipped with a dust collector system and dust collector drumming stations. Fourteen dust collectors serviced the work areas, chemical reactor banks, and the three UF_4 packaging stations located in the Green Salt Plant. Several dust collector drumming stations also were located on the first floor.

The Green Salt Plant contains one inactive HWMU in the north central area. It is considered a HWMU because it is reported to have handled Hydrogen Fluoride. It is planned to be closed under CERCLA. HF residues, decon water and trash are the materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

The Green Salt Plant has three process areas: hydrofluorination process area, ammonia dissociation and nitrogen generation process area, and hydrofluoric acid recovery process area. The last two of the process areas are wet. Anticipated contaminants from these processes are summarized below for each process area.

Hydrofluorination Area

This process area includes most of the facility, including the 12 reactor banks.

Hydrofluorination Banks. In general, the hydrofluorination process involved contacting UO_3 at high temperature with hydrogen gas (generated from dissociated ammonia) in a two-stage fluidized bed reactor to form uranium dioxide (UO_2, brown oxide). The UO_2 passed through a Cocoa reactor while in a hydrogen atmosphere and was then processed through a bank of heated, four-zone reactors (Talcum reactors) with countercurrent anhydrous hydrofluoric acid (AHF) to produce UF_4. The UF_4

was packaged, and the excess hydrofluoric acid from the conversion of UO_3 to UF_4 was scrubbed and stored in the original Bulk Tank Farm located north of the plant .

Twelve chemical reactor banks were used in the Green Salt Plant for the production of UF_4. Chemical Reactor Banks 1 through 6 and 7 through 12 (east and west, respectively), were composed mainly of a fluid bed reactor, a Cocoa reactor, and three Talcum reactors with a countercurrent AHF stream and were used for the conversion of UO_3 to UF_4. Chemical Reactor Banks 7, 8, and 9 were used most recently. Bank 8 was reconfigured for processing UO_3 to U_3O_8 (black oxide) to allow processing of Hanford UO_3 in the system. Each chemical reactor bank spans several floors within the plant because of the numerous equipment pieces that make up each bank. Banks 4, 5, 6, 10, 11, and 12 were emptied and abandoned in place (AIP) in 1967, and Banks 1, 2, and 3 were emptied and AIP in 1974. Anticipated contaminants include UF_4, U_3O_8, UO_3, UO_2, anhydrous HF, and mercury.

Thorium Tetrafluoride Production. In 1954, dry thorium oxide from the Special Products Plant (9A) was hydrofluorinated in Bank 7 to dry thorium tetrafluoride. The thorium tetrafluoride was returned to the Special Products Plant and subsequently used to produce thorium metal. Anticipated contaminants include Thorium oxide, HF, and thorium tetrafluoride.

Moving Bed Experimental Reactor. From 1955 through 1958, a vertical packed-bed reactor was tested for use in the hydrofluorination process. The reactor is located on the second level within the hydrofluorination area although ancillary equipment associated with the reactor has been removed. Anticipated contaminants are UO_3 and UF_4.

UF_4 Packaging. The three packaging stations (Packaging Stations 1, 2, and 3) located on the first floor of the Green Salt Plant within the hydrofluorination area were used for the packaging or repackaging of depleted and enriched UF_4. UF_4 was transferred to any of the three packaging stations from T-hoppers, drums, or cans. UF_4 was also delivered to Packing Station 2 by conveyor from the Talcum weigh bins under Banks 7, 8, and 9. In the packaging stations, green salt was weighed, blended according to specification, sampled, and packaged into ten gallon cans.

Depleted UF_4 received in 55 gallon drums from the DOE Paducah facility was blended and repackaged into ten gallon cans to ensure quality control. Packaging Station 1 and its associated dust collector were used for this process. Components of the packaging stations included weigh hoppers, blenders, package station hold hoppers, package hoppers, and a series of conveyors and feed screws. UF_4 (depleted and enriched up to 1.25 percent E) is the only anticipated contaminant.

Storage. Drummed materials and hoppers with residual material have been stored at various times in many areas and floors of the Green Salt Plant. Stored materials included UF_4, UO_3, and 19 drums of AHF residue generated in February 1989 during the emptying and cleaning of the AHF storage tanks

located at the Old North Tank Farm (19D). Anticipated contaminants include UF_4, UO_3, depleted UF_4, U_3O_8, and aqueous HF residues.

Water Treatment (Plant 4 Sump System). The sump system comprises six floor sumps and one sump tank. The six floor sumps are located on the first floor. The collection sump tank, also known as the east sump water tank, is located in the HF recovery area of the plant. Originally, two sump tanks, the collection sump tank and a filtrate sump tank (also known as the west sump tank), were located in the HF recovery area. Floor sump liquids were neutralized with lime in the collection sump tank and filtered through a plate-and-frame filter; then the filtrate was collected in the filtrate sump tank, which was removed sometime after 1986. The collection sump tank also received water from the HF filters via the KOH recirculation tank and wash waters from the UF_4 hoppers. Filtrate collected in the filtrate sump tank was subsequently discharged to the General Sump (18B). Solids collected during filtration were drummed, sampled, and sent to the Recovery Plant (8A) for recovery. Water from the HF scrubber was directed to the KOH recirculation tank and discharged directly to the General Sump.

In more recent years, after production ceased and the filtrate sump tank had been removed, liquids collected in the collection sump tank were directly discharged to either the General Sump or to the recovery plant. The sump system shows signs of deterioration, especially around the northwest and southeast sumps located in the crane bay area on the first floor of the plant. Visual observations include the presence of cracked and settling concrete and surface stains. Anticipated contaminants include UF_4, UO_3, UO_2, and HF.

Ammonia Dissociation And Nitrogen Generation Area

This process area is located on the first floor of the Green Salt Plant in the northwestern section. Anhydrous ammonia provided the feed material for both subprocesses.

Ammonia Dissociation System. Hydrogen gas was required in the hydrofluorination system fluid bed reactors to reduce UO_3 to uranium dioxide (UO_2, brown oxide). Hydrogen was generated for the fluid bed reactors by passing vaporized ammonia over an electrically heated nickel catalyst bed at a controlled temperature. The vaporized ammonia was cracked to hydrogen and nitrogen in a three to one ratio, and the hot gases were passed through a heat exchanger to heat fresh ammonia entering the ammonia dissociation system before introducing the hydrogen and nitrogen into the hydrofluorination system. The supply of ammonia was normally stored in storage tanks located in the original Bulk Tank Farm of the 1950s; however, for a certain period, ammonia was supplied to the ammonia dissociation system by the Pilot Plant Ammonia Tank Farm (19B). A large above ground horizontal tank located outside Plant 4 at the southwestern corner also stored anhydrous ammonia for use in the ammonia dissociation system. A newly constructed ammonia dissociator system was never used in the production process. Anticipated contaminants include anhydrous ammonia and catalyst (nickel).

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Nitrogen Generation. The nitrogen generation system used dissociated ammonia (hydrogen and nitrogen gas) supplied by the Plant 4 ammonia dissociation system to produce and store nitrogen gas for use during plant purging operations. The original nitrogen generator system was replaced with a new system, located along the north outside wall of the nitrogen generation room, but never placed into operational use. Ammonia is the only anticipated contaminant.

HF Recovery Area

This process area includes the subprocesses associated with hydrofluoric acid handling and is located on multiple floors in the northeastern section of the Green Salt Plant.

AHF Vaporization System. Vaporized AHF was required in the hydrofluorination system fluid bed reactors to convert UO_3 or U_3O_8 to uranium tetrafluoride (UF_4, green salt). Liquid AHF was vaporized with four vaporizers, and the vaporized AHF was then heated using two of three superheaters to obtain the required hydrofluorination process temperature. Upon exiting the superheaters, the vaporized AHF entered the hydrofluorination process at the end of the Talcum A and C reactors. The vaporizers and superheaters are located in the HF recovery area on the third and fourth levels, respectively. Anticipated contaminants include anhydrous HF, mercury, and ammonia.

Hydrofluoric Acid Recovery System. The hydrofluoric acid recovery system was designed and used to collect unreacted hydrogen fluoride (HF) gas exiting the production process. AHF vapor, which moved countercurrent to the production flow, exited each chemical reactor bank as dilute hydrogen fluoride. The HF exited each chemical reactor bank at the beginning of the first chemical reactor in the series (the Talcum A reactor), and the vapors were routed through Adams filters and through carbon-tubed Karbate condensers. Residual vapors that passed through the Karbate condensers were scrubbed with water to form dilute hydrofluoric acid (DHF). The gas stream was further processed through KOH scrubber units for recovery and neutralization of previously unrecovered HF vapors from the HF scrubber and recovery system and for the recovery and neutralization of fugitive KOH vapors from the KOH recirculation system. The KOH scrubber system consists of two venturi scrubbers (which were operated in series); a KOH recirculation tank; and an extensive network of pipes, valves, and pumps. Anticipated contaminants include UF4, HF (up to 30 wt percent), KOH, and KF.

HF Refrigeration. The HF refrigeration system was used to reclaim HF fumes as AHF from the Green Salt Plant and Plant 7 (7A) operations. The equipment used during this process has been removed from the Green Salt Plant. HF (anhydrous and aqueous) is the only anticipated contaminant.

Two concrete chip samples, 12 concrete core samples (three depths), two loose media samples seven steel coating samples, one transite sample, and two unknown liquid samples were collected to characterize the contamination in this component. The following presents the results of the analyses of this sample.

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Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected. For nine of the detected radioactive constituents (radium-226, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 380, a larger margin than any other radioactive constituent.

Concrete Cores

A total of three concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, and technetium-99) were detected. For eight of the detected radioactive constituents (lead-210, radium-226, radium-228, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 170, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 15 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, strontium-90, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 24, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 16 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, strontium-90, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For two of the detected radioactive constituents (radium-228 and technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 6.8, a larger margin than any other radioactive constituent.

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Steel Coatings

A total of four steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (strontium-90) were detected. For 17 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 200, a larger margin than any other radioactive constituent.

Supplemental Media

Two loose media and three unknown liquid samples were collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected in the loose media and all except two (cesium-137 and neptunium-237) in the liquids.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For 14 (antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, potassium, selenium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 490. The lead concentration in two samples from this component exceeded 20 times the TCLP limit. These samples were collected from the hydrofluorination area.

Concrete Cores

A total of three concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For 17 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, potassium, selenium, silver, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 29. There were no detections greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (antimony and thallium) were detected. For 12 of the detected inorganics (aluminum, arsenic, barium, chromium, copper, iron,

lead, mercury, nickel, potassium, selenium, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, selenium was the most significant, exceeding the concrete baseline by a factor of 7.9. There were no detections greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For 14 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, potassium, selenium, silver, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, selenium was the most significant, exceeding the concrete baseline by a factor of 13. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

A total of four steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For 11 of the detected inorganics (arsenic, chromium, copper, iron, manganese, mercury, nickel, potassium, selenium, silver, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, selenium was the most significant, exceeding the steel coating baseline by a factor of 93. The concentration of inorganics in six samples from this component exceeded 20 times the TCLP limit for one or more of the following: arsenic, cadmium, chromium, lead, mercury, selenium. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

Two transite samples, both collected from the Hydrofluorination process area, were collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, barium, chromium, lead, and mercury were detected in at least one sample. None of the results exceeded their respective TCLP limits of 100 mg/L for barium, 5.0 mg/L (for both chromium and lead) and 0.2 mg/L for mercury.

Supplemental Media

Two loose media samples were collected from this component for inorganic analyses. Only beryllium and thallium were not detected. Arsenic, chromium, lead, mercury, and selenium were each detected at concentrations exceeding 20 times the respective TCLP limits in both samples, one collected each from the Hydrofluorination Area and the HF Recovery Area

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Two unknown liquid samples were collected from this component for inorganic analyses. Antimony, beryllium, selenium and thallium were the only inorganic analytes not detected, but none of those detected exceeded the respective TCLP limit.

Summary of Semivolatile Organic Contamination

Transite

Two transite samples, both collected from the Hydrofluorination process area, were collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

The two loose media samples were analyzed for semivolatile constituents. Those semivolatile constituents that have detectable concentrations are: 1,4-dichlorobenzene; 2,4-dihclorophenol; 2,4-dinitrotoluene; 2-clorophenol; 2-methylnaphthalene; 4-chloro-3-methylphenol; 4-nitrophenol; acenaphthene; anthracene; Benzo(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(g,h,i)perylene; Benzo(k)fluoranthene; carbazole; chrysene; di-n-butyl phthalate; di-n-octyl phthalate; dibenzo(a,h)anthracene; dibenzofuran; dimethyl phthalate;fluoranthene; fluorene; hexachlorobtadiene; indeno(1,2,3-cd)pyrene; n-nitroso-di-n-pro;ylamine; naphthalene; pentachlorophenol; phenanthrene; phenol; pyrene; bis(2-ethylhexyl)phthalate; and o-methylphenol. 2,4-Dinitrophenol was the only one of these having a concentration exceeding 20 times the TCLP limit.

Two unknown liquid samples were analyzed for semivolatile constituents. Seven were detected. These are 2,4-dichlorophenol;2,4-dimethylphenol; di-n-octyl phthalate; fluoranthene; phenol; bis(2-ethylhexyl)phthalate; and p-methylphenol. None of those detected exceeded the respective TCLP limit.

Summary of Volatile Contamination

Transite

Two transite samples, both collected from the Hydrofluorination process area, were collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

The two loose media samples were the only ones analyzed for volatile constituents. Those volatile constituents that have detectable concentrations are: 1,1,1-trichloroethane; benzene; ethylbenzene; and (total) xylenes. None of these concentrations were greater than 20 times the respective TCLP limits.

Two unknown liquid samples were analyzed for volatile constituents, yet none were detected. Since no major media were analyzed for any organic constituents, supplemental media cannot support findings.

Summary of Pesticide/PCB Contamination

No major or supplemental media were sampled for pesticide/PCBs in the Green Salt Plant.

A.IV.3.6 Metals Production Plant (5A)

The Metals Production Plant (5A) is a three-story, irregularly shaped building consisting of a structural steel frame with transite siding and roofing panels on a concrete base. The first floor, the partial third floor, and a portion of the second floor are made of concrete, while diamond plate steel grating makes up the remainder of the second floor.

The main functions of the Metals Production Plant were reduction of uranium tetrafluoride (UF_4) to produce uranium metal derbies and remelting derbies and recycled uranium for casting into ingots. Other processes within the Metals Production Plant included sawing ingots into various sizes, machining graphite components used in ingot casting, derby breakout, preparation of used magnesium fluoride (MgF_2) for milling (recycling) and reuse in lining reduction vessels, and sampling metal products for quality.

The Metals Production Plant has one inactive HWMU located in the central area of the plant. This unit is considered a HWMU because it is reported to have handled ignitable liquids and benzene. The closure for this unit is planned under CERCLA. Filter and hold-up materials are the only materials to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

The Metals Production Plant contains 12 process areas, as described below.

Reduction

The reduction area occupies the southern portion of Plant 5. Two distinct process lines existed, on the east and west sides. The east process line generally processed depleted uranium materials, while the west side processed depleted, enriched, and normal uranium materials. Steel reduction pots were lined with MgF_2 slag, filled with a mixture of UF_4 and Mg, and capped with more MgF_2 slag. The pots were lidded and then heated in resistance element furnaces to initiate the exothermic reaction, which resulted in a chemical reduction reaction and the formation of uranium derbies. The pots were subsequently cooled in an air tank and then a water tank. After cooling, the derbies and the MgF_2 slag were "broken out" in the derby breakout booth to separate the uranium metal derby from the slag. The MgF_2 was screened and sized for transfer to the Slag Recycling Building (55A), where it was milled and returned to the reduction area for reuse. Currently, a large portion of the floor space

in the reduction area is used for waste materials drum storage. Potential contaminants include uranium metal, UF_4, UO_3, MgF_2, magnesium, mercury, lead, chromium, cadmium, and MgO.

Remelt

The remelt area occupies a large portion of the northern half of the Metals Production Plant. There are 28 vacuum induction remelt furnaces, 14 each on the east and west sides, and supporting equipment. The furnaces on the east side generally processed depleted and normal uranium; those on the west side processed enriched uranium. The tops of the remelt furnaces (2nd-floor level) are connected by an oval-shaped enclosure. Within the continuous-loop enclosure, the uranium derbies and recycled uranium were loaded into graphite crucibles, then conveyed to vacuum induction furnaces for melting and pouring to coated graphite molds. Cast uranium ingots were then removed from the molds and sent to be cropped. The molds were cleaned and recoated in the mold preparation process area. Residual uranium in crucibles was flame oxidized for removal. The furnaces are currently empty. However, two partially fired steel reduction pots (containing UF_4, Mg, and MgF_2) remain adjacent to the east bank of remelt furnaces. Potential contaminants include: U_3O_8, lubricating oil, MgO, magnesium, lead, zirconium, chromium, and zinc.

Ingot Cropping

After casting, the uranium ingots were cut to remove the upper portions (top crops), which contained higher concentrations of impurities and shrinkage cavities. Long ingots were also cut to form two smaller billets. The ingots were cut by one of three (3 ft diameter) ingot saws. During cutting, the saws used a water soluble coolant that was filtered and recirculated within the unit. Saw chips filtered from the coolant were sent to the Metals Fabrication Plant (6A), where they were pickled and pressed into briquettes to be remelted for recycle. Potential contaminants include uranium metal (up to 1.25 percent E) and lubricating oil.

Saw Sharpening

The ingot saws were sharpened, re-toothed, and otherwise maintained in the saw sharpening area. Items stored in the saw sharpening area include spare saws and saw repair equipment. The saw sharpener (Rotoclone) and the saw sharpener dust collector were removed in 1989.

Mold Preparation

The mold cleaning booth is located on the first floor of Plant 5, north of the separation booths. After molds and ingots were separated, molds entered the mold cleaning booth to remove the mold release agent and black oxide (U_3O_8). There the molds were rotated (on the mold rotator unit), scraped clean, recoated with terra paint (zirconia silicate), and dried for reuse. The mold cleaning booth currently contains the mold rotator unit and a small amount of residual dust from the last time it was used in production. The associated dust collector has been removed. Potential contaminants include U_3O_8, zirconium oxide, MgO, and yttria.

Graphite Machining

The graphite machining area occupies the northwestern corner of the second floor of the Metals Production Plant. Graphite blanks for crucibles, molds, and pour plugs were machined to specifications. Currently, stored equipment includes several lathes, drills, and saws. U_3O_8 is the only anticipated contaminant.

Hilco Oil Reclaimer

The Hilco Oil Reclaimer occupies an area in the northeastern corner the second floor of Plant 5. Used oil from the remelt furnace vacuum pumps was collected in a tank and processed for recovery (heated and filtered). The used oil remaining in this tank and the materials collected on the filters have been declared hazardous wastes, and the entire system has been reported as a Hazardous Waste Management Unit (HWMU) for storage. The processed oil was stored in a clean oil tank for reuse by the vacuum pumps. Anticipated contaminants include uranium, cooling oil, perchloroethlyene, and benzene.

South Staging

The south staging and storage area resides in the south end of the Metals Production Plant on all three floors. Originally, the area stored raw materials (UF_4, Mg, and MgF_2) and spare equipment for the reduction processes. Currently, the area is being used for drum storage (enriched, normal, and depleted uranium) and storage of other uranium items on pallets. Potential contaminants include UF_4, UO_3, Mg, and MgF_2.

North Staging

The north staging and storage area resides in the north end of the first floor of the Metals Production Plant. Originally, the area stored graphite for machining and staged molds, crucibles, and metal for the remelt process. Currently, the area is being used for drum storage (enriched, normal, and depleted uranium) and storage of other uranium items on pallets. Potential contaminants include U_3O_8 and uranium (up to 1.25 percent E).

Water Treatment

All of the floor sumps in Plant 5 were pumped to a 6,000-gallon stainless steel tank that pumped through a plate and frame filter to the General Sump. Since 1983, the collected material has been pumped to the Metals Fabrication Plant for treatment. Potential contaminants include U_3O_8, UF_4, hydraulic oil, lubricating oil, and cooling oil.

Plasma Spraying

The plasma spraying unit is new, unused equipment, similar to that used in the Pilot Plant Annex (37). The unit was installed to plasma coat graphite crucibles with inert materials. Potential contaminants include zirconium and zirconium oxide.

Maintenance

The maintenance area was used to maintain all Plant 5 equipment. Tools, equipment, and spare parts are stored there. Potential contaminants include: U_3O_8, UF_4, trichloroethylene, and 1,1,1-trichloroethane.

From this component, 11 concrete chip samples, 18 concrete core samples, 19 steel coating samples, and one transite sample were collected for characterization. Four loose media samples were collected to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of ten concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, lead-210, and strontium-90) were detected. For 13 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 690, a larger margin than any other radioactive constituent.

One concrete chip sample from this component were also analyzed for radioactive constituents using the TCLP test (see Appendix A.II for complete results). The results from these analyses indicate a wide variation in the leachability of radionuclides and elemental uranium from acid brick, from 0.2 percent (radium-226) to 11 percent (technetium-99).

Concrete Cores

A total of three concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (lead-210, plutonium-241, and strontium-90) were detected. For 11 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-239/240, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 530, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (lead-210, plutonium-241, and thorium-232) were detected. For nine of the detected radioactive constituents (cesium-137, neptunium-237, plutonium-239/240, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its

respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 350, a larger margin than any other radioactive constituent.

A total of four concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, lead-210, neptunium-237, plutonium-241, and strontium-90) were detected. For six of the detected radioactive constituents (technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 75, a larger margin than any other radioactive constituent.

Steel Coatings

A total of ten steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and strontium-90) were detected. For 14 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-239/240, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Americium-241 exceeded its baseline concentration by a factor of 120, a larger margin than any other radioactive constituent.

Supplemental Media

Five loose media samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (lead-210) were detected.

Summary of Inorganic Contamination

Concrete Chips

A total of ten concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (cobalt, mercury, selenium, and thallium) were detected. For 18 (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 300. The lead concentration in one sample from this component exceeded 20 times the TCLP limit. This sample was collected from the graphite machining area.

One concrete chip sample from this component were also analyzed for inorganics using the TCLP test (see Appendix A.II for complete results). No TCLP metals were detected at greater than 20 times the TCLP limit. The results from these analyses indicate a wide variation in the leachability of inorganics from concrete chips, from 0.1 percent (lead) to 53 percent (beryllium) of the TAL

inorganics, and a maximum of 6 percent (cadmium) of any TCLP metal, leached out in the TCLP test.

Concrete Cores

A total of three concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, cobalt, mercury, and thallium) were detected. For ten of the detected inorganics (calcium, chromium, copper, iron, lead, manganese, nickel, selenium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 350. The concentration of lead in two samples of the top ½-inch of concrete cores exceeded 20 times the TCLP limit. One sample was from the Hilco oil reclaimer, and one sample was from the pickling area.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cobalt, mercury, selenium, and thallium) were detected. For 12 of the detected inorganics (arsenic, barium, calcium, chromium, copper, iron, lead, manganese, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 20. There were no detections greater than 20 times the TCLP limit.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cobalt, mercury, selenium, and thallium) were detected. For ten of the detected inorganics (aluminum, barium, beryllium, calcium, chromium, copper, lead, manganese, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 11. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

A total of ten steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (thallium) was detected. For 13 of the detected inorganics (aluminum, antimony, barium, chromium, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the steel coating baseline by a factor of 4.8. The concentration of inorganics in five samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, cadmium, chromium, lead, mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

One transite sample, collected from the Reduction process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, only barium was detected. The barium result was well under the TCLP limit of 100 mg/L.

Supplemental Media

Five loose media samples were collected from this component for inorganic analyses. Beryllium, selenium, and thallium were the only inorganics not detected. Chromium, lead and mercury were greater than 20 times the respective TCLP limits five, five, and two times, respectively. The five chromium samples were collected from the Remelt Area (2), the Reduction Area (1), and the Water Treatment Area (2). The five lead samples were collected from the Remelt Area (2), the Reduction Area (1), and the Water Treatment Area (2). The two mercury samples were collected from the Remelt Areaand the Reduction Area.

Summary of Semivolatile Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of semivolatile organic contaminants. No semivolatiles were detected.

Transite

One transite sample, collected from the Reduction process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

Five loose media samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only eight (benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, di-n-butyl phthalate, fluoranthene, phenanthrene, and pyrene) were detected. There are no TCLP limits for any of these detected semivolatiles.

Summary of Volatile Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only four (2-hexanone, 4-methyl-2-pentanone, ethylbenzene, and total xylenes) were detected. There are no TCLP limits for the volatiles detected.

Nine concrete chip samples from this component were analyzed for volatiles using the TCLP test (see Appendix A.II for complete results). Only five volatiles (2-hexanone, 4-methyl-2-pentanone, ethylbenzene, xylene (total), and toluene) were detected in the solid samples, with eight volatiles (1,1,1-trichloroethane, 1,1-dichloroethene, 2-butanone, carbon disulfide, chlorobenzene, ethylbenzene, toluene, and xylene(total)) detected in the leachate. Several of the volatiles were detected in more than one sample. There are no TCLP limits for the detects found in the solid media, however, there are limits for 1,1-dichloroethene, 2-butanone, and chlorobenzene found in the leachates. None of the leachates, however, exceed their respective TCLP limits. A percent leached value is difficult to calculate due to the large number of non-detect results, however, for the samples that could be calculated, the percent leached ranges from 4 percent (xylene (total)) to 11.4 percent (ethylbenzene). As discussed in Attachment A.II.7, no concrete is expected to be characteristically hazardous for volatiles.

Concrete Core

A total of three concrete core samples from the top half inch depth were collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (ethylbenzene, toluene, and total xylenes) were detected. There are no TCLP limits for the volatiles detected.

A total of three concrete core samples from the second half inch depth was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (ethylbenzene, toluene, and total xylenes) were detected. There are no TCLP limits for the volatiles detected.

A total of three concrete core samples from the bottom (1" to 4") depth was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two (ethylbenzene and total xylenes) were detected. There are no TCLP limits for the volatiles detected.

Transite

One transite sample, collected from the Reduction process area, was collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

A total of five loose media samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (bromoform) was detected. There is no TCLP limit for bromoform.

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Summary of Pesticide/PCB Contamination

No major or supplemental media were sampled for pesticide/PCBs contamination.

A.IV.3.7 Metals Fabrication Plant (6A)

The Metals Fabrication Plant (6A) is a single-level, irregularly shaped building, with a partial basement 20 ft deep. Plant 6 consists of a structural steel frame on a reinforced poured concrete base and floor with transite siding and roofing.

The Metals Fabrication Plant was designed to perform major uranium metal fabrication processes, including rolling, machining, heat treating, pickling, scrap metal briquetting, and inspection/packaging of products. All processes were discontinued in 1989; however, the process equipment has not been dismantled or removed from the building. Some machining equipment has been removed from the building for drum storage.

The major processes performed in the Metals Fabrication Plant are described as follows. The anticipated contaminants for Plant 6 are summarized below for each process area.

Rolling Mill Area

The Rolling Mill was constructed in 1952 to roll uranium ingots (received from Plant 5) into rods, flats, or ovals as required. The Rolling Mill was constructed in, and currently occupies, the majority of the western half of Plant 6 (known as the Mill Room). The equipment has been abandoned in place and is largely inaccessible because of uranium dust contamination. Consequently, a portion of the information provided by this report has not been field verified. A 1000-mCi radiation source remains in the ingot inspection area of the mill (south of the control booth). Subgrade access to the mill exists throughout most of the Rolling Mill bay; this also was not visually inspected.

Production from the Rolling Mill was permanently shut down in the 1970s; however, materials were generally not removed from tanks, furnaces, and other equipment. Additionally, the NuSal Furnace (originally part of the Rolling Mill process area) was used during the 1980s for beta heat treating ingots before shipment for extrusion. The Rolling Mill process area includes the subprocesses detailed below. Anticipated contaminants include uranium metal, lithium carbonate, and potassium carbonate.

New Ingot Furnace. Uranium metal (in the form of ingots) was received by the ingot storage area to be scheduled for rolling. The ingots were stored until they were charged to the ingot furnace. The New (automatic) Ingot Furnace was an electrically heated, continuous liquid bath furnace that heated the ingots sufficiently to allow rolling. A salt bath of lithium carbonate (Li_2CO_3) and potassium carbonate (K_2CO_3) was used as the heating medium. The New Ingot Furnace delivered the heated ingot to the Blooming Mill approach table.

Blooming Mill. The function of the reversing Blooming (billet) Mill was to reduce the cross-sectional area of a heated ingot (as received from the New Ingot Furnace) to a point where the size and shape of the pieces were suitable for further cross-sectional reduction in the Continuous Bar Mill. The ingots were discharged from the Blooming Mill onto the runout table.

Cropping. The cropping step followed rough rolling in the Blooming Mill and removed the end portion of the billet that had been distorted or "fish-tailed" during the blooming process. Cropping was accomplished with 60-ton up and down cut shears. The subsequent cropped material was sent for further processing in the Metals Fabrication Plant. The crop ends were cooled in a water-filled tank and sent to the Metals Production Plant (5A) casting area for recycling.

Equalizing Furnace. The function of the Equalizing Furnace was to receive the oval billets (after they had been rolled, cropped, and cut into lengths) and increase their temperature. The furnace was also used on occasion to reheat round bars, which already had been run through the Continuous Bar Mill but required a further reduction in cross section. Like the New Ingot Furnace, the Equalizing Furnace was electrically heated and used a salt bath of Li_2CO_3 and K_2CO_3 for a heating medium.

Continuous Bar Mill. The function of the continuous Bar Mill was to convert oval billets (as received from the Blooming Mill) to round bars so that they could be fed to the Core Machining process to produce slugs. The continuous Bar Mill received billets rolled by the Blooming Mill, cropped and cut to length by the Crop Shear, and brought to the correct temperature in the Equalizing Furnace. The Continuous Bar Mill consisted of alternate vertical and horizontal rollstands set in a straight line. Oval passes were cut in the vertical rolls at stands 1, 3, and 5 while round passes were cut in the horizontal rolls at stands 2, 4, and 6. This mill was designated "continuous" because the billet passed from stand to stand and was not reversed for multiple passes through a single stand.

Electrical Bay and Basement. The extreme western north-south bays of Plant 6 contain the electrical switching, transformer, and disconnect apparatus for support of the Rolling Mill operation. In addition, a basement area exists under a portion of the electrical bay.

Machining Area

The machining process area makes up much of the area in the eastern portion of the Metals Fabrication Plant and includes the following subprocesses:

Core Machining. The primary function of the machines in the Core Machining area was to fabricate uranium rods into finished slugs. Rods were received from the Rolling Mill. More recently, tubes were received from Reactive Metals Inc. (RMI). The routing of a slug through the machining area was dependent on the specifications to be met.

The Core Machining area currently contains two cutoff lathes separated by three earlier cutoff lathes, a drill press, a lathe, a chip conveyor, two vacuum cleaner units, a condensate tank, and a robot. This equipment has been generally cleaned of metal waste, and coolant oil has been drained. However, machine oil remains within the casings of these machines. The chip conveyor also has been cleaned, but the vacuum cleaner units may not have been cleaned out. Anticipated contaminants include uranium metal, U_3O_8, hydraulic oils, and water-soluble oils.

Inspection Area. The Inspection Area covers a large portion of the northeastern quadrant of Plant 6. The primary operations of the area were to inspect finished slugs and to ensure that the slugs met all specifications established by both the FMPC and its respective customers. Although the specific layout of inspection equipment and stored product areas changed over the years, this area of the plant was always used primarily for inspection operations. As recently as 1989, equipment in the Inspection Area consisted of a roller conveyor with gravity and powered sections, a gauging jig, ultrasonic testing machines, scales, and wheeled carts for transporting shipping boxes. The anticipated contaminant is uranium.

Miscellaneous Machining. Flat cropping and sampling operations were performed on horizontal milling machines located in the southeastern areas of Plant 6. Cropping entailed cutting the rough or top end of a flat billet resulting from the casting process in Plant 5 (5A). Sampling was accomplished by drilling and cutting a small piece from the flat, for laboratory testing. Milling machines in the 4A Program (tank shielding) machined uranium flats for the U.S. Army in the 1980s. Anticipated contaminants include uranium metal, cooling and hydraulic oils.

Maintenance Shop and Tool Machining. A local maintenance area is located northeast of the main portion of the core machining area. This shop provided specialized maintenance for Plant 6 machines and processes. A large machining area was also associated with the maintenance shop to provide the cutting tools and jigs necessary for machining of uranium metal in the main machining operations.

Chip Briquetting

Uranium turnings, machining chips, and uranium sawdust from the operations of Plants 5, 6, and 9 were collected, washed, pickled (in nitric acid), and crushed to form dense metal briquettes for remelt casting feed. This process was performed in the southeastern corner of the Metals Fabrication Plant. Anticipated contaminants include uranium metal, U_3O_8, lubricating oil, hydraulic oil, coolant oil, and ammonia.

Heat Treating Area

The Heat Treating process area included two subprocesses performed in the south of Plant 6.

Salt Water (NuSal) Heat Treating. The purpose of Beta Heat Treating was to transform the grain structure and relieve stresses of uranium rod stock by heat treating the rods in a salt bath furnace.

Beta Heat Treating facilities were not included in the original (1952) plant layout; however, the facilities were in place by 1958. During the years of Rolling Mill operations, the Beta Heat Treating facilities were used to process rods as they left the flying shear. The Beta or Salt-Water (NuSal) Heat Treating System consisted primarily of a furnace and a water quench tank. The furnace used a 50/50 blend of sodium chloride (NaCl) and potassium chloride (KCl) as a heating medium. Anticipated contaminants included uranium metal, sodium chloride, and potassium chloride.

Amsler-Morton Furnace. The Amsler-Morton Furnace is adjacent to the Enriched Uranium Restricted Area in the southeastern corner of Plant 6. The area is inaccessible because of high radiation exposure rates; consequently, information in this report has not been field verified. The furnace was used to heat-treat cores until its shutdown in 1970. Like the NuSal Heat Treating Furnace, the Amsler-Morton Furnace used a 50/50 blend of NaCl and Kcl. The area also houses a water quench tank. Anticipated contaminants include uranium metal, cooling oil, sodium chloride, and potassium chloride.

Vacuum Outgas Furnace

The Vacuum Outgas Furnace has a refractory-lined heating zone and a water-cooled cooling zone. The furnace and associated instrumentation are currently located at the extreme southern end of Plant 6. The furnace was used for outgassing and baking mold coatings of graphite molds that were used in Plants 5 and 9. The Vacuum Outgas Furnace is currently empty.

Old Water Treatment

The Old Water Treatment Plant, also known as the Plant 6 Sump, is located in a separate room in the northwestern corner of Plant 6. The Old Water Treatment facility started up when the plant opened in 1952. Some components of the facility currently remain in use.

During the production era, typical wastes sent to the water treatment process included acidified wastewater from the briquetting carousel sumps, slug washer tank fluids, and scrap pickling tank fluids. The aforementioned liquids were pumped to the 6000 gallon acid-hold tank or to the Scrap Pickling outside spent acid tank. Other treated liquids included nonacid and/or oily wastewater from floor sumps, nearby buildings, pads (storm runoff and fire deluge), oil clarifiers, and the Rolling Mill. These liquids were pumped to the 10,000 gallon inside settling tank or temporarily to the outside tank. Anticipated contaminants include: MgO; lithium chloride; NaOH; cooling oils; lubricating oils; trichloroethylene; 1,1,1-trichloroethane; lead; carbon tetrachloride; and barium.

Pickling Area

The Pickling process area includes two pickling processes, an acid gas handling process, and the machining processes coolant clarifier process.

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Scrap Pickling. The Scrap Pickling equipment consists of a three-compartment stainless steel rectangular tank that rests on the floor such that the uncovered top is approximately waist-high. Uranium scraps, ingots, and debris were routinely cleaned of surface oxidation in the Scrap Pickling area. The pieces were processed in mesh baskets or trays and then submerged in and moved between the tanks by an overhead track/hoist system. The entire Scrap Pickling system was drained at plant shutdown in 1989. The tanks are free of visible residue. The trench behind the unit is visibly empty; however, the sump pump area currently contains liquids. Anticipated contaminants include: uranyl nitrate cooling oils, U_3O_8, ammonia, cadmium, chromium, lead, benzene, chlorobenzene, toluene, and trichloroethylene.

Slug Pickling. Various types of uranium cores (collectively known as "slugs") were cleaned in this assembly line process. The slug washer used a concentrated caustic spray solution as the first step for removal of residual oil, dirt, and salt from the slugs. Following a water spray rinse, some products were moved off-line if pickling was not required, but most passed through a concentrated nitric acid dip, followed by a water rinse. The process continued with a neutralization rinse, followed by a hot water spray-and-dip rinse, and ended with hot air drying. The fluids in all of the Slug Pickling tanks, and the fan-forced air in the dryer, were heated by steam and/or hot-water internal heat exchangers. Anticipated contaminants are ammonia and hydraulic oil.

Coolant Clarifiers. Three coolant clarifiers with rakes and pumps are located near the east side of the Metals Fabrication Plant. The coolant oil from the Acme-Gridley machines, Turret Lathes, Heald Borematic machines, Centerless Grinders, and Cross Transfermatic machine went through clarifiers, where the insoluble oil layer was skimmed with rakes. The Coolant Clarifier units consisted of three primary components: a tank, flotation cell, and sludge scraper mechanism. The tank was constructed with two compartments, for dirty and clean coolant. The flotation cell included a motor drive rotor-stator assembly that provided a froth to entrain the insolubles and two skimmers driven by a separate motor. The sludge scraper mechanism contained a series of scrapers mounted on a drag chain conveyor that was driven at slow speed by a separate motor. Anticipated contaminants include: uranium metal, cooling oil, water-soluble oil, and hydraulic oil.

NO_x Destructor. The NO_x Destructor equipment was installed to serve various acid-related pickling processes in Plant 6: the Scrap Pickling operation, part of the Briquetting Carousel, and part of the Slug Washer line. Fumes from collection hoods over those processes were ducted directly to the bottom of the NO_x Destructor's first scrubbing tower. Flow through the system was provided by a blower in the roof-mounted exhaust stack. The fumes travelled up the first scrubber, exited at the top, entered the bottom of the second scrubber, and finally exited. Sodium sulfide (Na_2S) solution provided the NO_x destruction capability. Anticipated contaminants are sodium sulfide and NaOH.

Six concrete chip samples, 15 concrete core samples, one loose media sample, seven steel coating samples, one transite sample, and two unknown liquid samples were collected from this component for characterization. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of five concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, neptunium-237, plutonium-241, and strontium-90) were detected. For ten of the detected radioactive constituents (americium-241, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 860, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For three of the detected radioactive constituents (radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 9.9, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.7, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (lead-210) were detected. For 15 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-238,

plutonium-239/240, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 240, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and three unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, lead-210, and thorium-232) were detected in the loose media and all except seven (cesium-137, lead-210, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, and thorium-232) in the liquids.

Summary of Inorganic Contamination

Concrete Chips

A total of five concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, mercury, selenium, and thallium) were detected. For 16 (aluminum, arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, manganese, nickel, potassium, silver, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 320. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for lead (greater than 100 mg/kg). These samples were collected from the rolling mill area and the vacuum outgas furnace.

Concrete Cores

A total of three concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and thallium) were detected. For 17 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 72. The concentration of inorganics in two samples of the top ½-inch of concrete cores from this component exceeded 20 times the TCLP limit. One sample from the old water treatment area exceeded the limit for chromium. One sample from the pickling area exceeded the limit for lead.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, mercury, selenium, and thallium) were detected. For 11 of the detected inorganics (aluminum, arsenic, chromium, cobalt, copper, iron, lead, nickel, potassium, sodium, and zinc), the maximum

concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 81. The concentration of lead in one sample of concrete cores from a depth of ½ to 1-inch from the pickling area exceeded 20 times the TCLP limit.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, selenium, and thallium) were detected. For 11 of the detected inorganics (aluminum, cadmium, chromium, cobalt, copper, lead, mercury, potassium, silver, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 22. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of inorganics. All 23 inorganic constituents were detected. For 12 of the detected inorganics (aluminum, antimony, barium, beryllium, calcium, chromium, iron, magnesium, manganese, potassium, silver, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the steel coating baseline by a factor of 21. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, chromium, lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

One transite sample, collected from the Rolling Mill process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, none were detected.

Supplemental Media

One loose media sample was collected from this component for analyses of inorganic constituents. All 23 constituents were detected except beryllium and thallium. Chromium, lead, and selenium concentrations exceeded 20 times the respective TCLP limits in this sample collected from the Rolling Mill Area.

Three unknown liquid samples were analyzed for inorganic constituents. Of 23 constituents, all but six (antimony, arsenic, beryllium, cadmium, mercury, and thallium) were detected, yet none of these exceeded the respective TCLP limits.

Summary of Semivolatile Organic Contamination

Transite

One transite sample, collected from the Rolling Mill process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

One loose media sample was collected from this component for analyses of semivolatile constituents. 2-Methylnaphthalene; di-n-butyl phthalate; di-n-octyl phthalate; fluoranthene; naphthalene; phenanthrene; and pyrene were detected, but none were above 20 times the respective TCLP limits.

Three unknown liquid samples were analyzed for semivolatile organic constituents. 2,4-Di-methylphenol and p-methylphenol were the only semivolatiles detected, but they were not above the respective TCLP limits.

Summary of Volatile Organic Constituents

Transite

One transite sample, collected from the Rolling Mill process area, was collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

One loose media sample was collected from this component for analyses of volatile constituents. 2-Butanone and toluene were detected, but neither was above 20 times the respective TCLP limits.

Three unknown liquid samples were analyzed for semivolatile organic constituents. 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethene; methylene chloride; tetrachloroethene; toluene; and trichloroethene were detected, and tetrachloroethene exceeded the TCLP limit.

Summary of Pesticide/PCB Contamination

No major or supplemental media were sampled for pesticide/PCBs in the Metals Fabrication Plant.

A.IV.3.8 Plant 6 Electrostatic Precipitator (south) (6C)

Plant 6 Electrostatic Precipitator South (6C) is a single-level building adjacent to the east side of the Metals Fabrication Plant (6A) and consists of a poured concrete base and floor, a structural steel frame, and corrugated steel siding and roofing.

The building contains an electrostatic precipitator (Precipitron), which handled exhausts vented from the machining processes in the Metals Fabrication Plant. The electrostatic elements were typically not

powered because exhausts contained moisture. This facility currently contains the Precipitron and air filters. Anticipated contaminants for Building 6C are U_3O_8 and cooling oils.

Three concrete core samples (three depths) were collected at one location to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, uranium-234, and uranium-235/236) were detected. For four of the detected radioactive constituents (lead-210, technetium-99, elemental uranium, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 170, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, and thorium-228) were detected. For six of the detected radioactive constituents (lead-210, technetium-99, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 35, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99, and thorium-232) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For three of the detected inorganics (cobalt, lead, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the

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inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 3.1. The concentration of inorganics in samples of the top ½-inch of concrete cores from this component did not exceed 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For three of the detected inorganics (lead, potassium, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the concrete baseline by a factor of 1.4. The concentration of inorganics in samples of concrete cores from a depth of ½ to 1-inch from this component did not exceed 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and thallium) were detected. For four of the detected inorganics (barium, calcium, chromium, and cobalt), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, cobalt was the most significant, exceeding the concrete baseline by a factor of 1.4. The concentration of inorganics in samples of concrete cores from a depth greater than 1-inch from this component did not exceed 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.3.9 Plant 6 Electrostatic Precipitator (North) (6E)

Plant 6 Electrostatic Precipitator North (6E) is a single-level building. The building is adjacent to the east side of the Metals Fabrication Plant (6A) and consists of a poured concrete base and floor, a structural steel frame, and corrugated steel siding and roofing.

The building contains one process area, an electrostatic precipitator (Precipitron), which handled exhausts vented from the machining processes in the Metals Fabrication Plant. The electrostatic elements were typically not powered because exhausts contained moisture. The facility currently contains the Precipitron and air filters. The anticipated contaminants are U_3O_8 and cooling oils.

Although a concrete chip sample was scheduled for this component, none was taken because the floor is inaccessible. Therefore, baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.3.10 Plant 6 Salt Oil Heat Treat Building (6F)

Salt-Oil Heat Treatment Building (6F) is a single-level, rectangular building that adjoins the south end of the Metals Fabrication Plant (6A). The building consists of a structural steel frame on a concrete base with transite siding and roofing panels. The building contains an immersion electrode salt furnace, a molten salt tank, an oil quench tank, a hot water washer with attached sump tank, two heat exchangers, a trenched floor sump, and a chain conveyor. All of the equipment is included in the salt-oil heat treating process. Anticipated contaminants are uranium metal, sodium chloride, potassium chloride, and cooling oils.

Mark 31 Target Element Cores were processed in the building salt-oil heat treating system located at the south end of the Metals Fabrication Plant. This was the only production molten salt-dip operation at the site which used oil rather than water for quenching. Heat treating and quenching operational times and temperatures were strictly controlled to achieve uniform core grain properties. The Mark 31 cores were loaded into steel baskets and heated in a 50/50 molten salt mixture of sodium chloride and potassium chloride. The furnace was electric, with three pairs of water-cooled electrodes. The cores were quenched in 131°F oil recirculated for temperature control.

Three concrete core samples (three depths collected from a single location), one masonry chip sample, one steel coating sample, and one unknown liquid sample were collected to characterize the contamination in this component. The following presents the results of the analyses of this sample.

Summary Of Radiological Contamination

Concrete Cores

A total of five concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and lead-210) were detected. For 11 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-234 exceeded its baseline concentration by a factor of 840, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, neptunium-237, plutonium-241, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 66, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, lead-210, neptunium-237, and plutonium-241) were detected. For nine of the detected radioactive constituents (americium-241, radium-228, technetium-99, thorium-228, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 23, a larger margin than any other radioactive constituent.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For four of the detected radioactive constituents (lead-210, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 78, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, neptunium-237, polonium-210, radium-226, radium-228, strontium-90, and thorium-232) were detected.

Summary Of Inorganic Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, silver, and thallium) were detected. For ten of the detected inorganics (aluminum, arsenic, barium, lead, magnesium, manganese, selenium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 13. There were no detections greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, cobalt, copper, mercury, nickel, potassium, selenium, silver, and thallium) were detected. For nine of the detected inorganics (arsenic, barium, chromium, iron, lead, manganese, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the

inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 5.6. There were no detections greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, chromium, cobalt, copper, mercury, nickel, potassium, selenium, silver, sodium, and thallium) were detected. For nine of the detected inorganics (aluminum, barium, cadmium, calcium, lead, magnesium, manganese, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 4.3. There were no detections greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (arsenic, beryllium, cobalt, mercury, silver, thallium, and vanadium) were detected. For eight (antimony, chromium, copper, iron, lead, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 9.0. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except beryllium was detected. For eight of the detected inorganics (antimony, copper, iron, manganese, nickel, potassium, silver, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the steel coating baseline by a factor of 9.5. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, cadmium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One unknown liquid sample was collected from this component and analyzed for inorganic constituents. All of 23 inorganic constituents but nine (aluminum, arsenic, beryllium, cobalt, mercury, selenium, silver, thallium, and vanadium) were detected, but none of them exceeded the respective TCLP limits.

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Summary Of Semivolatile Organic Contamination

Supplemental Media

One unknown liquid sample was collected for analyses of semivolatile organic constituents. bis(2-Ethylhexyl)phthalate was the only detected constituent, but it did no exceed the TCLP limit.

Summary Of Volatile Organic Contamination

Supplemental Media

One unknown liquid sample was collected for analyses of volatile organic constituents. Tetrachloroethene was the only detected constituent, but it did no exceed the TCLP limit.

Summary Of Pesticide/PCB Contamination

No major or supplemental media were sampled for pesticide/PCBs in the Plant 6 Salt Oil Heat Treat Building.

A.IV.3.11 Plant 6 Sump Building (6G)

The Plant 6 Sump Building (6G) is a newly built, unused, multi-story structure located on the northwest corner of the Metals Fabrication Plant (6A). The Plant 6 Sump Building is constructed of a steel frame with metal siding and roofing. The structure was built on a reinforced concrete pad.

A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1263 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 85 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.3.12 Recovery Plant (8A)

Recovery Plant (8A), a two-story structure located on the south side of 101st Street between A and B streets. The building consists of a structural steel frame on a reinforced poured concrete foundation, reinforced concrete ground floors, transite interior and exterior siding panels (insulation material between panels), and transite roof panels. The second floor is primarily steel grating with some concrete flooring. Plant 8 is attached to the new Rotary Kiln/Drum Reconditioning Building (8C) to the south. It converted uranium-containing residues and off-specification and scrap uranium metal to more suitable chemical forms for recycling to the production process in the Ore Refinery Plant (2A). The materials processed for recovery in the Recovery Plant included mostly metal chips and turnings, off-specification green salt from the Hydrofluorination Plant (4A), dust collector residues, and sump cakes.

The Recovery Plant has one inactive HWMU located in the north central area of the plant. It is considered a HWMU because it is reported to have handled solvents (EPA waste code F002). Closure for this HWMU is to be attained through CERCLA response. Steel, firebrick, concrete, and hold-up material are the materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Recovery Plant consists of 16 process areas, some of which contain or contained more than one process unit during the history of the Recovery Plant. Anticipated contaminants are summarized in the discussion of each process area.

Oxidation Furnace #1

The oxidation furnace No. 1 was installed in 1953 in the southeastern corner of the plant. It is a six-hearth, refractory-brick-lined, industrial furnace used periodically until 1988 for the recovery of enriched uranium material and the treatment of depleted uranium waste. This furnace has the same design as the oxidation furnace No. 2.

Enriched uranium scraps from several production plants were oxidized to black oxide in oxidation furnace No. 1, screened by rotexing, and then reintroduced into the production process at the Ore Refinery Plant. Alternatively, depleted uranium waste was oxidized and/or dewatered for volume reduction and free water removal before packaging for transport to disposal or storage. Besides uranium in varying levels of enrichment, some of the materials fed to the oxidation furnace in these operations contained RCRA-listed chlorinated solvents; therefore, the equipment has been identified as a HWMU under RCRA statutes.

An Amerjet dust collector and a scrubber system treat the dust and off-gas streams from the furnace. Both are considered HWMUs. The dust collector provided ventilation for the drumming station, which receives collector dust discharges, and the product drumming station. The scrubber system was a dedicated venturi scrubber that used water as the scrubbing solution and received off-gases directly from the furnace vents. Anticipated contaminants include uranium (III) oxide, uranium (up to 1.25 percent enriched), high grade residues, ammonium diuranate cakes, oily sludges, and mercury.

Oxidation Furnace #2

The oxidation furnace No. 2 is located near the east end of Plant 8, along the north wall. It is a six-hearth, refractory-brick-lined, industrial furnace that operated from the mid-1950s through 1987. The furnace is 54 inches in diameter and 25 ft high. Oxidation furnace equipment included a drum dumping station, from which the feed material was transported to the furnace via a flexible screw conveyor that discharged into the top hearth. Drop holes allowed the feed material to fall from one rotating hearth to another. Product exiting the furnace was discharged from the sixth hearth into a water-cooled screw, conveyed to a bucket elevator, and then lifted and dropped into the drum packaging station.

Several types of enriched uranium feed materials were processed through oxidation furnace No. 2, including dust collector sludges, materials such as green salt with magnesium oxide from the Green Salt Plant, and off-specification uranium from various production plants. These materials were converted to calcium uranate for reprocessing through the Ore Refinery Plant.

A Wheelabrator dust collector and a scrubber system provided treatment of dust and off-gases from oxidation furnace No. 2. The Wheelabrator unit collected dust from the furnace product drumming station and feed drum dumping station. The dedicated scrubber system was a venturi scrubber using ten percent caustic (sodium hydroxide) as the scrubber solution for off gases from the furnace vents. Anticipated contaminants include uranium (III) oxide, sodium hydroxide, calcium uranate, calcium fluoride, and mercury.

Graphite Furnace

Installed in 1953, the graphite furnace was used for only about three months in early 1960 and has been completely removed. The 2-ft-wide, 10-ft-long furnace was a moving hearth (chain grate) gas-fired furnace used for processing contaminated graphite. This graphite was mostly furnace crucibles that were jaw-crushed in the Metals Production Plant (5A), as well as select feed material, processed for the recovery of black oxide. Anticipated contaminants include uranium metal (up to 0.71 percent enrichment) and graphite.

Muffle Furnace

The muffle furnace is a single-hearth furnace built in the 1950s, used during the 1980s only for a three-week test period in 1983, and closed in-place in 1985. The unit design was a refractory-brick-lined, steel hearth capable of both forward and reverse rabbling, 8.5 ft in diameter and 20 ft in height. The furnace was operated with variable retention times to obtain complete oxidation of the feed material.

Materials fed to the furnace during the 1983 test included enriched off-specification green salt and filter cake with a high lime content. Upon completion of the test, the furnace was run to "dead bed," thereby recovering the end product, calcium uranate. This material was returned to the production operation in the Ore Refinery Plant.

A scrubber system and two Amerjet dust collectors handled off-gases and dust generated by muffle furnace operation. One dust collector controlled dust from the furnace feed drum dumping station, one of three access doors to the furnace hearth, and the dust drumming station beneath the dust collector itself. The other dust collector controlled dust from the two remaining furnace hearth access doors, the furnace product drumming station, and the dust drumming station for the scrubber itself. The dust collectors were removed in 1991. The Amerjet collectors use filter bags that, when spent, were processed through the box furnace. The scrubber for off-gases from the muffle furnace was also used for the primary calciner. The scrubber was a venturi unit using, at different times, either water

or ten percent caustic for the scrubber solution. A holding tank collected scrubber solutions that passed through the venturi to allow reuse of the water and chemical. This scrubber system was dismantled and removed in 1991. Anticipated contaminants include: U_3O_8, MgF_2, arsenic, lead, wet low grade sump cakes, prill, lithium, and potassium carbonate.

Box Furnace

The box furnace is a single, gas-fired furnace located outside the Recovery Plant, immediately adjacent to the north wall of the building next to the muffle furnace. The box furnace is constructed of angle iron and sheet metal and is lined with refractory brick. It was installed in the mid-1950s and operated intermittently for more than 30 years, converting scrap uranium into black oxide and burning other contaminated materials into ash suitable for reprocessing in the Ore Refinery Plant. The box furnace operation was relatively simple, with batch feeding, manual rabbling, and hand raking of ash into product drums.

Scrap materials fed to the box furnace included off-specification uranium and thorium tetrafluoride, dirty prill, off-specification uranium derbies from the Metals Production Plant (5A), high-uranium-content mill cleanout from the Preparation Plant (1A), and partially oxidized metal oxidation feed. Contaminated materials included rags, filters, cloth, paper, and other burnable trash containing uranium; dust collector bags from air pollution control equipment; and Rockwell smelting furnace cleanings from the Metals Production Plant (5A). The box furnace is considered to be a HWMU.

A dedicated venturi scrubber system handled off-gases from the box furnace. Water was the scrubbing solution; a holding tank near oxidation furnace No. 1 collected used scrubber water for reuse and solids settling. Anticipated contaminants include: uranium metal (up to 1.25 percent enrichment), oil, and solvents (1,1,1-trichloroethane; trichloroethylene; perchloroethylene), and magnesium.

UF_4/Th_4 Reversion

The green salt reverter was a horizontal, electrically heated, ribbon flight retort reactor used to revert scrap green salt to black oxide. Only operated for green salt reversion from 1956 to 1958, the reverter used superheated steam flowing countercurrent to the green salt feed material.

The reverter unit was used for six months in 1966 to process 59 metric tons of thorium tetrafluoride and produce thorium hydroxide, with hydrofluoric acid as a by-product. The green salt reverter was equipped with a dust collector and scrubber; all of this equipment has been removed. Anticipated contaminants include: UF_4, HF (aqueous and anhydrous), KOH, thorium oxalate, and thorium hydroxide.

Old Rotary Kiln

The old rotary kiln is located in the southeastern part of Plant 8 (8A) and operated from 1952 to 1989. It is a 5.5-ft diameter, rotating steel cylindrical kiln and is lined with refractory brick. The kiln was used for the drying, roasting, and oxidation of recoverable materials, which were fed to the unit by a second-floor feed dumping station located at the west end of the kiln. The end products containing recoverable uranium exited the east end of the kiln at the first-floor product drumming station and were reused as feed stock in the Ore Refinery Plant. The old rotary kiln also treated waste by volume reduction (dewatering) before shipment off-site.

The old rotary kiln was equipped with both a dust collector and a scrubber system. The dust collector was configured to collect particulate emissions from the drum dumper, feed tray, breach chamber, and drum packaging station of the kiln as well as the primary calciner. The dust was handled either as recovered feed material for the Ore Refinery Plant or waste, depending on uranium levels. The dust collector has been removed. The scrubber system was similar to those discussed in the earlier sections.

The materials fed to the old rotary kiln consisted of a large variety of uranium and thorium process materials, including sump cakes, magnesium fluoride, machining chips and turnings, and thorium oxide, oxalate, and hydroxide. Dry material feeding was by screw conveyor, while wet feeding was by manual raking from a drum dump tray. Kiln products could be conveyed to a silo on the Plant 8 East Pad (74C) in addition to being packed in drums. Anticipated contaminants include uranium tetrafluoride, uranium metal (up to 0.95 percent enriched), thorium, sodium hydroxide, high/low grade residues, tributyl phosphate, lubricating, hydraulic, and cooling oil sludges.

Ball Mill

The ball mill was located on the east end of the first floor of Plant 8 and was used for milling scrap uranium residues to facilitate dissolution in hydrochloric acid digesters. The ball mill has been removed. Two principal feeds to the ball mill, magnesium fluoride and crushed carbonate salts, were raked into the mill feed chute for wet milling (with water from a recycle tank) to a slurry that was transferred to a digester by pumping. Anticipated contaminants are MgF_2 and slag.

Primary Calciner

The primary calciner, installed in 1953, is located on the east side of Plant 8. Operated intermittently until 1989, the calciner consists of an eight-hearth, gas-fired industrial furnace with poured concrete hearth decks and an automatic rabble. The unit is 13.5 ft in diameter with a refractory-lined steel shell. The primary calciner was used for drying and roasting of recoverable uranium and thorium residues and wastes, but it was used exclusively for wastes processing after 1985. Many of the feeds were the same as were fed to the old rotary kiln; some of the post-1985 wastes dried in the primary calciner included slag leach cake, neutralized raffinate, and sump cake from the Eimco filter in the water treatment/filtration process. Some of these wastes, such as spent solvents, contained hazardous

constituents; therefore, the equipment has been classified as a HWMU. The primary calciner has a dust collector that also served the old rotary kiln, as described above. The scrubber system for the primary calciner was shared with the muffle furnace. Anticipated contaminants include uranium (up to 0.95 percent enriched), sodium hydroxide, magnesium fluoride, and mercury.

Rotex Screening

The vibrating rotex screening unit is located west of the primary calciner and spans both the first and second floors in the Recovery Plant. The rotex screening unit operated intermittently from the mid-1950s to 1989, separating particles of reclaimed and waste material that were larger than eight mesh from those smaller than eight mesh. The latter was shipped to the Ore Refinery Plant, while the former was incinerated in the Recovery Plant. An additional use of the rotex unit was for repackaging both recyclable and waste materials into drums.

Airborne emissions from the rotex screen were handled in a dust collector situated in the penthouse area on the roof of the Recovery Plant. This unit uses filter bags, which have been placed on the unit since the rotex screen was shut down. During routine operation, collector residues were either reprocessed in the Ore Refinery Plant, sent to the Plant 8 Old Metal Dissolver Pad (Component 74Q), or drummed as waste for disposal off-site. Anticipated contaminants are U_3O_8 and UF_4.

Williams Mill

The Williams crushing hammer mill is located on the first floor of Plant 8, between the old rotary kiln and oxidation furnace No. 1 process areas and was taken out of service in the 1960s. The Williams unit (also known as a slugger crusher) was designed for both wet and dry crushing of materials up to six inches in diameter. Feed materials were introduced into the mill via the drum dumper. Materials such as magnesium fluoride, sludge, contaminated graphite, incinerator ash, furnace salts, and dust collector sludges were reduced to fractional sizes of plus ½ inch and minus ½ inch. Williams mill products were drummed and transferred to the digesters in the hydrometallurgical system for uranium recovery processing.

The Williams unit is equipped with blowers, ductwork, and a cyclone separator for dust control. Presumably, the air discharge from the cyclone vented to the atmosphere above the roof of Plant 8. Anticipated contaminants are uranium (up to 0.95 percent enrichment) and MgF_2.

Oil Centrifuge

The oil centrifuge was located next to the uranyl ammonium phosphate (UAP) furnace and was intended to remove solids from waste oil for use as fuel for the UAP furnace. Contaminated waste oil was first held in a decant tank to remove water and then passed through the centrifuge and stored in two large storage tanks. The tanks were located on a diked concrete pad south of Plant 8. The centrifuged waste oil was never used in the UAP furnace and the centrifuge and tankage have been removed. Anticipated contaminants include: carbon tetrachloride, tetrachloroethylene,

trichloroethylene, 1,1,1-trichloroethane, acetone, ethylbenzene, methyl ethyl ketone, toluene, and xylene.

Hydrometallurgical/Treatment

This process area covers roughly the northwestern two-thirds of Plant 8 and contains or contained most of the wet processing units for scrap recovery and water/wastewater treatment. Some of the units are still in operation for storm-water and wastewater treatment.

Hydrometallurgical System. The hydrometallurgical system was the wet processing system for uranium recovery from milled, crushed, and rotexed low-grade residues. Two processes, known as the ammonium diuranate (ADU) and UAP processes, were used and consisted generally of digestion (dissolution), precipitation, filtration, and wastewater neutralization.

The UAP process, used from 1958 to 1967, consisted of digestion of the residues with hydrochloric acid in the five digestion tanks (D101 through D105) on the first floor and filtration of the slurry through the two Eimco filters, which are rotary drum vacuum filters precoated with diatomaceous earth that are located on the second floor. The filter cake (tailings) was discarded to waste pits west of the production area, while the uranium-bearing filtrate was pumped to precipitation tanks that received ammonium hydroxide and phosphoric acid feeds. The resultant slurry, containing precipitates of UAP, was filtered on two Oliver precoat rotary drum vacuum filters located on the second floor south of the digestion tanks. The UAP cake was sent to the UAP furnace for drying, while the Oliver filtrate was neutralized with caustic or lime, filtered again on the Oliver filters, and pumped to the General Sump (Component 18B). The UAP Oliver filters have been removed, while most of the rest of the UAP process units and tanks are still in place and either in use for water treatment or abandoned in place. Anticipated contaminants include uranium metal, Hcl, prill, and magnesium.

The ADU process, used from 1955 to 1957 and again from 1967 to 1971, employed two tanks located on the second floor and west of the Oliver filters that are situated along the north wall of the Recovery Plant. The filtered digestion liquor was heated and reacted with ammonium hydroxide to precipitate ADU, which was filtered on the west Oliver filter. The ADU cake was then sent to the UAP furnace, and the filtrate was treated as described above for the UAP process. Anticipated contaminants include: uranium (up to 0.95 percent enrichment), MgF_2, Hcl, copper, phosphoric acid, and ammonium hydroxide.

WINLO Process. From 1962 to 1964, the WINLO process was operated as a means of returning relatively pure, high-assay uranium materials to the Green Salt Plant. Black oxide from the furnaces and UAP and metal dissolver liquor were dissolved in hydrochloric and nitric acids and filtered on the Eimco filters. The filtrate containing uranium was then treated with 30 percent hydrofluoric acid, copper sulfate, and sulfur dioxide. The resultant green salt precipitate was filtered on a horizontal

pan filter, passed through a dryer, and sent to the Green Salt Plant for further processing. Filtrate from the pan filter was neutralized with lime slurry and pumped to a waste settling pit. All related equipment (except the Eimco filters) and tankage, including a sulfur dioxide gas tank north of Plant 8, have been removed. Anticipated contaminants include: U_3O_8, uranyl ammonium phosphate cake, Hcl, ammonia, aqueous HF, $CuSO_4$, SO_2, and UF_4.

Water Treatment/Filtration. This process served as a wastewater treatment system for the site, including storm water, process water, and perched water. Portions of the system are still in use. Wastewater streams were pumped into the digesters, where hydrated lime was added for neutralization, and the wastewater was then filtered through the Oliver filters. The filtrate was transferred to holding tanks on the north side of the Recovery Plant before being pumped to the General Sump. The Oliver filter cake was drummed and sent to the old rotary kiln or primary calciner for drying.

An exception to the above process scheme for wastewaters from other plants is the handling of raffinate sump water from the Ore Refinery Plant during the 1980s. This raffinate sump water was transferred to the Recovery Plant for the recovery of recyclable material and handled by first segregating the stream in holding tanks. Then the wastewater was treated with caustic at a Ph of ten to 11. The treated wastewater was filtered on the east Eimco filter, and the filtrate was analyzed for uranium, copper, and Ph. The filtrate was pumped to the General Sump if it proved to be in-specification.

Wastewaters from the building were collected mostly in the main floor sump, except for the spent scrubber solutions and a few small diked and sump areas on the second floor, which were pumped directly from their points of generation. From 1955 through 1971 when the hydrometallurgical processes were in operation, these wastewaters were neutralized with caustic in a neutralization tank. After 1971, the wastewaters were treated in the digester tanks, filtered, sampled, and discharged to the General Sump like the other plant wastewaters.

The Plant 8 perched water treatment unit is situated in the northwestern corner of Plant 8. The system operates under the requirements of a CERCLA removal action. This particular area was not used during the historical operating period of the Recovery Plant according to available plant records. Anticipated contaminants include: uranium, thorium, NaOH, Hcl, and diatomaceous earth.

UAP Furnace

The UAP furnace was a 6-hearth, gas-fired furnace located west of the old rotary kiln along the south wall of Plant 8. As discussed above, the UAP furnace was used to dry UAP and ADU filter cakes from hydrometallurgical processing of residues. The UAP furnace had a dust collector but apparently not a scrubber system. The furnace and dust collector have been removed. Anticipated contaminants include uranyl ammonium phosphate cake, ammonium diuranate cake, wet low grade scrap cake, mercury, and sodium hydroxide.

Thorium Storage Silo

Thorium compounds recovered in Plant 8 processes were stored in an elevated steel silo located on the Plant 8 East Pad (74C). The southeastern corner of the old rotary kiln area was the feed point for a conveyor that transferred the thorium materials outside to a bucket elevator. A raised conveyor system distributed the material for top entry into the silo. The silo and the conveyor/elevator system were removed in 1988. Because all equipment has been removed and this process area is located on another component (Plant 8 East Pad), no sampling will be proposed for this process area. Anticipated contaminants include thorium hydroxide, thorium oxalate, and thorium oxides.

Bulk Storage Tanks

Four bulk storage tanks were located north of the Recovery Plant within diked concrete containment areas with small corner sumps. Three horizontal cylindrical steel tanks currently occupy a location east of the filtrate tanks and the Plant 8 North Pad (74R). Two of the tanks are 17,000 gallons each and provide bulk storage for caustic. The third is a 12,250-gallon sodium oxalate storage tank and is marked. Historically, this area was used for the bulk storage of phosphoric acid and sulfur dioxide. The phosphoric acid tank is now being used as the sodium carbonate tank. The sulfur dioxide tank has been removed. Anticipated contaminants are NaOH and H_3PO_4.

Two masonry (one sampled for chemical contamination and one sampled for radiological contamination), 22 concrete chips, nine concrete cores (each divided into 3 samples), 29 steel coatings, 1 transite, three loose media, one sediment and two unknown liquid samples were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of 12 concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (lead-210) were detected. For 17 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 640, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241,

polonium-210, radium-228, and strontium-90) were detected. For eight of the detected radioactive constituents (technetium-99, thorium-227, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 130, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-227, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 75, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, polonium-210, and strontium-90) were detected. For eight of the detected radioactive constituents (neptunium-237, technetium-99, thorium-227, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 10, a larger margin than any other radioactive constituent.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (lead-210 and strontium-90) were detected. For 16 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 160, a larger margin than any other radioactive constituent.

Steel Coatings

A total of 16 steel coating samples was collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected. For 19 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective

concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 690, a larger margin than any other radioactive constituent.

Supplemental Media

Three loose media, one sediment and two unknown liquid samples were collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected in the loose media and sediment and all except 11 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, thorium-228, thorium-232, and uranium-235/236) in the liquids.

Summary of Inorganic Contamination

Concrete Chips

A total of 12 concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all were detected. For 22 (aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 150. The concentration of inorganics in five samples from this component exceeded 20 times the TCLP limit. These include one sample for barium (greater than 2000 mg/kg) from the ball mill area, one sample for cadmium (greater than 20 mg/kg) from the muffle furnace area, one sample for chromium (greater than 100 mg/kg) from the ball mill area, and two samples for lead (greater than 100 mg/kg) from the ball mill and UAP furnace areas.

Concrete Cores

A total of four concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, selenium, silver, and thallium) were detected. For 14 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, lead, magnesium, manganese, mercury, nickel, potassium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 76. The concentration of inorganics in two samples of the top ½-inch of concrete cores from the oil centrifuge area exceeded 20 times the TCLP limit for barium (greater than 2000 mg/kg).

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, selenium, and thallium) were detected. For four of the detected inorganics (barium, chromium, lead, and mercury), the maximum concentration of each exceeded its respective concrete

baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 6.8. There were no detections at greater than 20 times the TCLP limit.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, cadmium, selenium, and thallium) were detected. For 12 of the detected inorganics (aluminum, antimony, barium, chromium, cobalt, lead, magnesium, mercury, nickel, potassium, silver, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, antimony was the most significant, exceeding the concrete baseline by a factor of 2.8. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (beryllium, cadmium, and selenium) were detected. For eight (barium, chromium, copper, lead, mercury, nickel, potassium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 490. The chromium and lead concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. The sample was collected in the Hydrometallurgical Systems Area WINTO & Water Treatment Area.

Steel Coatings

A total of 16 steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except were detected. For 15 of the detected inorganics (aluminum, antimony, arsenic, beryllium, chromium, copper, iron, magnesium, manganese, nickel, potassium, selenium, silver, sodium, and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the steel coating baseline by a factor of 7.2. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: arsenic, cadmium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

A total of four loose media and two unknown liquid were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (selenium) were detected in loose media and all except nine (antimony, beryllium, cadmium, chromium, cobalt, mercury, nickel, thallium and

vanadium) were detected in liquids. The concentration of inorganics in one or more of the liquid media samples exceeded 20 times the TCLP limit for at least one of the following: barium, chromium, lead and silver.

One sediment sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (beryllium, potassium, selenium, silver, sodium, thallium, and vanadium) were detected. The concentration of lead in this sample exceeded 20 times the TCLP limit.

Summary of Volatile Organic Contamination

Supplemental Media

A total of four loose media, one sediment sample, and two unknown liquid samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (methylene chloride, toluene, and total xylenes) were detected in the loose media, only five (2-butanone, acetone, ethylbenzene, toluene, and total xylenes) were detected in the sediment, and only two (styrene and tetrachloroethene) were detected in the liquids. There are TCLP limits for 2-butanone and tetrachloroethene. In the sediment sample, 2-butanone was detected at 140 mg/kg, well below 20 times the TCLP limit of 4,000,000 mg/kg. In the liquid sample, tetrachloroethene was detected at 1.0 mg/L, also well below the TCLP limit of 700 mg/L.

Summary of Semivolatile Organic Contamination

Supplemental Media

Four loose media, one sediment and two unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 25 (2,4-dichlorophenol, 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, carbazole, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, o-methylphenol, phenanthrene, phenol, and pyrene) were detected in the loose media, 19 (2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene) in the sediment, and only two (4-nitrophenol and naphthalene) in the liquids. There is a TCLP for only o-methylphenol, which was detected at a maximum concentration in the loose media of 1300 mg/kg, well below the 20 times TCLP value of 4,000,000 mg/kg.

Summary of Pesticide/PCB Contamination

No media were analyzed for pesticide/PCB contamination.

A.IV.3.13 Rotary Kiln/Drum Reconditioning (8C)

Rotary Kiln/Drum Reconditioning Building (8C) is an unused, multi-story structure located directly adjacent to the south side of the Scrap Recovery Plant (8A). The Rotary Kiln/Drum Reconditioning Building is a pre-engineered steel structure with steel siding. The structure was built on a reinforced concrete pad. The Rotary Kiln Building consists of two process areas which are separated by a wall. Because it has never been used and an inspection indicated no visible chemical contamination, no intrusive samples were planned for either process area. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2680 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 504 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Although the averages for fixed and for removable surface contamination were both well below the sampling criteria, an administrative decision was made to sample the Rotary Kiln/Drum Reconditioning Building.

The Rotary Kiln/ Drum Reconditioning Building contains two process areas neither of which was used due to stoppage of production. These are described as follows:

New Rotary Kiln

The new and unused rotary kiln was installed in the Rotary Kiln/Drum Reconditioning Building to receive and dry waste residues from on-property processes. The waste residues were to be oxidized and stabilized for shipment, storage, and disposal. The new equipment includes a rotary kiln and a dust collection system.

New Drum Reconditioning

New and unused reconditioning equipment was installed to clean and refurbish storage containers.

From this component, a total of two concrete chips were collected. The following provides a summary of the results of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For three of the detected radioactive constituents (radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value.

Elemental uranium exceeded its baseline concentration by a factor of 4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For ten (aluminum, arsenic, barium, chromium, cobalt, lead, nickel, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 3. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.3.14 Special Products Plant (9A)

Special Products Plant (9A) is a single-level building. It is irregularly shaped. The building consists of a structural steel frame with transite siding and roofing panels and a poured concrete base and floor.

The Special Products Plant contains nine process areas. The primary purposes of Plant 9 were uranium reduction, uranium casting, and the following support processes: chip briquetting; scrap metal pickling; derby cleaning; Zirnlo decladding; and the production, machining, and heat treatment of uranium ingots. The recent and historical process areas are described below. The anticipated contaminants for Plant 9 are summarized with each process area.

Reduction and Derby Cleaning

These two processes used similar equipment and occurred in the same area.

Uranium Reduction. This process was similar to the one detailed for the Metals Production Plant (5A). Originally, milled dolomite was used as a pot liner for the uranium reduction process. Later, MgF_2 (a reaction by-product) was used to line the reduction pots. Liners were formed in jolters, then filled with a blend of UF_4 and Mg, lidded, and furnaced. The uranium produced from the reduction reaction was cooled and separated from the MgF_2 and dolomite. The uranium reduction area currently contains three jolters, six liner hoppers, a pot filling/blending machine, a capping and lidding station, 13 reduction furnaces, cooling tanks, and a breakout booth. Anticipated contaminants include UF_4, dolomite, MgF_2, magnesium, and prill.

Derby Cleaning. The uranium derbies were cleaned with a molten salt treatment that consisted of a 50/50 blend of lithium carbonate (Li_2CO_3) and potassium carbonate (K_2CO_3). The treatment removed any MgF_2 that adhered to the derbies. The operation was conducted in resistance element furnaces originally used for uranium reduction. Currently, eight Rockwell resistance furnaces are in the area. Anticipated contaminants include depleted uranium, lithium and potassium carbonate, magnesium, and MgF_2.

Uranium Casting

Enriched uranium derbies and recycle metal were remelted to cast 11- and 13-inch (diameter) ingots for further processing. Graphite crucibles and zirconia-coated graphite molds were used in the induction-heated vacuum NPR furnaces. After pouring an ingot, crucibles were inverted and subjected to flame oxidation to "burn out" residual uranium. Ingots were cooled and separated from the molds and sent for machining. Molds were cleaned and recoated in the Special Products Plant. Equipment in the area includes two induction furnaces, dust collection equipment, a vacuum system, and an oil reclaimer. Anticipated contaminants include uranium (up to 2.1 percent enrichment) and zirconium.

Zirnlo Decladding

The Zirnlo decladding process operated from 1963 to 1988 and was used for decladding nonirradiated fuel cores of copper and zirconium or nickel and aluminum cladding. Cores were sawed to size and placed sequentially in oxidizing and then reducing baths to remove the clad layers. Equipment in the area includes a reciprocating saw, open tanks, and holding tanks. Anticipated contaminants include: uranium (up to 2.1 percent enrichment), NaOH, aqueous HF, ammonia, copper, zirconium, nickel, and aluminum.

Uranium Machining

A variety of machining processes for uranium ingots was performed here, including top cropping, outer diameter turning, hole boring, and chamfering. Equipment includes saws, lathes, drills, and milling machines. Anticipated contaminants include: uranium (up to 2.1 percent enrichment), U_3O_8, and lubricating oil.

Heat Treating

Uranium ingots produced in the Special Products Plant were beta heat treated in NuSal salt in an ingot heat-treating furnace. Originally, the ingots were beta heat treated three times, but later the treatment was a one-step process. The Plant 9 ingot heat-treating furnace has been removed. Anticipated contaminants include: uranium (up to 2.1 percent enrichment), NaCl, and Kcl.

Scrap Metal Pickling

A nitric acid bath was used to remove surface oxidation from metal to be used for remelt feed. The pickling area currently contains a nitric acid tank, a rinse tank, and a fume scrubber. Anticipated contaminants include U_3O_8, uranyl nitrate, and ammonia.

Briquetting

Uranium chips from the Special Products Plant machining were dumped into a crusher, put into baskets, centrifuged, and then bathed in nitric acid to remove oxides. The chips were then rinsed twice with water, centrifuged, and briquetted in a press. The nitric acid tank, two water rinse tanks, two centrifuges, chip crusher, briquette press, and fume scrubber have all been removed. Anticipated contaminants include U_3O_8, ammonia, hydraulic oil, cooling oil, and lube oil.

Internal and External Remelt Furnaces

All equipment has been removed from the internal and external remelt furnace area. Equipment included four vacuum induction furnaces, two vacuum pumps, a crucible "burnout" station, pot charging and mold cleaning stations, a separation booth, and an oil reclaimer (see Metals Production Plant [5A] description). The Metals Production Plant (5A) currently contains furnaces identical to those removed from the internal and external remelt furnace area. Because the process has been removed, sampling of this area is covered under the uranium reduction and derby cleaning and the enriched uranium casting areas. The anticipated contaminant for this process area is lubricating/cooling oil.

Thorium Metal

Thorium was dissolved in nitric acid and precipitated as ThF_4 with HF. The ThF_4 was then dried, pulverized, blended with calcium and zinc chloride, and thermally reduced to a zinc-thorium derby. The derby was subsequently dezinc-ed and remelted in a vacuum furnace. Turnings, created from machining the thorium to a final form, were acid washed and briquetted for return to the remelt cycle. The thorium metal process was performed during 1954 and 1955, and all equipment has been removed. Because the process has been removed, sampling of this area is covered under the uranium reduction and derby cleaning and the enriched uranium casting areas. The anticipated contaminants for this process area are thorium tetrafluoride and zinc fluoride.

Four acid brick, six concrete chip, 18 concrete core (three depths), 14 steel coating, and one transite sample were collected to characterize the contamination in this component. Three loose media and two liquid samples were collected to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Acid Brick

A total of three acid brick samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, lead-210, plutonium-241, and strontium-90) were detected. For 11 of the detected radioactive constituents (americium-241, neptunium-237, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 750, a larger margin than any other radioactive constituent.

Concrete Chips

A total of 12 concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, lead-210, radium-226, radium-228, thorium-228, and thorium-232) were detected. For 11 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 20000, a larger margin than any other radioactive constituent.

Concrete Cores

A total of five concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and lead-210) were detected. For 11 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-234 exceeded its baseline concentration by a factor of 840, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, neptunium-237, plutonium-241, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 66, a larger margin than any other radioactive constituent.

A total of five concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four

(cesium-137, lead-210, neptunium-237, and plutonium-241) were detected. For nine of the detected radioactive constituents (americium-241, radium-228, technetium-99, thorium-228, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 23, a larger margin than any other radioactive constituent.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, lead-210, radium-226, and strontium-90) were detected. For 14 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, technetium-99, thorium-227, thorium-228, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 150, a larger margin than any other radioactive constituent.

Supplemental Media

Three loose media and two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, lead-210, and radium-226) were detected were detected in the loose media and all except one (cesium-137) in the liquids.

Summary of Inorganic Contamination

Acid Brick

A total of three acid brick samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver, and thallium) were detected. For eight of the detected inorganics (barium, chromium, copper, lead, mercury, nickel, potassium, and zinc), the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 160. The concentration of chromium in two samples from this component exceeded 20 times the TCLP limit. These two samples were collected from the Zirnlo Decladding Area and the Heat Treating Area.

Concrete Chips

A total of six concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and thallium) were detected. For 15 (arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, silver, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with

concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 54. The lead concentration of one sample from this component exceeded 20 times the TCLP limit, which for lead is greater than 100 mg/kg. This sample was from the uranium machining area.

One concrete chip from this component was also analyzed for inorganics using the TCLP test (see Appendix A.II for complete results). No inorganics were detected at greater than 20 times the TCLP limit. The other results from these analyses indicate a wide variation in the leachability of inorganics from concrete chips, from 0.7 percent (lead) to 58 percent (sodium) of the TAL inorganics, and a maximum of 16 percent (barium) of any TCLP metal, leached out in the TCLP test.

Concrete Cores

A total of five concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, selenium, silver, thallium) were detected. For 18 of the detected inorganics (aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 95. The concentration of barium in one sample of the top ½-inch of concrete cores from the triple beta heat treating area exceeded 20 times the TCLP limit.

A total of five concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, copper, mercury, selenium, and thallium) were detected. For 17 of the detected inorganics (aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 16. There were no detections at greater than 20 times the TCLP limit.

A total of five concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, copper, selenium, thallium) were detected. For 18 of the detected inorganics (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the concrete baseline by a factor of 6. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (selenium) was detected. For ten of the detected inorganics (aluminum, antimony, beryllium, cadmium, chromium, copper, magnesium, potassium, silver, and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the steel coating baseline by a factor of 4.7. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium, chromium, lead, and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

One transite sample, collected from the Uranium Machining process area, was collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, chromium was the only metal detected. The chromium result did not exceed the TCLP limit of 5 mg/L.

Supplemental Media

A total of three loose media and two unknown liquid samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (nickel, selenium, and thallium) were detected in loose media and all except five (antimony, selenium, silver, thallium, and vanadium) were detected in unknown liquid. The concentration of inorganics in one or more of these loose media samples exceeded 20 times the TCLP limit for at least one of the following: cadmium, chromium, lead, silver. The concentration of inorganics in one or more of these unknown liquid samples exceeded 20 times the TCLP limit for at least one of the following: barium, cadmium, chromium, lead, and mercury.

Summary of Semivolatile Organic Contamination

Concrete Chips

A total of four concrete chips samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only six (bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, p-methylphenol (cresol), phenanthrene, and pyrene) were detected. There is a TCLP limit for only p-methylphenol, which was detected in one sample at 650 mg/kg, well below the 20 times TCLP value of 4,000,000 mg/kg.

One concrete chip sample from this component was analyzed for semivolatiles using the TCLP test (see Appendix A.II for complete results). No semivolatiles were detected either in the solid sample or the leachate.

Transite

One transite sample, collected from the Uranium Machining process area, was collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, 1,4-dichlorobenzene, o-methylphenol, hexachlorobutadiene, and nitrobenzene were detected. Three of the four exceed their respective TCLP limits; 1,4-dichlorobenzene (17.2 mg/L detected versus TCLP limit of 7.5 mg/L), hexachlorobutadiene (14.9 mg/L detected versus TCLP limit of 0.5 mg/L) , and nitrobenzene (28.3 mg/L detected versus TCLP limit of 2.0 mg/L).

Supplemental Media

Three loose media and two unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 24 (2,4-dimethylphenol, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, carbazole, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene) were detected in the loose media and 13 (1,2,4-trichlorobenzene, 2,4-dimethylphenol, anthracene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, fluoranthene, o-methylphenol, phenanthrene, phenol, and pyrene) in the liquids. Of these, there is a TCLP for only o-methylphenol, which was detected at a maximum concentration in the liquids of 7 mg/L, well below the 20 times TCLP value of 200,000 mg/kg.

Summary of Volatile Organic Contamination

Concrete Chips

A total of four concrete chips samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (2-butanone) were detected. There is a TCLP limit for 2-butanone, which was detected in two samples at a maximum concentration of 3000 mg/kg, well below 20 times the TCLP limit of 4,000,000 mg/kg.

One concrete chip sample from this component was analyzed for volatiles using the TCLP test (see Appendix A.II for complete results). Only one volatile (2-butanone) was detected in the solid sample at 2600 mg/kg, well below 20 times the TCLP limit of 4,000,000 mg/kg. In the leachate, four volatiles (benzene, chloroform, ethylbenzene, and xylene (total)) were detected. Of the volatiles detected in the leachate, only two have TCLP limits (benzene and chloroform) and the levels found in the leachate are well below the respective TCLP limits. Because of the large number of non-detects both in the solid samples and the leachate, the percent leached cannot be calculated.

Transite

One transite sample, collected from the Uranium Machining process area, was collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

A total of three loose media and two unknown liquid samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only five (1,1,1-trichloroethane, 4-methyl-2-pentanone, benzene, ethylbenzene, and total xylenes) were detected in the loose media and only two (4-methyl-2-pentanone and total xylenes) were detected in the liquid. There is a TLCP limit for benzene, which was detected in the loose media at 18 mg/kg, well below 20 times the TLCP limit of 10,000 mg/kg.

Summary of Pesticide/PCB Contamination

No media were analyzed for Pesticide/PCB contamination.

A.IV.3.15 Plant 9 Sump Treatment Facility (9B)

Plant 9 Sump Treatment Facility (9B) is a single-level building adjoining the west side of the Special Products Plant (9A) and consists of a structural steel frame on a concrete base and floor with transite walls and roofing. Plant 9 Sump Treatment Facility treated wastewater from the Special Products Plant, originally with ammonium hydroxide (NH_4OH) and later with lime, to remove the bulk of the contaminants before wastewater transfer to the General Sump (18B). Currently, the equipment remaining in the Sump Treatment Facility includes a decant tank, an acid tank, a mix tank, two plate and frame filters, and three filtrate tanks. A single process area has been identified for the Sump Treatment Facility. The anticipated contaminants are: uranium (up to 2.1 percent E), uranyl nitrate, trichlorethylene, copper, zirconium, nickel, aluminum, sodium hydroxide, and HF.

From this component two masonry, six concrete cores (three depths), and one steel coating sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99, and thorium-230) were detected. For two of the detected radioactive constituents (lead-210 and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99, and uranium-235/236) were detected. For two of the detected radioactive constituents (lead-210 and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, and technetium-99) were detected. For six of the detected radioactive constituents (radium-228, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 3, a larger margin than any other radioactive constituent.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-241, polonium-210, strontium-90, thorium-228, and thorium-232) were detected. For nine of the detected radioactive constituents (lead-210, plutonium-239/240, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 55, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, plutonium-241, radium-226, and strontium-90) were detected. For 13 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 410, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, arsenic, beryllium, mercury,

nickel, selenium, silver, and thallium) were detected. For seven of the detected inorganics (aluminum, barium, chromium, copper, lead, potassium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 3.9. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, mercury, nickel, selenium, silver, and thallium) were detected. For seven of the detected inorganics (aluminum, arsenic, barium, beryllium, chromium, potassium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, beryllium was the most significant, exceeding the concrete baseline by a factor of 3.1. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For 11 of the detected inorganics (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, lead, nickel, potassium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 8.1. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, thallium, and vanadium) were detected. For four (chromium, copper, lead, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 33. The lead concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. The sample was collected in the Sump Treatment area.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (arsenic, selenium, silver, and vanadium) were detected. For three of the detected inorganics (chromium, copper, and magnesium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the steel coating baseline by a factor of 2.5. The concentration of inorganics in two samples from this component exceeded 20 times the

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TCLP limit for one or more of the following: chromium, lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Semivolatile Organic Contamination

Concrete Core

Only one concrete core sample at three depth intervals (0-½ inch, ½-1 inch, and 1-4 inches) was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected.

Summary of Volatile Organic Contamination

Concrete Core

Only one concrete core sample, collected from the top half inch of concrete, was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two (tetrachloroethene and total xylenes) were detected. There is a TCLP limit for tetrachloroethene, which was detected at 1.0 mg/kg , well below 20 times the TCLP limit of 14,000 mg/kg.

Only one concrete core sample, collected from the second half inch of concrete, was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (total xylenes) were detected. There is no TCLP limit for total xylenes.

Only one concrete core sample, collected from the bottom depth (1" to 4"), was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two (tetrachloroethene and total xylenes) were detected. There is a TCLP limit for tetrachloroethene, which was detected at 2.0 mg/kg , well below 20 times the TCLP limit of 14,000 mg/kg.

Masonry Chips

Only one masonry chips sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (total xylenes) were detected. There is no TCLP limit for total xylenes.

Summary of Pesticide/PCB Contamination

No samples were analyzed for pesticides/PCBs.

A.IV.3.16 Electrostatic Precipitator (9F)

The Plant 9 Electrostatic Precipitator (9F) is adjacent to the east side of the Special Products Plant (9A) and consists of a poured concrete base and floor, a structural steel frame, and corrugated steel siding and roofing. The facility contains the electrostatic precipitator (Precipitron) that handled exhausts from vented machining equipment in Plant 9. The electrostatic elements were typically not electrically powered because exhausts contained moisture. This facility currently contains the Precipitron and air filters. The anticipated contaminants are U_3O_8 and uranium metal.

One concrete core (collected from three depths) sample was collected from the first depth was collected to characterize the contamination in this component. The following represents the results of the analysis of this sample.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 12 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For six of the detected radioactive constituents (cesium-137, lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 370, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-239/240, plutonium-241, and strontium-90) were detected. For four of the detected radioactive constituents (lead-210, plutonium-238, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 15, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-241, polonium-210, and thorium-232) were detected. For seven of the detected radioactive constituents (lead-210, plutonium-238, technetium-99, elemental

uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 5, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (arsenic, beryllium, cobalt, selenium, silver, thallium, and vanadium) were detected. For ten of the detected inorganics (antimony, barium, cadmium, chromium, copper, lead, mercury, potassium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 68. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (arsenic, beryllium, cadmium, cobalt, mercury, selenium, silver, thallium, and vanadium) were detected. For five of the detected inorganics (antimony, chromium, magnesium, potassium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, antimony was the most significant, exceeding the concrete baseline by a factor of 8.4. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (arsenic, beryllium, cadmium, cobalt, copper, mercury, selenium, silver, and thallium) were detected. For two of the detected inorganics (antimony and potassium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, antimony was the most significant, exceeding the concrete baseline by a factor of 6.7. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.3.17 Pilot Plant Wet Side (13A)

The Pilot Plant Wet Side (13A) is a multilevel processing facility just south of First Street, located in the southeastern corner of the FEMP production area. The building is constructed of cinder block on poured reinforced concrete floors and has a flat reinforced concrete roof. The mezzanine floor is supported by a structural steel frame.

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The building has performed a wide variety of processing functions since Pilot Plant operations were initiated in October 1951. At different times, the processing involved size reduction, dissolution, precipitation, filtration, solvent extraction, and drying of numerous uranium, thorium, and zinc compounds. Because of the test nature of the processing operations, the long history of the building, and the rapid turnover of test projects, not all operations can be completely documented and are lost to history. It is thought that the more important processing campaigns (in terms of generating contamination) have been identified, including at least a representative process from each general type and for each type of feed material.

The Pilot Plant Wet Side houses tanks, columns, filters, ovens, and size reduction equipment. These units were used to carry out solvent extraction purification of thorium- and uranium-bearing solutions; to process liquids from the building's floor drains; to digest thorium and uranium; to produce thorium oxalate, thorium hydroxide gel, thorium tetrafluoride, and zinc fluoride intermediate products; to size reduce calcium fluoride so it could be reused as pot liner material; to dissolve metals; to oxidize uranium compounds; and to treat barium chloride solutions. The contaminants anticipated are discussed below.

The Pilot Plant Wet Side has one inactive HWMU located in the west of the plant and another inactive one located in the northwest area. The units are considered HWMUs because they reportedly handled hazardous material. the first managed barium, chromium, lead, mercury, benzene, and pyridine; the second handled only barium. Closure of the first HWMU is planned through CERCLA response. The second will be closed under RCRA. Hold-up and sump materials, concrete, and soils are the only materials expected to be generated by the closure of the first unit. The materials expected to be generated by the closure of the second unit are yet to be determined. For more information on HWMUs, see Appendix K, Table K-1.

Because of the rapid turnover of test projects and because much of the equipment within the Pilot Plant Wet Side was reused as new test projects were brought on-line, the building has been divided into four representative process areas. Individual processes have been grouped according to the area of the building where they were/are located.

Southern Extraction Area

Solvent extraction operations were carried out in the southern third of the Pilot Plant Wet Side. A concrete block partition wall separates the southern two-thirds of the extraction area (the "high bay" area) from the northern third, which is contiguous with the Central and Northern Areas. Uranyl nitrate purification was carried out here in the 1950s (to carry out a development program in support of Ore Refinery [2A] startup) and in the 1970s (to purify uranyl nitrate generated from various uranium processing operations). In the latter half of the 1960s, the extraction system was used to purify thorium nitrate. Although several tanks were added and some equipment modifications were

made to process the thorium, the extraction operations involved in the 1950s, 1960s, and 1970s were similar.

Uranyl or thorium nitrate solutions containing undesirable contaminants were introduced into the top of the pulsed extraction column. The solvent, tributyl phosphate (TBP) in kerosene for uranyl solutions and Diamyl-amyl phosphonate (DAAP) in kerosene or di-sec-Butyl phenyl phosphonate (DSBPP) in kerosene for thorium, was introduced at the bottom. Uranium or thorium was transferred from the aqueous phase to the organic phase as the solutions passed through the column.

The depleted aqueous stream, called the raffinate, flowing out of the bottom of the column was washed with kerosene in a single mixer-settler stage to remove entrained TBP. The raffinate, containing most of the unwanted chemical impurities from the original nitrate feed, then was sent to a storage tank before being filtered. There it was either treated for nitrate recovery or discarded through the waste treatment system after treatment with sodium hydroxide to remove copper and other impurities.

The uranium- or thorium-loaded organic was scrubbed with water to remove entrained acid. In some cases, the scrubbing was performed in the top section of the extraction column; in others, scrubbing was accomplished in a separate scrubber column. The organic then was sent to a stripping column, where the uranium or thorium was back extracted into hot water, producing a purified uranyl or thorium nitrate stream (OK liquor) that exited the bottom of the stripper. The OK liquor was contacted with kerosene (to remove entrained solvent) in the OK stripper before (1) boildown and transfer to the refinery, (2) transfer to the ADU precipitation process in Building 13A, or (3) being drummed for shipment as product. In 1966, a short campaign of OK liquor was converted to thorium nitrate tetrahydrate crystals, $Th(NO_3)_4 \bullet 4\ H_2O$, by boildown followed by crystallization.

Solvent exiting the top of the extractor was treated in a number of ways to remove impurities including[1)] sodium carbonate wash in the mixer settler, [2)] distillation in the kerosene fractionator, followed by sodium carbonate wash, or [3)] storage in a holdup tank without treatment.

Processing of uranyl nitrate that contained uranium with less than one percent enrichment was carried out primarily in six inch columns; that with greater than one percent enrichment in two inch columns. Thorium processing was carried out in both six and nine inch columns. Anticipated contaminants include: uranium (up to 1 percent enrichment), thorium, tributyl phosphate, kerosene, diamyl amyl phosphonate, radium, and naphtha mineral spirits.

Sump Processing System

The Pilot Plant sump system collected washwater, rainwater, spills, and sludges from the building and from the Maintenance Building (13B), the Sump Pump House (13C), the UF_6 to UF_4 Reduction Facility (54A), the Pilot Plant Shelter (54B), the Pilot Plant Annex (37), the Pilot Plant Warehouse

(68), and the Pilot Plant Thorium Tank Farm (13D) on the west side of the Pilot Plant. After 1968, most wastewaters were collected in one of four sumps located in the process area. Wastewaters from all five sumps and from the F-102 tank were transferred to one of two holding tanks according to the primary contaminant in the wastewater, uranium or thorium. These holding tanks, also known as sump tanks, are wooden tanks located inside a 4-ft-high concrete containment dike southwest of the Pilot Plant Wet Side.

The Pilot Plant sump system was refurbished in 1968. At this time, the old floor drain system was covered over, abandoned in place, and replaced with grating-covered floor trenches. A temporary, abandoned sump, located west of the Pilot Plant and east of the existing Sump Pump House, was used during the refurbishment and is currently being remediated as an approved removal action because it contains radiological and hazardous wastes that could potentially contaminate surrounding soils. Anticipated contaminants include: uranium; thorium; NaOH; ammonia; magnesium oxide; MgF_2; lead; 1,1,1-trichloroethane; NaCl; HF; oxalic acid; tributyl phosphate; kerosene; mercury; copper; nickel; chromium; HF; ammonia; MgO; barium; cadmium; and benzene. For purposes of sampling, the Sump Processing System and the Central Area were considered the same process area. See Central Area for sample information.

Central Area

The central area was used to produce thorium oxalate and thorium hydroxide gel and to convert barium chloride, as discussed in the following subsections.

Thorium Oxalate. Equipment in the Pilot Plant used to produce thorium oxalate was operated from 1970 to 1976. Thorium nitrate solution was mixed with an excess of oxalic acid solution. This produced a slurry of thorium oxalate particles in nitric acid, which was pumped to a plate-and-frame filter press located on the mezzanine where a thorium oxalate cake was produced. This filter cake was washed in the press and then dehydrated. This material was sent off-site to the General Electric Company in Evendale to be calcined to thorium oxide powder. Anticipated contaminants include thorium oxalate, thorium nitrate, and oxalic acid.

Thoria Gel and Ammonium Diuranate. The process for producing thorium hydroxide gel, located in the central portion of the Pilot Plant Wet Side, involved the chemical denitration of thorium nitrate by precipitation from solution with ammonium hydroxide and carbon dioxide.

The system of polyvinylidene chloride-lined piping, 1000-gallon rubber-lined tanks, and 900-gal rubber-lined vacuum tanks made up the major part of the 1-ton thorium/day facility. Other equipment used included a precipitation tank, two filter presses in the mezzanine area, and six tray driers.

Thorium nitrate from the Thorium Tank Farm was mixed with an aqueous ammonia solution, a sulfate solution, and carbon dioxide gas in the precipitation tank. Following precipitation, the

material was transferred to the filter feed tank before processing in the filter presses. The solids from the filter presses were dried in the six drying ovens before packaging in product cans for shipment to the General Electric Evendale facility for densification by high-temperature firing. The filtrate was sent to two hold tanks and then to a polishing filter. The thorium cake from the polishing filter was recovered, and the filtrate went to the sump.

A uranium production run of dried ammonium diuranate (ADU) was performed in 1979 with the same precipitation, filtration, and drying equipment used for the production of thoria gel. The feed to the ADU process came from the Ore Refinery Plant (2A) and was purified in the Pilot Plant six inch column system. ADU was precipitated by the addition of ammonium hydroxide to a solution of uranyl nitrate. Following precipitation, the ADU was filtered and washed in the plate-and-frame filter located in the Mezzanine. The ADU was placed in pans and dried, then milled and sent to the Green Salt Plant (4A) for hydrofluorination. Anticipated contaminants include ammonia and thorium hydroxide.

Barium Chloride Conversion. From December 1985 through March 1986, barium chloride ($BaCl_2$) salts were converted to barium sulfate ($BaSO_4$) in a batch process that used equipment located in the northern and central areas of the Pilot Plant Wet Side. The $BaCl_2$ salts were generated from the cleanout of molten salt bath used in the uranium metal extrusion operation at Reactive Metals Incorporated (RMI) in Ashtabula, Ohio. The processing in the Pilot Plant converted the waste from a RCRA hazardous form to a nonhazardous form. This facility was considered a HWMU and underwent closure. Anticipated contaminants include barium chloride and barium sulfate.

Northern Area

The northern area was used for thorium digestion, thorium tetrafluoride and zinc fluoride preparation, and various other processes, as discussed in the following subsections.

Thorium Digestion. Thorium digestion was carried out in an agitated tank, located in the northern third of The Pilot Plant Wet Side. The product of the digestion, a thorium nitrate solution, was sent to the solvent extraction process for removal of impurities. Most of the solid material fed to the digester was thorium nitrate crystals, $Th(NO_3)_4$. Thorium oxides and residues were also dissolved here in nitric acid (HNO_3) and hydrofluoric acid (HF). Anticipated contaminants included thorium and ammonia.

Thorium Tetrafluoride and Zinc Fluoride Precipitation. A pilot facility for the precipitation of thorium tetrafluoride from thorium nitrate was located in the northern portion of the Pilot Plant Wet Side. This facility also was used for the precipitation of zinc fluoride from zinc oxide. The facility operated from 1969 to 1971, and all equipment items have been removed from this area in the Pilot Plant. The main equipment items were a precipitation tank, a hold tank, a thorium nitrate head tank, a HF head tank, three box filters, and a vacuum tank.

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Thorium tetrafluoride was precipitated from a heated, agitated solution of thorium nitrate and hydrofluoric acid in the polypropylene precipitator tank. Following thorium tetrafluoride precipitation, the solution was allowed to settle, the mother liquor was decanted, and the concentrated slurry was filtered on a box filter. The filter cake was washed with deionized water to remove impurities. The wet cake was then ready to be dried. The filtrate was neutralized and sent to the sump system. The same equipment was used for the precipitation of zinc fluoride hydrate from USP-grade zinc oxide using aqueous hydrofluoric acid. Anticipated contaminants included: thorium tetrafluoride, thorium nitrate, HCl, zinc fluoride, and HF (aqueous).

Crushing and Milling/Pot Liner Preparation. Jaw crushers and a ball mill were located along the north wall of the Pilot Plant Wet Side. These units were used to size reduce slag from uranium processing (primarily uranium-contaminated magnesium fluoride from the Green Salt Plant [4A]) and calcium fluoride from thorium derby production from the Metals Production Plant (5A). After size reduction, these materials were recycled back as pot liner materials to the processes from which they had originated. Before an upgrade of the ventilation system for the crushers and ball mill in 1959, these units exhausted dust-laden air to the atmosphere, creating uranium contaminated areas outside the building. The crushers and ball mill were removed by 1986. Anticipated contaminants are calcium fluoride and MgF_2.

Metal Dissolver/Decladding. A metal dissolver/pickling facility was located in the northern third of the Pilot Plant Wet Side and included a trough tank and associated equipment. Historically, this equipment was used for jobs such as special etching and cleaning of castings, accountability studies, dissolving Burn Pit Ash, and recovery of enriched scrap.

In 1973, the metal dissolver facility was modified to facilitate the decladding of cores by the addition of a constant volume pump, condenser, and filtrate receiver tank. Aluminum-canned cores were declad by placing them in the stainless steel-ventilated trough and circulating nitric acid and sodium hydroxide. The spent treatment solutions were pumped to the Pilot Plant sump system for reclamation of uranium. The metal dissolver equipment was moved out of the Pilot Plant in 1985. Anticipated contaminants included: uranium, aluminum, ammonia, NaOH, and nickel.

Enriched Oxidation Furnace. A small, single-hearth, gas-fired furnace, installed in 1956 along the east wall in the northern area of the Pilot Plant Wet Side, was used to oxidize uranium scrap materials whose enrichment was too high to be processed in the Plant 8 furnaces. Materials were loaded into the furnace in trays. After oxidation of the materials, the trays were moved into an exit vestibule and lifted to an air cooling chamber. The black oxide (U_3O_8) they contained was subsequently dumped into a drum or can for transfer to a digestion system, either in the Pilot Plant (13A) or the Ore Refinery Plant 2A. Improvements to ventilation and dust control were installed later. Anticipated contaminants are uranium (up to 2.5 percent enrichment) and U_3O_8.

Ten acid brick, four concrete chip, 55 concrete core (collected at three depths), six masonry, and six steel coating samples were collected to characterize the contamination in this component. Four loose media and eight liquid samples were collected to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Acid Brick

A total of five acid brick samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (thorium-227) were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Plutonium-238 exceeded its baseline concentration by a factor of 14,000, a larger margin than any other radioactive constituent.

Concrete Cores

A total of nine concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (thorium-227) were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 800, a larger margin than any other radioactive constituent.

A total of eight concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (thorium-227) were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-228 exceeded its baseline concentration by a factor of 970, a larger margin than any other radioactive constituent.

A total of eight concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (strontium-90 and thorium-227) were detected. For 17 of the detected radioactive constituents (americium-241, cesium-137, lead-210, plutonium-238, plutonium-239/240, plutonium-241,

polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 290, a larger margin than any other radioactive constituent.

Masonry Chips

A total of four masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (strontium-90) were detected. For 18 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 620, a larger margin than any other radioactive constituent.

Steel Coatings

A total of five steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (cesium-137) were detected. For 18 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 840, a larger margin than any other radioactive constituent.

Supplemental Media

Two loose media and six unknown liquid samples were collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected in the loose media and all except one (strontium-90) in the liquids.

Summary of Inorganic Contamination

Acid Brick

A total of five acid brick samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium, and thallium) were detected. For 12 of the detected inorganics (antimony, arsenic, barium, chromium, copper, lead, mercury, nickel, potassium, selenium, sodium, and zinc), the maximum concentration was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 40. The concentration of chromium in one

sample from this component exceeded 20 times the TCLP limit. This sample was collected from the Northern Extraction Area.

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, selenium, and thallium) were detected. For nine (barium, chromium, cobalt, copper, lead, mercury, nickel, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 11. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

A total of eight concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For 15 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, potassium, selenium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 40. The concentration of lead in one sample of the top ½-inch of concrete cores from the central area exceeded 20 times the TCLP limit.

A total of nine concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For 16 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, potassium, selenium, silver, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 38. The concentration of lead in two samples of concrete cores from a depth of ½ to 1-inch exceeded 20 times the TCLP limit. One sample was from the central area and one sample was from the northern area.

A total of eight concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For 14 of the detected inorganics (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, potassium, selenium, silver, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, selenium was the most significant, exceeding the concrete baseline by a factor of 9.1. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

A total of three masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, selenium, silver, and thallium) were detected. For ten (antimony, arsenic, barium, chromium, cobalt, lead, mercury, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 29. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of four steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For five of the detected inorganics (arsenic, cadmium, iron, nickel, and selenium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the steel coating baseline by a factor of 2.2. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Semivolatile Organic Contamination

Acid Brick

A total of two acid brick samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, ten (2-chlorophenol, 4-chloro-3-methylphenol, acenaphthene, benzo(b)fluoranthene, chrysene, di-n-octyl phthalate, fluoranthene, phenanthrene, phenol, and pyrene) were detected. There are no TCLP limits for any of these semivolatiles.

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only four (butyl benzyl phthalate, di-n-octyl phthalate, fluoranthene, and phenanthrene) were detected. There are no TCLP limits for any of these semivolatiles.

Masonry Chips

Only one masonry chip samples was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected.

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Supplemental Media

Two loose media and five unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 13 (acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, butyl benzyl phthalate, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene) were detected in the loose media, and 20 (2-methylnaphthalene, acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, butyl benzyl phthalate, carbazole, chrysene, di-n-octyl phthalate, dibenzofuran, dimethyl phthalate, fluoranthene, fluorene, naphthalene, o-methylphenol, p-methylphenol (cresol), phenanthrene, phenol, and pyrene) in the liquids. There are TCLP limits for only o-methylphenol and p-methylphenol, which were each detected at a maximum concentration in the liquids of 0.5 mg/L, compared to a TCLP limit of 200,000 mgL.

Summary of Volatile Organic Contamination

Acid Brick

A total of two acid brick samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only eight (1,1,1-trichloroethane, ethylbenzene, m,p-xylene, methylene chloride, o-xylene, styrene, tetrachloroethene, and total xylenes) were detected. There is a TCLP limit for tetrachloroethene, which was detected at 5.0 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg.

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only six (1,1,1-trichloroethane, ethylbenzene, m,p-xylene, o-xylene, tetrachloroethene, and total xylenes) were detected. There is a TCLP limit for tetrachloroethene, which was detected at 3.0 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg.

Concrete Cores

A total of two concrete core samples, collected from the top half inch of concrete, was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only six (1,1,1-trichloroethane, 4-methyl-2-pentanone, ethylbenzene, tetrachloroethene, toluene, and total xylenes) were detected. There is a TCLP limit for tetrachloroethene, which was detected at 10 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg.

A total of two concrete core samples, collected from the second half inch of concrete, was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only six (1,1,1-trichloroethane, 4-methyl-2-pentanone, ethylbenzene, tetrachloroethene, toluene, and total xylenes) were detected. There is a TCLP limit for

tetrachloroethene, which was detected at 23 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg.

A total of two concrete core samples, collected from the bottom depth of concrete (1" to 4"), was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (ethylbenzene, tetrachloroethene, and toluene) were detected. There is a TCLP limit for tetrachloroethene, which was detected in both samples at a maximum concentration of 8.0 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg.

Masonry Chips

Only one masonry chips sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only five (1,1,1-trichloroethane, ethylbenzene, m,p-xylene, o-xylene, and total xylenes) were detected. There are no TCLP limits for the volatiles detected.

Supplemental Media

A total of two loose media and five unknown liquid samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only six (ethylbenzene, m,p-xylene, o-xylene, styrene, tetrachloroethene, and total xylenes) were detected in the loose media and only seven (1,1,1-trichloroethane, 1,1-dichloroethane, 2-butanone, acetone, styrene, tetrachloroethene, and toluene) were detected in the liquid. There is a TCLP limit for tetrachloroethene, which was detected in the loose media at 290 mg/kg, well below 20 times the TCLP limit of 14,000 mg/kg . In the liquid, tetrachloroethene was detected in two samples at a maximum concentration of 500 mg/L, which is below the TCLP limit of 700 mg/L.

Summary of Pesticide/PCB Contamintation

No media were analyzed for pesticide/PCB contamination

A.IV.3.18 Sump Pump House (13C)

The Sump Pump House (13C) is located southwest of the Pilot Plant Wet Side (13A) and just south of the Pilot Plant Thorium Tank Farm (13D). The Sump Pump House consists of a single-level, high concrete block wall structure, supported on reinforced concrete foundations, having a reinforced concrete floor and sloping shingled roof. It contains three pumps on concrete pedestals that draw water from adjacent underground concrete sump tanks located just east of the Sump Pump House. These underground tanks have been abandoned and filled with concrete. The purpose of the Sump Pump House was to pump filtered sump system flows from treatment facilities inside the Pilot Plant Wet Side to the General Sump (18B) for final treatment and discharge.

The Sump Pump House contains the pumps that handled all sump system flows from the Pilot Plant process areas. The pumps were configured to pump filtered sump water from two underground concrete sump tanks located just east of the building. The filtered sump water could be routed from the Pilot Plant Wet Side to segregate uncontaminated water in one of the underground tanks. The collected waters were sampled and pumped to the General Sump (18B) and routed to one of several tanks, depending on the water quality analyses. The underground tanks have been filled with concrete and are not targets for sampling.

During the history of the Pilot Plant, the sump piping system was replaced with floor trenches, and a temporary underground sump was used during the renovation period. That sump is located east of the underground concrete sumps and may have been tied into the Sump Pump House.. The temporary sump is now being remediated through a CERCLA removal action (No. 24). Anticipated contaminants include uranium, thorium, sodium hydroxide, and magnesium oxide.

Three concrete core samples and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and plutonium-241) were detected. For 16 of the detected radioactive constituents (americium-241, cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-228 exceeded its baseline concentration by a factor of 790, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (neptunium-237, plutonium-238, and strontium-90) were detected. For 11 of the detected radioactive constituents (cesium-137, lead-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 56, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241,

cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, thorium-228, thorium-230, and thorium-232) were detected. For three of the detected radioactive constituents (radium-228, technetium-99, and thorium-228), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-228 exceeded its baseline concentration by a factor of 2.3, a larger margin than any other radioactive constituent.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and plutonium-241) were detected. For 16 of the detected radioactive constituents (americium-241, cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 32, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, thallium, and zinc) were detected. For seven of the detected inorganics (aluminum, barium, chromium, copper, lead, sodium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 84. The concentration of barium in one sample of the top ½-inch of concrete cores from the sump pump exceeded 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, chromium, cobalt, mercury, nickel, potassium, selenium, silver, thallium, and zinc) were detected. For six of the detected inorganics (barium, calcium, lead, manganese, sodium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 18. There were no detections greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, chromium, cobalt, mercury, nickel, selenium, silver, thallium, and zinc) were detected. For five of the detected inorganics (copper, lead, magnesium, sodium, and vanadium), the maximum

concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 4.9. There were no detections greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, nickel, silver, and thallium) were detected. For ten (barium, chromium, cobalt, copper, lead, mercury, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 28. There were no detections greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was collected for organic analyses.

A.IV.3.19 Laboratory (15A)

The Laboratory (15A) houses the analytical, metallurgical, and chemical process laboratories for the FEMP and is located near the intersection of First Street and B Street. The Laboratory is a multilevel, irregularly shaped building constructed of concrete block walls and concrete floors. Courtyards are located between the south and central corridors and between the central and north corridors. A basement area is located beneath the western portion of the building. Piping access tunnels, which are accessible through access ways located in the first floor east corridor, run at basement level below the north and central corridors and join the basement on the west. A laboratory sump is located in the north courtyard, and wastewaters collected in this sump are pumped to the General Sump (18B). The Laboratory is currently undergoing renovation; as part of this renovation, the northern portion of the building was extended and a second story addition constructed over the extended northern portion.

Although Building 15A is currently undergoing renovation, the building is still generally divided into radiologically nonrestricted and restricted access areas. The dividing line for the two areas generally runs from the southwestern corner to the northeastern corner of the building, with the unrestricted access area located to the east of the dividing line and the restricted access area located to the west of the dividing line. The basement of the laboratory has historically been used as a maintenance area and as storage of radioactive samples.

The Laboratory has two inactive HWMUs. One is located in the Drum Storage Area near the loading dock, and the other is located in the Drum Storage Area near the southwest corner of the Laboratory. From process knowledge, they are considered HWMUs. The first is planned to be closed under RCRA, the second through CERCLA response. Herculite, rinsewater, and PPE are the materials

expected to be generated by the closure of the first, herculite and PPE from the second. For more information on HWMUs, see Appendix K, Table K-1.

Eastern Unrestricted Access Area

The eastern nonrestricted access area still contains a library, two conference rooms, and offices.

Western Restricted Access Area

Historically, the western restricted access area contained inorganic and isotopic laboratories, an organic laboratory added around 1990, some office space, several satellite accumulation areas, and the following:

- A mercury recycle unit located in Room W-22 and operated last in 1987.
- The Pilot Process, which was the pilot for the thorium process used in the Green Salt Plant(4A), was developed and performed in Rooms W-4 (heat treating) and W-10 (wet chemistry) in 1967. These rooms are now inactive and are managed as exclusion zones because of the presence of radiological contamination.
- Before the laboratory renovations, a photo lab was located at the western end of the north corridor in Room N-27. For about one year (1989), an electrolytic silver recycling unit located in Room N-27 was used to recover silver from the spent photographic solutions that contained either silver nitrate or silver sulfate.
- Wastewaters generated at the numerous sinks within the various laboratories as a result of sample preparation and/or cleaning were and are conveyed to a central collection sump located in the north courtyard of the Laboratory.

The western restricted access area currently contains laboratories, some offices, various satellite accumulation areas, a chemical storage area (cabinets located in Room W-18 store excess, unused but usable, chemicals), and a few storage areas for radioactive materials (i.e. outdated uranium standards and samples of uranium products used to check for impurities). The rooms currently in use as radioactive material storage areas (C-18, S-43, and W-4) are managed as exclusion zones. Anticipated contaminants for this process area include: uranyl nitrate, U_3O_8, thorium, mercury, 1,1,1-trichloroethane, acetone, PCB's, asbestos, chloroform, ammonia, europium-152, thorium nitrate, tetrachloroethylene, niobium, lanthanum, lead, silver, platinum, acids (nitric, sulfuric, acetic, hydrochloric, hydrofluoric, chromic, perchloric), solvents, plutonium, argon, nitrogen, and miscellaneous laboratory chemicals and reagents.

Basement

Until late in 1989, the Maintenance Department operated a maintenance shop located in the northern area of the basement. The shop also functioned as a satellite accumulation area, temporarily storing wastes such as spent solvents, used oil, and PCBs. The southern area of the basement was once

equipped with caged areas that stored uranium products (i.e. green salt, orange oxide, and uranium turnings), thorium, and laboratory chemicals.

One concrete chip, eight concrete cores (three depths), one sediment, three masonry, and two unknown liquid samples were collected to characterize the contamination in this component.

Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For two of the detected radioactive constituents (elemental uranium, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, neptunium-237, plutonium-239/240, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 270, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 23, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and thorium-230) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.1, a larger margin than any other radioactive constituent.

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Masonry Chips

A total of three masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 54, a larger margin than any other radioactive constituent.

Supplemental Media

One sediment and three unknown liquid samples were collected from this component for analysis of radioactive constituents. All of these 20 constituents were detected in the sediment and all except six (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, and polonium-210) in the liquids.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, nickel, selenium, silver, and thallium) were detected. For ten (aluminum, arsenic, barium, chromium, cobalt, lead, mercury, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 29. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, selenium, and thallium) were detected. For 13 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, cobalt was the most significant, exceeding the concrete baseline by a factor of 76. There were no detections at greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, nickel, selenium, silver, and thallium) were detected. For 11 of the detected inorganics (aluminum, arsenic, barium, calcium, chromium, cobalt, manganese, mercury, potassium, sodium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics

with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 6.3. There were no detections at greater than 20 times the TCLP limit.

No concrete core samples from below a depth of 1-inch from this component were analyzed for inorganics.

Masonry Chips

A total of three masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver, and thallium) were detected. For eight (arsenic, chromium, leads, mercury, nickel, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 26. There were no detections at greater than 20 times the TCLP limit.

Supplemental Media

One sediment sample was collected from this component for analyses of inorganic constituents. Of 23 constituents, all but six (antimony, nickel, potassium, selenium, thallium, and vanadium) were detected. Concentrations of cadmium, chromium, lead, mercury, and silver were greater than 20 times the respective concrete baselines in the sediment sample collected from the north courtyard.

One unknown liquid sample was collected from this component for analyses of inorganic constituents. Of 23 constituents, all but 11 (aluminum, antimony, arsenic, beryllium, chromium, cobalt, manganese, nickel, selenium, thallium, and vanadium) were detected. No concentrations of any metals in this unknown liquid sample were greater than 20 times the respective concrete baselines.

Summary of Semivolatile Organic Contamination

Supplemental Media

One sediment sample was collected from this component for analyses of semivolatile organic constituents. Acenaphthene; anthracene; Benzo(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(g,h,i)perylene; Benzo(k)fluoranthene; carbasole; chrysene; dibenzo(a,h)anthrace; dibenzofuran; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; phenanthrene; pyrene; and bis(2-ethylhexyl)phthalate were the semivolatiles detected, yet none of them exceeded 20 times the respective TCLP limits.

One unknown liquid sample was collected from this component for semivolatile organic analyses, yet none were detected.

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Summary of Volatile Organic Contamination

Supplemental Media

One sediment and one unknown liquid sample were collected from this component for analyses of volatile organic constituents, yet none were detected.

Summary of Pesticide/PCB Contamination

No media were analyzed for pesticides/PCBs.

A.IV.3.20 Biodenitrification Towers (18D)

The Biodenitrification Towers (18D) is a multilevel (six-floor), irregularly shaped structural steel frame on a poured concrete base and floor with noninsulated, corrugated metal siding and roofing. The Biodenitrification Towers is located southeast of the intersection of A Street and 102nd Street. High nitrate wastewaters that are collected in the Biodenitrification Towers Surge Lagoon (18A) are mixed with methanol from the Methanol Tank (18J) and fed to the Biodenitrification Towers where they enter one of four 30 ft towers that operate in series. The wastewater flows up through the towers, fluidizing coal particles that have bacteria attached. The bacteria decompose the methanol and nitrates to form carbon dioxide (CO_2) and nitrogen (N_2) gases, which bubble off the top of the towers and are released to the atmosphere. Anticipated contaminants include phosphoric acid, sulfuric acid, and methanol.

Since there is little or no evidence of contamination and since results or radiological surveys do not exceed the sampling criteria in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2082 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 70 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.IV) within each material type associated with this component have been used for characterization.

A.IV.3.21 Clearwell Pump House (18G)

The Clearwell Pump House (18G) is a single story structure located near the southwest corner of Waste Pit #1. The Pump House is a steel framed, transite-sided structure on a concrete pad. The Clearwell Pump House houses two electrical pumps and accompanying equipment. The Clearwell Pump House is used to pump stormwater from the Clearwell to the Biodenitrification Surge Lagoon (18A) for sampling, analysis, and potential release. The anticipated contaminants are uranium and 1,1,1-trichloroethane.

One concrete chip sample was collected to characterize the contamination in this component. The following represents the results of the analyses of this sample.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For four of the detected radioactive constituents (lead-210, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 71, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, mercury, nickel, selenium, silver, and thallium) were detected. For 11 (aluminum, arsenic, barium, chromium, cobalt, copper, lead, manganese, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 11. There were no detections at greater than 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

The major media sample collected from this component was not analyzed for semivolatile organic constituents.

Summary of Volatile Organic Contamination

The major media sample collected from this component was not analyzed for volatile organic constituents.

Summary of Pestcide/PCB Contamination

Concrete chips

Only one concrete chip sample was collected from this component for analysis of pesticide/PCB contaminants. Of 28 pesticides/PCBs for which analyses were performed, only two (4,4'-DDE and Dieldrin) were detected. There are no TCLP limits for either of the detected pesticides.

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A.IV.3.22 BDN Effluent Treatment Facility (18H)

The BDN Effluent Treatment Facility (18H) is located to the north of the Plant 8 Warehouse (80) on a parcel of land that includes effluent treatment process equipment. It is a single story, steel frame structure on a reinforced concrete floor, with metal siding and roofing.

Process effluent is received in the BDN Effluent Treatment Facility subsequent to treatment in the Biodenitrification Towers (18D). The effluent is further treated in Building 18H through chlorination and aeration to reduce biological oxygen demand (BOD) and total suspended solids (TSS). Following treatment, the effluent is released to the Sewage Treatment Plant for final treatment and discharge. The equipment housed in and near the Treatment Facility includes pumps, chlorinators, process tanks, air compressors, aerators, and a filter press. The equipment located along the southwest interior wall was controlled and labeled as a radiological contamination area. Drums of anthracite are currently stored outside the Treatment Facility. Anticipated contaminants include uranium and oil.

One concrete chip sample sample was collected to characterize the contamination in this component. The following represents the results of the analyses of this sample.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 8.3, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, mercury, potassium, selenium, silver, and thallium) were detected. For four (arsenic, chromium, nickel, and vanadium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 3. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.3.23 Engine House/Garage (31A)

The Engine House Garage (31A) is a single-story, irregularly shaped building located in the southeastern corner of the intersection of First Street and D Street. The building is constructed of cinder blocks with a concrete roof and floor. Three aboveground fuel tanks, located just south of the garage, are associated with the building operations as is the concrete pad to the south and east of the building. The facility is operated as a garage for performing general maintenance on the on-property vehicles. The Garage also houses the facility's ambulance and fire engine.

The Engine House/Garage is considered a wet process area because of the frequent use of solvents and oils. The garage performs repair work and preventive maintenance on the vehicles used in the process area. Fuel and motor oils are used throughout this facility. The fuel oil supply is stored in three aboveground tanks on the south side of the building. Each tank is contained separately in metal tubs for secondary containment. Spills, which occur on the concrete floor as a result of operations, are cleaned with floor scrubber units maintained in the building. However, stains were observed during the visual inspection of the building. Spare parts, such as motors and batteries, are stored for use in building operations. Leaking batteries, on the floor in the east-central section of the building, were also observed during the inspection. A sewer system in the building collects water from the floor. This water is pumped to a tank located just east of the building. A sample of this water is collected for testing before discharge.

Anticipated contaminants include: waste oil; solvents; 1,1,1-trichloroethane; asbestos; gasoline; H_2SO_4; mercury; and ethylene glycol.

The Engine House/Garage has one inactive HWMU located in the west-central portion of the building. It is considered a HWMU because it is reported to have handled solvents (EPA waste code F002). It is planned to be closed under RCRA. Concrete and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Two masonry chip, two concrete cores (separated into three depths), and one loose media and three unknown liquid were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For eight of the detected radioactive constituents (lead-210, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 7.5, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, and uranium-235/236) were detected. For one of the detected radioactive constituents (thorium-228), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-228 exceeded its baseline concentration by a factor of 1.1, a larger margin than any other radioactive constituent.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For nine of the detected radioactive constituents (lead-210, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 24, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and three unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-239/240, plutonium-241, and strontium-90) were detected in the loose media and all except nine (americium-241, cesium-137, neptunium-237, plutonium-239/240, radium-226, radium-228, thorium-228, thorium-230, and thorium-232) in the liquids.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For 12 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, nickel, potassium, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 15. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For five of the detected inorganics (arsenic, barium, chromium, nickel, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 1.9. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, mercury, selenium, and thallium) were detected. For three of the detected inorganics (aluminum, arsenic, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the concrete baseline by a factor of 1.3. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, selenium, silver, and thallium) were detected. For ten (arsenic, barium, chromium, cobalt, copper, lead, mercury, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 76. The barium and lead concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. This sample was collected in the Garage Area.

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Supplemental Media

One loose media sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, selenium, and thallium) were detected. The concentration of lead in this sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media three unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 12 (2-methylnaphthalene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, diethyl phthalate, fluoranthene, isophorone, naphthalene, phenanthrene, and pyrene) were detected in the loose media and 11 (2-methylnaphthalene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, di-n-octyl phthalate, diethyl phthalate, fluoranthene, naphthalene, p-methylphenol (cresol), phenanthrene, phenol, and pyrene) in the liquids. There is a TCLP limit for only p-methylphenol, which was detected in one liquid sample at a concentration of 20 mg/L, well below the TCLP limit of 200,000 mg/L.

Summary of Volatile Organic Contamination

Supplemental Media

A total of one loose media and three unknown liquid samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only three (2-butanone, acetone, and methylene chloride) were detected in the loose media and only eight (1,1-dichloroethane, 2-butanone, 4-methyl-2-pentanone, acetone, benzene, ethylbenzene, toluene, and total xylenes) were detected in the liquid. There is a TCLP limit for 2-butanone, which was detected in the loose media at 30 mg/kg and in the liquid at 21 mg/L, both well under the TCLP limit (20 times the TCLP limit) of 4,000,000 mg/kg for loose media and 200,000 mg/L for the liquid. There is also a TCLP limit for benzene, which was detected in the liquid at 11 mg/L, well below the TCLP limit of 500 mg/L.

Summary of Pesticides/PCBs Contamination

No samples were analyzed for Pesticides/PCBs.

A.IV.3.24 Pilot Plant Annex (37)

The Pilot Plant Annex (37) is a single-story, rectangular building consisting of a structural steel frame anchored in a reinforced concrete foundation and a reinforced concrete floor and roof, cinder block walls, and glass windows. The building adjoins the Six to Four Reduction Facility 1 (54A) and the Pilot Plant Wet Side (13A) to form a complex that serves Pilot Plant functions. The function of the

Pilot Plant Annex was to test new processes for uranium and thorium production and recovery which were, in successful cases, implemented in the production plants at the FEMP. The processes in this annex were primarily dry, while those in the Pilot Plant Wet Side were wet.

The Pilot Plant Annex contains six process areas plus additional processes that have been removed and associated equipment and tankage outside the building. Several dust collectors located outside also are associated with the Annex. Like the other processing buildings in the Pilot Plant complex (13A and 54A), the Pilot Plant Annex changed configuration frequently to meet its mission of testing processes for potential improvement of operations at other plants of the FEMP. Thus, the following process descriptions may be incomplete by omission of process units that were installed, tested, and dismantled many years ago.

Removed Processes

Some of the unit processes formerly operated in the Pilot Plant Annex have been removed. The names of these processes and brief descriptions are as follows:

- *Oil Reclaimer*. Hilco oil reclaimer for vacuum pump oil was used in the P-2 furnace (portions may still be present but are not identified on available drawings);
- *Thorium Tetrafluoride Mill*. Dehydrated thorium tetrafluoride was milled and packaged for reduction in a mill that has been removed;
- *Calcium Metal Storage*. Drums of fine calcium metal were stored and weighed for the reduction process using a portable scale that has been removed;
- *Box Furnace*. The box furnace, which has been removed, was an electrically heated multipurpose furnace used for enriched uranium turnings and sawdust oxidation;
- *Enriched Derby Furnace*. The enriched derby furnace was a small-scale reduction furnace, now removed, which used to perform test runs for production of five inch diameter enriched uranium derbies up to five percent U-235;
- *Centrifugal Casting Furnace*. No information is available for this unit, and a nearby tank shown on earlier drawings in the area where plutonium out-of-spec (POOS) materials drums are currently stored.

The anticipated contaminants for the Pilot Plant Annex include the following, per process area:

n grit-blasting furnace crucibles: U_3O_8, uranium

n briquetting unit: uranium tetrafluoride, magnesium

n rotoblaster: uranium metal(up to 0.71 percent E), magnesium fluoride

n plasma furnace: zirconia, magnesium oxide

n P-2 (de-zincing) furnace: uranium (up to 1.25 percent E), thorium, zinc
n NuSal heat treat furnace: quench oil, sodium chloride, potassium chloride
n thorium tetrafluoride mill: thorium tetrafluoride, zinc fluoride
n calcium metal storage: calcium
n box furnace: uranium metal (up to 1.25 percent E)
n enriched derby production: uranium metal (up to five percent E)
n oil reclaimer: uranium, thorium, lubricating oils, zinc

East Wall Processes

Several processes were located along the east inside wall of the annex, north of the center of the building.

Grit Blaster and Dust Collector. The grit blaster and dust collector are located along the east wall of the Pilot Plant Annex. The unit was designed to remove slag from thorium and uranium derbies and crucibles from Plant five with an abrasive mixture. The grit blaster contains approximately 300 pounds of spent coarse coal slag abrasive grit and uranium particles. The grit blaster equipment consisted of a ventilated glove-box-type booth in which the blasting was performed, a motor and drive that supplied the compressed air and coal slag grit used in the cleaning operation, and a holding tank for the grit. The equipment was shut down in 1989, when the Pilot Plant discontinued production operations.

The Wheelabrator dust collector, located outside on the southeastern corner of the Pilot Plant Annex, serviced the grit blasting unit, as well as the heat-treat furnace, briquetting press, shot blaster, charging station, and jolter. The latter two units have been removed. The dust collector may contain dust.

Briquetting Unit. The briquetting unit is located along the east wall of the Pilot Plant Annex. It consists of a rotary briquetting press, a drumming station, and roller conveyors. The process involved UF_4 and magnesium blending and crushing into briquettes to make a high-density reduction charge, ultimately for use in the Metals Production Plant (5A). The press compressed the uranium/magnesium blend into pillow-shaped briquettes. After the material was formed into briquettes, a vibrating-type conveyor with a stainless steel pan transferred the briquetted material to a drumming station. A dust enclosure was vented to the Wheelabrator east dust collector discussed in the section describing the grit blaster. Operation of the briquetting unit was discontinued in the late 1950s or early 1960s.

Roto (shot)-Blaster. The shot-blasting operation was performed on the east side of the Pilot Plant Annex. The unit process consisted of a Pangborn Rotoblast used to remove magnesium fluoride slag and magnesium plate from derbies on an enclosed work table. The unit was designed to accommodate work pieces up to two feet in height and 4,000 pounds in weight. A 1-ton hoist on a

swinging jib was used for material handling. The abrasive used in the blasting was uranium shot composed of prill from reduction furnaces in the Metals Production Plant.

The unit propelled 10,000 kilograms of shot per hour. The spent uranium was transported to a pneumatic separator, where dust and fines were removed by air current and the remaining shot was separated by size. Usable shot was returned to the storage bin, and the fine material was drawn away by the west Wheelabrator dust collector discussed in the grit blaster section; the Roto-clone dust collector located just north of the west Wheelabrator also may have serviced the rotoblaster. Fires occurred in the unit and ventilation ducts because very fine uranium dust would occasionally ignite less flammable uranium and magnesium salts. Cleaned derbies were returned to the Metals Production Plant for density determinations. Low-density derbies, indicating the presence of excessive slag, were returned to the rotoblaster for further processing.

Plasma Furnace

The plasma spraying unit and dust collector were installed in 1962 in the southwestern corner of the Pilot Plant Annex. This process involved the application of protective coatings of molten ceramic particles to pour plugs and the interior of clean crucibles from the grit blasting unit. Once sprayed, the crucibles were returned to the Metals Production Plant. In 1965, an environmental chamber equipped for vacuum and inert-atmosphere operations was installed to permit the use of spray materials that either were toxic or would deteriorate when sprayed in air.

The environmental chamber, which was removed about ten to 15 years ago, was used for a short time to spray on experimental uranium oxide coatings under high-temperature melting conditions. The remaining booth and spray system were shut down when the Pilot Plant production operations were discontinued in 1989. The spray booth is ventilated through the dust collector located outside of the southwestern corner of the Pilot Plant Annex.

P-2 Furnace

The dezinc-ing operation performed in the Pilot Plant Annex was the same as the operation performed in the Six to Four Reduction Facility (54A), except that a P-2 furnace was used. The P-2 furnace also removed excess hydrogen gas from 2- and 4-inch-thick flat castings of uranium metal. A small amount of water from a concrete ram pit under this furnace was removed with a portable sump pump and transferred to the Pilot Plant sump system for treatment. Two Hoffman dust collectors located in the alley between the Pilot Plant Annex and the Six to Four Reduction Facility, near the northwestern corner of the annex, were used to collect dust from the P-2 induction furnace.

NuSal Heat Treat Furnace

The NuSal salt furnace is located in the northeastern corner of the Pilot Plant Annex. This furnace, installed in January 1964, replaced the original heat-treating furnace. The heat-treating unit consists of an immersion electrode salt furnace, an oil quench tank, two wash water tanks, a heat exchanger to

maintain the quench tank temperature, and a hoist. A 50/50 blend of molten sodium chloride and potassium chloride salts was used as a medium for heat-treating uranium core blanks on a pilot scale.

The pieces that were to be heat-treated were loaded into fixtures, and the fixtures were totally immersed into the salt bath. After a specified heating time, the fixtures and pieces were transferred from the salt bath to an oil or water quench tank. Sludge was removed to prevent it from interfering with the movement of pieces through the furnace or the attainment of the desired characteristics in the heat-treated pieces. The solidified sludge and salt were drummed and transferred to the waste pits.

West Wall Processes

The central area along the west inside wall of the Pilot Plant Annex is currently used for drum storage. The drums currently stored here are slightly higher in plutonium content than site specifications allow.

Southeast Processes

A charging station and a jolter are the only remaining portions of the pilot-scale uranium reduction process originally located here.

Outside Areas

Several pieces of equipment that supported process operations in the Pilot Plant Annex are located outside the building, as discussed in the preceding sections. These units are (all have concrete bases and low curbs):

- Hoffman Dust Collectors, which serviced the P-2 furnace, in the alley outside the northwestern corner of the annex;
- Wheelabrator East Dust Collector, which serviced furnaces and blasting operations along the east wall of the annex, outside the southeastern corner of the building;
- Roto-Clone Wet Dust Collector, which may have served the shot blaster, just north of the Wheelabrator West Dust Collector; and
- Wheelabrator West Dust Collector, which serviced Plasma Furnace, outside the southwestern corner of the annex.

Eighteen concrete chips, 12 masonry, and one steel coating sample were collected to characterize the contamination in this component and six liquid samples were collected to support this characterization.

Summary of Radiological Contamination

Concrete Chips

A total of ten concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (cesium-137) were detected. For 17 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 730, a larger margin than any other radioactive constituent.

Masonry Chips

A total of seven masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For 15 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-241, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 160, a larger margin than any other radioactive constituent.

Supplemental Media

A total of three unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-241, polonium-210, and strontium-90) were detected.

Summary of Inorganic Contamination

Concrete Chips

A total of ten concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (selenium) were detected. For 19 (aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, thallium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 950. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for lead (greater than 100 mg/kg). One sample was from the P-2 furnace area, one from the wet wall processes area, and one from outside areas.

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Masonry Chips

A total of seven masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, cadmium, and selenium) were detected. For ten (barium, chromium, cobalt, copper, lead, mercury, nickel, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 100. The lead concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit. These samples were collected in the East Wall Processes Area, the Plasma Furnace, The P-2 Furnace, and the West Wall Processes Areas.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, selenium, and vanadium) were detected. For seven of the detected inorganics (barium, beryllium, calcium, magnesium, potassium, silver, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, silver was the most significant, exceeding the steel coating baseline by a factor of 6.5. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, chromium, lead, and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

A total of three unknown liquid samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (cadmium, chromium, mercury, selenium, thallium, and vanadium) were detected. The concentration of inorganics in one or more of these samples exceeded 20 times the TCLP limit for at least one of the following: lead and silver.

Summary of Semivolatile Organic Contamination

Supplemental Media

Three unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected.

Summary of Volatile Organic Contamination

Supplemental Media

A total of three unknown liquid samples was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two

(2-butanone and toluene) were detected. There is a TCLP limit for 2-butanone, which was detected at a maximum concentration of 18 mg/L, well below the TCLP limit of 200,000 mg/L.

Summary of Pesticide/PCB Contamination

No media were analyzed for pesticide/PCB contamination.

A.IV.3.25 Incinerator Building (39A)

The Incinerator Building (39A), a two-story square structure, is located within the west-central portion of the FEMP Production Area between the Ore Refinery Plant (2A) and the Recovery Plant (8A) and along 102nd Street. The building consists of a structural steel frame on a reinforced concrete base and floor, transite interior and exterior siding panels (insulation materials between panels), and transite roof panels.

The Incinerator Building shares one inactive HWMU with the Waste Oil Decant Shelter (39B) and with the Building 39A Pad (74W). This unit is considered a HWMU because reportedly it handled solvents (EPA waste codes F001 and F002) and lead. Closure is to be attained through CERCLA response. Hold-up material, concrete, rinsewater, and PPE are the materials expected to be generated by the closure of this HWMU. For more information on HWMUs, see Appendix K, Table K-1.

The Incinerator Building contains four processes: the drum dryer, the trash baler, the liquid waste incinerator, and the solid waste incinerator. Initially, this facility was entirely devoted to the drum dryer process; once the drum dryer was removed, the trash baler, solid and liquid waste incinerators were added. The drum dryer and the liquid waste incinerator processes are considered wet processes.

Drum Dryer

Aqueous raffinate slurry from the extraction process in the Ore Refinery Plant, which comprised acid insoluble solids, soluble acid nitrates, and excess nitric acid, was dried on two large rotary drums on the second floor in an acid-brick-lined diked area. A recycle surge tank was attached to the feed pan of each filter. As the dried raffinate cake was scraped off the rotary drum, it fell into one of two gas-fired rotary calcine furnaces located on the first floor, where it was further dried. Metal oxides were discharged from the rotary calciners into the William's hammer mill. The pulverized particles were pneumatically conveyed to Silo 3, a large, outdoor storage tank.

Nitric acid and water vapors from the drum driers and the rotary calciners were exhausted by means of a venturi-type scrubber, located on the diked pad north of the incinerator building. A knife grinder, used to sharpen the filter cake knives on the filters, was located in the center of the second floor. All drum dryer process and associated equipment has been removed, leaving the second floor empty and allowing for the installation of the trash baler and the solid and liquid waste incinerators on

the first floor. Anticipated contaminants for this component are uranium, UO_3, ammonia, and raffinates.

Trash Baler

Solid wastes generated by site operations were transported to the Incinerator Building in dumpsters for sorting and incineration or compaction. The dumpsters were emptied onto the conveyor component of the building, which carried the solid wastes to the sorting platform, where they were segregated into burnable and non-burnable piles. Solid wastes capable of being incinerated were taken to the solid waste incinerator, while non-burnables, such as metal, glass, and plastics, were placed in the vertical crusher of the trash baler. The vertical crusher remains in operation and is currently used to compact office-type wastes generated within the process area. Uranium is the only anticipated contaminant.

Liquid Waste Incinerator

The liquid waste incinerator (also referred to as the trane incinerator) is a gas-fired single-chamber unit consisting of a 50 gallon feed tank, air intake ductwork and two blowers, a primary burn chamber, exhaust ductwork, a vertical discharge stack, a baghouse filter, and an electrical control panel. Other equipment associated with the liquid waste incinerator but not in the Incinerator Building include a 5800-gallon storage tank, a concrete storage pad located east of the building, an oil/water separation unit in the Waste Oil Decant Shelter (39B), and an overhead oil transfer line that terminates at the 50 gallon feed tank.

The Liquid Waste Incinerator was used from 1980 to 1986 to incinerate waste oils generated by various plants. In general, waste oil was transported to the oil/water separator unit in the waste oil decant shelter, then pumped from the separation unit to the 5800-gallon storage tank or the 50 gallon feed tank. The waste oil was then incinerated, and exhausts were directed to a baghouse filter for ash removal before being vented through a stack.

Drums of waste oil awaiting incineration were stored on the concrete pad east of the Incinerator Building. Samples of the waste oil exhibited 1,1,1-trichloroethane and lead concentrations above regulatory threshold levels. Per RCRA regulations, the waste oils were classified as hazardous wastes, and the liquid waste incinerator and associated equipment were designated as a HWMU. Anticipated contaminants include: uranium; spent solvents; 1,1,1-trichloroethane; trichloroethylene; perchloroethylene; and spent lubricating/hydraulic oils.

Solid Waste Incinerator

Vehicle loads of burnable materials were delivered into the Incinerator Building and put onto the lower section of the trash baler conveyor. Burnables were then placed in the feed hopper to be fed into the main chamber of the solid waste incinerator (also referred to as the Kelley incinerator). A

thermal reactor mounted above the main chamber burned the particulate matter before it entered the stack. Anticipated contaminants are uranium; 1,1,1-trichloroethane; and acetone.

Two concrete chip, nine concrete core (three depths), one masonry, eight steel coating, and one transite sample were collected to characterize the contamination of this component. One loose media and one liquid sample were collected to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For 18 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 380, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For 15 of the detected radioactive constituents (americium-241, lead-210, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 87, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-239/240, radium-228 and strontium-90) were detected. For nine of the detected radioactive constituents (lead-210, plutonium-241, polonium-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 9, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight

(americium-241, cesium-137, plutonium-238, plutonium-239/240, plutonium-241, radium-228, strontium-90 and technetium-99) were detected. For one of the detected radioactive constituents (thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Masonry Chips

A total of two masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-239/240 and strontium-90) were detected. For 17 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 910, a larger margin than any other radioactive constituent.

Steel Coatings

A total of four steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-241 and strontium-90) were detected. For 16 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 330, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and strontium-90) were detected in the loose media and all except seven (americium-241, cesium-137, lead-210, plutonium-241, radium-228, strontium-90, and thorium-232) in the liquid.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, selenium and silver) were detected. For 16 (arsenic, barium, beryllium, calcium, chromium, cobalt, copper, lead, magnesium, manganese, mercury, nickel, sodium, thallium, vanadium and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with

concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 53. The concentration of lead in one sample from this component exceeded 20 times the TCLP limit, which for lead is greater than 100 mg/kg. This sample was from the solid waste incinerator area.

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, silver, sodium, and thallium) were detected. For 17 of the detected inorganics (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, nickel, potassium, selenium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 30. The concentration of lead in one sample of the top ½-inch of concrete cores from the liquid waste incinerator area exceeded 20 times the TCLP limit (greater than 100 mg/kg).

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, cadmium, cobalt, mercury, selenium, silver, sodium, thallium, and vanadium) were detected. For nine of the detected inorganics (aluminum, arsenic, barium, beryllium, chromium, copper, lead, nickel, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 24. There were no detections at greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cobalt, mercury, selenium, sodium, thallium, and vanadium) were detected. For ten of the detected inorganics (aluminum, arsenic, barium, beryllium, calcium, chromium, magnesium, manganese, potassium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, beryllium was the most significant, exceeding the concrete baseline by a factor of 1.6. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

A total of two masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, cobalt, copper, mercury, selenium, silver, sodium, thallium, vanadium and zinc) were detected. For three (arsenic, barium and lead) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 60. The lead concentration of inorganics in

two samples from this component exceeded 20 times the TCLP limit. Both samples were collected in the Drum Dryer Area.

Steel Coatings

A total of four steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (antimony) was detected. For nine of the detected inorganics (aluminum, arsenic, barium, beryllium, cadmium, copper, selenium, sodium and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, selenium was the most significant, exceeding the steel coating baseline by a factor of 44. The concentration of inorganics in seven samples from this component exceeded 20 times the TCLP limit for one or more of the following: arsenic, barium, cadmium, chromium, lead, mercury, and selenium. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Transite

Two transite samples, both collected from the Liquid Waste process area, were collected for the analysis of TCLP metals. Of the eight TCLP metals analyzed, arsenic, chromium, and mercury were detected in both samples. None of the results exceeded their respective TCLP limits of 5.0 mg/L (for both arsenic and chromium) and 0.2 mg/L for mercury.

Supplemental Media

One loose media sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, cobalt, mercury, selenium, sodium, thallium and vanadium) were detected. The concentration of no inorganics in this sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Transite

Two transite samples, both collected from the Liquid Waste process area, were collected for the analysis of TCLP semivolatile organics. Of the 11 TCLP semivolatiles analyzed, none were detected.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 13 (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, butyl benzyl phthalate, chrysene, di-n-octyl phthalate, dibenzo(a,h)anthracene, diethyl phthalate, fluoranthene, naphthalene,

phenanthrene, phenol and pyrene) were detected in the loose media and none were detected in the liquid. There are no TCLP limits for any of the semivolatiles detected.

Summary of Volatile Organic Contamination

Transite

Two transite samples, both collected from the Liquid Waste process area, were collected for the analysis of TCLP volatile organics. Of the 11 TCLP volatiles analyzed, none were detected.

Supplemental Media

A total of one loose media and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only two (methylene chloride and toluene) were detected in the loose media and none were detected in the liquids. There are no TCLP limits for either of the volatiles detected.

Summary of Pesticide/PCB Contamination

Concrete Cores

Three concrete core samples from the same location but three depth intervals (0-½ inch, ½-1 inch and 1-6 inches) were collected from this component for analysis of pesticide/PCB contaminants. Of 28 pesticides/PCBs for which analyses were performed, only one (Aroclor-1254) was detected and it was detected in all three depth intervals. The maximum detected concentration, which occurred in the top ½-inch, was well below the TSCA limit of 50 ppm.

A.IV.3.27 Waste Oil Decant Shelter (39B)

The Waste Oil Decant Shelter (39B) is a rectangular structure consisting of a transite roof with steel supports over a concrete pad located just south of the Ore Refinery Plant (2A). The Waste Oil Decant Shelter housed the oil/water separator. The oil-water separation process, a wet process area, was the only process performed in the facility. The oil-water separation process received waste oils from various operations site-wide. The oil and solvents were then processed through the oil-water separator. The oil and solvents were decanted during the process to remove the water fraction before incineration of the oils in the Incinerator Building (39A). The process has been declared a HWMU under RCRA regulations.

The Waste Oil Decant Shelter shares an inactive HWMU with the Incinerator Building (39A) and with Building 39A Pad (74W). For details see Section A.IV.3.25.

The anticipated contaminants for the Waste Oil Decant Shelter include spent lubricating and hydraulic oils, and spent solvents, (1,1,1-trichloroethane; perchloroethylene; and trichloroethylene).

One concrete core (collected from three depths) sample, one steel coatings, one loose media and one unknown liquid sample were collected were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 15 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236 and uranium-238) were detected. For three of the detected radioactive constituents (lead-210, technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 19, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90 and thorium-228) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 2, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-230 and thorium-232) were detected. For one of the detected radioactive constituents (polonium-210), the maximum concentration of each exceeded its respective concrete baseline value. Polonium-210 exceeded its baseline concentration by a factor of 1.1, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-238 and strontium-90) were detected in the loose media and all except one (cesium-137) in the liquid.

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Summary Of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For six of the detected inorganics (aluminum, arsenic, chromium, copper, lead, and potassium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 3.4. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For five of the detected inorganics (aluminum, arsenic, chromium, lead, and potassium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.3. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, cadmium, selenium, and thallium) were detected. For six of the detected inorganics (arsenic, chromium, cobalt, copper, lead, and potassium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (beryllium, selenium, and thallium) were detected. For three of the detected inorganics (aluminum, barium, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the steel coating baseline by a factor of 1.6. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One loose media and one unknown liquid sample sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (arsenic, beryllium, mercury, selenium, silver, and thallium) were detected in the loose media and all except six (antimony, beryllium, mercury, selenium, silver, and thallium) were detected in the liquid. The concentration of lead in the loose media sample exceeded 20 times the TCLP limit. The concentration of inorganics in the liquid sample exceeded the TCLP limit for the following: cadmium and chromium.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected for the loose media and only three (bis(2-ethylhexyl)phthalate, p-methylphenol(cresol), and phenol) were detected in the liquid. There is a TCLP limit for only p-methylphenol, which was detected in one liquid sample at a concentration of 4 mg/L, well below the TCLP limit of 200,000 mg/L

Summary of Volatile Organic Contamination

Supplemental Media

A total of one loose media sample and one unknown liquid was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (acetone) were detected in the loose media and only four (1,1-dichloroethane, 2-butanone, acetone, and carbon disulfide) were detected in liquids. There is a TCLP limit for 2-butanone, which was detected in the liquid at 43 mg/L, well below the TCLP limit of 200,000 mg/kg.

Summary of Pesticide/PCB Contamination

No samples were analyzed for pesticides/PCB contamination.

A.IV.3.28 Six to Four Reduction Facility 1 (54A)

The Six to Four Reduction Facility 1 (54A) is one of the Pilot Plant processing facilities located on the southwest end of First Street. It is an irregularly shaped building whose western wall adjoins the Pilot Plant Wet Side and a small portion of the eastern wall joins with the Pilot Plant Annex (37). The building has several distinct parts; the various parts of the overall building contain different types of construction materials.

The main processing area is located in the northwestern part of the building. It consists of a structural steel frame on a reinforced concrete base, reinforced poured concrete floor, transite siding panels with insulation between the inner and outer panels, transite roof panels, lead bolt covers and sill moldings, and glass windows. The main processing area contains three-level steel structures that house the reduction reactors, the AHF recovery system, the HF scrubbers, the thorium derby production area, the derby saw/sampling area, and two furnace rooms. Most activity in this building occurred in these areas. The transformation of uranium fluoride from UF_6 to UF_4 and the production of uranium and thorium derbies occurred in the areas discussed below. Based on process knowledge, uranium, thorium, calcium, magnesium, zinc, and perchloroethylene are expected to be present in this building.

A transformer room and utility room are attached to the north wall of the main processing area. A mechanical room, a hallway, and a power generator room are attached to the east wall of the main processing area. A control room, electrical room, and battery room are attached to the south wall of the main processing area, and office and lab rooms are situated along the eastern common wall with the Pilot Plant Wet Side (13A). The latter office and lab rooms are accessible from either building.

The autoclave area, the southern portion of the Six to Four Reduction Facility 1, was added when the UF_6 to UF_4 process was upgraded between 1982 and 1984. This area is described as the first Process Area below.

Autoclave Area

The Autoclave Area is 32 ft high and consists of a structural steel frame on poured reinforced concrete base with poured reinforced concrete floor, steel siding panels, and a sloped steel roof. The roof is of composite construction, having a corrugated steel deck covered with rigid insulation and five-ply built-up roofing.

UF_6 cylinders, 10- and 14-ton capacities, were delivered from the gaseous diffusion plants at Portsmouth, Ohio; Oak Ridge, Tennessee; and Paducah, Kentucky; to the concrete Pilot Plant Pad (74U) south of the autoclave section. The cylinders were placed in one of three low-pressure, steam-heated autoclave units located in the autoclave section of the Six to Four Reduction Facility. The autoclaves heated the UF_6 to vaporization at 113°C (235°F). The vaporized UF_6 was piped to a heated surge tank and from the tank to the reactors in the main process area.

During feed cylinder changeovers, the lines were first evacuated with two vacuum pumps located at the northwestern corner of the autoclave room; then the lines were pressurized with nitrogen. The vacuum pumps drew the vapors through a cold trap, then through a molecular sieve where Freon-11Ô was used to cool a cylinder to 40°F to solidify the purged UF_6. Molecular sieves removed any UF_6 remaining after the cold trap. In the predecessor process, before 1982, the UF_6 cylinder heating process was carried out in a single steam-jacketed cubicle located outside the southwestern corner of

the building on Pilot Plant Pad. Possible contaminants include Freon-11™, uranium hexafluoride, uranium tetraflouride, and ammonia.

UF6 Reduction Reactors

The reduction reaction was carried out in the two reactor vessels located in the southwestern quadrant of the original processing area, above where packaging stations and drum conveyors are shown on the first floor plan. UF_6 feed gas was mixed with hydrogen, obtained from dissociated ammonia, and fed through a mixing head at the top of one of two vertical tube reaction vessels 15 inches in diameter and 20 ft high.

Heat was applied to the external surfaces of the reaction vessels to induce the reduction reaction. Reduction occurred between 815 and 870°C (1500 to 1600°F) in the upper reaction zones. Compressed air from a distribution ring located at the base of each zone removed excess reaction heat from the external surfaces of the reactors. This cooling minimized the corrosion and oxidation of the reactor and cooled the down-flowing gas-powder mixture. Pneumatic vibrators and cycling through heating/cooling cycles were used to dislodge UF_4 slag that accumulated on the walls of the reaction vessels.

UF_4 powder fell through the reaction vessel into a water-cooled, jacketed-screw conveyor and then passed through a sealed hopper, rotary valve, and pulverizer. The screw conveyor transported the UF_4 to one of the two packaging stations. The UF_4 was then packaged into ten gallon cans, weighed, and subsequently used in the Metals Production Plant (5A). The packaging station was ventilated with the exhaust going to two bag-type dust collectors located northeast of the packing station, above the plant floor. Green salt, collected in the hopper at the base of the dust collector units, was placed in drums for subsequent use in the Green Salt Plant (4A) or for disposal, depending upon its analysis. Anticipated contaminants include ammonia, thorium, uranium, calcium, magnesium, and zinc.

AHF Recovery

Gases exiting the reactors passed through two cyclone separators, two sintered metal filters, and an activated carbon tube-type filter for removal of UF_4 dust and unreacted UF_6. The reaction gases were then cooled to condense out anhydrous hydrogen fluoride (AHF). The AHF refrigeration systems are located along the north and west walls, also within a steel structure. A horizontal, cylindrical steel tank, located outside the east wall near the northeastern corner of the Pilot Plant Annex, provided intermediate storage for the AHF, which was then pumped to the Old/Main Tank Farm for long-term storage using equipment located and controlled on a platform next to the tank. Anticipated contaminants are uranium dust and Freon-11™.

DHF Recovery

The remaining off-gas passed through a series of three aqueous scrubbers to remove residual HF. Scrubber effluent, dilute hydrofluoric acid (DHF), was collected in polyethylene tanks at the bases of

the scrubbers. The scrubber equipment is located within a three-level steel structure along the west wall of the main processing facility. The process is considered wet. Anticipated contaminants are uranium dust and Freon-11™.

Thorium Derby Production/Reduction

Equipment for various uses was contained in the main processing area before 1982. These uses included lining furnace pots with calcium fluoride, blending thorium tetrafluoride with calcium and zinc fluoride, loading furnace pots, producing thorium metal derbies, and sampling thorium metal derbies. Jolters, located in the northeastern corner of the building, were used to line furnace pots with calcium fluoride (CaF_2) or magnesium fluoride (MgF_2).

Thorium tetrafluoride was blended with calcium and zinc fluoride in an enclosed blender located near the jolters. An argon purge was used on the blender. The blended material was charged into the CaF_2-lined pots, capped with CaF_2, and enclosed with a lid in the same general area. The loaded pots were then heated in one of two Rockwell resistance type furnaces, also located in the northeastern quadrant of the main processing area, to produce a thorium zinc metal derby and CaF_2 slag. After cooling, the pots were taken to the Metals Production Plant (5A) where the metal and CaF_2 were removed. The CaF_2 was processed in the Pilot Plant Wet Side (13A) for recycle as pot liner, and the metal was returned to the six to four reduction facility for sampling.

Pre-dried thorium tetrafluoride, produced in the Pilot Plant Wet Side, was placed in pans stacked in the Rockwell furnaces for further dehydration. The dried ThF_4 was then milled in the Pilot Plant Annex (37) before use in derby production as described above. Possible contaminants include uranium and thorium metal, calcium, zinc, and magnesium.

Derby Saw/Sampling

A power hacksaw, located in the southeastern corner of the process area (between the Furnace Room and the east wall) was used to saw a thin slice from each thorium zinc derby for chemical analysis. Thorium/zinc dust from the sampling was drummed and sent to the Recovery Plant (8A). Before the UF_6 to UF_4 process upgrade in 1982, a scale located near the power hacksaw is believed to have been removed and that the recession in the floor upon which it was installed was filled with concrete. Possible contaminants include uranium metal, thorium dust, Freon-11™, and water-soluble oil.

P-1 Furnace Room

From 1969 to 1971, the Zn-Th derbies from the Rockwell furnaces were placed in the P-1 vacuum furnace, located in the furnace room, to be heated to a sufficient temperature to vaporize away the zinc. The P-1 furnace was cooled with perchloroethylene circulated through a cooling jacket at one time because of the production of higher enrichment materials; otherwise, water was used. The purified thorium metal derbies were saw-sampled as discussed above. The process is considered a

wet process. Possible contaminants include uranium metal, thorium metal, zinc, and perchloroethylene.

PLT Furnace

The PLT furnace was located in the northeastern quadrant of the main processing area just north and west of the aisle that led to the rollup steel door in the east wall of the facility. In this furnace, a continuous process to produce uranium metal was tested. UF_4 and magnesium were fed continuously to the furnace, and molten uranium was continuously separated from molten MgF_2 on an experimental basis. Possible contaminants are uranium metal (up to 1.25 percent E) and perchloroethylene.

From this component a total of 37 samples were collected. These include: seven concrete chips, nine concrete core depths (a total of three concrete core locations), ten masonry samples, and 11 steel coating samples. The following presents a summary of the results of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of six concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-241, and strontium-90) were detected. For 16 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 520, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, lead-210, and strontium-90) were detected. For 12 of the detected radioactive constituents (americium-241, plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 430, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, neptunium-237, plutonium-241, and strontium-90) were detected. For 11 of the detected radioactive constituents (americium-241, plutonium-238, radium-228, technetium-99, thorium-228,

thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 250, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-241, strontium-90, and technetium-99) were detected. For six of the detected radioactive constituents (radium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 12, a larger margin than any other radioactive constituent.

Masonry Chips

A total of eight masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-241, and strontium-90) were detected. For 12 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 70, a larger margin than any other radioactive constituent.

Steel Coatings

A total of seven steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (cesium-137) were detected. For 16 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Plutonium-238 exceeded its baseline concentration by a factor of 460, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

A total of six concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (cadmium, selenium, and thallium) were detected. For 14 (aluminum, antimony, barium, beryllium, chromium, cobalt, copper, lead, mercury, nickel, potassium, silver, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than

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baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 73. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver, and thallium) were detected. For 12 of the detected inorganics (aluminum, beryllium, calcium, chromium, cobalt, copper, lead, mercury, nickel, potassium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 94. The concentration of lead in one sample of the top ½-inch of concrete cores from the DHF recovery area exceeded 20 times the TCLP limit.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and silver) were detected. For 14 of the detected inorganics (aluminum, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, manganese, nickel, potassium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 3.1. There were no detections at greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and silver) were detected. For 12 of the detected inorganics (aluminum, barium, beryllium, chromium, cobalt, copper, lead, nickel, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 13. The concentration of chromium in one sample of concrete cores from a depth greater than 1-inch from the DHF recovery area exceeded 20 times the TCLP limit.

Masonry Chips

A total of ten masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (selenium, silver, and thallium) were detected. For 17 (aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 770. The lead concentration of inorganics in seven samples from this component exceeded 20 times the TCLP limit. Two of the samples were collected in the Autoclave Area. The others

were collected in the UF6 Reduction Reactor Area, the DAG Recovery Area, the Derby/Saw Sampling Area, the P-1 Furnace Area, and the PLT Furnace Area.

Two masonry chip samples from this component were also analyzed for inorganics using the TCLP test (see Appendix A.II for complete results). Only one TCLP metal, lead (at 13,000 mg/kg) in one sample collected from the Autoclave Area , was detected at greater than 20 times the TCLP limit. Lead was detected in the TCLP leachate at 11 mg/L, exceeding the TCLP limit of 5.0 mg/L and indicating that only two percent of available lead leached from the solid sample. There were no other results from these analyses that are considered reliable for comparison. Based on the percent of lead that leached (two percent) from the masonry chip discussed above, there is a second masonry chip also collected from the Autoclave Area (at 16,300 mg/kg lead) that would exceed TCLP limits if leached.

Steel Coatings

A total of eight steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all were detected. For 12 of the detected inorganics (antimony, beryllium, chromium, copper, iron, magnesium, manganese, mercury, nickel, potassium, sodium, and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, beryllium was the most significant, exceeding the steel coating baseline by a factor of 3.1. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium, lead, and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Organic Contamination

No media from this component was analyzed for organic contamination.

A.IV.3.29 Slag Recycling Building (55A)

The Slag Recycling Building (55A) is a multilevel, rectangular consisting of a structural steel frame on a concrete base with transite siding and roofing panels. The first floor is concrete, while the second, third, and fourth floors are constructed of diamond plate steel grating.

The Slag Recycling Building contains the slag milling process area. Magnesium fluoride (MgF_2) slag was received from the Metals Production Plant (5A) breakout system via the Slag Recycling Pit/Elevator. The slag was separated into coarse and fine streams and then stored for processing. The coarse stream (representing material produced by the Metals Production Plant reduction reaction) was ball milled and passed through an air classifier to select the product particle distribution. The fine stream (representing pot liner material) was passed through the system, but only a small fraction was

saved. Both products were stored in bins in the building and subsequently air-veyed to conveyor feed bins in the Metals Production Plant. Excess fines, classified waste, and larger metal particles were drummed for dispositioning. Currently, the Slag Recycling Building contains bucket elevators, storage bins, a ball mill, a Rotex vibrating screen, and conveyors (vibrating, flight, and pneumatic). Anticipated contaminants include magnesium fluoride, magnesium, uranium, and prill.

One concrete chip sample, one steel coatings, one loose media and one unknown liquid were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, lead-210, neptunium-237, plutonium-241, strontium-90, thorium-228, and thorium-232) were detected. For eight of the detected radioactive constituents (plutonium-239/240, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 76, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (strontium-90) were detected. For 15 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, and thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 64, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-238, and strontium-90) were detected in the loose media and all except seven (neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, and thorium-232) in the liquid.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, sodium, and thallium) were detected. For eight (aluminum, arsenic, barium, copper, lead, nickel, potassium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (selenium, sodium, and thallium) were detected. For five of the detected inorganics (iron, magnesium, manganese, potassium, and vanadium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, magnesium was the most significant, exceeding the steel coating baseline by a factor of 1.9. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One loose media sample and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (beryllium, selenium, silver, thallium, and vanadium) were detected in loose media and all except 11 (antimony, arsenic, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, vanadium, and zinc) were detected in the liquid. The concentration of lead in the loose media sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected in either the loose media or the liquid.

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Summary of Volatile Organic Contamination

Supplemental Media

A total of one loose media and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only five (chlorobenzene, tetrachloroethene, toluene, trichloroethene, and total xylenes) were detected in the loose media and none were detected in the liquid. There is a TCLP limit for chlorobenzene and tetrachloroethene, which were detected in the loose media at 63 mg/kg and 61 mg/kg, respectively, both well below 20 times the TCLP limits of 2,000,000 mg/kg (chlorobenzene) and 14,000 mg/kg (tetrachloroethene).

Summary of Pesticide/PCB Contamination

No samples were analyzed for pesticides/PCB contamination.

A.IV.3.30 Slag Recycling Pit/Elevator (55B)

The Slag Recycling Pit/Elevator (55B) is a multilevel, square building consisting of a structural steel frame on a poured concrete base with transite siding and roofing panels. The first floor is concrete; the second, third, and fourth floors are made of diamond plate steel grating.

The Slag Recycling Pit/Elevator contains the slag processing area. Magnesium fluoride (MgF_2) slag was received from the breakout system in the Metals Production Plant (5A). The slag was screened into coarse and fine streams. The slag was then sent to the Slag Recycling Building for further processing, or the unsplit stream could be dispatched to mobile hoppers (for transport to waste pits). The Slag Recycling/Pit Elevator also stored quantities of slag and conveyed slag to the screening process. Currently, The Slag Recycling Pit/Elevator contains bucket elevators, a storage bin, and conveyors. Anticipated contaminants include: magnesium fluoride, magnesium, uranium, and prill.

One concrete chip sample, one steel coatings sample, two liquid samples, and one loose media sample were collected from this component to support characterization. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (strontium-90) were detected. For five of the detected radioactive constituents (cesium-137, lead-210, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value.

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Elemental uranium exceeded its baseline concentration by a factor of 87, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, plutonium-238, and strontium-90) were detected in the loose media and all except seven (neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, and thorium-232) in the liquid.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, mercury, silver, and thallium) were detected. For four (lead, selenium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 6. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (beryllium) was detected. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the steel coating baseline by a factor of 0.9. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One loose media sample and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (beryllium, selenium, silver, thallium, and vanadium) were detected in loose media and all except 11 (antimony, arsenic, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, vanadium, and zinc) were detected in the liquid. The concentration of lead in the loose media sample exceeded 20 times the TCLP limit.

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Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected in either the loose media or the liquid.

Summary of Volatile Organic Contamination

Supplemental Media

A total of one loose media and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only five (chlorobenzene, tetrachloroethene, toluene, trichloroethene, and total xylenes) were detected in the loose media and none were detected in the liquid. There is a TCLP limit for chlorobenzene and tetrachloroethene, which were detected in the loose media at 63 mg/kg and 61 mg/kg, respectively, both well below 20 times the TCLP limits of 2,000,000 mg/kg (chlorobenzene) and 14,000 mg/kg (tetrachloroethene).

Summary of Pesticides/PCB Contamination

No samples from this component were analyzed for Pesticides/PCBs.

A.IV.3.31 Drum Reconditioning Building (66)

The Drum Reconditioning Building (66) is a one-story, rectangular building located north of the Plant 1 Storage Building (1B). The building consists of a structural steel frame and steel side panels over a concrete base. The building operations entailed removing old paint from 30 and 55 gallon drums, which were then repainted and dried or crushed if found not to be reusable. A solvent storage area is associated with this building.

The Drum Reconditioning Building one inactive HWMU located to the east of the building. It is considered to be an HWMU because it is reported to have contained batteries with cadmium and lead. It is planned to be closed under RCRA. Hold-up and dust tubes are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

The Drum Reconditioning Building contains four process areas described below. Three of the processes are considered dry, and the other process is considered wet. Anticipated contaminants from these processes are cadmium and xylene.

Shot Blasting

Shot blasting was performed by a Wheelabrator. The Wheelabrator bombarded the drums with a steel abrasive to remove old paint and any drum contents that were not removed during the decontamination process in the Recovery Plant (8A). The material blasted off the drums was collected in the containment bin of the Wheelabrator. A Wheelabrator dust collector, located immediately east of the Drum Reconditioning Building, removed dust generated from this process.

Painting

As part of drum reconditioning, the drums were repainted. Solvent-based paints were applied to drums using a spray paint booth and oven. Black, white, or red enamels with a clear lacquer liner were applied. The spray paint booth was equipped with a water wall, which constantly flowed to remove the excess paint. The contaminated water was pumped into a sump. A protectant was applied to the other walls of the paint booth before painting. This protectant allowed the paint, which splattered on the other walls, to be peeled off and discarded. After painting was completed, the drums were transferred to the oven for drying. Paint drippings have been observed in the oven. In 1988, the solvent-based paints were replaced by water-based paints.

Drum Baling

Drums that were not deemed reusable were crushed and baled by the drum baler for disposal. Drums chosen to be baled were not always clean drums. Hydraulic oil has been reported to have leaked from the drum baler into a pit located beneath the baler. Anticipated contaminants are cadmium and xylene

Solvent Storage

The solvent storage area is a separate area. Although it is attached to the Drum Reconditioning Building, it cannot be accessed through the building. The solvent storage area managed materials associated with the processes in the Drum Reconditioning Building. Paints, solvents, and scrap paint were housed in the area. Stains have also been reported on the floor of the storage area.

Three concrete chips, two concrete core samples (divided into three samples each), one loose media and three unknown liquid sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of three concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (americium-241) were detected. For 11 of the detected radioactive constituents (lead-210, plutonium-238, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the

maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 69, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, plutonium-239/240, and strontium-90) were detected. For 11 of the detected radioactive constituents (neptunium-237, plutonium-238, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 57, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For nine of the detected radioactive constituents (americium-241, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-228 exceeded its baseline concentration by a factor of 23, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, uranium-234, uranium-235/236, and uranium-238) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 2.8, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, lead-210, plutonium-241, and strontium-90) were detected in the loose media and all except five (plutonium-238, plutonium-239/240, polonium-210, uranium-234, and uranium-238) in the liquid.

Summary of Inorganic Contamination

Concrete Chips

A total of three concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, cadmium, mercury, and thallium) were detected. For 11 (antimony, arsenic, barium, copper, lead, magnesium, potassium, selenium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 6. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (beryllium, cadmium, chromium, mercury, selenium, silver, and thallium) were detected. For 11 of the detected inorganics (aluminum, antimony, arsenic, barium, cobalt, copper, lead, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 6.8. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, chromium, mercury, nickel, selenium, silver, and thallium) were detected. For four of the detected inorganics (calcium, lead, sodium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 3.6. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, chromium, mercury, nickel, selenium, silver, and thallium) were detected. For three of the detected inorganics (magnesium, potassium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 2.7. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of five steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except one (thallium) was detected. For eight of the detected inorganics (barium, calcium, chromium, copper, iron, manganese, potassium, and sodium), the maximum

concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the steel coating baseline by a factor of 4.3. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One loose media sample and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (beryllium, mercury, potassium, selenium, silver, and thallium) were detected in the loose media and all except five (chromium, mercury, selenium, thallium, and vanadium) were detected in the liquid The concentration of chromium in the loose media sample exceeded 20 times the TCLP limit. The concentration of inorganics in the liquid sample exceeded the TCLP limit for the following: barium and lead.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 16 (2,4-dimethylphenol, acenaphthene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butyl phthalate, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene) were detected in the loose media and only one (diethyl phthalate) was detected in the liquid. There are no TCLP limits for the semivolatiles which were detected.

Summary of Volatile Organic Contamination

Supplemental Media

A total of one loose media, one oil sample, and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (total xylenes) were detected in the loose media, only two (methylene chloride and toluene) were detected in the oil, and 11 (1,1,1-trichloroethane, 1,1-dichloroethane, 2-butanone, 4-methyl-2-pentanone, acetone, ethylbenzene, methylene chloride, tetrachloroethene, toluene, vinyl chloride, and total xylenes) were detected in the liquid. There are TCLP limits for 2-butanone and tetrachloroethene which were detected in the liquids at 6100 mg/L and 3 mg/L, respectively, well below their respective TCLP limits of 200,000 mg/L and 700 mg/L.

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Summary of Pesticide/PCB Contamination

No media were analyzed for pesticide/PCB contamination.

A.IV.3.32 Decontamination Building (69)

The Decontamination Building (69) is a single-story, rectangular building consisting of a structural steel frame, concrete block walls with glass windows, a concrete floor covered with acid brick tile, and corrugated metal roofing. This facility was used as a decontamination and decommissioning facility.

The Decontamination Building is considered one process area and is used to decontaminate and/or decommission radiologically contaminated ferrous and nonferrous scrap metals, miscellaneous equipment, and vehicles. The primary operating units include five open-topped decontamination tanks (one caustic wash tank and four acid bath tanks), a bridge crane, a drainage system, a sump system, a caustic storage tank, steam cleaner/spray washers, fume exhaust ventilation systems and air handling units, a vacuum dust collector system, and a scale. Decontamination of smaller metal and equipment is conducted by immersion in acid or caustic baths. Larger pieces of metal, equipment, and vehicles are decontaminated by spray washing on the outside decontamination pad (74P).

Items to be decontaminated are surveyed by radiological technicians to determine the contamination and hot spots. Depending on surface characteristics and materials of construction, the item may be soaked in one or more acidic/caustic tank solutions and/or steam sprayed for the decontamination to be complete. The decontaminated items are checked by radiological technicians to ensure that decontamination is complete. If so, the item is discarded or reused. If not, the item goes through this process again until it is considered decontaminated. Anticipated contaminants include: NaOH, ammonia, sodium silicate, lead, methyl ethyl ketone, used oils and lubricants, and nitric acid.

Two acid brick samples, three concrete core samples and one masonry sample were collected to characterize the contamination of this component. One loose media and one liquid sample were taken to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 72, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 140, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, neptunium-237, and plutonium-238) were detected. For 12 of the detected radioactive constituents (lead-210, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 38, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, thorium-232, and uranium-235/236) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 180, a larger margin than any other radioactive constituent.

Supplemental Media

One sludge and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (neptunium-237) were detected in the sludge and all except three (cesium-137, neptunium-237, and plutonium-238) in the liquid.

Summary of Inorganic Contamination

Acid Brick

Only one acid brick samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, thallium, and vanadium) were detected. For five of the detected inorganics (chromium, copper, lead, sodium, and zinc), the maximum concentration of each was greater than the respective concrete baseline. Of the inorganics with concentration was greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 23. There were no detections at greater than 20 times the TCLP limit.

Concrete Cores

One concrete core sample was collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, copper, lead, nickel, and zinc were reported at levels greater than five times background levels with lead greater than 20 times TCLP limit. Cadmium and sodium concentrations were between two and five times background levels. Chromium and potassium were detected at levels less than two times background levels. Aluminum, antimony, arsenic, barium, beryllium, calcium, cobalt, iron, magnesium, manganese, silver, and vanadium were present in significant quantities but are normal constituents of concrete and are at or below background levels.

In the second core depth, ½ - 1 inch, lead, sodium, and zinc concentrations were between two and five times background levels. Arsenic, chromium, copper, nickel, and zinc were reported at levels less than two times background levels. Aluminum, barium, beryllium, cadmium, calcium, cobalt, iron, magnesium, manganese, potassium, and vanadium were present in significant quantities but are normal constituents of concrete and are all at or below background levels.

No analysis was performed on the bottom core depth due to the results of a trending analysis indicating low contaminant concentrations.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, thallium and vanadium) were detected. For ten (barium, chromium, cobalt, copper, lead, mercury, nickel, silver, sodium and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 77. The lead concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. This sample was collected in the Decontamination Area.

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Supplemental Media

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cobalt, selenium, thallium and vanadium) were detected. The concentration of inorganics in this sample exceeded 20 times the TCLP limit for the following: chromium.

Summary of Semivolatile Organic Contamination

Supplemental Media

One sludge and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 20 (2-methylnaphthalene, acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, dibenzofuran, dimethyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene) were detected in the sludge and only two (2,4-dimethylphenol and bis(2-ethylhexyl)phthalate) were detected in the liquid. There are no TCLP limits for the semivolatiles which were detected.

Summary of Volatile Organic Contamination

Supplemental Media

A total of one sludge and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, none were detected.

Summary of Pesticides/PCB Contamination

No samples from this component were analyzed for pesticides/PCBs.

A.IV.4 Process Support Buildings

This component category includes 49 structures that house operations currently used to treat contaminated media or to support activities necessary to maintain the site. These structures support daily activities and ongoing and proposed removal actions at the FEMP. The physical distribution of contaminants is varied, consistent with the diversity of activities that took place in these buildings.

A.IV.4.1 General/Refinery Sump Control Building (2B)

The General/Refinery Sump Control Building (2B) is a two-story building comprised of an older original building and a newer annex attached on the south side. The original building consists of a concrete first floor and metal diamond plate second floor. It was constructed with a structural steel frame and transite panels for the walls and roof. The annex consists of a concrete floor covered with

floor tile on the first floor and only concrete on the second floor. The walls consist of structural steel and wall board. The ceiling on the first floor is metal decking, while the second floor has metal decking covered with fiberglass insulation. The building is located south of the General Sump (18B) and the Refinery Sump (3H) and north of the Bulk Lime Handling Building (2C).

In the General/Refinery Sump Control Building, the magnesium oxide and lime are mixed with water to form a slurry and then transferred to the refinery sump operation. The slurry is to be used for precipitation of uranium compounds from process wastewater and storm-water runoff. The annex holds new laboratory facilities to support the refinery sump. The building consists of a single process area. Anticipated contaminants include: barium oxide, magnesium oxides, magnesium hydroxide, and barium hydroxide.

One concrete chip sample and one steel coating sample were collected to characterize the contamination in this component and one loose media sample was collected to support this characterization. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238 and plutonium-239/240) were detected. For seven of the detected radioactive constituents (lead-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 30, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, thorium-228, and thorium-232) were detected.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 13 (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, selenium, thallium and vanadium) were detected. For seven (aluminum, barium, lead, manganese, silver, sodium, and zinc) of the detected inorganics, the

maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 10. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, arsenic, beryllium, cadmium, potassium, selenium, silver, sodium, thallium and vanadium) were detected. For one of the detected inorganics (magnesium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, magnesium was the most significant, exceeding the steel coating baseline by a factor of 1.5. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium, lead, and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (beryllium, potassium, and thallium) were detected in loose media and all except nine (antimony, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver and thallium) were detected in liquids. The concentration of inorganics in the loose media sample exceeded 20 times the TCLP limit for the following: chromium, lead, and mercury. None of the supplemental media exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

One unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only three (bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and di-n-butyl phthalate) were detected. There are no TCLP limits for any of these detected semivolatiles.

Summary of Volatile Organic Contamination

Supplemental Media

One unknown liquid sample was collected from this component for analysis of volatile organic contaminants. None of the 39 volatile constituents for which analyses were performed were detected.

Summary of Pesticides/PCB Contamination

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No media were analyzed for pesticide/PCB contamination.

A.IV.4.2 Bulk Lime Handling Building (2C)

The Bulk Lime Handling Building (2C) is a three-level building located immediately south of the Refinery Sump Control Building (2B) and east of the Maintenance Building (3A). The first and third levels of the building are rectangular and the second level consists of a steel silo. The Bulk Lime Handling Building has a structural steel frame, transite siding and roofing, and a concrete foundation. A concrete loading dock or pad for the building is located to the east.

The Bulk Lime Handling Building consists of one wet process area, bulk lime handling. The bulk lime handling process produced a lime slurry for several of the processes in the Ore Refinery Plant (2A). Bulk lime (CaO), in the form of pebbles, was delivered via the truck loading dock to the building. A vacuum pump filled the silo with the lime. The silo released the lime proportionally to the lime slaker. The lime slaker mixed the lime with water to create a lime slurry. The slurry exited the lime slaker to the break tank for further agitating. When the slurry was completely mixed, it was pumped to a holding tank located immediately north of the building before being distributed to other processes. Anticipated contaminants from this process include: CaO and $Ca(OH)_2$.

One concrete core (three depths) and one steel coating sample were collected to characterize the contamination in this component and one sediment and one liquid sample were collected to support this characterization. The following presents the results of the analyses of these samples.

In summary, elevated concentrations of lead were found in the concrete core, steel coating, sediment and unknown liquid samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (americium-241 and plutonium-238) were detected. For nine of the detected radioactive constituents (lead-210, neptunium-237, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 7, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and uranium-235/236) were

detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and uranium-235/236) were detected. For one of the detected radioactive constituents (americium-241), the maximum concentration of each exceeded its respective concrete baseline value. Americium-241 exceeded its baseline concentration by a factor of 2.3, a larger margin than any other radioactive constituent.

Supplemental Media

One sediment and one unknown liquid sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and strontium-90) were detected in the sediment and all except 13 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, and thorium-232) in the liquid.

Summary of Inorganic Contamination

Concrete Cores

Concrete core samples were collected from three depths: 0 - ½ inch, ½ - 1 inch, and 10 - 40 inches. In the top half inch, only 11 (aluminum, arsenic, barium, calcium, iron, lead, magnesium, manganese, mercury, sodium and zinc) of the 23 inorganics for which analyses were performed were detected. The concentration of only four detected inorganics (barium, lead, sodium and zinc) exceed OU3 concrete baseline values. Most significant of these is lead, whose concentration exceeded the concrete baseline by a factor of 12. The concentration of only two detected inorganics (arsenic and manganese) exceeded the Part B Soil Screening Criteria. Most significant of these is arsenic, whose concentration exceeded the screening level by a factor of 100. The concentration of all inorganics for which there are TCLP limits 20 times the limit.

In the second core depth (½ - 1 inch), only seven inorganics (aluminum, barium, calcium, iron, magnesium, manganese, and zinc) were detected. Four inorganics (arsenic, lead, mercury and sodium) were detected in the top depth but not in the second depth. The concentration of only zinc exceeded the OU3 baseline concentration, by a factor of 4.5, slightly greater than that detected in the top depth. The concentration of only manganese exceeded the Part B Soil Screening Level, by a factor of 2.0, slightly less than that in the top depth. The concentration of all inorganics for which there are TCLP limits 20 times the limit.

In the bottom core depth (1 - 4 inches), only nine inorganics (aluminum, barium, calcium, iron, lead, magnesium, manganese, silver and zinc) were detected. Of these, lead and silver were not detected in the second depth and silver was not detected in the top depth. Three inorganics (arsenic, mercury and sodium) were detected in the top depth but not the bottom. The concentration of five inorganics (barium, lead, magnesium, silver and zinc) exceeded the OU3 baseline concentration. Most significant of these was lead, by a factor of 14, slightly higher than in the top depth. The concentration of only manganese exceeded the Part B Soil Screening Level, by a factor of 2.3, slightly greater than that in the top depth. The concentration of all inorganics for which there are TCLP limits 20 times the limit.

Steel Coatings

All inorganics, except beryllium and selenium, for which analyses were performed were detected in the steel coating sample. Only one inorganic (calcium) was detected in excess of the OU3 baseline concentration for paint, by a factor of 1.4. Only three inorganics (arsenic, chromium and manganese) exceeded the Part B Soil Screening Criteria. Most significant of these was cadmium, which exceeded the screening level by a factor of 15. Chromium, lead and mercury exceeded 20 times the TCLP limit. Most significant of these was lead, which exceeded this limit by a factor of 820.

Supplemental Media

One sediment sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver and thallium) were detected. The concentration of inorganics in this sample exceeded 20 times the TCLP limit for the following: chromium and lead.

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 16 (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, selenium, silver, thallium, vanadium, and zinc) were detected. The concentration of no inorganics in this sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

One sediment and one unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 13 semivolatiles (benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in the sediment and one was detected (bis(2-ethylhexyl)phthalate) in the liquid. There are no TCLP limits for any of these detected semivolatiles.

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Summary of Volatile Organic Contamination

Supplemental Media

One sediment sample and one unknown liquid were collected from this component for analysis of volatile organic contaminants. None of the 39 volatile constituents for which analyses were performed were detected in either sample.

Summary of Pesticide/PCB Contamination

No media were analyzed for Pesticide/PCB contamination.

A.IV.4.3 Maintenance Building (3A)

The Refinery Maintenance Building (3A) is a single-story, square building located just north of 101st Street and west of the Bulk Lime Handling Building (2C). The Maintenance Building has a structural steel frame, with transite panels covering cinder block walls, and a concrete floor. The building is one room except for some office space and two small steel-grate mezzanines which provide storage for motors and pumps.

The Maintenance Building is the maintenance facility for the Ore Refinery Plant (2A). Repairs to various equipment used in the plant, including pumps and motors, are performed in this building. Among the tasks performed on the equipment are welding and electrical work. Solvents and oils are frequently used throughout the building. Tools and spare parts, required to repair and maintain the equipment, are stored in this building. Only one process area is identified for the building. Because of the use of degreasing solvents in the maintenance activities, the process is considered wet. Anticipated contaminants are uranium (up to five percent Enriched) and 1,1,1-trichloroethane.

Six concrete core (three depths), two masonry, and one steel coating sample were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240 and radium-228) were detected. For six of the detected radioactive constituents (technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, plutonium-238 and plutonium-239/240) were detected. For ten of the detected radioactive constituents (lead-210, neptunium-237, polonium-210, radium-226, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 23, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90 and technetium-99) were detected. For one of the detected radioactive constituents (cesium-137), the maximum concentration of each exceeded its respective concrete baseline value. Cesium-137 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90 and technetium-99) were detected. None of the activities for the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, arsenic, beryllium, cadmium, selenium, silver and thallium) were detected. For ten (barium, chromium, cobalt, copper, lead, mercury, nickel, potassium, vanadium and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 46. The lead concentration of inorganics in one samples from this component exceeded 20 times the TCLP limit. The sample was collected in the Maintenance Area.

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, arsenic, selenium and thallium) were detected. For nine of the detected inorganics (aluminum, barium, cobalt, copper, lead, mercury, nickel, sodium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the

most significant, exceeding the concrete baseline by a factor of 43. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, arsenic, beryllium, cadmium, mercury, selenium, silver and thallium) were detected. For two of the detected inorganics (magnesium and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, magnesium was the most significant, exceeding the concrete baseline by a factor of 1.2. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver and thallium) were detected. For four of the detected inorganics (arsenic, magnesium, sodium and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 1.3. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For three of the detected inorganics (calcium, silver and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, calcium was the most significant, exceeding the steel coating baseline by a factor of 1.4. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.4 Ozone Building (3B)

The Ozone Building (3B) consists of a concrete floor and a structural steel frame with transite panel walls and roof located north of the NAR Control House (3C). The Ozone Building originally housed an acid bleaching process. Ozone was created from the bleaching of nitric acid from the NAR Towers (3D). The acid bleaching equipment was removed before 1975. The building currently stores industrial hygiene sampling equipment and supplies. The anticipated contaminant is nitric acid.

Three concrete core (three depths) and two steel coating samples were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, plutonium-239/240, strontium-90, and thorium-227) were detected. For ten of the detected radioactive constituents (plutonium-241, polonium-210, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 18, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, and thorium-227) were detected. For five of the detected radioactive constituents (thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 2.8, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. The maximum concentration of only two of the detected radioactive constituents (polonium-210 and uranium-238) exceeded its respective concrete baseline value, both by a factor of 1.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-241 and strontium-90) were detected. For nine of the detected radioactive constituents (lead-210, radium-226, technetium-99, thorium-227, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 6, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cobalt, selenium, silver, sodium, and thallium) were detected. For 14 of the detected inorganics (arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, manganese, mercury, nickel, potassium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 35. The concentration of inorganics in two samples of the top ½-inch of concrete cores from this component exceeded 20 times the TCLP limit. The lead concentration in one sample from the acid bleaching area exceeded the limit, and the chromium concentration in one sample from the acid bleaching area exceeded the limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, arsenic, cadmium, chromium, cobalt, mercury, selenium, silver, sodium, thallium, and vanadium) were detected. For one of the detected inorganics (lead), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.2. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, arsenic, cadmium, cobalt, mercury, selenium, sodium, thallium, vanadium, and zinc) were detected. For five of the detected inorganics (chromium, lead, manganese, nickel, and silver), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 3.1. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, arsenic, beryllium, selenium, silver, and vanadium) were detected. For five of the detected inorganics (iron, manganese, nickel, potassium, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the steel coating baseline by a factor of 3.7. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is

not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.5 Refrigeration Building (3G)

The Refrigeration Building (3G) is a transite building with a concrete floor and a transite roof located west of the Harshaw Digestion Fume Recovery Tower (3F). The building originally housed a refrigeration process for the Harshaw nitric acid recovery process. The Harshaw process was active for only three years, from 1957 to 1960. Following the shutdown of the Harshaw process, the equipment in the building was removed. The building housed an instrument repair shop until 1991. At that time, the building was converted to a storage area. Currently, the building stores sampling equipment and supplies. The only anticipated contaminant for the Refrigeration Building is refrigerant.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (cesium-137) were detected. For four of the detected radioactive constituents (lead-210, radium-226, technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 97, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, technetium-99 and thorium-228) were detected. For one of the detected radioactive constituents (thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 2.2, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, strontium-90, technetium-99, thorium-228, uranium-234, uranium-235/236 and uranium-238) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, cobalt, selenium, silver and thallium) were detected. For 12 of the detected inorganics (aluminum, arsenic, barium, chromium, lead, manganese, mercury, nickel, potassium, sodium, vanadium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 73. The concentration of lead in one sample of the top ½-inch of concrete cores from the refrigeration area exceeded 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, arsenic, cobalt, selenium and thallium) were detected. For seven of the detected inorganics (aluminum, barium, lead, manganese, mercury, potassium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 6. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, arsenic, cobalt, selenium and thallium) were detected. For 12 of the detected inorganics (aluminum, barium, calcium, chromium, lead, magnesium, manganese, mercury, nickel, potassium, vanadium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 3.6. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (silver and thallium) were detected. For none of the detected inorganics did the maximum concentration of each exceed its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, manganese was the most significant, exceeding the steel coating baseline by a factor of 0.8. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium, lead and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

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Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.6 Electrical Power Center Building (3L)

The Electrical Power Center Building (3L) is a single-story building and consisting of a concrete floor and structural steel frame with transite siding and roof. The component contains electrical meters, panels, and main circuit breakers. The building is attached to the north side of the Maintenance Building (3A).

The Electrical Power Center Building is a secondary unit substation that receives 13. two kV and transforms it down to 480 V to power general-use equipment, which includes lighting, receptacles, and miscellaneous equipment in the Ore Refinery Plant (2A) and the Recovery Plant (8A). Inside the building is a cinder block room currently used as a breakroom. The only anticipated contaminants for the component are PCBs.

One concrete chip, one masonry chip, and two steel coating samples were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99 and thorium-232) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-238, plutonium-241 and radium-228) were detected. For seven of the detected radioactive constituents (polonium-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 20, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and lead-210) were detected. For 12 of the detected radioactive constituents (americium-241, plutonium-238, plutonium-239/240,

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radium-226, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 76, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, cadmium, cobalt, copper, mercury, selenium, silver, sodium and thallium) were detected. For one (lead) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.1. There were no detections at greater than 20 times the TCLP limit.

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver and thallium) were detected. For nine (arsenic, calcium, chromium, cobalt, lead, mercury, potassium, sodium and vanadium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 160. The concentration of mercury in one samples from the electrical distribution area exceeded 20 times the TCLP limit, which for mercury is greater than 4 mg/kg.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For three of the detected inorganics (aluminum, copper and lead), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the steel coating baseline by a factor of 1.9. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

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A.IV.4.7 Plant 4 Maintenance Building (4C)

In September 1994, Plant 4 Maintenance Building (4C) was removed as part of Removal Action 19. (For a complete list and description of Removal Actions, see section 1.4.4.1 and Table 1-2.) The building was not anticipated to be removed as part of this removal action, yet when the demolition technique for Removal Action 19 was determined, the maintenance building was removed for safety reasons. The facility was a single-story structure located south of the Green Salt Plant (4A) and immediately west of the Plant 4 Warehouse (4B) and was constructed of a structural steel frame supported by a reinforced poured concrete base with transite walls and roof.

The Plant 4 Maintenance Building housed the maintenance activities for the Green Salt Plant and other chemical process areas. More recently it was the base for asbestos removal operations at the FEMP site. The maintenance building consisted of a small office, a breakroom/conference area, and a large open area for maintenance activities. The building housed tools, maintenance equipment, an asbestos removal glove box, and two chemical storage cabinets. Hydraulic oils and several types of degreasing solvents, including trichloroethylene and 1,1,1-trichloroethane, were used and stored in the maintenance building. Anticipated contaminants were uranium tetraflouride; trichloroethylene; 1,1,1-trichloroethane; and hydraulic oils.

One concrete chip and one steel coating sample were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For six of the detected radioactive constituents (technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 21, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver and thallium) were detected. For five (cobalt, copper, manganese, potassium and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant,

exceeding the concrete baseline by a factor of 2. There were no detections greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, mercury, potassium, selenium, silver, and thallium) were detected. For four of the detected inorganics (arsenic, iron, magnesium, and manganese), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, manganese was the most significant, exceeding the steel coating baseline by a factor of 5.8. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.8 Plant 5 Ingot Pickling (5B)

The Plant 5 Ingot Pickling Building (5B) is a new and unused facility located directly adjacent to the northwest side of the Metals Production Plant (5A). The building is a two story structure, with a main ground level and partial basement.

The Plant 5 Ingot Pickling building was constructed to receive newly cast ingots from the Metals Production Plant. The facility was designed to separate the ingot from the mold, clean the mold, and pickle the ingot in nitric acid. New, unused equipment housed in the building includes: ingot pickling tanks, a nitric acid tank, a wash water tank, an ingot conveyor, scrubber, robot, and a mold separator/cleaning booth. The facility was never brought on-line due to suspension of production activities. An inspection revealed no visible chemical contamination but a concrete chip sample was taken. There are no anticipated contaminants for the Plant 5 Ingot Pickling facility.

A total of two concrete chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, plutonium-238,

plutonium-239/240, and strontium-90) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 2, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (cadmium, cobalt, mercury, nickel, selenium, silver, and thallium) were detected. For six (aluminum, antimony, arsenic, chromium, potassium, and sodium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, antimony was the most significant, exceeding the concrete baseline by a factor of 11. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.9 Plant 5 Electrical Substation (5C)

The Plant 5 Electrical Substation (5C) is a single-story building comprised of a structural steel frame on a concrete base and floor with transite siding and roofing. It adjoins the Metals Production Plant (5A).

The substation receives 13,200-volt feeds from the main electrical station and feeds 480-volt lines to the Metals Production Plant (5A). The substation contains transformers and disconnects. Anticipated contaminants include PCB oils.

One concrete chip sample and one steel coatings were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, and thorium-232) were detected. For six of the detected radioactive constituents (neptunium-237, polonium-210, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its

respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4.4, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-241, and radium-228) were detected. For six of the detected radioactive constituents (lead-210, plutonium-238, technetium-99, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4.4, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of eight detected (chromium, cobalt, lead, magnesium, nickel, potassium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 1.5. The concentrations of all inorganics for which there are TCLP limits 20 times the limit.

Steel Coatings

In steel coatings, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of cobalt exceeded OU3 paint baseline value by a factor of 2.3. The concentrations of lead exceeded 20 times the TCLP limit by a factor of 14.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.10 West Derby Breakout/Slag Milling Building (5D)

The West Derby Breakout/Slag Milling Building (5D) is a new and unused facility located on the west side of the Metals Production Plant (5A). The structure consists of four stories on the south side and two stories on the north, with a mezzanine level at approximately the third floor level. The interior wall along the Metals Fabrication Plant (6A) consists of transite panels. The facility was never used because of suspension of production activities. The West Derby Breakout/Slag Milling Building was constructed to perform the following processes:

Slag Milling

This process was intended to mill, store, and distribute used magnesium fluoride (slag) to line smelting pots. The area was to be used also to drum slag wastes. The equipment installed to perform these tasks includes bins, conveyors, screens, bucket elevators, a ball mill, and a dust collector. This facility would replace the Slag Recycling Building (55A).

Derby Breakout

This process was designed to receive cooled reduction pots and to separate the metal derbies from the mold pot liner and residual magnesium fluoride. The facility was never brought on-line because of suspension of site production activities. The equipment within this process includes pot conveyors, a jolter, a grizzly conveyor, a screen, a crusher, and a dust collector.

Since the building has never been used and there are no anticipated contaminants, no intrusive samples were collected for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1556 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 74 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.11 Plant 8 Maintenance Building (8B)

Plant 8 Maintenance Building (8B) is a single-story structure located west of the Recovery Plant (8A) and surrounded on three sides by the Plant 8 West Pad (74D). The Plant 8 Maintenance Building consists of cinder block walls supported on reinforced concrete footings, with a reinforced poured concrete floor and roof and glass windows. The maintenance building houses the maintenance activities for the Recovery Plant and consists of a small corner breakroom and an open room with a roll-up door to admit small to medium-sized pieces of equipment for servicing and repair. The building houses tools, maintenance equipment, spare parts, and service fluid (i.e. oils and greases) for motors and other rotating equipment in one drum or smaller quantities (on the basis of inspection). Since the CERCLA process began, the Plant 8 Maintenance Building has been a pumping point for transfer of perched water pumped from a shallow well outside the northeastern corner of the Plant 8 Maintenance Building to the Recovery Plant for treatment. A small (less than 50-gal) raised metal tank along the north wall receives the well discharge, and a small centrifugal pump mounted on the tank transfers the perched water to the northwestern corner of the Recovery Plant via pipeline.

A floor sump at the midpoint of the south wall is currently used as a pipeway for steam and condensate lines. The steel cover of the sump was not removed during the inspection, so the sump's condition and contents, either water or sediment, are not known. This sump may have been used to collect floor washings from maintenance activities when the Recovery Plant (8A) was in operation.

Although equipment was usually serviced in place in the Recovery Plant (8A), smaller pieces of equipment, some of which may have been radiologically contaminated, were taken to the Plant 8 Maintenance Building and may have spread contamination there. Several types of degreasing solvents and cleaners were used and stored in small quantities in the building. Contaminants include lubricants, cooling, hydraulic oils, and degreasing solvents.

A total of three masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

A total of three masonry chip and one concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, plutonium-238, and plutonium-239/240) were detected. For seven of the detected radioactive constituents (radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 12, a larger margin than any other radioactive constituent.

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Masonry Chips

A total of three masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For 12 (barium, chromium, cobalt, copper, lead, manganese, mercury, nickel, potassium, selenium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 300. The lead concentration of inorganics in two sample from this component exceeded 20 times the TCLP limit. The sample was collected in the Maintenance area.

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Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, silver, and thallium) were detected. For three (lead, mercury, and selenium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 8. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.12 Plant 8 Railroad Filter Building (8D)

The Plant 8 Railroad Filter Building (8D), which is located east of the Plant 8 East Pad (74C) along B Street, is a single-level building surrounded by a concrete pad on the south, east, and north sides, a Railroad Tank Car Wash Pit on the west side between the building and the Plant 8 East Pad, and a settling basin immediately east toward the center of the concrete pad. The Plant 8 Railroad Filter Building is a pre-engineered structure consisting of a structural steel frame supported on a reinforced poured concrete base with steel siding panels and sloped steel roof panels. The Railroad Tank Car Wash Pit is constructed of concrete that supports railroad tracks.

Railroad gondolas filled with bulk magnesium fluoride (MgF_2) from the Weldon Spring DOE facility were positioned over the Railroad Tank Car Wash Pit and unloaded onto the Plant 8 East Pad. The bulk MgF_2 was then drummed and processed. Residues from the railroad gondolas were washed into the Railroad Tank Car Wash Pit. Runoff from the pad also drains into the Railroad Tank Car Wash Pit. Washwater and pad runoff collected in the Railroad Tank Car Wash Pit were agitated and pumped from the Railroad Filter Building to Plant 8 (8A) for treatment and filtration. At one time, the collected washwater and pad runoff was sand filtered in the pit before being pumped to Plant 8. Anticipated contaminants include uranium oxide (U_3O_8) and MgF_2.

Because its size is insignificant, no intrusive samples were taken from the component. Therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.13 Plant 9 Substation (9D)

The Plant 9 Electrical Substation (9D) is a single-story building adjoining the Special Products Plant (9A). It consists of a structural steel frame on a concrete base and floor with transite roofing and siding.

The transformers receive 13,200-volt feeds from the Main Electrical Station (16A) and feed 480-volts to the Special Products Plant. The only anticipated contaminants are PCB oils.

One concrete chip sample and one steel coating sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For eight of the detected radioactive constituents (cesium-137, radium-228, technetium-99, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 3.3, a larger margin than any other radioactive constituent.

Summary of Chemical Contamination

Concrete Chips

In concrete, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of six detected (arsenic, barium, chromium, lead, potassium, and sodium) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 7.1. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 16 of the 23 organics for which analyses were performed were detected. Only four inorganics (antimony, chromium, potassium, and vanadium) which exceeded OU3 paint baseline values. The most significant of these was potassium, which exceeded the paint baseline by a factor of 5.0. The concentrations of two inorganics (chromium and lead) exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.14 Plant 9 Cylinder Shed (9E)

Plant 9 Cylinder Shed (9E), which is located northeast of the 2nd Street and D Street intersection, is a single story, three-sided steel framed structure with transite siding and a concrete floor. The cylinder

shed was used to store pressurized gas cylinders that were required for Plant 9 (9A) operations. The component was posted as a radiologically contaminated area and access was restricted. The storage shed currently contains empty cylinder storage racks. Since there are no anticipated contaminants, no visible chemical contamination was detected during an inspection, and the shed is of insignificant size, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 23,324 dpm/100 cm^2 (beta-gamma), well above the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 164 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Because the average total surface contamination was greatly above the sampling criteria, intrusive samples were taken.

One concrete chip sample and one steel coating sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, radium-228, and strontium-90) were detected. For two of the detected radioactive constituents (technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 2, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of nine detected (aluminum, arsenic, barium, calcium, chromium, cobalt, lead, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 1.6. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel, 19 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (aluminum and silver) exceeded OU3 paint baseline values. The most significant of these was aluminum which exceeded the paint baseline by a factor of 1.6. The concentrations of three inorganics for which there are TCLP limits exceeded 20 times the TCLP limit. The most significant of these was lead.

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Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.15 Boiler Plant (10A)

Building 10A, the Boiler Plant, is a five-story, irregularly shaped building located directly west of the railroad tracks next to the Coal Pile (P-018). A railroad car receiving dock is attached to the building. The Boiler Plant is constructed with a structural steel frame, transite panels, and a concrete floor.

The steam production process in the Boiler Plant encompasses four coal-fired steam boilers that provide the heat necessary to produce steam for the FEMP. Two of the four boilers are typically used. The Boiler Plant receives water to create the steam from three sources, including the Water Plant (20B), condensate return to the system, and process water. Anticipated contaminants from the steam production process are sulfur; flyash; mercury; 1,1,1-trichloroethane; lead; and oil.

A total of two concrete chips sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cobalt, mercury, selenium, silver, and thallium) were detected. For 13 (aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, nickel, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, chromium was the most significant, exceeding the concrete baseline by a factor of 79. The chromium concentration in two samples from this component exceeded 20 times the TCLP limit. These two samples were collected from the steam production area.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.16 Boiler Plant Maintenance Building (10B)

The Boiler Plant Maintenance Building (10B) is a single-story building adjacent to the west side of the Boiler Plant (10A) and consists of a poured concrete base and floor, a structural steel frame, and corrugated steel siding and roofing. The facility provides maintenance for the boiler plant operation and other utility operations. A variety of items are stored here including tools, a vented basin for solvent cleaning of tools, and other equipment. The anticipated contaminants are degreasing solvents (1,1,1-trichloroethane) and lubricating oils.

A total of two concrete core (one core was sampled at three depths and one duplicate taken in the top half inch) and one steel coating sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99, and thorium-230) were detected. For two of the detected radioactive constituents (lead-210 and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, technetium-99,and uranium-235/236) were detected. For two of the detected radioactive constituents (lead-210 and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, strontium-90, and technetium-99) were detected. For six of the detected radioactive constituents (radium-228, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each

exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 3, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Core

One concrete core was collected for analysis of inorganic constituents. At the 0 - 1/2 inch level of the core, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of 11 detected (aluminum, arsenic, barium, calcium, chromium, cobalt, lead, nickel, potassium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 18.0. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit. Lead was the significant exceedance in the duplicate sample as well.

At the 1/2 - 1 inch level of the core, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of 9 detected (aluminum, calcium, chromium, cobalt, lead, manganese, nickel, potassium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 1.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

At the 1 - 4 inch level of the core, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of 10 detected (aluminum, beryllium, calcium, chromium, cobalt, lead, nickel, potassium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was chromium which exceeded the concrete baseline by a factor of 1.9. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (copper and nickel) exceeded OU3 paint baseline values. The most significant of these was copper which exceeded the concrete baseline by a factor of 3.2. The concentrations of two inorganics (chromium and lead) exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.17 Wet Salt Storage Bin (10C)

The Wet Salt Storage Bin (10C) is a rectangular concrete storage facility located directly north of the Boiler Plant Maintenance Building (10B). A sodium chloride solution that was used to regenerate on-property zeolite water softeners was stored in the storage bin. The sodium chloride arrived by

truck in a granular form and was deposited in the storage bin. Subsequent to deposition, the sodium chloride was dissolved in water to form the solution.

The salt is not toxic, and an inspection indicated no visible chemical contamination. Furthermore, the size of storage bin is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1667 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 38 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.18 Utility Heavy Equipment Building (10E)

The Utility Heavy Equipment Building (10E) is located northwest of the Boiler Plant (10A). This component was built in 1993 to house a front end-loader and the "Super Sucker," which is a tank truck with a high-vacuum end used for cleaning sediment from basins.

The Utility Heavy Equipment Building was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.19 Main Maintenance Building (12A)

The Main Maintenance Building (12A) is a two-story rectangular structure is constructed of cinder blocks with concrete floors. It is located at the northwestern corner of the intersection of 2nd Street and D Street, near the central portion of the FEMP production area. A second story area in the southeastern corner of the building houses offices and a conference room.

The Main Maintenance Building contains the main maintenance stores, shops, and associated offices and has been divided into six process areas according to the location of the various activities within the building. The anticipated contaminants include: uranium, thorium, solvents (1,1,1-trichloroethane and perchloroethylene), motor oils, lubricating oils, hydraulic oil, paint, mercury, and silver.

Decontamination Room and Emergency Generator Room

The decontamination room is located at the west end of the main maintenance building and has a separate entry. This room is currently referred to as the ladder room and stores various maintenance materials and tools. The room has a main door and an eight feet wide sliding door equipped with a pivoting beam hoist to transfer heavy equipment into the room. The interior walls are cinder block, and the outer wall is transite. The southern portion of the room has a concrete floor, while the

northern portion has an acid-resistant tile floor. Across the opening of the sliding door is a shallow grated floor trench.

Historically, the decontamination room was used to decontaminate radioactive machinery before working on the machinery at the various shops within Main Maintenance Building. The parts were washed with acid, and the acid solution then was recycled in a closed loop system for acid and uranium recovery. The acid wash system consisted of a virgin acid tank, sump and sump pit, floor drain and trough, spent acid tank, and filter press. The acid wash system has been removed from the room. The sump was not visible during the inspection but may have been hidden by the large amount of equipment and tools in storage and the large work benches in the center of the room.

The emergency generator room is located in the northwestern corner of the building. An aboveground emergency generator diesel fuel tank is located outside the northwestern corner of the emergency generator room. An underground gasoline storage tank was removed outside the northwestern corner.

Maintenance Stores and Office Areas

The maintenance stores are used to warehouse materials bought in large lots and to maintain an inventory of spare equipment and replacement parts. Chemicals are stored in two general areas of the stores: 1) in the paint room, a diked room for flammable paint and solvents at the east end of the stores area, and 2) in the northwestern corner of the steel stores, where acids, oxidizers, alkaline cleaners, and copier chemicals are stored. Gas cylinders, including some for hazardous chemicals such as freon, are stored in the Cylinder Storage Building (12B). The Main Maintenance Building has loading and receiving docks, as well as the Building 12 North Pad (74N), north of the maintenance stores area. The offices located on the second floor house the administration of the Site Services and Maintenance departments.

Electric Shop and Scale Shop

The electric shop houses the equipment and materials used in repair of electrical gear and, before 1991, a parts washer that used a chlorinated solvent. The parts washer, which was located against the east wall of the shop just north of the tool cage, was primarily used to degrease electric motor parts. The scale shop is used to repair and calibrate small weigh scales and contains a weight control room and a radio room.

Paint Shop and Carpenter Shop

The paint shop is equipped with a vent hood for smaller paint jobs and a paint spray booth for larger paint jobs. The paint spray booth is a large roof-vented chamber used to control both the emission of paint fumes/mists and external contamination (i.e. dust particles) from contacting freshly painted surfaces. The booth is constructed of sheet metal with conventional furnace/air conditioner type filters along the booth's south door. The paint spray booth has been in operation since 1952 but is

currently out of service while air emissions are under regulatory review and permitting. One area of the paint shop is used as a satellite accumulation area (SAA) for the temporary storage of small quantities of hazardous waste generated during maintenance activities within the various shops. Wastes stored at the SAA range from paint cleaning equipment to solvent spill residues.

Instrument Shop

The instrument shop houses repair and testing equipment for instruments and gauges from the production facilities at FEMP. A mercury reclaiming unit is set up in a fan-vented hood with an airtight sliding door. The mercury recycling unit is used to recycle/reclaim mercury from contaminated mercury solutions generated during the filling of mercury manometers or from spillage of mercury on the floor during the dismantling of instruments containing mercury. The mercury recycling unit consists of a low-speed centrifugal mercury separator that uses acids under a vent hood. The unit has been in use since 1952.

Machine, Pipe, Millwright, and Welding Shops

The machine, pipe, millwright, and welding shops house equipment for fabricating, threading and milling, and welding of primarily metal equipment and parts. Also, storage racks and tool cribs are located in these work areas. One area of the machine shop is used as a Satellite Accumulation Area (SAA) for the temporary storage of small quantities of hazardous waste generated during maintenance activities within the various shops. Wastes stored at the SAA range from paint-cleaning equipment to solvent spill residues. The weld shop houses the equipment used for welding metal parts and a solvent-based parts cleaner. The parts cleaner, which was removed from service in May 1989, was primarily used to degrease machine parts before welding.

A total of three acid brick samples, eight masonry chip, eight concrete cores (each divided into three depths), five steel coating, and one loose media were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples

Summary of Radiological Contamination

Acid Brick

A total of three acid brick samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and thorium-227) were detected. For 12 of the detected radioactive constituents (cesium-137, lead-210, polonium-210, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 91, a larger margin than any other radioactive constituent.

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Masonry Chips

A total of eight masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-241, and strontium-90) were detected. For 15 of the detected radioactive constituents (cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 99, a larger margin than any other radioactive constituent.

Concrete Cores

A total of eight concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-241, and strontium-90) were detected. For 14 of the detected radioactive constituents (cesium-137, lead-210, plutonium-238, plutonium-239/240, polonium-210, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 180, a larger margin than any other radioactive constituent.

A total of seven concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, neptunium-237, and plutonium-241) were detected. For 11 of the detected radioactive constituents (plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Plutonium-239/240 exceeded its baseline concentration by a factor of 28, a larger margin than any other radioactive constituent.

A total of six concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-241, radium-228, and strontium-90) were detected. For eight of the detected radioactive constituents (lead-210, plutonium-238, plutonium-239/240, technetium-99, thorium-230, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 8.8, a larger margin than any other radioactive constituent.

Steel Coatings

A total of five steel coating samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and plutonium-241) were detected. For 16 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 250, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and strontium-90) were detected.

Summary of Inorganic Contamination

Acid Brick

A total of five acid brick samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except two (beryllium and thallium) were detected. For 13 of the detected inorganics (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, and zinc)the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 152. The lead concentration in four samples from this component exceeded 20 times the TCLP limit. Two of these samples were collected from the Digestion area, and one was collected each from the Extraction Area and the Denitration Area. The chromium concentration in one sample from this component exceeded 20 times the TCLP limit in the Denitration Area.

Masonry Chips

A total of six masonry chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, selenium, silver, and thallium) were detected. For ten (arsenic, barium, chromium, copper, lead, magnesium, manganese, mercury, potassium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 62. The lead concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit. The samples were collected in the Decontamination and emergency Generation Rooms area and the Electrical & Scale Shops.

Concrete Cores

A total of six concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, selenium, and thallium) were detected. For 16 of the detected inorganics (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 67. The concentration of lead in two samples of the top ½-inch of concrete cores exceeded 20 times the TCLP limit. One sample was from the decontamination and emergency generator rooms and one sample from the instrument shops area.

A total of six concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, selenium, silver, and thallium) were detected. For 14 of the detected inorganics (arsenic, barium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 12. There were no detections at greater than 20 times the TCLP limit.

A total of six concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, mercury, selenium, and thallium) were detected. For 14 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, iron was the most significant, exceeding the concrete baseline by a factor of 2.3. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of six steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, silver, and thallium) were detected. For 13 of the detected inorganics (arsenic, cadmium, calcium, cobalt, copper, iron, magnesium, manganese, mercury, nickel, selenium, sodium, and zinc), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, nickel was the most significant, exceeding the steel coating baseline by a factor of 19. The concentration of inorganics in four samples from this component exceeded 20 times the TCLP limit for one or more of the following: cadmium, chromium, lead, and mercury. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not

considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Semivolatile Organic Contamination

Supplemental Media

One loose media sample was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 12 (acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected. There are no TCLP limits for any of these semivolatiles.

Summary of Volatile Organic Contamination

Supplemental Media

Only one loose media sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (1,1,1-trichloroethane) were detected. There is no TCLP limit for 1,1,1-trichloroethane.

Summary of Pesticide/PCB Contamination

No media was analyzed for pesticide/PCB contamination.

A.IV.4.20 Pilot Plant Maintenance Building (13B)

The Pilot Plant Maintenance Building (masonry) is a single-level structure located northwest of the Pilot Plant Wet Side (13A). The Pilot Plant Maintenance Building consists of concrete block walls supported on reinforced concrete footings, with a reinforced poured concrete floor and roof, and glass windows. The building has two 8-ft-wide roll-up doors on the east side facing a paved apron area on the north side of the Pilot Plant Wet Side.

During the Pilot Plant operating period, the activity based in the maintenance building maintained equipment in the Pilot Plant Complex. The building has been converted for use as a base of operation for radiation technicians involved in renovation, removal actions, and remediation studies at the FEMP.

The Pilot Plant Maintenance Building housed the maintenance activities for the Pilot Plant complex (in several adjacent buildings). The maintenance building consisted of a small corner breakroom and an open room with two roll-up doors to admit small to medium-sized pieces of plant equipment for servicing and repair. The building housed tools, maintenance equipment, spare parts, and fresh and used service fluids for motors and other rotating equipment (i.e. oils and greases) in small quantities

(typically one drum or less). Although the Pilot Plant equipment was usually serviced in-place in the process buildings, smaller pieces of equipment, some of which may have been radiologically contaminated, were taken to the maintenance building for service and repair.

Since the CERCLA process began, the Pilot Plant Maintenance Building has been used as an operating base for radiation technicians and is in the process of being decontaminated and renovated. Two tile-floored offices are enclosed in the building; the remainder of the building, which still has exposed concrete floors, is used for storage and calibration of equipment and supplies used in the FEMP health and safety program. The room in the northeastern corner of the building that opens to the east via a roll-up door is still used for storage of maintenance equipment. The area is considered a wet process because of the use of solvents in the operation. The anticipated contaminants include lubricating and hydraulic oils and mercury.

One concrete core sample (taken from three depths) and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For five of the detected radioactive constituents (radium-228, technetium-99, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 1.6, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-239/240, and strontium-90) were detected. For nine of the detected radioactive constituents (plutonium-238, radium-226, radium-228, technetium-99, thorium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 17, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and radium-228) were detected. For one of the

detected radioactive constituents (elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Masonry Chips

In masonry chips, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (cobalt and mercury) exceeded OU3 concrete baseline values. The most significant of these was mercury which exceeded the concrete baseline by a factor of 29. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Concrete Cores

One concrete core was collected for analysis of inorganic constituents.

At the 0 - 1/2 inch level of the core, there were 17 detections of the 23 inorganic analytes for which analyses were performed were detected. The concentrations of six detected (antinomy, barium, iron, potassium, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was zinc which exceeded the concrete baseline by a factor of 36.7. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

At the 1/2 - 1 inch level of the core, there were 13 detections of the 23 inorganic analytes for which analyses were performed were detected. The concentrations of three detected (antinomy, potassium, and sodium) exceeded OU3 concrete baseline values. The most significant of these was antimony which exceeded the concrete baseline by a factor of 8.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

At the 1 - 4 inch level of the core, there were 16 detections of the 23 inorganic analytes for which analyses were performed were detected. The concentrations of only antinomy was detected exceeded OU3 concrete baseline values which by a factor of 11.4. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Volatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for volatile organic constituents.

Summary of Semivolatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for semivolatile organic constituents.

Summary of Pesticides/PCB Contamination

No major or supplemental media samples from this component were analyzed for PCB/Pesticide constituents.

A.IV.4.21 Electrical Substation (16B)

The Electrical Substation (16B) is a cinder block building with a concrete floor and metal sheet roof. The building contains electrical meters, panels, and main circuit breakers. The building is located north of the Security Building (28A).

The Electrical Substation is a secondary unit substation that receives 13.2 kV and transforms it down to 480 V to power the Health and Safety Building (53A), Security Building (28A), Human Resources Building (28B), and east trailers. The electrical substation consists of a single process area. Anticipated contaminants include PCB oils.

Two concrete chip sample (one is a field duplicate) and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and uranium-235/236) were detected. For five of the detected radioactive constituents (plutonium-239/240, polonium-210, radium-228, technetium-99, and thorium-228), the maximum concentration of each exceeded its respective concrete baseline value. Plutonium-239/240 exceeded its baseline concentration by a factor of 18, a larger margin than any other radioactive constituent.

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-239/240, polonium-210, and uranium-235/236) were detected. For three of the detected radioactive constituents (lead-210, plutonium-238, and technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 15, a larger margin than any other radioactive constituent

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For 13 (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, nickel, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the concrete baseline by a factor of 7.2. There were no detections at greater than 20 times the TCLP limit.

Concrete Chips

A total of two concrete chips samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, mercury, nickel, selenium, silver, and thallium) were detected. For nine (aluminum, arsenic, barium, chromium, cobalt, lead, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 13. There were no detections at greater than 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for semivolatile organic constituents.

Summary of Volatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for volatile organic constituents.

DRAFT

Summary of Pesticides/PCB Contamination

No major or supplemental media samples from this component were analyzed for PCB/Pesticide constituents.

A.IV.4.22 Main Electrical Switch House (16D)

Main Electrical Switch House (16D) is a cinder block building with a concrete floor and a transite roof. The building is divided into two rooms; the west room contains the electrical switching equipment, and the east room contains a group of lead-acid batteries used as a backup power supply. The building is located east of the Heavy Equipment Building (46) and north of the Main Electrical Station (16A). The Main Electrical Switch House consists of a single process area. There were no anticipated contaminants for this component.

This facility is the main electrical switch house for the site. The equipment in this building monitors and directs the electricity to the various substations around the site. During the visual building inspection, the floor underneath the backup battery supply had a white powder (crystals) that most likely resulted from the overfilling of the battery acid.

One concrete chip sample and one masonry chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.1, a larger margin than any other radioactive constituent.

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For two of the detected radioactive constituents (radium-228 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.1, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and silver) were detected. For seven (barium, cadmium, chromium, cobalt, lead, mercury, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 27. There were no detections at greater than 20 times the TCLP limit.

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, lead, mercury, selenium, silver, and thallium) were detected. For three (barium, potassium, and sodium) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 3. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.23 Dissolved Oxygen Building (18P)

The Dissolved Oxygen Building (18P) is located south of the Sewage Treatment Area. This component is used to aerate site effluent (with the exception of Sewage Treatment Plant discharge) to raise the dissolved oxygen concentration above the NPDES minimum limit of 5 ppm prior to discharge to the Great Miami River. Building 18P houses several aeration blowers and recirculation pumps and has an associated tank located immediately outside the building.

The Dissolved Oxygen Building was not considered in the RI/FS WPA, since it was under construction at the time of writing. Therefore, it is not expected to have elevated levels of contamination, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.24 IAWWT Valve House (18Q)

The IAWWT Valve House (18Q) is located north of the Storm Water Retention Basins (18E). This component has two primary functions. It is the junction point, with a series of nodes, to direct flow of stormwater, site effluent, and groundwater. Building 18Q also is referred to as the South Plume

Interim Treatment (SPIT) Facility, where 200 gallons per minute of groundwater extracted from the South Plume are treated using ion exchange columns and a filtration system.

The IAWWT Valve House was not considered in the RI/FS WPA, since it was under construction at the time of writing. Therefore, it is not expected to have elevated levels of contamination, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.25 Tank Farm Control House (19C)

The Tank Farm Control House (19C) is a single-story structure located along 2nd Street and to the southeast of the Main Tank Farm (19A). The Tank Farm Control House is a steel-framed building with metal siding and roofing, built on a reinforced concrete pad. The building was originally designed to be the control center for the Main Tank Farm but was never used in that capacity. The Control House has been used for office space. The facility contains electrical control boards as well as general office equipment.

The Control House has never been used, and no contaminants are anticipated. Furthermore, there is no visible chemical contamination, and it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA. Therefore, no intrusive samples were planned for this component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 308 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.26 Tank Farm Lime Slitter Building (19E)

The Tank Farm Lime Slitter Building (19E) is located west of the Main Maintenance Building (12A). This component was installed next to the Main Tank Farm (19A) to support the HF Tank Neutralization Project. Bags of hydrated lime are placed in a "slitter," where a knife opens the bag and the lime is dropped into a tank, where it is mixed with water to form a lime slurry.

The Tank Farm Lime Slitter Building was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.27 Pump Station and Power Center (20A)

The Pump Station and Power Center (20A) is a single-story, steel framed structure with metal roofing and transite siding panels on a reinforced concrete base located directly west of the boiler plant cooling towers. The building houses the primary pumps for the site sanitary system. Sanitary wastes are also chlorinated at this facility. The southern third of the building interior houses high-voltage control equipment. The only anticipated contaminant is chlorine from the treatment process. A visual inspection of the structure revealed an Asbestos Repair Order posted on the lower southeast corner of the building where the transite siding had been previously damaged. Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA and no further visible contamination was detected, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 2008 dpm/100 m^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 228 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.28 Water Plant (20B)

The Water Plant Building (20B) is a two-story, rectangular building adjacent to the southwestern corner of the Boiler Plant (10A). It is constructed with a structural steel frame, transite panels, a concrete floor, and an aboveground 750,000-gallon concrete tank, located next to the main building. The water treatment process in the Water Plant begins with water extracted from the three production wells at the facility. The extracted water is transferred to the aboveground concrete storage tank, then pumped into the plant for treatment with aluminum sulfate (alum) and lime for softening for use in the boilers in the Boiler Plant (10A). A laboratory is located in the building to assist in process control. The anticipated contaminants from the water treatment process include alum, lime, and sulfuric acid.

Because it is anticipated that the contamination levels do not exceed the sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2026 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 54 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.29 Well House 1 (20E)

Well House 1 (20E) is a single-story, cinder block wall and concrete floor structure located adjacent to the south side of 2nd Street and directly north of the Elevated Potable Storage Tank (26B). Well

House 1 is one of three on-property pumping stations that supply the process area with water for fire protection and other potable uses. Well House 1 houses one water pump and accompanying equipment. There are no anticipated contaminants for the facility. An inspection conducted through the window of the structure indicated that the asbestos pipe insulation appeared to be friable.

The results of radiological surveys do not exceed sampling criteria contained in the WPA, and no other visible contamination was detected. Furthermore, the size of this component is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 28 dpm/100 cm^2 (alpha and beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.30 Well House 2 (20F)

Well House 2 (20F) is a single-story, cinder block wall and concrete floor structure located directly north of the Rust Engineering Building (45A). Well House 2 is one of three on-property pumping stations that supply the process area with water for fire protection and other potable uses. Well House 2 houses one water pump and accompanying equipment. There are no anticipated contaminants for the facility.

The results of radiological surveys do not exceed sampling criteria contained in the WPA, and an inspection indicated no visible chemical contamination. Furthermore, the size of this component is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1147 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 99 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.31 Well House 3 (20G)

Well House 3 (20G) is a single story, cinder block wall and concrete floor structure located northwest of the Pilot Plant Thorium Tank Farm (13D). Well House 3 is one of three on-property pumping stations that supply the process area with water for fire protection and other potable uses. The facility houses one water pump and accompanying equipment and a diesel-powered back-up generator for the pump. An approximately 150-gallon diesel fuel tank is located directly south of the building. The results of radiological surveys do not exceed sampling criteria contained in the WPA, and an inspection indicated no visible chemical contamination. Furthermore, the size of this facility is

insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 3417 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 41 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.32 Gas Meter Building (22A)

The Gas Meter Building (22A) is a single-story structure with cinder block walls and concrete floor located southwest of the Finished Products Warehouse (77). The Gas Meter Building houses the main natural gas meter for the site and ancillary equipment. The building also contains incoming and distribution natural gas lines. The facility is not a radiologically contaminated component, although a locked, chain-link fence surrounds the perimeter of the facility because of safety measures relating to the gas lines. The results of radiological surveys do not exceed sampling criteria contained in the WPA, and an inspection indicated no visible chemical contamination. Furthermore, the size of the building is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 148 two dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 50 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.33 Storm Sewer Lift Station (22B)

The Storm Sewer Lift Station (22B) is a single-story structure with cinder block walls and concrete floor located west of the Services Building (11). An access ladder is located in the southwest corner of the concrete floor. The ladder leads down to the pump room, which is approximately 20 ft below grade. The ladder access point is posted as a confined space. The Storm Sewer Lift Station is used to pump stormwater to the Great Miami River. The station is operational and houses two pumps, electrical equipment, control panels, photometer, flow rate meter, National Pollutant Discharge Elimination System (NPDES) composite sampler, and other accompanying equipment. Monitoring equipment is also located in the building. Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA and an inspection indicated no visible chemical contamination and the size is insignificant, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 2000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 56 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of

1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.34 Truck Scale (22C)

The Truck Scale (22C) is located south of the Receiving/Incoming Materials Inspection Building (82). The Truck Scale is a reinforced concrete structure with the functional surface approximately two feet below grade. The Truck Scale was installed to weigh incoming and outbound, multi-axle vehicles as required by existing transportation regulations. The scale was originally installed near the Engine House/Garage (31A) but later was relocated to the Receiving/Incoming Materials Inspection Building.

Since it is outside of radiologically controlled areas and an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 400 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.35 Scale House and Weigh Scale (22D)

The Scale House and Weigh Station (22D) is a single-story, steel frame structure with reinforced concrete floor and transite siding located directly east of the Elevated Water Storage Tank (26B). The scale is approximately 2ft below grade. The Scale House and Weigh Scale was used to determine the weight of incoming and outbound multi-axle vehicles prior to the installation of the Truck Scale (22C). The scale was also used to weigh outbound sea/land cargo containers. The Scale House contains a digital scale, printer, power control switches, and a grated sump. An inspection indicated several motor oil spots on the scale and broken/cracked transite panels on the lower east side of the building.

Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA and since there was no other visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 156 two dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 359 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.36 Railroad Scale House (24A)

The Railroad Scale House (24A) is a single story, cinder block and concrete floor facility located south of the main railroad tracks which run east/west through the north side of the plant. The Railroad Scale House performed one purpose, weighing incoming and outgoing rail cars. Anticipated contaminants include uranium, asbestos, lead, PCBs, and mercury. An inspection of the building indicated a black, oily sludge covering most of the flooring.

One concrete chip sample and two masonry chip samples were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, technetium-99, and uranium-235/236) were detected. For one of the detected radioactive constituents (thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 2.2, a larger margin than any other radioactive constituent.

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, and technetium-99) were detected. For five of the detected radioactive constituents (lead-210, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4.8, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, cobalt, copper, nickel, potassium, silver, sodium, and thallium) were detected. For six (barium, chromium, lead, mercury, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 22. There were no detections at greater than 20 times the TCLP limit.

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, selenium, silver, and thallium) were detected. For seven (aluminum, arsenic, barium, lead, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 16. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.37 Railroad Engine House (24B)

The Railroad Engine Garage (24B) is a single-story structure located northeast of the Main Maintenance Building (12A). The Railroad Engine House is built over the end of a railroad spur track and provided a covered storage and maintenance area for the site's locomotive. It consists of cinder block walls, a reinforced poured concrete floor, and a steel frame roof structure with transite panels. The floor has a concrete trench deep that facilitated locomotive maintenance.

This facility was used for locomotive storage and maintenance. The building contained maintenance fluids (ethylene glycol and lubricating oils) when the building was in use. The trench allowed maintenance personnel access to the undercarriage of the locomotive. A sump is located at the bottom of the trench for liquid collection. The main floor is equipped with drains that feed into the sump. Although only ethylene glycol and oils are chemicals documented as having been used in the Railroad Engine House, effective maintenance of the oily areas of the engine probably also required use of detergents and/or cleaning solvents that were petroleum- or chlorinated-hydrocarbon-based. Anticipated contaminants include ethylene glycol, lubricating oils, cleaning solvents, and detergents.

One masonry chip sample and one concrete chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For five of the detected radioactive constituents (radium-228, technetium-99, elemental uranium, uranium-234, and

uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 2.2, a larger margin than any other radioactive constituent

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and thorium-232) were detected. For five of the detected radioactive constituents (thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 18, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cobalt, mercury, nickel, silver, and thallium) were detected. For five (arsenic, barium, chromium, lead, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 27. There were no detections at greater than 20 times the TCLP limit.

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, cobalt, mercury, selenium, and silver) were detected. For seven (chromium, copper, iron, lead, nickel, thallium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 17. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.38 Chlorination Building (25A)

The Chlorination Building (25A) is a single-story structure with cinder block walls and reinforced concrete floor located directly adjacent to the west side of the Primary Settling Basins (25G), both of which are within the Sewage Treatment Plant. The Chlorination Building houses a chlorine feed

water treatment system. This facility is used to chemically treat the trickling filter effluent when the ultra-violet disinfection system is off-line. The only anticipated contaminant is chlorine. An inspection of the facility revealed a minor pump lubricant leak on the pump and floor near the pump.

Since the inspection indicated no other visible chemical contamination and the component size is insignificant (approximately 10 ft x 16 ft x 8 ft high), no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1076 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 288 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.39 Manhole #175/Effluent Line/Sampling Building (25B)

Manhole #175/Effluent Line/Sampling Building (25B) is a combination of three integrated entities that release wastewater from the property into the Great Miami River. Two process areas have been identified, and the anticipated contaminants for each include uranium and trace constituents associated with the wastewater.

Manhole 175

Manhole 175 is constructed upstream of the junction of the effluent from the Sewage Treatment Plant through the U.V. Disinfection Building (25D) and the effluent from the Storm-Water Retention Basin (18E). A single-level Sampling Building is installed beside Manhole 175, with manhole access to the Effluent Line. The building consists of a structural steel frame on a poured concrete base and floor with noninsulated, corrugated metal siding and roofing.

A representative sample from Manhole 175, on the basis of the flow rate of the combined stream, is pulled into the building for monitoring to determine compliance with National Pollutant Discharge Elimination System (NPDES) requirements.

Effluent

The 16-inch-diameter, 4,200-foot-long Effluent Line, which begins at Manhole 175 and extends to the Great Miami River, is intended to handle all liquid effluents from the property. A series of manholes between the Sewage

A.IV.4.39 Sewage Lift Station Building (25C)

The Sewage Lift Station Building (25C) is a single-story structure, cinder block wall with reinforced concrete floor located immediately north of the Main Electrical Station (16A). The Sewage Lift

Station Building houses two effluent pumps and associated equipment. The Sewer Lift Station pumps accumulated sanitary wastes from the site to the Sewage Treatment Plant. The treated effluent is subsequently released to the Great Miami River through Manhole-175 (25B). The only anticipated contaminant is hydrogen sulfide.

Results from radiological surveys do not exceed the sampling criteria contained in the WPA, and no visible chemical contamination was detected during an inspection. Furthermore, the size of building is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1850 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 106 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization. Treatment Plant and the river provides access to the line. However, Manhole 175 is the last access point to the Effluent Line that is located on the FEMP property.

Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 267 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.40 <u>UV Disinfection Building (25D)</u>

U.V. Disinfection Building (25D) is a single-level, concrete structure located immediately west of the Trickling Filters (25H) in the Sewage Treatment Plant. Approximately 6 feet of the facility is situated below grade. The building houses two ultraviolet sewage disinfection systems, a flow meter, and sampling equipment. The ultraviolet disinfection system is used to destroy residual bacteria remaining from the trickling filter process.

There are no anticipated contaminants, and the results of radiological surveys do not exceed sampling criteria included in the WPA. Furthermore, an inspection revealed no visible chemical contamination, and the size of the building is insignificant. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1301 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 328 dpm/100 m^2 (beta-gamma), well below the sampling criteria of

1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.41 Digester and Control Building (25E)

The Digester and Control Building (25E) is a multilevel building consisting of cement block construction on reinforced concrete footers, flat reinforced concrete roofs, glass windows, and a concrete upper level. The building houses a 27,000-gallon water tank, the anaerobic bacterial digester for site sewage treatment, and the digester control room. Anticipated contaminants are unavailable.

Two concrete cores (each sampled at three depths) and two masonry sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Masonry Chips

A total of two masonry chip samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For three of the detected radioactive constituents (neptunium-237, radium-228, and thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Neptunium-237 exceeded its baseline concentration by a factor of 1.4, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, plutonium-238, plutonium-241, polonium-210, radium-228, and strontium-90) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 11, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, radium-228, strontium-90, technetium-99, uranium-234, uranium-235/236, and uranium-238) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, strontium-90, technetium-99, and thorium-230) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, arsenic, beryllium, cobalt, copper, lead, mercury, selenium, and thallium) were detected. For six of the detected inorganics (barium, calcium, chromium, magnesium, manganese, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the concrete baseline by a factor of 1.8. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, cobalt, lead, mercury, selenium, silver, and thallium) were detected. For six of the detected inorganics (arsenic, barium, magnesium, manganese, sodium, and vanadium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 1.7. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, cobalt, lead, mercury, silver, and thallium) were detected. For five of the detected inorganics (arsenic, barium, magnesium, nickel, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 1.9. There were no detections at greater than 20 times the TCLP limit.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, arsenic, beryllium, cadmium, selenium, silver, and thallium) were detected. For ten (barium, chromium, cobalt, copper, lead, mercury, potassium, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 150. The lead and

mercury concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. This sample was collected in the Digester Area.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.42 Pump House - High-Pressure Fire Protection (26A)

The Pump House - High-Pressure Fire Protection (26A), which is located south of the Elevated Water Storage Tank (26B), consists of an approximately 300,000-gallon steel water storage tank and cinder block wall and concrete floor building. The Pump House was installed to provide the site with a water supply for fire protection. The building houses three pumps that draw water from the tank as required. The facility also houses two diesel-powered back-up generators for the pumps. The only anticipated contaminants are lubricating oils.

Since results of radiological surveys do not exceed sampling criteria contained in the WPA and since an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2268 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 329 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.43 Main Electrical Strainer House (26C)

The Main Electrical Strainer House (26C) is a cinder block building with a partial concrete floor and a transite roof. The building contains the control valves for the main electrical deluge fire protection system, which provides fire sprinkler protection for the Main Electrical Station. The building has a belowground, open surface, water storage tank. The tank is visible from the inside the building through the partial metal floor grating. The only anticipated contaminant for the component is halon because of the presence of fire protection equipment.

One concrete core (divided into three depths) one masonry sample, and one unknown liquid sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For five of the detected radioactive constituents (lead-210, radium-228, thorium-230, elemental uranium, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 4.6, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For five of the detected radioactive constituents (lead-210, radium-228, thorium-230, elemental uranium, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 4.6, a larger margin than any other radioactive constituent.

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Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 12 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, thorium-228, thorium-230, and thorium-232) were detected.

Summary of Inorganic Contamination

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, cadmium, selenium, silver, and thallium) were detected. For nine (aluminum, arsenic, barium, chromium, cobalt, mercury, potassium, sodium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 170. The mercury concentration of inorganics in one sample from this component exceeded 20 times the TCLP limit. This sample was collected in the Electrical Deluge System Area.

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, selenium, silver, and thallium) were detected. For nine of the detected inorganics (aluminum, barium, cobalt, copper, lead, mercury, potassium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 420. The concentration of inorganics in one sample of the top ½-inch of concrete cores from electrical deluge system area exceeded 20 times the TCLP limit for mercury (greater than 4 mg/kg).

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, selenium, and thallium) were detected. For eight of the detected inorganics (arsenic, cobalt, copper, lead, magnesium, mercury, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 53. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, lead, selenium, and thallium) were detected. For six of the detected inorganics (arsenic, barium, copper, mercury, silver, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 6.3. There were no detections at greater than 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Supplemental Media

Only one unknown liquid samples was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, none were detected.

Summary of Volatile Organic Contamination

Supplemental Media

Only one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, none were detected.

Summary of Pesticide/PCB Contamination

No media was analyzed for pesticide/PCB contamination.

A.IV.4.44 Guard Post on West End of 2nd Street (28D)

The Guard Post on West End of 2nd Street (28D) is a wood frame building with wood siding. Historically, this guard post was occupied by guards who used the building as a checkpoint to provide access control to the K-65 Silo and waste pit areas. Currently, the building maintains radiological monitoring equipment for controlling contamination on equipment exiting the area.

Since there are no anticipated contaminants and its size is insignificant, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant

radiological surface contamination. The results indicate an average total surface contamination of 1058 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 50 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.45 Propane Storage (38A)

The Propane Storage Building (38A), which is located southeast of the Coal Pile, is a single-story structure consisting of a cinder block wall and reinforced concrete floor. The propane storage building is considered to have served the following two functions:

Propane Storage

Two steel vessels with a capacity of 33,000 gallons each store propane for site vehicles. Historic site photographs indicate the presence of five storage tanks rather than two. The time period for removal of the three tanks is not known.

Propane Distribution

The Propane Storage structure houses monitoring and vaporization equipment. This equipment was used to distribute propane to several ancillary storage locations throughout the site.

The only anticipated contaminant is propane. The building interior was not accessible because of a locked security chainlink fence. Nevertheless, since results of radiological surveys do not exceed sampling criteria contained in the WPA, and since an inspection of the facility indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2270 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 59 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.46 Incinerator Sprinkler Riser House (39C)

The Incinerator Sprinkler Riser House (39C), which is located in the northeast corner of the A Street and 102nd Street intersection, is a single-level building consisting of cinder block walls and a concrete floor. This facility originally provided fire protection for the Old Cooling Water Tower (3K). The Incinerator Sprinkler Riser House houses one pump and accompanying equipment. The Riser House is now used to provide fire protection for the Incinerator Building (39A).

No anticipated contaminants are present in this component, and contamination levels are assumed not to exceed sampling criteria contained in the WPA, an external inspection of the building revealed no

visible chemical contamination, and its size is insignificant. A survey was performed to confirm the absence of significant radiological surface contamination. Therefore, no intrusive samples were planned for this component. The results indicate an average total surface contamination of 1300 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 66 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.47 Utility Shed East of Rust Trailers (45B)

The Utility Shed East of Rust Trailers (45B) is located along A Street, northeast of the Rust Engineering Building (45A). This facility is a single story structure consisting of a wood frame and concrete pad. The Utility Shed is used to store small tools and excess office furniture. Since there are no anticipated contaminants, there is little or no evidence of contamination, and its size is insignificant, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 7556 dpm/100 cm^2 (beta-gamma), above the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 157 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2.

One wood sample was collected from this component to support characterization.

Summary of Radiological Contamination

Wood

One wood sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, cesium-137, and plutonium-241) were detected.

Summary of Inorganic Contamination

Wood

One wood sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, nickel, selenium, silver, thallium, and vanadium) were detected. No samples exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.4.48 Heavy Equipment Building (46)

The Heavy Equipment Building (46) is a single-story building located near the Engine House/Garage (31A). It is a pre-engineered facility consisting of a structural steel frame on a reinforced poured concrete base, sloped steel roof panels, steel siding panels, and glass windows. The Heavy Equipment Building is divided into three separate sections and is used to store forklifts, trucks, and other heavy equipment associated with plant operations. Oil is the only anticipated contaminant for the facility.

One concrete core (divided into three depths) sample, two steel coatings, two loose media and one unknown liquid were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For five of the detected radioactive constituents (radium-228, technetium-99, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 2.2, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-238, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One sediment and two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, neptunium-237, plutonium-241, and strontium-90) were detected in the sediment and all except ten (cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-226, strontium-90, thorium-228, thorium-232, and uranium-235/236) in the liquids.

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For 13 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, nickel, potassium, sodium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 13. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For nine of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, lead, nickel, and sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.9. There were no detections at greater than 20 times the TCLP limit.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, mercury, selenium, and thallium) were detected. For one of the detected inorganics (sodium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the concrete baseline by a factor of 1.4. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

A total of three steel coating samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (beryllium, potassium, selenium, silver, thallium, and vanadium) were detected. For five of the detected inorganics (barium, copper, iron, manganese, and sodium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, barium was the most significant, exceeding the steel coating baseline by a factor of 3.9. The concentration of inorganics in three samples from this component exceeded 20 times the TCLP limit for one or more of the following: barium, chromium, and lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

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Summary of Semivolatile Organic Contamination

Supplemental Media

One sediment and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, 11 (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in the sediment sample and only one (bis(2-ethylhexyl)phthalate) was detected in the liquid. There are no TCLP limits for the semivolatiles detected.

Summary of Volatile Organic Contamination

Supplemental Media

A total of one sediment and one unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, none were detected in either media.

Summary of Pesticide/PCB Contamination

No media were analyzed for Pesticides/PCB contamination.

A.IV.4.49 Six to Four Reduction Facility 2 (51)

Six to Four Reduction Facility 2 (51) is located outside of the southwest corner of the process area. The building is technically a single-story building; however, several catwalk structures create second and third story levels. The Six to Four Reduction Facility 2 consists of a structural steel frame, siding, and roof construction, situated on a reinforced concrete pad.

The Six to Four Reduction Facility 2 was constructed in 1987 to house a second facility to reduce uranium hexafluoride (UF_6) to uranium tetrafluoride (UF_4). The equipment for the reduction process was partially installed but not completed due to suspension of production activities. Currently, only permanently affixed equipment, such as an overhead crane and catwalk structures, is present in the facility.

The structure will house the future Advanced Wastewater Treatment (AWWT) Plant that is intended to improve the removal of uranium and other priority pollutant metals from the site effluent. The planned process includes superoxidizer and ion exchange technologies.

No intrusive samples were planned, since this building is new and has never been used and is located outside of radiologically controlled areas. Other reasons for not collecting intrusive samples include the fact that radiological surveys do not exceed sampling criteria contained in the WPA and that no

evidence of contamination exists. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 19 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.50 Pilot Plant Dissociator Shelter (54C)

The Pilot Plant Dissociator Shelter (54C), a pre-engineered single-story structure is located at the northwestern corner of the Six to Four Reduction Facility 1 (54A) just south of First Street. The Pilot Plant Dissociator Shelter is constructed of a structural steel frame supported on a reinforced poured concrete base with a reinforced concrete floor, corrugated aluminum siding, and metal roof. The east side of the building is open to the environment and is equipped with an aluminum canopy that shelters the open east side from weather. Miscellaneous equipment is currently staged at the east entrance of the building.

The facility contains three ammonia dissociators that were used to catalytically dissociate or "crack" anhydrous ammonia to hydrogen and nitrogen for use in the Pilot Plant Six to Four Reduction Facility 1. Liquid anhydrous ammonia was first heated to vaporization. The vaporized ammonia was then passed over an electrically heated nickel catalyst bed at a controlled temperature, where it was "cracked" to hydrogen and nitrogen. The hot dissociated ammonia (hydrogen and nitrogen gas) was then passed through a heat exchanger to heat incoming liquid ammonia entering the ammonia dissociators. The dissociated ammonia was then passed through a water-cooled heat exchanger, where residual ammonia and moisture were absorbed onto one of two molecular sieves and then fed to one of two reaction vessels located in the UF_6 to UF_4 reduction process area. Anticipated contaminants are ammonia and nickel.

Two concrete chips (one analyzed for chemical contamination and one analyzed for radiological contamination), two steel coatings, and one loose media sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, plutonium-239/240, and strontium-90) were detected. For eight of the detected radioactive constituents (plutonium-238, radium-228, technetium-99, thorium-228, elemental uranium,

uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 4.2, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and neptunium-237) were detected.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, cobalt, copper, mercury, nickel, potassium, selenium, silver, and thallium) were detected. For six (arsenic, lead, manganese, sodium, vanadium, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 3. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except three (antimony, beryllium, and thallium) were detected. For two of the detected inorganics (magnesium and potassium), the maximum concentration of each exceeded its respective steel coating baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the steel coating baseline by a factor of 1.6. The concentration of inorganics in two samples from this component exceeded 20 times the TCLP limit for one or more of the following: chromium, lead. However, as discussed in Attachment A.II.2.6.2, the material from which these samples were taken is not considered hazardous. However, if the coatings were removed from the material, they may be characteristically hazardous.

Summary of Semivolatile Organic Contamination

Supplemental Media

Only one loose media samples was collected from this component for analysis of semivolatile organic contaminants. Of 66 semivolatiles for which analyses were performed, only ten (acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, fluoranthene, phenanthrene, and pyrene) were detected. There are no TCLP limits for the semivolatiles detected.

Summary of Volatile Organic Contamination

Supplemental Media

Only one loose media sample was collected from this component for analysis of volatile organic contaminants. Of 39 volatile constituents for which analyses were performed, only one (tetrachloroethene) was detected. There is a TCLP limit for tetrachloroethene, which was detected at 3 mg/kg; well below 20 times the TCLP limit of 14,000 mg/kg.

Summary of Pesticide/PCB Contamination

No media was analyzed for pesticides/PCBs.

A.IV.4.51 Decontamination and Decommissioning Building (78)

The Decontamination and Decommissioning (D&D) Building (78) is located northeast of the Magnesium Storage Building (32A). The D&D Building is a multi-level, steel frame facility with metal siding and a reinforced concrete pad. The D&D Building is designed for decontamination processes and was constructed to replace the current Decontamination Building (69). There are no anticipated contaminants for the facility, as this building is still under construction.

Since an inspection confirmed no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 87 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.4.52 Receiving/Incoming Materials Inspection (82)

The Receiving/Incoming Materials Inspection Building (82) is located north of the Truck Scale (22C) and south of the Elevated Potable Storage Tank (20D). It consists of a structural steel frame, metal siding and roofing, and a reinforced concrete base. The Receiving/Incoming Materials Inspection Building is used to accept and examine the nonradioactive materials and supplies that arrive routinely at the site. The building contains offices and receiving equipment. The building is also used as a controlled area exit.

No anticipated contaminants exist for this component, and it is located outside of radiologically controlled areas. Furthermore, results of radiological surveys do not exceed sampling criteria contained in the WPA, and an inspection indicated no visual chemical contamination. Therefore, no intrusive samples were planned for this component. A survey was performed to confirm the absence

of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 54 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5 Containers and Containerized Material - Aboveground

This component category consists of 23 components that now contain (or previously contained) potential contaminants and/or waste materials (including all waste, holdup, and product inventory). Drummed materials may be exposed on concrete pads or protected in structures. The pads (see Storage Pads, Parking Lot, Roads, and Railroads component category below) on which the containers are stored are likely to be contaminated by past spills.

A.IV.5.1 Plant 1 Ore Silos (1C)

The Plant 1 Ore Silos (1C) is a multilevel platform structure located south of the Preparation Plant (1A) and east of A Street. The Plant 1 Ore Silos has a structural steel frame and support piers and a concrete pad for a base. The structure supports two groups of silos, including six concrete and eight tile silos. The open-steel-frame structure is more than 80 ft high, covering an "L"-shaped area approximately 54 ft. x 115 ft. Component 1C was temporarily used for overflow storage of cold metal oxides. The silos have not been used since 1962.

The Plant 1 Ore Silos has one dry process area, milled ore storage. The silos were originally intended to store milled uranium ores for processing in the Ore Refinery Plant (2A). Instead, the silos were used to temporarily store dried extraction raffinates with a low radium concentration (also referred to as "cold" metal oxides) from the raffinate treatment systems. This material is similar to material stored in Silo 3 of OU4. Herculite dikes were placed under the silos in 1991 as a spill prevention measure for the deteriorating silos.

No sampling was performed in the Plant 1 Ore Silos because of inaccessibility. The silos comprising this component are part of Removal Action No. 13, which had begun before the inception of CRU3 sampling. (For a complete list and description of Removal Actions, see Table 1-2.) Baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization. Anticipated contaminants from this process are uranium-234, uranium-235, uranium-238, thorium-234, thorium-232, radium-228, lead, barium, selenium, mercury, arsenic, cadmium, chromium, and metal oxide. Baseline values were used to estimate the source term associated with the Plant 1 Ore Silos.

A.IV.5.2 Nuclear Fuel Services Storage and Pump House (2E)

The NFS Storage and Pump House (2E) consists of a pump house and four outside tanks. The pump house is a cinder block building with a concrete floor and ceiling that measures approximately 14 ft x 16 ft x 9 ft high. The tank area is approximately 51 ft x 61 ft, with a concrete dike where the four tanks are mounted. The building is located south of the Preparation Plant (Component 1A) and the Plant 1 Ore Silos (1C).

The Nuclear Fuel Services (NFS) Storage and Pump House received uranyl nitrate (UNH) from other DOE sites by tank truck and was stored in the four horizontally mounted tanks. From the storage tanks, the UNH was pumped to the enriched calciner located in Building 2A. Currently, the tanks store UNH that was produced from digestion processes on-property.

The Nuclear Fuel Services Storage and Pump House has one inactive HWMU located in the east central part of the building. It is considered hazardous because reportedly handled strong acid, barium, lead, chromium, and mercury. Closure is to be attained through CERCLA response. Hold-up materials are the only materials expected to be generated by the closure of this unit. For more information on HWMUs, see Appendix K, Table K-1.

The anticipated potential contaminants for the component include: uranium (up to five percent enrichment), uranyl nitrate, plutonium/neptunium, nitric acid, barium, and chromium.

From this component, two concrete core samples and one masonry chip sample were collected.

Summary of Radiological Contamination

Masonry Chips

Only one masonry chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and strontium-90) were detected. For 14 of the detected radioactive constituents (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-234 exceeded its baseline concentration by a factor of 360, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, radium-228 and strontium-90) were detected. For four of the detected radioactive constituents (lead-210, radium-226, technetium-99 and elemental uranium), the maximum concentration of each

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exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 200, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, and strontium-90) were detected. For nine of the detected radioactive constituents (lead-210, radium-226, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 28, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary of Inorganic Contamination

Concrete Cores

One concrete core was collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, all but six (antimony, mercury, nickel, selenium, silver, and thallium) of 23 inorganic analytes were detected. Since only one concrete core sample from the top half inch was analyzed for inorganic analytes in Component 2E, the maximum and average comparisons of detected analytes to OU3 concrete baselines are one in the same. Ten inorganic analytes (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, lead, vanadium, and zinc) have concentrations that exceed OU3 concrete baseline values. Most significant of those is chromium which exceeded the baseline by a factor of approximately 15. The concentration of chromium (121 mg/kg), which was collected in the NFS Storage area, exceeded 20 times the TCLP limit.

In the second core depth, ½ - 1 inch, all but six (antimony, cadmium, mercury, selenium, silver, and thallium) of 23 inorganic analytes were detected. Since only one concrete core sample from the second half inch was analyzed for inorganic analytes in Component 2E, the maximum and average comparisons of detected analytes to OU3 concrete baselines are one in the same. Ten inorganic analytes (aluminum, arsenic, barium, calcium, chromium, copper, lead, magnesium, nickel, and zinc) have concentrations that exceed OU3 concrete baseline values. Most significant of those is chromium which exceeded the baseline by a factor of approximately 14. The concentration of chromium (115 mg/kg), which was collected in the NFS Storage area, exceeded 20 times the TCLP limit.

The bottom core depth was not analyzed due to the change in the RI scope.

Masonry Chips

Only one masonry chips samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, thallium, and vanadium) were detected. For six (aluminum, cobalt, copper, lead, nickel, zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 9.8. The concentration of inorganics in the masonry chip sample from this component did not exceed 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.3 NAR Towers (3D)

The Nitric Acid Recovery Towers or NAR Towers (3D is a six-level open steel supported structure located north of the NAR Control House (3C) and the Ozone Building (3B). The ground floor of the structure is contained in a concrete diked area (70 ft x 108 ft). The upper five levels have steel plating as flooring.

The NAR Towers was part of a closed-loop system designed to recover nitric acid. The system consisted of two absorber towers in which nitrogen oxide fumes were drawn through a series of bubble cap trays. The fumes were collected from the Metal Dissolver (Component 2D) and from the digestion and denitration processes in the Ore Refinery Plant (Component 2A). Nitric acid was recovered for reuse in the Ore Refinery Plant. The system was shut down in 1988. The anticipated contaminants for the component are nitric acid and urea.

One steel coatings sample, one concrete core sample and one unknown liquid sample were collected from this component. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, neptunium-237, plutonium-238, plutonium-241, and strontium-90) were detected. For seven of the detected radioactive constituents (plutonium-239/240, radium-228, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 11, a larger margin than any other radioactive constituent.

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Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 1.8, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, lead-210, neptunium-237, plutonium-241, radium-228, strontium-90, and technetium-99) were detected. For seven of the detected radioactive constituents (americium-241, plutonium-239/240, thorium-227, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-227 exceeded its baseline concentration by a factor of 8.6, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, radium-228, and strontium-90) were detected.

Summary of Inorganic Contamination

Concrete Cores

One concrete core was collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, all but six inorganic analytes (antimony, cadmium, cobalt, mercury, silver, and thallium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the top half inch interval in Component 3D, maximum and average comparisons to OU3 baseline concentrations for concrete are one in the same. Seven inorganic analytes (aluminum, chromium, copper, lead, nickel, vanadium, and zinc) exceeded baseline concentrations. Most significant of which is lead, which exceeded the baseline by a factor of four. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

In the second core depth, ½ - 1 inch, all but eight inorganic analytes (antimony, beryllium, cadmium, cobalt, mercury, silver, thallium, and vanadium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the second half inch interval in Component 3D, comparison of maximum and average concentrations to OU3 concrete baseline concentrations for concrete result in the same number. Three inorganic analytes (copper, lead, and zinc) exceeded baseline concentrations. Most significant of which is lead, which exceeded the baseline by a factor of 18. None of the inorganic analytes exceeded 20 times TCLP limits in the second half inch of the core sample.

In the bottom core depth, 1 - 4 inches, all but seven inorganic analytes (antimony, beryllium, cobalt, mercury, potassium, thallium, and vanadium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the 1 - 4 inch interval in Component 3D, comparison of maximum and average concentrations to OU3 concrete baseline concentrations result in the same number. Three inorganic analytes (copper, lead, and zinc) exceeded baseline concentrations. Most significant of which is lead, which exceeded the baseline by a factor of approximately 8. None of the inorganic analytes exceeded 20 times TCLP limits in the 1 - 4 inch interval of the core sample.

Steel Coatings

One sample of steel coatings was collected for inorganic constituents. All but seven inorganic analytes (antimony, beryllium, cobalt, mercury, silver, thallium, and vanadium) out of 23 were detected. Since only one sample of steel coatings was taken for inorganic analytes in Component 3D, comparison of maximum and average concentrations to OU3 paint baseline concentrations result in the same number. Three inorganic analytes (copper, lead, and zinc) exceeded baseline concentrations. Most significant of which is aluminum, which exceeded the baseline by a factor of approximately three. Two analytes, chromium (136 mg/kg) and lead (1,900 mg/kg), both of which were collected from the Nitric Acid Recovery area, exceeded 20 times the TCLP limits (100 mg/kg for both analytes).

Supplemental Media

One sample of unknown liquids was collected for inorganic constituents. 11 inorganic analytes (aluminum, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc) out of 23 were detected. No inorganic analytes exceeded TCLP limits.

Summary of Semivolatile Organic Contamination

The major media sampled in this component did not include analysis of semivolatile organic compounds.

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Supplemental Media

One unknown liquid sample was collected for analysis of semivolatile organic compounds. Four semivolatiles (di-n-butyl phthalate, pyrene, bis(2-ethylhexyl)phthalate, and o-methylphenol) were detected. None of these analytes exceeded TCLP limits.

Summary of Volatile Organic Contamination

The major media sampled in this component did not include analysis of volatile organic compounds.

Supplemental Media

One unknown liquid sample was collected for analysis of volatile organic compounds, however none were detected nor did they exceed TCLP limits.

Summary of Pesticides/PCB Contamination

Major and supplemental media in this component were not sampled for analysis of PCBs/pesticides.

A.IV.5.4 Harshaw Digestion Fume Recovery (3F)

Harshaw Digestion Fume Recovery (3F) is a multilevel open-steel structure (19 ft x 35 ft x 35 ft high) located east of the Refrigeration Building (3G). Under the structure is a concrete dike covered with acid brick.

The building was installed in 1957 to relieve the fume load of the NAR Towers (Component 3D). Nitrogen oxide fumes from digestion processes in and around the Ore Refinery Plant (Component 2A) were collected to produce nitric acid. The process was shut down in 1960; since that time, the structure has not been used. The anticipated contaminants for the building are ammonia and nitric acid.

From this component, one acid brick sample, one concrete core sample, two steel coatings samples and one unknown liquid sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-241, technetium-99, uranium-235/236, and uranium-238) were detected. For three of the detected radioactive constituents (lead-210, radium-226, and radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 7, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, and strontium-90) were detected. For ten of the detected radioactive constituents (americium-241, lead-210, polonium-210, radium-226, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 3.5, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (neptunium-237), the maximum concentration of each exceeded its respective concrete baseline value. Neptunium-237 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (neptunium-237), the maximum concentration of each exceeded its respective concrete baseline value. Neptunium-237 exceeded its baseline concentration by a factor of 1.2, a larger margin than any other radioactive constituent.

Steel Coatings

Only one steel coating sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-241, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 15, a larger margin than any other radioactive constituent.

Supplemental Media

Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, neptunium-237, radium-228, and strontium-90) were detected.

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Summary of Inorganic Contamination

Acid Brick

One sample of acid brick was collected for inorganic constituents. Nine inorganic analytes (aluminum, barium, iron, lead, magnesium, manganese, mercury, potassium, and sodium) out of 23 were detected. Since only one sample of acid brick was taken for inorganic analytes in Component 3F, comparison of maximum and average concentrations to OU3 concrete baseline concentrations result in the same number. Two inorganic analytes (lead and mercury) exceeded baseline concentrations. Most significant of these is mercury which exceeded the baseline by a factor of approximately 47. None of the inorganic analytes exceeded 20 times the TCLP limits.

Concrete Cores

One concrete core was collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, all but five inorganic analytes (cadmium, mercury, selenium, sodium, and thallium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the top half inch interval in Component 3F, maximum and average comparisons to OU3 baseline concentrations for concrete are one in the same. Nine inorganic analytes (antimony, arsenic, barium, chromium, cobalt, lead, magnesium, manganese, and zinc) exceeded baseline concentrations. Most significant of which is lead, which exceeded the baseline by a factor of approximately 17. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

In the second core depth, ½ - 1 inch, all but five inorganic analytes (antimony, mercury, selenium, sodium, and thallium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the second half inch interval in Component 3F, comparison of maximum and average concentrations to OU3 concrete baseline concentrations for concrete result in the same number. Nine inorganic analytes (aluminum, arsenic, barium, cadmium, cobalt, copper, lead, silver, and vanadium) exceeded baseline concentrations. Most significant of these is silver, which exceeded the baseline by a factor of approximately 4. None of the inorganic analytes exceeded 20 times TCLP limits in the second half inch of the core sample.

In the bottom core depth, 1 - 4 inches, all but six inorganic analytes (antimony, cadmium, mercury, selenium, sodium, and thallium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the 1 - 4 inch interval in Component 3F, comparison of maximum and average concentrations to OU3 concrete baseline concentrations result in the same number. Six inorganic analytes (aluminum, arsenic, barium, chromium, copper, and manganese) exceeded baseline concentrations. Most significant of these is arsenic, which exceeded the baseline by a factor slightly greater than 1. None of the inorganic analytes exceeded 20 times TCLP limits in the 1 - 4 inch interval of the core sample.

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Steel Coatings

One sample of steel coatings was collected for inorganic constituents. All but nine inorganic analytes (aluminum, antimony, beryllium, cadmium, potassium, silver, sodium, thallium, and vanadium) out of 23 were detected. Since only one sample of steel coatings was taken for inorganic analytes in Component 3F, comparison of maximum and average concentrations to OU3 paint baseline concentrations result in the same number. Two inorganic analytes (iron and manganese) exceeded baseline concentrations, both by factors of 1. Two analytes, lead (819 mg/kg) and mercury (9.1 mg/kg), both of which were collected from the Harshaw Fume Recovery area, exceeded 20 times the TCLP limits, 100 mg/kg and 4 mg/kg, respectively.

Supplemental Media

Two samples of unknown liquids were collected for inorganic constituents. Four inorganic analytes (antimony, selenium, silver, and thallium) out of 23 were detected. None of the inorganic analytes exceeded TCLP limits.

Summary of Semivolatile Organic Contamination

The major media sampled in this component did not include analysis of semivolatile organic compounds.

Supplemental Media

Two unknown liquid sample were collected for analysis of semivolatile organic compounds. Eight semivolatile organic compounds (benzo(a)anthracene, di-n-octyl phthalate, diethyl phthalate, fluoranthene, phenanthrene, pyrene, bis(2-ethylhexyl)phthalate, and p-methylphenol) were detected. None of these analytes exceeded TCLP limits.

Summary of Volatile Organic Contamination

The major media sampled in this component did not include analysis of volatile organic compounds.

Supplemental Media

Two unknown liquid sample were collected for analysis of volatile organic compounds. Six volatile organic compounds (1,1,1-trichloroethane, 1,1-dichloroethane, acetone, ethylbenzene, toluene, and total xylenes) were detected in each of the samples. None of these analytes exceeded 20 times the TCLP limits.

Summary of Pesticides/PCBS Contamination

Major and supplemental media in this component were not sampled for analysis of PCBs/pesticides.

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A.IV.5.5 Refinery Sump (3H)

The Refinery Sump (3H) is comprised of six tanks and is located south of the General Sump (18B) and west of B Street. It is an outside, acid brick containment area (55 ft x 100 ft) and provides treatment of contaminated effluents from the Ore Refinery Plant (2A) with MgO (magnesium oxide) to precipitate uranium.

The MgO was slurried with water in the General/Refinery Sump Control Building (Component 2B) for use in the process. The treated Refinery Sump effluents were transferred to the adjacent General Sump for further treatment. The recovered uranium (as cake slurry) was recycled through the digestion area of the Ore Refinery Plant. Currently, several of the tanks that store uranyl nitrate (UNH) await processing. The anticipated contaminants are uranyl nitrate, magnesium oxide, tributyl phosphate, kerosene, magnesium uranate, nitric acid, chromium, and barium.

From this component, one acid brick sample, one concrete core sample, one loose media sample, and one steel coatings sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For four of the detected radioactive constituents (lead-210, radium-226, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 17, a larger margin than any other radioactive constituent.

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 12 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For five of the detected radioactive constituents (cesium-137, lead-210, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 110, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210,

neptunium-237, plutonium-238, and radium-228) were detected. For six of the detected radioactive constituents (technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 34, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For four of the detected radioactive constituents (radium-228, technetium-99, thorium-230, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 9, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-238, and plutonium-241) were detected.

Summary of Inorganic Contamination

Acid Brick

One sample of acid brick was collected for inorganic constituents. Six inorganic analytes (arsenic, beryllium, cadmium, selenium, silver, and thorium) out of 23 were not detected. Since only one sample of acid brick was taken for inorganic analytes in Component 3H, comparison of maximum and average concentrations to OU3 concrete baseline concentrations result in the same number. Four inorganic analytes (barium, copper, lead, and mercury) exceeded baseline concentrations. Most significant of these are barium, copper, and mercury, each of which exceeded the baseline by a factor of approximately 5. None of the inorganic analytes exceeded 20 times the TCLP limits.

Concrete Cores

One concrete core was collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, all but 10 inorganic analytes (antimony, arsenic, beryllium, cadmium, cobalt, mercury, potassium, silver, thallium, and vanadium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the top half inch interval in Component 3H, maximum and average comparisons to OU3 baseline concentrations for concrete are one in the same. Eight inorganic analytes (aluminum, chromium, copper, iron, lead, magnesium, nickel, and zinc) exceeded baseline concentrations. Most significant of which is copper, which exceeded the baseline by a factor of approximately 3. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

In the second core depth, ½ - 1 inch, all but eight inorganic analytes (arsenic, beryllium, cadmium, cobalt, mercury, silver, thallium, and vanadium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the second half inch interval in Component 3H, comparison of maximum and average concentrations to OU3 concrete baseline concentrations for concrete result in the same number. Three inorganic analytes (antimony, calcium, and magnesium) exceeded baseline concentrations. Most significant of these is antimony, which exceeded the baseline by a factor of approximately 7. None of the inorganic analytes exceeded 20 times TCLP limits in the second half inch of the core sample.

In the bottom core depth, 1 - 4 inches, all but 10 inorganic analytes (antimony, arsenic, beryllium, cobalt, copper, mercury, potassium, silver, thallium, and vanadium) out of 23 were detected. Since only one sample was taken for inorganic analytes in the 1 - 4 inch interval in Component 3H, comparison of maximum and average concentrations to OU3 concrete baseline concentrations result in the same number. Three inorganic analytes (calcium, chromium, and zinc) exceeded baseline concentrations. Most significant of these is zinc, which exceeded the baseline by a factor almost 3. None of the inorganic analytes exceeded 20 times TCLP limits in the 1 - 4 inch interval of the core sample.

Steel Surface

One sample of steel coatings was collected for inorganic constituents. All but seven inorganic analytes (antimony, arsenic, beryllium, cobalt, potassium, silver, and thallium) out of 23 were detected. Since only one sample of steel coatings was taken for inorganic analytes in Component 3H, comparison of maximum and average concentrations to OU3 paint baseline concentrations result in the same number. Two inorganic analytes (magnesium and zinc) exceeded baseline concentrations. Most significant of these was zinc, which exceeded the baseline by a factor of 4. Three analytes, cadmium (46.6 mg/kg), chromium (210 mg/kg), and lead (2,780 mg/kg), each of which were collected in the Wastewater Treatment area, exceeded 20 times the TCLP limits, 20 mg/kg (cadmium) and 100 mg/kg (chromium and lead).

Supplemental Media

One loose media sample was collected for inorganic constituents. Three inorganic analytes (beryllium, selenium, and thallium) out of 23 were not detected. One inorganic analyte, lead (309 mg/kg), which was collected in the Wastewater Treatment area exceeded 20 times the TCLP limits.

Summary of Semivolatile Organic Contamination

The major media sampled in this component did not include analysis of semivolatile organic compounds.

Supplemental Media

One loose media sample was collected for analysis of semivolatile organic compounds. 11 semivolatile organic compounds (anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, diethyl phthalate, fluoranthene, ideno(1,2,3-cd)pyrene, phenanthrene, pyrene, and bis(2-ethylhexyl)phthalate) were detected. None of these analytes exceeded TCLP limits.

Summary of Volatile Organic Contamination

The major media sampled in this component did not include analysis of volatile organic compounds.

Supplemental Media

One loose media sample was collected for analysis of volatile organic compounds. None of the volatile organic compounds were detected and none exceeded 20 times the TCLP limits.

Summary of Pesticides/PCBS Contamination

Major and supplemental media in this component were not sampled for analysis of PCBs/pesticides.

A.IV.5.6 Combined Raffinate Tanks (3J)

Combined Raffinate Tanks (3J) is a multilevel open tank farm area (39 ft x 169 ft x 20 ft high) located north of the Hot Raffinate Building (3E) and west of the NAR Towers (3D). Beneath the raffinate tanks is a concrete pad and dike covered with acid brick. Structural steel is used as the structural support for the 17 vertical tanks and the stairs and catwalks.

The Combined Raffinate Tanks received raffinates and slag leach filtrates and concentrated them by evaporation for reprocessing in the Ore Refinery Plant (2A). Spent Zirnlo acid (high levels of copper digested in hydrofluoric acid) was transferred to the combined raffinate tanks from portable dumpsters from the Plant 9 Zirnlo process for use in this process. The anticipated contaminants are: barium carbonate; alum; ore raffinates; uranyl nitrate; lubricating and cutting oils; 1,1,1-trichloroethane; trichloroethylene; and perchloroethylene.

From this component, two acid brick samples, two concrete core samples, one steel coatings sample, and one unknown liquid sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Acid Brick

A total of two acid brick samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, cesium-137, and

neptunium-237) were detected. For 15 of the detected radioactive constituents (lead-210, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 420, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (plutonium-238) was detected. For 14 of the detected radioactive constituents (americium-241, cesium-137, neptunium-237, plutonium-241, polonium-210, radium-226, radium-228, technetium-99, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 670, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, neptunium-237, and strontium-90) were detected. For seven of the detected radioactive constituents (plutonium-239/240, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 150, a larger margin than any other radioactive constituent.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, plutonium-241, and strontium-90) were detected. For 14 of the detected radioactive constituents (lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 180, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-241, and radium-228) were detected.

Summary of Inorganic Contamination

Acid Brick

Two samples of acid brick were collected for inorganic constituents. Six inorganic analytes (antimony, beryllium, cadmium, selenium, silver, and thorium) out of 23 were not detected. The maximum concentrations of three inorganic analytes (barium, lead, and mercury) exceeded OU3 baseline concentrations for concrete. Most significant of these are mercury, which exceeded the baseline by a factor of approximately 93. The average concentrations of three inorganic analytes (barium, lead, mercury) exceeded OU3 concrete baseline concentrations. Most significant of these was mercury, which exceeded the baseline by a factor of approximately 59. None of the inorganic analytes exceeded 20 times the TCLP limits.

Concrete Cores

Two concrete core samples were collected at three depths: 0 - ½ inch, ½ - 1 inch, and 1 - 4 inches. In the top half inch, all but four inorganic analytes (antimony, beryllium, selenium, and thallium) out of 23 were detected. The maximum concentrations of 12 inorganic analytes (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, and vanadium) exceeded OU3 baseline concentrations for concrete. Most significant of these are cobalt and copper, which exceeded their baselines by factors of approximately 31 and 29, respectively. The average concentrations of 13 inorganic analytes (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, potassium, vanadium, and zinc) exceeded OU3 baseline concentrations for concrete. Most significant of these is mercury, which exceeded its baseline by a factor of approximately 8. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

In the second core depth, ½ - 1 inch, all but five inorganic analytes (antimony, beryllium, mercury, selenium, and thallium) out of 23 were detected. The maximum concentrations of seven inorganic analytes (aluminum, arsenic, barium, calcium, chromium, manganese, and vanadium) exceeded OU3 baseline concentrations for concrete. Most significant of these is vanadium, which exceeded its baseline by a factor of approximately 3. The average concentrations of seven inorganic analytes (aluminum, arsenic, barium, calcium, chromium, manganese, and vanadium) exceeded OU3 baseline concentrations for concrete. Most significant of these is potassium, which exceeded its baseline by a factor of approximately 2. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

In the third core depth, 1 - 4 inches, all but five inorganic analytes (antimony, beryllium, cadmium, selenium, and thallium) out of 23 were detected. The maximum concentrations of 10 inorganic analytes (aluminum, arsenic, barium, chromium, cobalt, lead, magnesium, manganese, mercury, and vanadium) exceeded OU3 baseline concentrations for concrete. Most significant of these is mercury, which exceeded its baseline by a factor of approximately 43. The average concentrations of 10

inorganic analytes (arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, potassium, and vanadium) exceeded OU3 baseline concentrations for concrete. Most significant of these is mercury, which exceeded its baseline by a factor of approximately 43. None of the inorganic analytes exceeded 20 times TCLP limits in the top half inch of the core sample.

Steel Coatings

One sample of steel coatings was collected for inorganic constituents. All but two inorganic analytes (beryllium and thallium) out of 23 were detected. Since only one sample of steel coatings was taken for inorganic analytes in Component 3J, comparison of maximum and average concentrations to OU3 paint baseline concentrations result in the same number. Three inorganic analytes (cadmium, magnesium, and selenium) exceeded baseline concentrations. Most significant of these was selenium, which exceeded the baseline by a factor of 51. Three analytes, cadmium (232 mg/kg), chromium (1,120 mg/kg), and selenium (42.2 mg/kg), each of which were collected in the Combined Raffinate area, exceeded 20 times the TCLP limits, 20 mg/kg, 100 mg/kg, and 20 mg/kg, respectively.

Supplemental Media

One sample of unknown liquids was collected for inorganic constituents. Seven inorganic analytes (arsenic, beryllium, cadmium, mercury, silver, thallium, and vanadium) out of 23 were not detected. None of the inorganic analytes exceeded 20 times the TCLP limits.

Summary of Semivolatile Organic Contamination

The major media sampled in this component did not include analysis of semivolatile organic compounds.

Supplemental Media

One unknown liquid sample was collected for analysis of semivolatile organic compounds. Two semivolatile organic analytes (4-nitrophenol and di-n-butyl) were detected. None of these analytes exceeded TCLP limits.

Summary of Volatile Organic Contamination

The major media sampled in this component did not include analysis of volatile organic compounds.

Supplemental Media

One unknown liquid sample was collected for analysis of volatile organic compounds. None of the volatile organic compounds were detected and, accordingly, none exceeded 20 times the TCLP limits.

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Summary of Pesticides/PCBs Contamination

Major and supplemental media in this component were not sampled for analysis of PCBs/pesticides.

A.IV.5.7 Pilot Plant Thorium Tank Farm (13D)

Pilot Plant Thorium Tank Farm (13D) is an outside, rectangular concrete containment area, with a shallow sump (1 ft x 2 ft) in the southeastern corner, west of the Pilot Plant Wet Side (13A). The tank farm consists of three vertical cylindrical steel tanks on grade and two vertical cylindrical steel tanks on support columns. The Pilot Plant Thorium Tank Farm stored thorium nitrate tetrahydrate liquid, bulk process chemicals (such as nitric acid, ammonia, and sodium hydroxide), spent solvents, and deionized water, all of which were used or produced in the Pilot Plant Wet Side. Two of the tanks are RCRA hazardous waste storage tanks because of the storage of spent solvents.

Portable pumping was used when spills or leakage occurred in the concrete containment area. Overhead piping was used to transfer the liquids between the tanks and the Thorium Tank Farm.

The Pilot Plant Thorium Tank Farm has four inactive HWMUs, two of which are located in the southwest corner; another one is located northeast of the Pilot Plant Warehouse (68), and the last one is located west of the Pilot Plant (13A). These units are considered HWMUs because the first two handled solvents (EPA waste code F002), the third handled ignitable liquids, and the fourth HWMU handled strong acids, cadmium, and chromium. The first three are planned to be closed under RCRA, and the remaining one is to be closed through CERCLA response. Hold-up materials are the only materials expected to be generated by the closure of the first three HWMUs; the materials expected to be generated by the closure of the remaining HWMU are lab waste and concrete. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants include: uranyl nitrate; thorium; thorium nitrate; 1,1,1-trichloroethane; mineral spirits; ammonia; sodium hydroxide; diamyl amyl phosphonate; tributyl phosphate; and kerosene.

From this component, two concrete chip samples and one unknown liquid sample were collected. The following presents the results of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, and strontium-90) were detected. For 13 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230,

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thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 240, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and plutonium-241) were detected.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 15 of the 23 inorganics for which analyses were performed were detected. The concentrations of seven detected (arsenic, chromium, copper, lead, nickel, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was chromium which exceeded the concrete baseline by a factor of 40. The concentrations of chromium also exceeded both the 20 and 40 times TCLP by factors of 3.2 and 1.6, respectively.

Supplemental Media

One unknown liquid sample was collected for inorganic analysis.
Of the 23 inorganic constituents, 19 analytes were detected. Those not detected were antimony, cobalt, thallium, and vanadium. Three analytes were detected at concentrations greater than 20 times their respective TCLP limits; cadmium (greater than 20 mg/kg), chromium (greater than 100 mg/kg), and lead (greater than 100 mg/kg).

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.8 General Sump (18B)

The General Sump (18B) provides treatment of contaminated site effluents other than sewage. The component is located north of the Recovery Plant (8A) and west of B Street. The General Sump consists of 16 tanks, most of which are located outside in four separate concrete containment areas. The open area that makes up General Sump is approximately 113 ft. x 116 ft.

Effluent from the production plants was transferred to the General Sump and combined for batch processing. The effluents then were neutralized and coagulants were added. After coagulant addition, the effluent was transferred to the recovery plant filter system for suspended solids and precipitant removal, and the resultant filtrate was transferred back to the General Sump. At the General Sump, treated effluent was segregated on the basis of nitrate concentration and routed to either the eight million gallon Low-Nitrate Biodenitrification Surge Lagoon (18A) or the 500,000

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gallon High-Nitrate Holding Tank (18L). Some of the wastewater streams received at the General Sump (i.e. Cooling Tower [20C] blowdown, Boiler Plant [10A] blowdown, and coal pile runoff) were permitted to be discharged directly to the Great Miami River after coagulation and settling treatments. The anticipated contaminants include uranium, thorium, and spent solvents (1,1,1-trichloroethane; trichloroethylene; and perchloroethyelene).

Three concrete cores (three depths) were collected to characterize the contamination in this component. One loose media and one steel coating were collected to support this characterization. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (lead-210 and plutonium-241) were detected. For 14 of the detected radioactive constituents (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 510, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, lead-210, neptunium-237, strontium-90, and thorium-230) were detected. For four of the detected radioactive constituents (cesium-137, radium-228, technetium-99, and thorium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 98, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, and strontium-90) were detected. For three of the detected radioactive constituents (radium-228, technetium-99, and thorium-228), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 160, a larger margin than any other radioactive constituent.

Supplemental Media

Two loose media samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (lead-210) were detected.

Summary of Inorganic Contamination

Concrete Cores

One concrete core sample from the top 1/2-inch depth was collected from this component for analysis of inorganic constituents. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, cobalt, nickel, potassium, selenium, silver, sodium, and thallium) were detected. For 7 of the detected inorganics (barium, chromium, copper, lead, mercury, vanadium, and zinc), the maximum concentration of each exceeded its respective baseline, barium was the most significant, exceeding the concrete baseline by a factor of 20. There were no detections at greater than 20 times the TCLP limit.

One concrete core sample from a depth of 1/2 to 1-inch was collected from this component for analysis of inorganic constituents. Of 23 inorganic constituents, only 9 (aluminum, arsenic, barium, calcium, chromium, iron, lead, magnesium, and manganese) were detected. For 2 of the detected inorganics, barium and lead, the maximum concentration of each exceeded its respective baseline. Barium was the more significant, exceeding the concrete baseline by a factor of 1.5. There were no detections at greater than 20 times the TCLP limit.

One concrete core sample from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, only 10 (aluminum, arsenic, barium, calcium, chromium, iron, lead, magnesium, manganese, and zinc) were detected. For 2 of the detected inorganics, chromium and lead, the maximum concentration of each exceeded its respective baseline. Iron was the more significant, exceeding the concrete baseline by a factor of 1.3. There were no detections at greater than 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.9 Methanol Tank (18J)

The Methanol Tank (18J) is an aboveground, stainless steel tank (20 ft in diameter x 15 ft high) at the southwestern corner of the Biodenitrification Surge Lagoon (18A). The Methanol Tank is situated in a concrete containment (31 ft x 41 ft x 8 ft high). The concrete floor of the containment area is sloped to a trench located inside the containment along the west wall, and this trench is sloped to a sump located in the northwestern corner of the containment. Liquids collected in the sump are pumped to the Biodenitrification Surge Lagoon.

The Methanol Tank stores methanol that is used as a food source for the biomass colony in the FEMP biodenitrification process. The only anticipated contaminant is methanol.

One concrete chip sample and one unknown liquid sample were collected to characterize the contamination in this component. The following represents the results of the analyses of this sample.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 15 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-226, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, and uranium-235/236) were detected.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of four detected (arsenic, cobalt, lead, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 2.1. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Supplemental Media

In the unknown liquid sample, eight of the 23 inorganics for which analyses were performed were detected. Those detected were barium, calcium, copper, iron, lead, manganese, potassium, and zinc. There were no detections at greater than 20 times TCLP.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.10 High Nitrate Storage Tank (18M)

The High Nitrate Tank (18M) is a 500,000 gallon vertical steel tank (60 ft in diameter) on a concrete diked pad. The unit was constructed for auxiliary support of the biodenitrification processing but has not been activated because of reduced nitrate wastes as a result of production deactivation.

The high Nitrate Storage Tank was intended to store high-nitrate wastes from the operation of the Ore Refinery Plant (2A). The tank has not been used, but in the future it is intended to provide interim storage of filtrate from the uranyl nitrate (UNH) neutralization project. The tank is considered one process area. The are no anticipated contaminants for the Nitrate Storage Tank Farm.

Two concrete chip sample (one field duplicate) and one steel coatings sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, neptunium-237, plutonium-239/240, plutonium-241, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.3, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of three detected (chromium, selenium, and vanadium) exceeded OU3 concrete baseline values. The most significant of these was selenium which exceeded the concrete baseline by a factor of 5.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit. The field duplicate sample had similar results, supporting the original sample.

Steel Coatings

In steel coatings, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of barium exceeded OU3 paint baseline value by a factor of 7.2. The concentrations of two inorganics (barium and lead) exceeded 20 times the TCLP limits.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.11 Main Tank Farm (19A)

The Main Tank Farm (19A) is an open area with four horizontal storage tanks on concrete supports and two vertical tanks on concrete pads. The tank supports are approximately 20 ft high and are

within a secondary containment system comprised of concrete diking approximately 4 feet high. The Main Tank Farm was installed in 1986 to replace the Old North Tank Farm (19D) for receipt and storage of bulk liquid chemicals.

The Main Tank Farm has one inactive hazardous waste management unit (HWMU) located on the east side of the building. This unit is considered a HWMU because it reportedly handled strong acid. Therefore, clean closure is planned under RCRA. Acid is the only material expected to be generated by the closure of this HWMU. For more information on HWMUs, see Appendix K, Table K-1.

The tanks have never been used, and contamination levels are not anticipated to exceed sampling criteria contained in the WPA. Furthermore, an inspection revealed no visible chemical contamination. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 230 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.12 Pilot Plant Ammonia Tank Farm (19B)

The Pilot Plant Ammonia Tank Farm (19B), constructed in 1986, contains two anhydrous ammonia tanks, approximately 20,000 gallons each. The two tanks are located in the open in a concrete-diked, partially subgrade structure located southwest of the Pilot Plant complex (13A, 37, and 54A). The Pilot Plant Ammonia Tank Farm stored anhydrous ammonia to supply the Pilot Plant uranium hexafluoride (UF_6) to uranium tetrafluoride (UF_4) operations and the Refinery only briefly. Anticipated contaminants include ammonia, hydrogen fluoride, potassium fluoride, and hydrochloric acid.

Because there is little or no evidence of contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 466 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 291 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

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A.IV.5.13 Old North Tank Farm (19D)

The Old North Tank Farm (19D) is approximately 130 ft square and located north of the Main Tank Farm (19A) near the northeastern corner of 2nd Street and B Street. The Old North Tank Farm is the remaining north portion of the original 1950s Bulk Tank Farm.

With the renovation of the Old North Tank Farm, which began in 1991, seven of the eight aboveground horizontal tanks have been removed, leaving only the concrete foundations for the tanks. The facility currently contains one aboveground vertical tank (Tank 17), one aboveground horizontal tank (Tank 18), a sump, and the remaining portion of the original sump drainage ditch.

The Old North Tank Farm has two inactive HWMUs. One is located north of the component itself; the other is in the center of the building. The first is considered a HWMU because it is reported to have handled hydrogen fluoride; the second handled strong acids. The first is planned to be closed under RCRA, the second through CERCLA response Hold-up materials are the only materials expected to be generated by the closure of either of these units. For more information on HWMUs, see Appendix K, Table K-1.

Component 19D is divided into two process areas.

Bulk Storage

The tank farm provided the bulk storage of liquid chemicals for use throughout the FEMP site and dilute hydrofluoric acid (DHF) recovered during operations of the Green Salt Plant (4A). Anticipated contaminants are: anhydrous ammonia, hydrofluoric acid (HF), dilute HF, potassium fluoride, and hydrochloric acid.

From this component, four concrete core samples, one steel coatings sample, and two unknown liquids samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-238, plutonium-239/240, and radium-228) were detected. For two of the detected radioactive constituents (neptunium-237, and polonium-210), the maximum concentration of each exceeded its respective concrete baseline value. Neptunium-237 exceeded its baseline concentration by a factor of 1.7, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137,

neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For five of the detected radioactive constituents (thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4.8, a larger margin than any other radioactive constituent.

A total of three concrete core samples from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and thorium-228) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, and thorium-232) were detected.

Summary of Inorganic Contamination

Concrete Cores

A total of two concrete core samples from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, selenium, silver, and thallium) were detected. For 10 of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, iron, mercury, potassium, and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 37. The lead concentration of inorganics in two samples of the top ½-inch of concrete cores from this component exceeded 20 times the TCLP limit. The samples were collected from the Bulk Storage Area and the Sump Area.

A total of two concrete core samples from a depth of ½ to 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, selenium, and thallium) were detected. For six of the detected inorganics (aluminum, arsenic, calcium, lead, mercury, and manganese), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 6.6. There were no detections at greater than 20 times the TCLP limit.

A total of two concrete core samples from a depth greater than 1-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, selenium, and thallium) were detected. For three of the detected inorganics (calcium, lead, and potassium), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.2. There were no detections at greater than 20 times the TCLP limit.

Steel Coatings

One steel coatings sample was analyzed for inorganic constituents. Of the 23 inorganic constituents analyzed, 16 were detected. Those not detected were antimony, beryllium, cadmium, selenium, silver, thallium, and vanadium. The maximum of the validated results exceeded the OU3 paint baseline for one analyte, arsenic. Arsenic exceeded its baseline by a factor of 1.6. The concentration of lead exceeded 20 times the TCLP limit (greater than 100 mg/kg). This sample was from the sump area.

Supplemental Media

One unknown liquid sample was analyzed for inorganic constituents. Of the 23 inorganics, eight were detected. Those detected were aluminum, arsenic, calcium, iron, magnesium, potassium, sodium, and zinc. There were no detections exceeding 20 times the TCLP limits.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic contamination.

Supplemental Media

One unknown liquid sample was analyzed for semivolatile organic contamination. There were no detections.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic contamination.

Supplemental Media

One unknown liquid sample was analyzed for volatile organic contamination. There were no detections.

Summary of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticide/PCB contamination.

A.IV.5.14 Elevated Potable Storage Tank (20D)

The Elevated Potable Storage Tank (20D) is located along E Street, east of the Metals Fabrication Plant (6A) and south of the Plant 6 Warehouse (79). The Elevated Potable Storage Tank is a steel structure 100-foot in height supporting a 210,000-gallon water storage tank. The tank is used to store water for on-property fire protection and other potable uses. The water is received from Well Houses 1, 2, and 3 (20E, 20F, and 20G, respectively).

Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA and an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1048 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 208 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.15 Process Water Storage Tank (20H)

Process Water Storage Tank (20H) is a 750,000-gallon, reinforced concrete tank situated between the Boiler Plant (10A) and the Cooling Towers (20C). The tank is equipped with a flexible membrane interior liner and has been used to store water necessary for production activities.

Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA and an inspection revealed no apparent visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1167 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 41 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.16 Trickling Filters (25H)

The Trickling Filters (25H), comprised of two concrete trickling filters (each 40 ft in diameter) and a concrete secondary clarifier unit, is located in the FEMP Sewage Treatment Area. The Trickling Filters provides aerobic bacterial digestion of domestic sewage from the FEMP site. The trickling filters are operated in series, and each trickling filter comprises an open concrete tank filled with a bed of porous slag pieces three-to-four inches in diameter, a four-arm rotary distributor, and an underdrain system. Decant from the two Primary Clarifier Basins (25G) is pumped to a trickling filter and sprayed over the slag bed via nozzles located at regular intervals along the arms of the

rotary distributor. Effluent exiting the underdrain system from the first trickling filter is then routed to the second trickling filter, and effluent is often recirculated through the trickling filter system three to four times for polishing. Effluent exiting the trickling filters is routed via in-ground concrete trenches to the secondary clarifiers for settling. The secondary clarifiers overflow to the Chlorination Building (25A) for chlorination, and settled material is transferred to the head of the sewage treatment system for subsequent treatment. There are no anticipated contaminants for this component.

A total of one concrete core sample and one unknown liquid sample were collected.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, polonium-210, radium-228, strontium-90, and uranium-235/236) were detected. For two of the detected radioactive constituents (lead-210 and technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, and uranium-235/236) were detected. For two of the detected radioactive constituents (technetium-99, and thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 1.5, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, neptunium-237, plutonium-239/240, polonium-210, radium-228, strontium-90, technetium-99, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, cesium-137, plutonium-238, and strontium-90) were detected.

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Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, silver, sodium and thallium) were detected. samples exceeded 20 times the TCLP limit. For nine of the detected inorganics (aluminum, arsenic, barium, calcium, lead, magnesium, manganese, vanadium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 3.7.

Only one concrete core sample from the second ½-inch was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, silver, sodium and thallium) were detected. For nine of the detected inorganics (aluminum, arsenic, barium, calcium, lead, magnesium, manganese, vanadium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 3.7.

Only one concrete core sample from a depth interval of one to four inches was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 12 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, potassium, silver, sodium and thallium) were detected. For eight of the detected inorganics (aluminum, arsenic, barium, calcium, lead, manganese, vanadium and zinc), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, vanadium was the most significant, exceeding the concrete baseline by a factor of 4.5.

Supplemental Media

One unknown liquid sample was collected for analyses of inorganic constituents. 13 of the 23 inorganics for which analyses were performed were detected. Not detected are antimony, arsenic, beryllium, cadmium, chromium, nickel, selenium, silver, thallium, and vanadium. None of the detected constituents exceeded the respective TCLP limits.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.5.17 Elevated Water Storage Tank (26B)

The Elevated Water Storage Tank (26B) is a 350,000-gallon, steel water storage tank, 265 ft above grade, with associated Pump House, located north of the Pump House-HP Fire Protection (26A). The

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Elevated Water Storage Tank was installed to provide the site with a water supply for fire protection. The building houses three pumps that draw water from the tank as required.

There are no anticipated contaminants and the results of radiological surveys do not exceed sampling criteria contained in the WPA. Furthermore, there is little or no evidence of contamination. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1013 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 387 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.18 Fire Training Tank (73C)

Final removal of the Fire Training Tank occurred in September 1994 as part of Removal Action 28. (For a complete list and description of all Removal Actions, see Table 1-2.) The Fire Training Tank was a small steel tank located in the middle of the 45-foot-diameter Fire Training Pond (73B) and drain pit near the northern boundary of the FEMP site, along B Street. The Fire Training Tank was used for training fire brigade members in fighting combustible liquid fires. The steel tank (which was never filled) was used to simulate a combustible liquid tank. Anticipated contaminants include uranium, used oils, toluene, and waste solvents and paint thinners.

The Fire Training Tank was part of the Fire Training Facility and therefore part of the HWMU comprising that facility. For a description of this HWMU, see Section A.IV.1.12, the Fire Brigade Training Center Building. For more information on HWMUs, see Appendix K, Table K-1.

The Fire Fighting Tank was outside of radiologically controlled areas and little or no evidence of contamination existed. Furthermore, the tank was insignificant in size. Therefore, no intrusive samples were scheduled for the component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.19 Confined Space Burn Tank (73E)

Final removal of the Confined Space Burn Tank (73E) occurred in December 1994 as part of Removal Action 28. (For a complete list and description of all Removal Actions, see Section 1.2.2.2 and Table 1-2.) The Confined Space Burn Tank was located north of the process area and south of the Fire Brigade Training Center Building (73A). (Final demolition of 73A occurred in September 1994.) The Confined Space Burn Tank was a horizontal, steel tank situated directly on the ground surface. The east end of the tank has been removed for training purposes. The tank was originally

located at the Old Tank Farm (19D) and then located outside the process area. The tank was released from the process area under DOE guidelines for release of materials without radiological restrictions following decontamination. The only anticipated contaminant was hydrofluoric acid.

The Confined Space Burn Tank was part of the Fire Training Facility and therefore part of the HWMU comprising that facility. For a description of this HWMU, see Section A.IV.1.12, the Fire Brigade Training Center Building. For more information on HWMUs, see Appendix K, Table K-1.

The Confined Space Burn Tank was outside of radiologically controlled areas, and an inspection indicated no visible chemical contamination. Furthermore, the tank was insignificant in size (approximately 20 ft long and 6 ft in diameter). Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1185 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 198 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.5.20 Drums (non-RCRA) (G-009)

Non-RCRA Drums (G-009) are stored in or on many of the components in the OU. Drummed materials include recyclable residues from production and waste treatment activities, wastes, high-grade compounds, and contaminated materials. A majority of the Non-RCRA Drums are currently stored under roof at the Plant 1 Pad (74T) or inside former production facilities, such as Metals Production Plant (9A), Metals Fabrication Plant (6A), and Special Products Plant (9A). Non-RCRA Drums are typically standard 55 gallon drums that may be overpacked in larger drums, if deteriorated.

As discussed in Section 1.2 (Volume 1), the characterization and disposition of drummed waste (both RCRA and non-RCRA), thorium waste, and product inventory is part of the scope of Removal Action 9. These materials are not part of the final remedial decision for the OU3 RI/FS Report. Therefore, no sampling of these materials occurred as part of the OU3 RI/FS characterization study. However, because these materials belong to OU3, a summary is presented in this document. This material was classified as an inventoried material for two basic reasons:

- The material was in inventory, either as a waste, a product, or an intermediate product intended for processing, when the FEMP mission changed from production to cleanup in 1989; or

- It has been generated as a result of removal actions or daily operation and maintenance activities at the FEMP since production ceased.

This material was placed into one of three categories. They are defined as:

Product

This category includes uranium metal products that have a uranium concentration above that which may be economical to recover. Product inventory includes material ranging from contaminated soil, rocks, sand, bricks, and ceramics to fuel elements and cores.

The FEMP is pursuing several options for the removal of these materials, including the following:

- Use at other DOE sites;
- Use at other government (non-DOE) facilities;
- Sale to the private sector; or
- Relocation to, and storage at, other DOE facilities.

If efforts toward all of these options are unsuccessful, the FEMP will seek declaration of these materials as "wastes" and subsequent off-site disposal consistent with the strategy for low-level wastes (Removal Action 9).

Thorium

This category includes a variety of end products produced as part of the thorium refining process at the FEMP from the early 1950s through the early 1970s.
Because of its extensive thorium capabilities, the FEMP was designated as the DOE's national repository for thorium. Much of the thorium material stored at the site has now been designated as "excess", making it available for disposal.

Other

This category includes containerized inventoried material which is not classified as either thorium or product.

Based on actual analytical results or process knowledge, these inventory categories are further segregated by its regulatory status. The descriptions of the various regulatory status options are:

- Non-RCRA: Based on either actual analytical results or process knowledge, the material is not hazardous under 40 CFR 261.3.

- RCRA. Based on either actual analytical results or process knowledge, the material is hazardous under 40 CFR 261.3. This material may have been generated by removal actions and/or closure of a Hazardous Waste Management Unit (HWMU).

- Uncharacterized. This material can not be characterized as RCRA or non-RCRA either by analytical results or by process knowledge. Uncharacterized materials are stored based on their origin and process

knowledge, until the material can be characterized. If the material is suspected of being RCRA, it is stored in a RCRA storage facility.

Tables A.IV-1 through A.IV-9 provide a summary of each inventoried material type and regulatory status, which includes a listing of the number of containers, the net weight, and (when applicable) the appropriate EPA hazardous waste codes. Each table is grouped by the category of inventoried material and its regulatory status (e.g., Product RCRA). The inventoried materials are then further grouped by current storage location and material descriptions.

Table A.IV-10 provides a total of the number of containers and net weight for all categories of inventoried materials. This table includes both inventory material currently active (on-property) as of August 21, 1995, and the inventory that has been shipped off-site from 1989 to 1995.

A.IV.5.21 RCRA Drums (G-010)

RCRA Drums (G-010) are located in specially designed and controlled facilities throughout OU3, including the KC-2 Warehouse (63), Plant 6 Warehouse (79), Plant 8 Warehouse (80), Plant 9 Warehouse (81), and other facilities. Most of the drummed material is classified as mixed-RCRA and radiological waste; therefore, no immediate disposition has been identified.

See A.IV.5.20 for a discussion of all inventory material, including Drums (RCRA and Non-RCRA). Tables A.IV-1 through A.IV-10 list the number of containers and net weight of inventory material (both currently on-property and shipped as of August, 1995). The majority of these tables are organized by storage location and material description.

A.IV.5.22 Inventory (G-011)

Inventory (G-011) includes materials produced under the former production mission of the FEMP as product. Both uranium and thorium metal are encompassed in this category. These materials are stored throughout many of the components in OU3.
See A.IV.5.20 for a discussion of all inventory material, including Drums (RCRA and Non-RCRA). Tables A.IV-1 through A.IV-10 list the number of containers and net weight of inventory material (both currently on-property and shipped as of August, 1995). The majority of these tables are organized by storage location and material description.

A.IV.5.23 Mobile Containers (sea/land) (G-012)

The Mobile Containers (G-012) are steel vessels used to package and ship FEMP waste off-site to a permanent waste disposal facility. The location and quantity of the containers varies daily. The containers are screened under Nuclear Regulatory Commission (NRC) and DOE guidelines and U.S. Department of Transportation (DOT) regulations before being shipped off-site.

Since there are no anticipated contaminants and little or no evidence of contamination, no intrusive samples were taken from the component. Since there are no volumes or weights associated with the

component because the number and location fluctuates, the contaminant source term will not include any contribution from this component. Baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.6 Containers and Containerized Material - Belowground

This component category includes two buried components that contain (or previously contained) waste, product, or chemicals. These containers hold residual quantities of material. The underground storage tanks included in this category, most of which have been removed, are described in Section 1.0 (Volume 1). Leakage from these belowground containers is a potential source for contamination of soil and groundwater. The soil surrounding these containers is likely contaminated by past spills and/or leakage and are addressed by OU5.

A.IV.6.1 Fire Training Burn Trough (73D)

The Fire Training Burn Trough (73D) is a 4-foot ´ 20-foot steel trough, which was used for training fire brigade members in fighting volatile liquid fires. It was located on the northern boundary of the site on B Street. The Burn Trough is partly subgrade, where used oil was ignited for extinguisher training. Anticipated contaminants are uranium, 1,1,1-trichloroethane, and copper.

The Fire Training Burn Trough was part of the Fire Training Facility and therefore part of the HWMU comprising that facility. For a description of this HWMU, see Section A.IV.1.12, the Fire Brigade Training Center Building. For more information on HWMUs, see Appendix K, Table K-1.

Although the Burn Trough was removed as part of Removal Action 28, it is still waiting for size reduction before it can be containerized. (For a complete list and description of Removal Actions, see Table 1-2). No intrusive sampling was scheduled for the Fire Training Burn Trough; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.6.2 Underground Storage Tanks (G-005)

Underground Storage Tanks (G-005) currently comprises seven underground tanks. At one time, the FEMP site contained 17 underground tanks at various locations. Ten were removed in 1990 as part of the site-wide underground storage tank (UST) removal program. The surrounding areas from the removed underground tanks are undergoing interim remediation.

Of the seven remaining underground tanks, four contain petroleum products and three contain wastewater residuals that may contain spent solvent residues, uranium, thorium, strontium-90, technetium-99, and radium. The anticipated contaminants for the underground tanks are petroleum compounds, waste oils, and solvents.

No intrusive sampling was scheduled for the Underground Storage Tanks; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.7 Bulk Material

This component category includes eight areas with large volumes of exposed material containing low levels of contaminants, all stored without containment.

A.IV.7.1 Soil Piles (G-013)

Soil, Rubble, and Construction Debris Piles (G-013) is a collective grouping of piles at the FEMP. Soil and debris have been generated on-property as a result of construction projects, removal actions, and routine maintenance. These piles were defined as a grouping primarily because of on-going activities involving continued generation and/or movement of these piles on-property. The primary elements of these piles are the soil piles in the northwestern corner of the production area of the site, including the Third Street Dirt Pile. The Soil Piles do, however, include all such piles throughout the OU.

Approximately 1,000,000 ft^3 of material is contained in the soil piles. The 12 primary current soil piles are discussed as follows.

East of Building 2A

The soil pile located east of the Plant 2 East Pad (74A) and south of the corner of B Street and 2nd Street in Grid 19 consists of 393 ft^3 of dirt rubble.

Southwest of Building 8A

The soil pile located southwest of the Recovery Plant (8A) and south of the Rotary Kiln/Drum Reconditioning Building (8C) in Grid 20 consists of 62.3 ft^3 of dirt rubble.

South of Building 8A

The soil pile located south of the Recovery Plant (8A), south of the Rotary Kiln/Drum Reconditioning Building (8C), in Grid 20 consists of 265 ft^3 of dirt rubble.

Southeast of Building 8A

The soil pile located southeast of the Rotary Kiln/Drum Reconditioning Building (8C) and southwest of the Plant 8 East Pad (74C) in Grid 20 consists of 2,945 ft^3 of dirt rubble.

South of Building 80

The soil pile located south of the Plant 8 Warehouse Building (80) in Grid 20 consists of 6,412 ft^3 of dirt rubble.

West of Building 5A

The soil pile located south of the Plant 5 Covered Storage Pad (5F), west of the Plant 5 Ingot Pickling Building (5B), and north of the Plant 5 Filter Building (5E) in Grid 12 consists of 1,244 ft^3 of dirt rubble.

North of Building 9A

The soil pile located southeast of the Plant 9 Warehouse Building (81) and north of the Special Products Plant (9A) in Grid three consists of 1,094 ft^3 of dirt rubble.

Between Railroad Tracks 6 and 9

The soil pile located north of the Boiler Plant (10A) and south of the KC-2 Warehouse Building (63) in Grid nine consists of 160,363 ft^3 of dirt rubble.

East of Coal Pile Run Off Basin

The soil pile located east of the Coal Pile Runoff Basin (18C) in Grid 11 consists of 187 ft^3 of dirt.

Third Street Dirt Pile

The soil pile located south of Quonset Hut 3 (62) and north of the Plant 1 Pad (74T) in Grid 17 consists of 803,589 ft^3 of dirt rubble.

Southwest of Building 15

The soil pile located southwest of the Lab Building (15) in Grid 21 consists of 84.3 ft^3 of dirt rubble.

North of Building 67

The soil pile located north of the Plant 1 Storage Pad (74T) and north of the Plant 1 Thorium Warehouse (Component 67) in Grid 24 consists of 1,006 ft^3 of dirt rubble.

The are no anticipated contaminants for the soil piles.

From this component, 59 soil samples were collected. No major media was collected from this component.

Summary of Radiological Contamination

<u>Supplemental Media</u>

Thirteen soil samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, neptunium-237, plutonium-241, strontium-90, and thorium-227) were detected.

Summary of Inorganic Contamination

Supplemental Media

Of the 59 soil samples collected from this component, eleven were submitted for analysis of inorganic constituents. Only ten of these 11 samples included analysis for antimony. Of these samples submitted, detections were reported for 19 of the 23 inorganic analytes. Those analytes not detected were antimony, mercury, silver, and thallium. Twelve of the analytes reported detections in 100% of all samples submitted. These prevalent analytes include aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, sodium, vanadium, and zinc. Only one sample exceeded 20 times TCLP for lead (greater than 100 mg/kg).

Summary of Semivolatile Organic Contamination

Supplemental Media

Twelve of the 59 soil samples were submitted for analysis of semivolatile organic constituents, only eleven of which included carbazole analysis. Of these samples submitted, detections were reported for 19 of the 23 inorganic analytes. The most prevalent fluoranthene and pyrene, reporting detections in 75% of samples submitted. There were no detections for 20 times greater than TCLP.

Summary of Volatile Organic Contamination

Supplemental Media

One to twelve samples were submitted for analysis of volatile organic constituents. One detection out of the 33 volatile organic analytes was reported. This detection was for acetone, which reported detections in two of six total samples submitted. There were no detections for 20 times greater than TCLP.

Summary of Pesticides/PCB Contamination

Supplemental Media

Eleven to twelve samples were submitted for analysis of pesticides/PCB constituents. detections were reported for nine out of 28 pesticide/PCB analytes. The most prevalent was aroclor-1254, having detections in 42% of the samples submitted. There were no detections for TSCA limits.

A.IV.7.2 Rock Salt Pile South of Building 61 (rock salt) (P-001)

The Rock Salt Pile south of Building 61 (P-001) is a bulk storage pile of commercial rock salt. The salt is seasonally stored and used for site road maintenance during adverse weather conditions. Currently, a pile of rock salt is located on the northeast side of the Metals Fabrication Plant (6A). The Rock Salt Pile is supplemented with deliveries from off-site vendors, and the location of the pile may vary with each delivery.

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Since there are no anticipated contaminants and there is little or no evidence of contamination, no intrusive samples were taken from the component. Since there are no volumes or weights associated with the component because of its temporary nature, the contaminant source term will not include any contribution from this component.

A.IV.7.3 Sand Piles South of Building 61 (sand) (P-002)

The Sand Piles south of Building 61 (P-002) are bulk storage piles of sand. The sand is used for on-property fill and construction purposes. The Sand Piles are routinely supplemented with deliveries from off-site vendors, and the location may vary with each delivery.

Since there are no anticipated contaminants and there is little or no evidence of contamination, no intrusive samples were taken from the component. Since there are no volumes or weights associated with the component because of its temporary nature, the contaminant source term will not include any contribution from this component.

A.IV.7.4 Gravel Pile North of Building 56 (gravel) (P-003)

The Gravel Pile north of Building 56 (P-003) is a bulk storage pile of gravel. The gravel is used for on-property fill and for construction purposes. The Gravel Pile is supplemented with deliveries from off-property vendors, and the location of the pile may vary with the delivery. At this time, there is no known gravel pile existing on the site.

Since there are no anticipated contaminants and there is little or no evidence of contamination, no intrusive samples were taken from the component. Since there are no volumes or weights associated with the component because of its temporary nature, the contaminant source term will not include any contribution from this component.

A.IV.7.5 Copper Metal Scrap Pile (copper) (P-004)

Final removal of the Copper Metal Scrap Pile (P-004) occurred as part of Removal Action No. 15. (For a complete list of removal actions, see Table 1-2.)

The Copper Metal Scrap Pile was located on the northwestern corner of the Plant 1 Pad (Component 74T). Component P-004 comprised two piles of scrap copper, associated coatings (insulation with between 1 and 80 percent amosite and chrysotile asbestos), and miscellaneous conduit. The piles were stored out in the open on top of the concrete pad and had no protective covering. A total of approximately 1370 tons of low-level radioactively contaminated scrap copper were stored in the two piles, and the scrap copper piles were approximately 15 ft and 30 ft high.

The Copper Metal Scrap Pile was generated from scrap metal resulting from the Cascade Improvements/Cascade Upgrades Project at the Gaseous Diffusion Plant in Paducah, Kentucky. The scrap metals were initially sent to the FEMP for shredding and casting. However, the casting

operations were abandoned when locations for the disposition of the resultant castings could not be identified. As a result, the scrap copper is currently being stored on the Plant 1 storage pad. The anticipated contaminants for the Copper Metal Scrap Pile are copper and asbestos.

No intrusive samples were collected from the Copper Metal Scrap Pile; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.7.6 Coal Pile (coal) (P-005)

The Coal Pile (P-005) is located east of the Boiler Plant (10A) and north of the Coal Pile Runoff Basin (18C). Approximately 115,000 ft^3 of coal are stored in one 10-foot-high pile. The coal pile is stored in the open on top of soil and has no protective covering. Most of the rainwater runoff from the coal pile and some of the runoff from the area immediately northeast of the coal pile drains along a small ditch located along the southeastern edge of the coal pile to a grated inlet and into the Coal Pile Runoff Basin. Some runoff from the area of the Water Plant (20B) also drains toward the southern end of the coal pile.

The coal is used as fuel for the boilers in the Boiler Plant; the Coal Pile is considered a single process area. There are no anticipated contaminants.

No samples were collected from the Coal Pile; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.7.7 Scrap Metal Pile (metal) (P-006)

Removal of the Scrap Metal Pile (P-006) occurred as part of Removal Action No. 15. (For a complete list of removal actions, see Table 1-2.) The Scrap Metal Pile was located on the Decontamination Pad (74P). Approximately 3,274 tons (400,000 ft^3, uncompacted) of low-level radioactively contaminated scrap metal are stored in a pile 15 ft to 20 ft high. The pile was stored in the open on top of a curbed concrete storage pad and has no protective covering.

The Scrap Metal Pile was generated at the FEMP as a result of past on-property demolition projects, abandoned equipment, and the upgrade of facilities and vehicles. In May 1987, the scrap metals on the Decontamination Pad were segregated into recoverable and refuse categories. The recoverable scrap metal was further segregated into ferrous and nonferrous categories, and within each of these, the metals were further segregated into high and low count. The anticipated contaminant for the Scrap Metal Pile is uranium.

No samples were collected from the Scrap Metal Pile; therefore, baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.7.8 Outside Equipment Storage Area (metal) (P-007)

The Outside Equipment Storage Area (P-007) consists of two open field yards northeast and northwest of the Decontamination Building (69). The Outside Equipment Storage Area is used to store junked contaminated vehicles and equipment. More than 150 contaminated and junked vehicles and wheeled pieces of equipment from site operations are stored on the field. Anticipated contaminants include uranium, sulfuric acid, ethylene glycol, lead, motor oil, asbestos, and motor fuels.

Since it is anticipated that contamination levels do not exceed sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 4578 dpm/100 cm^2 (beta-gamma), below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 110 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants (see Appendix A.3) within each material type associated with this component have been used for characterization.

A.IV.8 Storage Pads, Parking Lot, Roads, and Railroads

This component category consists of 27 components, most of which provided support for the transport or storage of raw materials, products, and wastes. These areas are, or have the potential to be, contaminated by leakage. The soil surrounding these areas are, or have the potential to be addressed by OU5.

A.IV.8.1 Contaminated Oil/Graphite Burner Pad (10D)

The Contaminated Oil/Graphite Burner Pad (10D) is a rectangular, reinforced concrete pad located northeast of the Boiler Plant (10A). It was constructed with berms, slopes, and grated trenches to contain any spilled liquid material and storm-water runoff.

The Contaminated Oil/Graphite Burn Pad provides storage for materials and equipment associated with contaminated oil and graphite burning. This involved three operations, described as follows:

Graphite burning entailed using a small, open gas-fired furnace to oxidize scrap graphite crucible or molds for uranium recovery. Only the graphite burner from this process remains on the pad.

In the oil burning process, a small refractory brick enclosure housed removable steel pots that were fed contaminated oil and solvent. Combustion was aided by an air jet into the steam-heated tank (where the oil was preheated) before going to the burner pot. Combustion was self-sustained. Ash

was drummed for uranium recovery. Of this process, only the oil burner enclosure and tank remain. All other equipment was removed.

The third operation of the pad involved a sump that decanted surface water. This water was pumped from the subgrade pit into portable tanks and sent to the Recovery Plant (8A) for wastewater treatment. The steam educator from this process was removed.

The anticipated contaminants for the Contaminated Oil/Graphite Burn Pad include uranium; tributyl phosphate; kerosene; lubricating; hydraulic and machine oils; spent solvents; 1,1,1-trichloroethane; perchloroethylene; and trichloroethylene.

From this component, two concrete cores and one unknown liquid were collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236 and uranium-238) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 400, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236 and uranium-238) were detected. For four of the detected radioactive constituents (lead-210, radium-228, technetium-99 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 99, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236 and uranium-238) were detected. For three of the detected radioactive constituents (lead-210, technetium-99 and

elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 59, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, and radium-228) were detected

Summary of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, cadmium, chromium, cobalt, mercury, selenium, thallium and vanadium) were detected. For nine of the detected inorganics (aluminum, arsenic, barium, copper, lead, nickel, potassium, sodium and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 5. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from the second ½-inch depth was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, cadmium, chromium, cobalt, mercury, nickel, potassium, selenium and thallium) were detected. For five of the detected inorganics (aluminum, arsenic, barium, lead and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 2.2. None of the detected results exceeded 20 times the TCLP limit.

No inorganic analyses were performed on the last core depth of 1-inch to 4-inches.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 16 (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium and zinc) were detected. None of the detected results exceeded the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. None of the 65 Semivolatile constituents for which analyses were performed were detected.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only three (2-butanone, tetrachloroethene, and toluene) were detected. There were no detections exceeding 20 times the TCLP limits.

Summary of Pesticides/PCB Contamination

Concrete Cores

One concrete core sample from three depth intervals (0-½ inch, ½-1 inch and 1-4 inches) was collected from this component for analysis of pesticide/PCB contaminants. Of 28 pesticides/PCBs for which analyses were performed, only 2 (aroclor-1254, aroclor-1260) were detected and they were each detected in each depth interval. These two PCBs were both detected at a maximum concentration in the top depth interval at concentrations of 4100 and 3400 mg/kg, respectively. These are well below the TSCA limit of 50 ppm (50,000 mg/kg).

Supplemental Media

One unknown liquid sample was collected from this component for analysis of pesticide/PCB contaminants. None of the 28 pesticides/PCBs for which analyses were performed were detected.

A.IV.8.2 Old Ten Ton Scale (30C)

The Old Ten Ton Scale (30C) was a "drive-on" weigh station located north of the Chemical Warehouse (30A). The scale was used to weigh incoming production materials that were transported on wooden pallets. The materials and pallets were transported with forklifts throughout the site.

The steel scale has been filled in with concrete. Because this component was removed before the inception of the OU3 WPA, no intrusive samples were scheduled. Therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

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A.IV.8.3 Old Truck Scale (31B)

The Old Truck Scale (31B) is a concrete platform located directly adjacent to the west side of the Engine House/Garage (31A). The Old Truck Scale was originally used to weigh incoming and outbound multi-axle vehicles. The scale was moved to the new weigh station near the New Receiving Building (82). A concrete base remains where the Old Truck Scale was located.

Since there are no anticipated contaminants and an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 38 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were scheduled for this component, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.8.4 Plant 2 East Pad (74A)

Plant 2 East Pad (74A) is a rectangular, reinforced concrete pad located due east of the Ore Refinery Plant (2A). It was constructed with berms, slopes, and grated trenches to contain any spilled liquid material and collect any storm-water runoff.

The pad was historically used as a staging area for UO_3 (black oxide) product produced in the denigration process of the Ore Refinery Plant. The UO_3 was stored in drums if the enrichment of the material exceeded 1 percent ^{235}U; otherwise, it was stored in drums or hoppers. The UO_3 was sent from Pad 74A to long-term storage on the Plant 1 Pad (74T), to the Green Salt Plant (4A) for conversion into UF_4 (green salt) or for off-site shipping for conversion to UF_6. Currently, Plant 2 East Pad is a drum storage area. The storm-water runoff collected in the grated trench is pumped to the Refinery Sump (3H) for eventual wastewater treatment. Pad 74A consists of a single process area. Anticipated contaminants include uranyl nitrate, UO_3 (up to three percent E), uranium (up to five percent E).

One concrete chip sample and one unknown liquid was collected from this component. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, lead-210, plutonium-238, plutonium-239/240, and strontium-90) were detected. For seven of the detected radioactive constituents (neptunium-237, radium-228, technetium-99, elemental uranium, uranium-234, uranium-

235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 48, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (radium-228) was detected.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, cadmium, selenium, silver and thallium) were detected. For seven of the detected inorganics (barium, copper, lead, mercury, potassium, sodium and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, mercury was the most significant, exceeding the concrete baseline by a factor of 3.3. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 13 (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, mercury, nickel, selenium, silver and thallium) were detected. None of the detected results exceeded the TCLP limit.

Summary Of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. None of the 65 Semivolatile constituents for which analyses were performed were detected.

Summary Of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected.

Summary Of Pesticides/PCB Contamination

No major or supplemental media collected from this component were analyzed for pesticides/PCBs.

A.IV.8.5 Plant 2 West Pad (74B)

Plant 2 West Pad (74B) is a rectangular, reinforced concrete pad located northwest of the Ore Refinery Plant (2A). The pad was constructed with berms, slopes, and grated trenches to contain any spilled liquid material and collect any storm-water runoff.

The pad was historically used as the storage pad for drums that contained various types of milled uranium ores. The drums were loaded onto either the Hot Side Ore Conveyor (2G) or the Cold Side Ore Conveyor (2F) and dumped into bucket elevators that carried the powdered ore up to the top floor of the Ore Refinery Plant for digestion in nitric acid. The empty drums were then returned to the Plant 2 West Pad to await removal for cleaning and reconditioning. Currently, the pad is a sea/land storage area. The storm-water runoff collected in the grated trench is pumped to the Refinery Sump (3H) for eventual wastewater treatment. The Plant 2 West Pad consists of a single process area. Anticipated contaminants for the pad include: UO_3, U_3O_8, UO_2, uranyl nitrate, uranyl ammonium phosphate cakes, ore, lead, ore concentrates, ammonium diuranate, MgF_2, aluminum oxide, urea, and oil.

One concrete chip sample was collected to characterize the contamination in this component. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, plutonium-238, plutonium-239/240, and strontium-90) were detected. For eight of the detected radioactive constituents (lead-210, neptunium-237, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-235/236 exceeded its baseline concentration by a factor of 35, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, mercury, selenium, silver, and thallium) were detected. For four of the detected inorganics (arsenic, barium, lead, and zinc) the maximum

concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 32. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.6 Plant 8 East Pad (74C)

Plant 8 East Pad (74C) is an irregularly shaped reinforced concrete pad located east of the Recovery Plant (8A). The pad is bordered on the east by a railroad track that ends at the south end of the pad; also, the Plant 8 Railroad Filter Building (8D) is immediately across the track from the east pad. The loading dock for the Recovery Plant at the northern end of the Plant 8 East Pad consists of reinforced concrete raised three feet to four feet above the pad and is considered part of the pad. One of the process areas of the Recovery Plant, the thorium storage silo, formerly was located on the pad next to the east wall of the Recovery Plant. Plant 8 East Pad has grated concrete trenches for runoff-water collection.

Plant 8 East Pad has one HWMU located in its northwest corner. This unit is considered a HWMU because it is reported to have handled ignitable liquids, lead, and methyl ethyl ketone. Closure will be attained through CERCLA response. Concrete and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Three distinctive processes have occurred on this pad: storage of materials for processing, drumming of Weldon Spring "airport scrap," and storage of pyrophoric uranium for processing. Each activity used roughly the same areas of the pad. The pad consists of a single process area.

Storage

The Plant 8 East Pad historically stored Recovery Plant products and large lots of drummed uranium and thorium residues that were to be processed in the Recovery Plant for recycling to the Ore Refinery Plant (2A). Both enriched and depleted uranium materials (U-235 content up to 1.25 percent E) were stored. Later in the history of usage and in current practice, drummed and other containerized uranium residues were stored for shipment off-site. Additionally, magnesium fluoride (airport scrap), oil and uranium in water mixtures, and pyrophoric uranium materials (uranium chips, turnings, and saw dust) have been stored in drums and portable hoppers on the Plant 8 East Pad. Both solid materials and materials containing free liquid were stored on the pad.

Airport Scrap

The airport scrap operation involved receipt of bulk MgF_2 from Weldon Spring in railroad gondola cars that were off-loaded to drums on the Plant 8 East Pad. The gondola cars and other railroad cars

were washed over the railroad filter building pit, decanted and filtered through sand filters in the Plant 8 Railroad Filter Building, and then pumped into the Recovery Plant for further treatment.

Pyrophoric Drum Sprinkler

Railroad Filter Pit water was circulated, by using the Plant 8 Railroad Filter Building filters and pumps, to a sprinkler system over the pyrophoric material drum storage area on the pad for use in cooling these drums. Drums of uranium metal fines produced in the Metals Fabrication Plant (Building 6A) and the Special Products Plant (9A) machining operations were temporarily stored on the pad to await furnacing in the Recovery Plant (8A). The fines were stored immersed in water.

Anticipated contaminants from these activities as summarized below include: uranium; uranium metal (up to 1.25 percent E); thorium compounds; and 1,1,1-trichloroethane.

From this component, one concrete chip sample, one loose media sample, and one unknown liquid sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For three of the detected radioactive constituents (lead-210, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 130, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, neptunium-237, plutonium-238, plutonium-241 and strontium-90) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-241, radium-226, radium-228, strontium-90, and thorium-232) were detected.

Summary of Inorganic Contamination

Concrete Chips

One concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For nine of the detected inorganics (aluminum, arsenic, barium, cobalt, copper, lead, potassium, sodium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 13.7. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, mercury, selenium, silver, and thallium) were detected in the loose media and all except 15 (aluminum, antimony, arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, mercury, nickel, selenium, silver, thallium, and vanadium) in the liquid. The concentration of lead in the loose media sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, 20 (2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butyl benzyl phthalate, carbazole, chrysene, di-n-octyl phthalate, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene) were detected in the loose media and none were detected in the unknown liquid. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

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Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected in either sample.

Summary of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.7 Plant 8 West Pad (74D)

Plant 8 West Pad (74D) is an irregularly shaped reinforced concrete pad located west of the Recovery Plant (8A). The pad surrounds the Plant 8 Maintenance Building (8B) on three sides. Also, the Old Drum Washer (8F) unit is located on the pad but is no longer used, having been abandoned in place in favor of a new drum reconditioning process. The pad has two grated trenches, one on the west and north edges and the other on the east edge.

Plant 8 West Pad historically stored both full and empty drums in support of Recovery Plant operations and for waste storage before shipment off-site for disposal. Enriched and depleted recovery materials and hazardous wastes were stored here. Materials stored on this pad contained free liquid or were solid in form. Empty and refurbished drums were also stored on the pad in conjunction with the Old Drum Washer. The grated trenches of the pad were used to transfer wash water from the Old Drum Washer and pad runoff and spillage to the Recovery Plant for treatment. Plant 8 West Pad consists of a single process area. Anticipated contaminants for the pad include uranium; 1,1,1-trichloroethane; and copper.

Plant 8 West Pad has one inactive HWMU located at the outside northwest corner of the Plant 8 Maintenance Building. This unit is considered a HWMU because it is reported to have handled ignitable liquids, lead, and methyl ethyl ketone. Closure of this HWMU is to be attained through CERCLA response. For more information on HWMUs, see Appendix K, Table K-1.

One concrete chip samples, one loose media sample, and one unknown liquid sample were collected from this component. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For nine of the detected radioactive constituents (lead-210, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234,

uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 210, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and strontium-90) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, lead-210, neptunium-237, plutonium-241, radium-226, radium-228, and strontium-90) were detected.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, mercury, potassium, selenium, silver and thallium) were detected. For ten of the detected inorganics (arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, nickel and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, copper was the most significant, exceeding the concrete baseline by a factor of 24. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, beryllium, silver and thallium) were detected in the loose media and all except 13 (antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, nickel, selenium, silver, thallium, vanadium and zinc) in the liquid. None of the detected results in the loose media exceeded 20 times the TCLP limit and none of the detected results in the liquid exceeded the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 65 semivolatile constituents for which analyses were performed, only nine (anthracene, benzo(a)anthracene, butyl benzyl phthalate, carbazole, chrysene,

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fluoranthene, phenanthrene, phenol and pyrene) were detected in the loose media and none were detected in the liquid. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected in either sample.

Summary of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.8 Plant 4 Pad (74E)

Plant 4 Pad (74E) is an irregularly shaped pad located due east of the Green Salt Plant (4A) and extending south toward the Plant 4 Warehouse (4B) and the location of the former Plant 4 Maintenance Building (4C). It is constructed of asphalt in the northern portion and concrete in the southern portion.

The Pad was historically used as a temporary storage area for mobile T-hoppers and J-hoppers of UO_3 and depleted UF_4, drummed uranium residues, and drummed scrap UF_4. Currently, the Plant 4 Pad is being used as a storage area for white metal boxes (WMBs). Mobile hoppers are being stored on a gravel area north of the Plant 4 Warehouse and east of the Plant 4 Pad. The pad consists of a single process area. Anticipated contaminants for the pad include uranium, UF_4, UO_3, UO_2, and U_3O_8.

One concrete chip sample and one asphalt chip sample were collected to characterize the contamination in this component. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-238, plutonium-239/240, and strontium-90) were detected. For six of the detected radioactive constituents (lead-210, technetium-99, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99

exceeded its baseline concentration by a factor of 14, a larger margin than any other radioactive constituent.

Asphalt

One asphalt sample taken from the top half inch of asphalt contained cesium-137 and elemental uranium at levels greater than five times the baseline levels. Uranium-234, uranium-235/236, and uranium-238 were reported to be between two and five times the baseline levels. Lead-210 and technetium-99 were detected at levels less than two times the baseline. Plutonium-239/240, polonium-210, radium-226, radium-228, thorium-228, thorium-230, and thorium-232 were present at activities at or below the baseline levels. Americium-241, neptunium-237, plutonium-238, and strontium-90 were not detected.

Summary Of Inorganic Contamination

Asphalt

Only one asphalt sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (aluminum, antimony, beryllium, cadmium, mercury, potassium, selenium, silver and thallium) were detected. For two of the detected inorganics (lead and manganese) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.3. None of the detected results exceeded 20 times the TCLP limit.

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, mercury, potassium, selenium, silver and thallium) were detected. For two of the detected inorganics (cobalt and sodium) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the concrete baseline by a factor of 1.4. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.9 Plant 7 Pad (74F)

Plant 7 Pad (74F) is a reinforced poured concrete pad located west and south of the location of the demolished Plant 7 (7A). This irregularly shaped pad is used as a staging (loading and unloading) pad for Plant 7.

Plant 7 Pad is considered one process area and is used for receiving, shipping, and storing UF_6 cylinders and T-hoppers that contain UF_4 from Paducah and UO_3 from Hanford. Before they were removed, four subgrade tanks collected condensate from steam-heated UF_6 autoclaves west of Plant 7. Currently, the pad contains empty mobile hoppers, waste, empty UF_4 cans, J-hoppers, a cylinder dolly, three storage tanks, and a scale. Anticipated contaminants for the pad include UF_4, UO_3, UF_6, and UO_2F_2.

From this component, one concrete chip sample was collected. Following is description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For seven of the detected radioactive constituents (lead-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 19, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver and thallium) were detected. For six of the detected inorganics (aluminum, arsenic, barium, chromium, lead and nickel) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.3. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.10 Plant 5 East Pad (74G)

Plant 5 East Pad (74G) is a rectangular, reinforced concrete pad, located east of the Metals Production Plant (5A) and north of the Slag Recycling Building (55A).

The Plant 5 East Pad was historically used for temporary storage of drummed residues and reduction pots from the Metals Production Plant and residues from the Slag Recycling Building. Currently, it stores uranium ingots, derbies, and other miscellaneous uranium products in drums and on steel skids. Anticipated contaminants for the pad include uranium (up to 1.25 percent E), UF_4, and magnesium.

From this component, one concrete chip, one loose media, and one unknown liquid sample were collected.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, lead-210, neptunium-237, and strontium-90) were detected. For 11 of the detected radioactive constituents (cesium-137, plutonium-239/240, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 290, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. None of these 20 constituents were detected.

Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, lead-210, plutonium-238, polonium-210, thorium-228, and thorium-230) were detected.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cobalt, mercury, nickel, selenium, silver, and thallium) were detected. For seven of the detected inorganics (aluminum, arsenic, barium, chromium, lead, sodium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 15. None of the detected results exceeded 20 times the TCLP limit.

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Supplemental Media

One loose media sample and two unknown liquid samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, chromium, potassium, selenium, thallium, and vanadium) were detected in the loose media and all except five (antimony, chromium, selenium, thallium and vanadium) in the liquids. The concentration of lead in the loose media sample exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile constituents.

Supplemental Media

One loose media sample and two unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, 15 (2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, carbazole, chrysene, di-n-octyl phthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in the loose media and none were detected in the liquids. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One loose media and two unknown liquid samples were collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only one (total xylenes) was detected in the loose media sample and none were detected in the liquids.

Summary Of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.11 Plant 5 South Pad (74H)

Plant 5 South Pad (74H) is an irregularly shaped, reinforced concrete pad located south of the Metals Production Plant (5A).

Pad 74H was used for loading, unloading, and temporary storage of feed materials entering and exiting the south end of the Metals Production Plant (i.e. UF_4 and magnesium). Currently, Plant 5

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South Pad contains dicalite, Sea/land containers, structural steel, and pipe racks. Anticipated contaminants for the pad are UF_4 and MgF_2.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and strontium-90) were detected. For six of the detected radioactive constituents (radium-228, technetium-99, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 38, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver and thallium) were detected. For five of the detected inorganics (aluminum, barium, chromium, potassium and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 1.6. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.12 Plant 6 Pads (74J)

Plant 6 Pad (74J) is an irregularly shaped concrete storage pad located north of the Metals Fabrication Plant (6A). The Plant 6 Pads were used for temporary storage of uranium tubes (up to 1.25 percent enrichment) processed by extrusion fabrication off-site and machined in the Metals Fabrication Plant. The easternmost six feet of the pad is part of the HWMU to the east of the pad, a result of lead contamination. Uranium metal (up to 1.25 percent E) is the only anticipated contaminant

The storage pad north of Plant 6 has one inactive HWMU located north of Plant 6. This unit is considered a HWMU because it handles solvents (EPA waste code F002) and lead. This unit will be

closed through CERCLA response. Risate, soil, and PPE are the only materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

From this component, two concrete chip sample was collected.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, lead-210, plutonium-238, plutonium-239/240, strontium-90, and thorium-228) were detected. For seven of the detected radioactive constituents (neptunium-237, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 34, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, cobalt, mercury, silver and thallium) were detected. For five of the detected inorganics (chromium, lead, potassium, sodium and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 23. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.13 Plant 9 Pad (74K)

Plant 9 Pad (74K) is a rectangular, reinforced concrete pad and located southeast of the Special Products Plant (9A). The pad was constructed with berms, slopes, and grated trenches to contain any spilled liquid material and collect any storm-water runoff.

Plant 9 Pad was historically used for temporary storage of process residues (i. e. CaF_2, MgF_2, thorium, uranium residues, and filter cake) and thorium and uranium chips and turnings. Metal fires were common on the pad. Currently, the Plant 9 Pad contains pallets, baskets, and overpacks. The storm-water runoff collected in the grated trench is pumped to the Refinery Sump (3H) for eventual

wastewater treatment. Anticipated contaminants include: uranium, uranium metal (up to 2.1 percent E), U_3O_8, thorium, thorium compounds, ThF_4, radium, strontium-90, MgF_2 and CaF_2.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, lead-210, neptunium-237, radium-228, strontium-90, and thorium-232) were detected. For ten of the detected radioactive constituents (americium-241, plutonium-238, plutonium-239/240, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 240, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, mercury, nickel, selenium, silver, sodium and thallium) were detected. For ten of the detected inorganics (aluminum, arsenic, barium, chromium, cobalt, copper, lead, manganese, vanadium and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 2.7. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.14 Building 65 West Pad (74L)

Building 65 West Pad (74L) is a reinforced, poured concrete pad located west of the Old Plant 5 Warehouse (65). It was constructed with berms, slopes, and grated trenches to contain any spilled liquid material and collect any storm-water runoff.

Historically, the pad stored remelt, top cores, reject cores, ingots, and some drums or residue materials awaiting analysis. Currently, the pad stores baled scrap drums, scrap metal awaiting decontamination, and uranium and thorium residues. Excess equipment also is stored on the pad.

Building 65 West Pad consists of a single process area. Anticipated contaminants are uranium and thorium metal and thorium compounds.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, lead-210, plutonium-241, and strontium-90) were detected. For 16 of the detected radioactive constituents (americium-241, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-226, radium-228, technetium-99, thorium-227, thorium-228, thorium-230, thorium-232, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 670, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, arsenic, cobalt, mercury, selenium, silver, sodium, thallium, and vanadium) were detected. For nine of the detected inorganics (barium, beryllium, calcium, chromium, copper, lead, magnesium, nickel, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 4.1. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.15 Building 64 East Pad and Railroad Dock (74M)

Building 64 East Pad and Railroad Dock (74M) is located along the eastern side of the Thorium Warehouse (64). It is a reinforced, poured concrete pad that wraps around the north end of the Thorium Warehouse and the Old Plant 5 Warehouse (65).

Pad 74M stored the Special Products Plant (9A) materials before the Plant 9 Warehouse (81) was built. The stored material included up to 2.1 percent enriched uranium in the form of ingots, billets,

and Zirnlo scrap from Hanford. More recently, after the Plant 9 Warehouse was built, the pad has supported the Thorium Warehouse and Decontamination Building (69) operations by storing drummed uranium and thorium residues awaiting repackaging and equipment awaiting decontamination. The railroad loading dock was intended to receive material from Hanford by rail although it was not used often. Most uranium was shipped to and from the site in trucks. The Building 64 East Pad and Railroad Dock consists of a single process area. Anticipated contaminants are uranium and thorium compounds and magnesium.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, and strontium-90) were detected. For ten of the detected radioactive constituents (americium-241, cesium-137, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 28, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, cadmium, cobalt, mercury, nickel, silver, and thallium) were detected. For two of the detected inorganics (copper and lead) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.3. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.16 Building 12 North Pad (74N)

Building 12 North Pad (74N) is a rectangular, concrete pad located north of the Main Maintenance Building (12A). Areas of the pad have been patched with asphalt, and sections of the pad contain minor cracks. The western edge of the pad is only partially curbed because the concrete curb and pad

near the historical location of the removed Underground Storage Tank (UST), Tank 6, is missing although sandbags have been stacked in this area as a temporary curb. The northern edge of the pad is not curbed, and the southern edge of the pad borders the Main Maintenance Building.

The pad is used by plant stores, which is based in the Main Maintenance Building, to store pipe (situated on pipe racks), drummed oils, returnable drums, and other nonradioactive materials for use on-site. Pad 74N consists of a single process area. Anticipated contaminants for the pad include: diesel fuel, ethylene glycol, solvents (1,1,1-trichloroethane and trichloroethylene), and lubricating and hydraulic oils.

From this component, one concrete chip sample and one loose media sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, lead-210, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and strontium-90) were detected.

Summary of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, cobalt, mercury, silver, and zinc) were detected. For three of the detected inorganics (chromium, lead, and thallium) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 4. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One loose media sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, mercury, potassium, silver, sodium, and thallium) were detected. The concentration of chromium exceeded 20 times the TCLP limit.

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Summary of Semivolatile Organic Contamination

No major media was analyzed for semivolatile organic constituents.

Supplemental Media

One loose media sample was collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, only seven (benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, di-n-octyl phthalate, fluoranthene, phenanthrene, and pyrene) were detected. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One loose media sample was collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected.

Summary of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.17 Decontamination Pad (74P)

The Decontamination Pad (74P) is an irregularly shaped, curbed pad located north and west of the Decontamination Building (69). The pad is used to decontaminate pieces of equipment and metal that are too large for the Decontamination Building. It also stores decontaminated scrap metal.

The Decontamination Pad contains two process areas, Decontamination and Storage.

Decontamination

The decontamination area is located just north of the Decontamination Building. This pad is used to decontaminate and decommission radiologically contaminated ferrous and nonferrous scrap metals going to the scrap piles and miscellaneous equipment that will go to maintenance for repair. These pieces of equipment and metal are cleaned with a steam cleaner/spray washer. If needed, caustic detergent or weak acid is added to the spray washer to augment cleaning. After being washed, the equipment is checked by a radiation safety technician to make sure it was correctly decontaminated before it is permitted to leave the pad. Wash waters and sludges are drained to the outside sump and mixed with the effluents from the Decontamination Building. The outside sump receives wastewater from the indoor sump, drainage from the outside pad, and runoff from the adjacent scrap metals pile

and surrounding yard area. Outdoor sump effluents flow by gravity to the General Sump (18B) located near the Recovery Plant (8A).

Scrap Storage Pile

After ferrous and nonferrous scrap metals are decontaminated and/or decommissioned, they are stored on the Decontamination Pad. Also, equipment that is old or no longer needed is taken apart, decontaminated, and stored on the pad. This storage area makes up approximately 90 percent of the pad. Storm-water runoff from the scrap piles is collected in the outdoor sump, which is piped to the General Sump.

The anticipated contaminants are oil, uranium, and thorium.

From this component, one asphalt sample and one concrete core sample were collected. Follows is a description of contamination.

Summary Of Radiological Contamination

Asphalt

Only one asphalt sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, neptunium-237, plutonium-239/240, strontium-90, uranium-234, uranium-235/236, and uranium-238) were detected. For ten of the detected radioactive constituents (lead-210, plutonium-238, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, thorium-232, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 19, a larger margin than any other radioactive constituent.

Concrete Cores

A total of two concrete core samples from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, plutonium-239/240, plutonium-241, and strontium-90) were detected. For ten of the detected radioactive constituents (cesium-137, lead-210, plutonium-238, polonium-210, radium-226, radium-228, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 27, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, thorium-230, thorium-232, and uranium-235/236) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99

exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, thorium-232, uranium-234, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary Of Inorganic Contamination

Asphalt

Only one asphalt sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, and thallium) were detected. For four of the detected inorganics (arsenic, lead, magnesium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.2.
None of the detected results exceeded 20 times the TCLP limit.

Concrete Cores

Two concrete core samples from the top ½-inch depth were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For ten of the detected inorganics (aluminum, arsenic, barium, calcium, copper, lead, manganese, nickel, sodium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, nickel was the most significant, exceeding the concrete baseline by a factor of 2.6. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from the second ½-inch depth interval was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For five of the detected inorganics (aluminum, barium, magnesium, potassium and sodium) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, sodium was the most significant, exceeding the concrete baseline by a factor of 1.3. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from a depth interval of 1-4 inches was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For four of the detected inorganics (aluminum,

barium, potassium, and sodium) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, potassium was the most significant, exceeding the concrete baseline by a factor of 1.3. None of the detected results exceeded 20 times the TCLP limit.

Summary Of Organic Contamination

Major media was not analyzed for organic contamination.

A.IV.8.18 Plant 8 Old Metal Dissolver Pad (74Q)

Pad 74Q (Plant 8 Old Metal Dissolver Pad) is a rectangular, reinforced concrete pad overlain by acid brick located west of the Recovery Plant (8A) and between the Plant 8 Maintenance Building (8B) and the Biodenitrification (BDN) Effluent Treatment Facility (18H). The Plant 8 Old Metal Dissolver Pad was used from 1955 to 1959 for the dissolution of scrap uranium metal. Two wooden vessels on brick-faced concrete support pedestals received metal baskets containing the scrap uranium metal. Concentrated hydrochloric acid in the wooden vessels accomplished the dissolution; the heat of the exothermic dissolution reaction was controlled by cooling coils mounted in the dissolver vessels. An overhead hoist system was employed for handling materials. Following dissolution, the hydrochloric acid that contained uranium was transferred to the Recovery Plant. A brick-lined concrete tank on the east part of the pad was filled with water and used as a quench tank in the event of a fire in the materials. The wooden vessels and hoist system have been removed, but the quench tank and support ribs remain. Anticipated contaminants include hydrochloric acid, magnesium, and prill.

From this component, one acid brick sample, two concrete chip samples, one loose media sample, and one unknown liquid sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and strontium-90) were detected. For five of the detected radioactive constituents (lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 72, a larger margin than any other radioactive constituent.

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, strontium-90, thorium-228,

thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For four of the detected radioactive constituents (lead-210, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 83, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, plutonium-238, and strontium-90) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, lead-210, radium-226, radium-228, and strontium-90) were detected.

Summary of Inorganic Contamination

Acid Brick

Only one acid brick sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, cobalt, mercury, nickel, potassium, selenium, thallium, vanadium, and zinc) were detected. For one of the detected inorganics (lead) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2. None of the detected results exceeded 20 times the TCLP limit.

Concrete Chips

Two concrete chip samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 14 (antimony, beryllium, cadmium, cobalt, copper, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc) were detected. For four of the detected inorganics (arsenic, chromium, lead, and manganese) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.8. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, beryllium, mercury, selenium, silver, and thallium) were detected in the loose media and all except four (antimony, mercury, silver and thallium) in the liquid. None of the detected results for the loose media exceeded 20 times the TCLP limit and none of the detected results in the liquid exceeded the TCLP limit.

Summary of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic contamination.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, 16 (2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in the loose media and none were detected in the liquid. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

No major media were analyzed for volatile organic constituents.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected in either sample.

Summary of Pesticide/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.19 Plant 8 North Pad (74R)

Plant 8 North Pad (74R) is a rectangular, reinforced concrete pad located north of the Recovery Plant (8A). The pad stored Recovery Plant feed materials and product. Located on the pad are tank and pumping units that are part of the Recovery Plant water treatment/filtration process area: three vertical, cylindrical steel filtrate storage tanks and the filtrate pumps and pump house. The box furnace, a process area for the Recovery Plant, and fan and vent stack for one of the other processes inside the Recovery Plant are located next to the wall of the building on the pad. The pad has a grated trench and sump/pump system along its northern perimeter but no containment curb or berm at the pad edge. On the east edge, the pad is contained by the wall for the bulk chemicals area.

The Plant 8 North Pad historically stored Recovery Plant feed materials (drummed residues and scrap metal) and black oxide (U_3O_8) furnace products before transfer to the Ore Refinery Plant (Building 2A). Both enriched (U-235 enrichment levels up to 1.25 percent) and depleted uranium materials were stored there. The filtrate storage tanks are tanks 21A, 22A, and 28A, which receive filtrate

from the Oliver filters inside the Recovery Plant. They are vertical, cylindrical steel tanks on grade and located just north of the filtrate pump house. The trench and sump/pump system on the pad contains potential spills or leakage of the filtrate and collects storm-water runoff from the pad for treatment in the Recovery Plant water treatment/filtration system. The Plant 8 North Pad consists of a single process area.

Plant 8 North Pad has one inactive HWMU located at the southeast side of the pad adjacent to Plant 8. It is considered a HWMU because it is reported to have handled solvents (EPA waste codes F001 and F002), barium, chromium, lead, and silver. The plan of closure for this HWMU is to be attained through CERCLA response. Firebrick, metal, hold-up material and PPE are the materials expected to be generated by its closure. For more information on HWMUs, see Appendix K, Table K-1.

Anticipated contaminants for pad 74R include: uranium, U_3O_8, uranium metal (up to 1.25 percent E), thorium metal, magnesium, SO_2, and ammonium hydroxide.

From this component, two concrete cores, two unknown liquid samples and two loose media samples were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, strontium-90, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For six of the detected radioactive constituents (cesium-137, lead-210, radium-226, radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 180, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, neptunium-237, plutonium-238, strontium-90, thorium-228, and thorium-232) were detected. For three of the detected radioactive constituents (radium-228, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 32, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241,

cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and thorium-232) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 7, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (plutonium-241 and polonium-210) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, and strontium-90) were detected.

Summary Of Inorganic Contamination

Concrete Core

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, mercury, selenium, and thallium) were detected. For 11 of the detected inorganics (aluminum, arsenic, barium, chromium, copper, lead, manganese, nickel, potassium, sodium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 5.8. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from the second ½-inch depth interval was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, arsenic, beryllium, mercury, selenium, and thallium) were detected. For ten of the detected inorganics (aluminum, barium, chromium, copper, lead, manganese, potassium, sodium, vanadium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 1.7. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from the 1-4 inch depth interval was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, arsenic, beryllium, cadmium, mercury, selenium, and thallium) were detected. For eight of the detected inorganics (aluminum, barium, chromium, lead, nickel, potassium, sodium, and vanadium) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 5.1. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (antimony, selenium, silver, and thallium) were detected. None of the detected results for the loose media exceeded 20 times the TCLP limit and none of the detected results in the liquid exceeded the TCLP limit.

Summary Of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, only 13 (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, di-n-butyl phthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in the loose media and none were detected in the liquid. There are no TCLP limits for any of the detected Semivolatiles.

Summary Of Volatile Organic Contamination

No major media were analyzed for volatile organic contamination.

Supplemental Media

One loose media and one unknown liquid sample were collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only four (2-butanone, ethylbenzene, toluene, and total xylenes) were detected in the loose media and only two (2-butanone, and toluene) in the liquid. Of these, only 2-butanone has a TCLP limit. It was detected in the loose media sample at a concentration of 14 mg/kg, well below 20 times the TCLP limit of 4,000,000 mg/kg; and in the liquid at 110 mg/L, well below the TCLP limit of 200,000 mg/L.

Summary Of Pesticide/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.20 Building 63 West Pad (74S)

The KC-2 Warehouse Pad (74S) is an irregularly shaped concrete located at the west end of the KC-2 Warehouse (63). The pad historically stored operations associated with the KC-2 Warehouse and has been identified as a single process area. The KC-2 Warehouse stored work order request materials, bulk items, drummed RCRA waste, PCB-contaminated equipment, drummed PCB-contaminated waste

oils, and landscaping and snow removal equipment. The KC-2 Warehouse is currently undergoing renovation for use as a RCRA warehouse. Currently, the Building 63 West Pad contains a pipe rack, excess equipment, and refractory brick. There are no anticipated contaminants.

One concrete chip sample was collected to characterize the contamination in this component. The following represents the results of the analyses of this sample.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, plutonium-238, plutonium-239/240, radium-228, technetium-99, and uranium-235/236) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, mercury, potassium, selenium, silver, and thallium) were detected. For nine of the detected inorganics (arsenic, chromium, cobalt, copper, lead, nickel, sodium, vanadium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 6.1. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

Concrete Chips

One concrete chip sample was collected from this component for analysis of pesticide/PCB contaminants. None of the 28 pesticides/PCBs for which analyses were performed were detected.

A.IV.8.21 Plant 1 Storage Pad (74T)

Plant 1 Storage Pad (74T) is an irregularly shaped, reinforced concrete pad located north, east, and west of the Preparation Plant (1A). The pad has been divided into four process areas: the new drum storage area, copper shredder/drum straightener, copper pile storage, and old drum storage area. The old drum storage area takes up most of the Plant 1 Storage Pad. This process area has been divided into four geographic quadrants.

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The pad originally was the drum storage location for low-level wastes and recoverable uranium residues used to support the Preparation Plant operations. Over time these drums deteriorated as a result of extended exposure to the elements, increasing the risk of release of hazardous material to the environment. Additionally, sections of the pad were cracked and broken. In 1991, Removal Action 7, which called for extensive repair of the Plant 1 Storage Pad, was approved by USEPA. (For a complete list and description of Removal Actions, see Section 1.2.2.1 and Table 1-2.) From 1991 to 1994, several portions of the pad were repaired and a partial perimeter curb was installed to channel stormwater runoff. Contaminated soil was removed from some areas adjacent to the pad, and then new concrete sections were placed over the excavated areas. The concrete removed as part of this Removal Action was drummed for disposal. Currently, the pad receives drums from property-wide processes.

Plant 1 Storage Pad has one HWMU located near the northwest corner of Plant 1, and this HWMU is active. This unit is considered a HWMU because it is handles solvents (EPA waste codes F002 and F003), barium, and lead. Closure of this HWMU is to be attained through CERCLA response. The waste materials generated by the closure of this unit are yet to be determined. For more information on HWMUs, see Appendix K, Table K-1.

New Drum Storage Area

Two tension support structures have been constructed as additions to Pad 74T. The tension support or sprung structures are built from a metal rod frame supporting an impermeable vinyl roof and sides. New concrete was poured northeast of the existing pad to support these structures. Concrete blocks were placed at every corner to provide tension support. Each structure is also surrounded by a concrete dike. The two rectangular sprung structures are designed to store a minimum of 2,500 drums. The drum contents include primarily uranium residues, not RCRA process waste, waste oils, barium salts, and solid residues containing solvents. Hercilite dikes surround the drummed liquid wastes in the new drum storage area.

Copper Shredder/Drum Straightener

The copper shredder/drum straightener area currently exists under the Plant 1 Storage Shelter (1B). The copper shredder removed the insulation around the scrap copper wire. The copper would then be shredded for reclamation. A Panghorn Dust Collector unit, located just west of the Drum Reconditioning Building (66), was used to contain the copper dust generated from the shredding process. Drum straightening equipment, associated with the Drum Reconditioning Building, was operated on the Plant 1 Storage Pad. The equipment currently remains on the pad but is no longer used.

Copper Pile Storage

Two scrap piles of insulated copper metal wire exist on the pad. These piles stored scrap copper metal that was to be processed through the copper shredder. The copper mainly was obtained from

transformer windings and discarded wire and cable products. The copper piles themselves are Component P-004, but the concrete pad beneath the piles is part of the pad.

Old Drum Storage Area

This area includes a vast storage area that holds all the drums on the Plant 1 Storage Pad except those stored in the new drum storage area. The old drum storage area covers such an extensive area that to evaluate the pad effectively, the area was divided into geographic quadrants. The quadrants store similar items. The drums contain an assortment of solid and liquid wastes, similar to those stored in the new drum storage area. Most of these drums are to be shipped or are awaiting evaluation. Many of the drums contain uranium residues from plant operations. Metal boxes primarily are stored in the southeastern quadrant area of the pad.

Northeast Quadrant

One concrete chip sample was taken from the top half inch of concrete. Elemental uranium was reported to have a concentration greater than 1000 mg/g, the OU5 WAC for soil. No activities of isotopic uranium are available for comparison of enrichment status or for verification of the measurement of elemental uranium. Technetium-99 was detected at an activity between two and five times the baseline level. Cesium-137 and strontium-90 were not detected.

Southeast Quadrant

One concrete chip sample was collected from the top half inch of concrete. In the original sample, technetium-99 was detected at an activity greater than 30 pCi/g. Cesium-137 and elemental uranium were present at levels greater than five times baseline levels. No activities of isotopic uranium are available for comparison of enrichment status or for verification of the measurement of elemental uranium. Strontium-90 was not detected. Duplicate precision was good for all analytes.

The anticipated contaminants are: uranium (up to 1.25 percent E); UO_3; U_3O_8; thorium compounds; ore concentrates; radium; technetium-99 residues; magnesium fluoride; methylene chloride; acetone; lead; barium; 1,1,1-trichloroethane; perchloroethylene; lithium carbonate; arsenic; silver; cadmium; other drummed RCRA wastes; and hazardous waste.

From this component a total of 11 samples were collected. This includes: six concrete chips, two loose media, one sediment, and two unknown liquids. The following presents a summary of the results of these samples.

Summary of Radiological Contamination

Concrete Chips

A total of four concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, neptunium-237, plutonium-238,

plutonium-239/240, plutonium-241, strontium-90, thorium-228, thorium-230, and thorium-232) were detected. For nine of the detected radioactive constituents (cesium-137, lead-210, radium-226, radium-228, technetium-99, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 300, a larger margin than any other radioactive constituent.

Supplemental Media

Two loose media samples and one sediment sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (neptunium-237 and plutonium-238) were detected in the loose media and all except three (neptunium-237, plutonium-238, and strontium-90) in the sediment.

Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, strontium-90, thorium-228, and thorium-232) were detected.

Summary Of Inorganic Contamination

Concrete Chips

A total of three concrete chip samples was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (antimony, beryllium, cadmium, silver, and thallium) were detected. For eight of the detected inorganics (aluminum, chromium, cobalt, copper, lead, manganese, potassium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 17.

Supplemental Media

Two loose media samples, one sediment sample, and two unknown liquid samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (beryllium, mercury, selenium, silver, sodium, thallium, and vanadium) were detected in the loose media, all except six (arsenic, beryllium, mercury, silver, thallium, and vanadium) in the sediment, and 11 (antimony, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, thallium, and vanadium) in the liquids. The concentrations of cadmium and lead in one of the loose media samples, and the concentration of lead in the sediment sample, exceeded 20 times the TCLP limit.

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Summary Of Semivolatile Organic Contamination

Concrete Chips

One concrete chips sample was collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, only six (benzo(a)anthracene, chrysene, di-n-butyl phthalate, fluoranthene, phenanthrene, and pyrene) were detected. There are no TCLP limits for any of the detected Semivolatiles.

Supplemental Media

A total of two loose media samples, one sediment sample and two unknown liquid samples were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, 20 (2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene) were detected in the loose media, 11 (anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, di-n-butyl phthalate, dibenzofuran, fluoranthene, phenanthrene, and pyrene) were detected in the sediment, and none were detected in the liquids. There are no TCLP limits for any of the detected Semivolatiles.

Summary Of Volatile Organic Contamination

Concrete Chips

One concrete chip sample was collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only one (toluene) was detected. There is no TCLP limit for toluene.

Supplemental Media

Two loose media samples, one sediment sample, and two unknown liquid samples were collected from this component for analysis of volatile organic contaminants. None of the 33 volatile constituents for which analyses were performed were detected in the loose media, only five (1,1,1-trichloroethane, 4-methyl-2-pentanone, ethylbenzene, toluene, and total xylenes) were detected in the liquids, and only two (2-butanone and toluene) were detected in the liquids. Of these, only 2-butanone has a TCLP limit. It was detected in one of the liquid samples at a concentration of 71 mg/L, well below the TCLP limit of 200,000 mg/L.

Summary Of Pesticide/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

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A.IV.8.22 Pilot Plant Pad (74U)

The Pilot Plant Pad (74U) is a rectangular, reinforced concrete pad located immediately south of the Pilot Plant Six to Four Reduction Facility 1 (54A). The pad is accessed by concrete driveways from the east and west, and a railroad track crosses the south end of the pad. On the east and west edges of the pad are steel columns and continuous rail beams that supported a track hoist system. The hoist system moved equipment and containers (i.e. cylinders of UF_6) between the autoclave room of the Six to Four Reduction Facility 1 and the pad. The concrete apron of the Pilot Plant Warehouse (68) borders the Pilot Plant Pad on the south.

Historically, the Pilot Plant Pad provided temporary storage of drummed uranium and thorium compounds, equipment, and operating supplies. Also, with the track hoist system and fork lifts, materials to be used in the Six to Four Reduction Facility operation were unloaded and staged on the pad. One such process operational use of the pad was for unloading cylinders of UF_6 from rail cars with the hoist system. In the original configuration of the UF_6 to UF_4 reduction process in the Six to Four Reduction Facility 1 before installation of the autoclaves in the southern part of the building, the cylinders were placed in a cubicle in the northwestern corner of the pad where they were heated to vaporize the UF_6, which was then piped inside the building for processing. The cubicle and the bridge hoist equipment have been removed.

The Pilot Plant Pad currently stores drums and white metal boxes that contain radiologically contaminated wastes. The storage area encompasses the main pad between the steel hoist support structures as well as concrete apron areas on the east and west sides of the southern half of the main pad. Drum storage areas contiguous with the pad extend westward to the concrete apron area south of the Pilot Plant Wet Side (13A). The Pilot Plant Pad has no berm, curb, trench, or sump for containment of runoff or spills.

The anticipated contaminants for this component include uranium and thorium compounds, uranium hexafluoride, aqueous hydrofluoric acid, ammonia, oil, and UF_6.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 14 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each

exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except four (beryllium, cadmium, selenium, and thallium) were detected. For two of the detected inorganics (arsenic and lead) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 1.3. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.23 Laboratory Pad (74V)

The Laboratory Pad (74V) is an irregularly shaped, reinforced concrete storage and loading located on the west side of the Laboratory (15A). The Laboratory Pad forms a low area next to the Laboratory loading docks, which are at first floor level; the pad is not curbed or bermed and receives runoff from paved and unpaved areas, including the paved north-south access road that runs between the Laboratory and the Pilot Plant complex.

The Laboratory Pad has typically been used for storage and loading of drummed laboratory wastes and storage, loading, and unloading of laboratory materials. In the past several years, this area has served as a storage and staging area for a waste/contaminant removal action for the former basement waste storage area in the Laboratory and as a storage and staging area during construction/renovation activities in the laboratory basement and north/west corridor. The latter activity is ongoing. The contractor has lined much of the pad and dock area with heavy plastic sheeting and stone or ceramic tiles and has positioned a 20-yd three dumpster on the pad.

Except for the raised dock areas, the storage capacity of the Laboratory Pad for drummed wastes is quite limited. The current processes used and the scale of hazardous substance handling in the Laboratory do not generate large enough quantities of hazardous and radioactive wastes to require large staging areas for drums before shipment. The anticipated contaminants include: uranium and thorium compounds, ammonia, hydrofluoric acid, tributyl phosphate, kerosene, and diamyl amyl phosphate.

From this component, one concrete chip sample was collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 15 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chip sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, mercury, selenium, silver, and thallium) were detected. For four of the detected inorganics (aluminum, chromium, lead, and nickel) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.2. None of the detected results exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.8.24 Building 39A Pad (74W)

Building 39A Pad (74W) is a rectangular, reinforced concrete pad located directly east of the Incinerator Building (39A) and north of the Hot Raffinate Building (3E). Pad 74W stored drums of waste oil waiting to be incinerated in Building 39A. A spray calciner was also situated on the pad for processing raffinate slurry from the Hot Raffinate Building.

The Building 39A Pad shares an inactive HWMU with the Incinerator Building (39A) and with the Waste Oil Decant Shelter (74W). For details see Section A.IV.3.25.

Building 39A Pad was historically used for one purposes. First, the pad contained a spray calciner in support of operations in the Hot Raffinate Building. Following the shutdown and removal of the calciner, the pad was primarily used for drum storage in support of Incinerator Building processes.

Because these two processes successively occupied the same pad, the entire pad is treated as one process area.

Spray Calciner

A spray calciner located on Building 39A Pad dehydrated raffinate slurry with a very low radium content that was pumped from the Hot Raffinate Building. Lime was added to adjust the pH and to aid in drying out the raffinate slurry. The solids were then pneumatically conveyed to the Metal Oxide Storage Tank (Silo 3) in the FEMP waste pit area.

Contaminated Oil Storage

Drums of waste oils, known to be contaminated with 1,1,1-trichloroethane and lead, were stored intermittently on the pad before being incinerated in the Liquid Waste Incinerator in the Incinerator Building. In 1986, on-property incineration ceased. Currently, the pad is so badly deteriorated with large cracks and vegetation that the pad is deemed unusable for storage at the facility.

Anticipated contaminants include 1,1,1-trichloroethane; lead; and PCB oils.

From this component, two concrete core samples and one unknown liquid sample were collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 15 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For one of the detected radioactive constituents (radium-228), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 4.7, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228, thorium-228, and uranium-235/236) were detected. For nine of the detected radioactive constituents (lead-210, polonium-210, radium-226, technetium-99, thorium-230, thorium-232, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 90, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, neptunium-237, plutonium-241, technetium-99, and uranium-235/236) were detected. For three of the detected radioactive constituents (lead-210, plutonium-238, and thorium-230), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.5, a larger margin than any other radioactive constituent.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, radium-228, strontium-90, and thorium-228) were detected.

Summary Of Inorganic Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except six (antimony, cadmium, potassium, selenium, silver, and thallium) were detected. For nine of the detected inorganics (barium, chromium, cobalt, copper, lead, manganese, mercury, nickel, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, nickel was the most significant, exceeding the concrete baseline by a factor of 10.7. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from the second ½-inch depth interval was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except seven (antimony, beryllium, cadmium, potassium, selenium, silver, and thallium) were detected. For nine of the detected inorganics (barium, chromium, cobalt, copper, lead, magnesium, mercury, nickel, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, nickel was the most significant, exceeding the concrete baseline by a factor of 10.7. None of the detected results exceeded 20 times the TCLP limit.

Only one concrete core sample from a depth interval of 1-4 inches was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, beryllium, cadmium, mercury, potassium, selenium, silver, and thallium) were detected. For three of the detected inorganics (cobalt, iron, and manganese) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, cobalt was the most significant, exceeding the concrete baseline by a factor of 8.1. None of the detected results exceeded 20 times the TCLP limit.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (antimony, beryllium, cadmium, cobalt, lead, potassium, selenium, silver, and thallium) were detected. None of the detected results exceeded the TCLP limit.

Summary Of Semivolatile Organic Contamination

No major media were analyzed for semivolatile organic constituents.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, only one (phenol) was detected. There is no TCLP limit for phenol.

Summary Of Volatile Organic Contamination

No major media were analyzed for volatile organic contamination.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only one (1,1,1-trichloroethane) was detected.

Summary Of Pesticides/PCB Contamination

No major or supplemental media were analyzed for pesticides/PCBs.

A.IV.8.25 Parking Lot (89)

The FEMP Parking Lots (89) consist of two asphalt lots, located on the south and southeast side, respectively, of the site process area. The Parking Lots provide parking for FEMP employees and visitor vehicles. This component is resurfaced as a general maintenance practice on a routine basis. The anticipated contaminants are motor oils, ethylene glycol, and gasoline.

This component is located outside of radiologically controlled areas and is anticipated to contain contamination levels below sampling criteria contained in the WPA. Furthermore, little or no evidence of contamination exists. Therefore, no intrusive samples were planned for the component. A survey was planned to confirm the absence of significant radiological surface contamination. However, the parking lots had been recently resurfaced, so the survey was not performed. Baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.8.26 Railroad Tracks (G-001)

The approximately 3 miles of FEMP Railroad Tracks (G-001) are located throughout the process area. The specific components of the tracks include the steel rails, wood ties, mechanical rail switches, crossings, and associated electrical equipment. The FEMP Railroad Tracks provided routes of transportation for incoming and outbound rail service from the CSX Line located northwest of the site. The tracks enable railcars access to most of the major process buildings. Anticipated contaminants for this component are uranium ore, creosote, magnesium fluoride (MgF_2), and uranium compounds.

Because contamination levels are expected to be below sampling criteria contained in the WPA, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination more than 74 samples of 4578 dpm/100 cm^2 (beta-gamma), below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination over 202 samples of 110 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.8.27 Roads (G-002)

Site Roads (G-002) includes the more than 5½ miles of paved roadway which outline the facility and those roadways that are between process plants within the facility. The original roads at the facility were constructed primarily of concrete. Site-wide road repairs at the facility led to the covering of the concrete roads with asphalt. A survey was performed to confirm the absence of significant radiological surface contamination (see Table A.XX). The results indicate an average total surface contamination of 2989 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 300 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Although the mean values for both total and removable surface contamination were below the respective sampling criteria, samples were taken to gather additional analytical information to confirm the immediate presence or absence of contaminants. Anticipated contaminants for the Site Roads include: motor oils, hydraulic fluids, ethylene glycol, gasoline, and uranium compounds.

The Roads contains two Process Areas, Process Area Roads and Site Access Roads.

From this component, two asphalt samples were collected.

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Summary of Radiological Contamination

Asphalt

Two asphalt samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, neptunium-237, plutonium-238, plutonium-239/240, and technetium-99) were detected. For three of the detected radioactive constituents (polonium-210, radium-228, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 14, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Asphalt

Two asphalt samples were collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 11 (antimony, beryllium, cadmium, chromium, cobalt, mercury, nickel, potassium, selenium, silver, and thallium) were detected. For four of the detected inorganics (calcium, manganese, vanadium, and zinc) the maximum concentration of each was greater than the respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 7.8. None of the detected results exceeded 20 times the TCLP limit.

Summary of Semivolatile Organic Contamination

Asphalt

Two asphalt samples were collected from this component for analysis of semivolatile organic contaminants. Of 65 Semivolatile constituents for which analyses were performed, only six (2-methylnaphthalene, benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene) were detected. There are no TCLP limits for any of the detected Semivolatiles.

Summary of Volatile Organic Contamination

Asphalt

Two asphalt samples were collected from this component for analysis of volatile organic contaminants. Of 33 volatile constituents for which analyses were performed, only one (2-butanone) was detected. It was detected in one sample at a concentration of 4 mg/kg, well below 20 times the TCLP limit of 4,000,000 mg/kg.

Summary of Pesticides/PCB Contamination

Asphalt

Two asphalt samples were collected from this component for analysis of pesticide/PCB contaminants. None of the 28 pesticides/PCBs for which analyses were performed were detected.

A.IV.9 Piping, Utilities, and Equipment - Aboveground

The above ground component category includes 18 structures, some of which contained or transported potentially hazardous substances. The interiors of such structures are contaminated. Exterior surfaces may have been contaminated by leakage or deposition during production activities. These components are also exposed to natural forces.

A.IV.9.1 Cold Side Ore Conveyor (2F)

The Cold Side Ore Conveyor (2F) provided a means for uranium ores and residues to reach the digestion process in the Ore Refinery Plant (2A). Though no longer functional, the following equipment remains on the Plant 2 West Pad (74B): a drum conveyor, a bucket elevator, a drum dumper, a screw conveyor, a conveyor shed, the Drum Dumper Building, and a 20 feet deep elevator pit.

The system was initially designed to handle drummed ores that contained very low levels of radium (referred to as "cold"). The drummed ores or residues were loaded onto the conveyor to be dumped into the bucket elevator system, which carried the material to the top floor of the Ore Refinery Plant for digestion in nitric acid. Anticipated contaminants include ore concentrates and high and low grade residues.

One concrete chip and one steel coating sample were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) were detected. For nine of the detected radioactive constituents (lead-210, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 110, a larger margin than any other radioactive constituent.

Summary of Inorganic Contamination

Concrete Chips

In concrete, 12 of the 23 inorganics for which analyses were performed were detected. The concentration of seven detected inorganics (arsenic, barium, lead, manganese, sodium, vanadium, and zinc) exceed the OU3 concrete baseline values. The most significant of these is lead, which exceeds the concrete baseline value by a factor of 27. The concentration of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 19 of the 23 inorganics for which analyses were performed were detected. The concentration of only three detected inorganics (arsenic, chromium, and iron) exceed the OU3 paint baseline values. The most significant of these is arsenic, whose concentration exceeds the paint baseline by a factor of 2.2. The concentration of three detected inorganics (chromium, lead, and mercury) exceed 20 times TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.9.2 Hot Side Ore Conveyor (2G)

The Hot Side Ore Conveyor (2G) provided a means for uranium ores and residues to reach the digestion process in the Ore Refinery Plant (2A). Though no longer functional, the following equipment remains on the Plant 2 West Pad (74B): a drum conveyor, two bucket elevators, two drum dumpers, two screw conveyors, a conveyor shed, the Drum Dumper Building, and a 20-ft. deep elevator pit.

The system was initially designed to handle drummed ores that contained high levels of radium (referred to as "hot"). The drummed ores or residues were loaded onto the conveyor to be dumped into the bucket elevator system, which carried the material to the top floor of the Ore Refinery Plant for digestion in nitric acid. Anticipated contaminants include uranium (up to 1.25 percent E), ore, ore concentrate, and high and low grade residues.

One concrete chip and one steel coating sample were collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, radium-228, and strontium-90) were detected. For four of the detected radioactive constituents (lead-210, radium-226, technetium-99, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 89, a larger margin than any other radioactive constituent.

Summary Of Chemical Contamination

Concrete Chips

In concrete, 13 of the 23 inorganics for which analyses were performed were detected. The concentration of only six detected inorganics (barium, lead, mercury, sodium, vanadium, and zinc) exceed the OU3 concrete baseline values. Most significant of these is lead, whose concentration exceeds the concrete baseline value by a factor of 4.0. The concentration of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 18 of the 23 inorganics for which analyses were performed were detected. The concentration of only four detected inorganics (arsenic, barium, mercury, and vanadium) exceed the OU3 paint baseline value. Most significant of these is vanadium, whose concentration exceeds the paint baseline value by a factor of 3.3. The concentration of four detected inorganics (barium, chromium, lead, and mercury) exceeded 20 times TCLP limits. Most significant of these is lead, which exceeded the 20 times TCLP limit by a factor of 1300.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.9.3 Plant 6 Electrostatic Precipitator (central) (6D)

Plant 6 Electrostatic Precipitator Central (6D) currently, contains an electrostatic precipitator air filters, and two cyclone separators in a concrete diked area. The precipitator is adjacent to the east side of the Metals Fabrication Plant (6A).

The electrostatic precipitator (Precipitron) handled exhausts vented from the machining processes in the Metals Fabrication Plant. The electrostatic elements were typically not powered because exhausts contained moisture. Anticipated contaminants are U_3O_8 and cooling oils.

One concrete chip sample and one loose media sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, technetium-99, and thorium-228) were detected. For two of the detected radioactive constituents (radium-228 and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Radium-228 exceeded its baseline concentration by a factor of 3.7, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (cesium-137, neptunium-237, plutonium-238, plutonium-241 and strontium-90) were detected.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except eight (antimony, arsenic, beryllium, cadmium, mercury, selenium, silver, and thallium) were detected. For three (cobalt, lead, and zinc) of the detected inorganics, the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 5. The concentration of inorganics in samples from this component did not exceed 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.9.4 Plant 7 Overhead Crane (7B)

Final removal of the Plant 7 Overhead Crane (7B) occurred in June of 1994 as part of Removal Action 19. (For a complete list of removal actions, see Table 1-2.) This crane was a 20-ton, steel, overhead bridge crane structure on a concrete pad. It was used for loading and unloading uranium hexafluoride (UF_6) cylinders and depleted uranium tetrafluoride (UF_4) hoppers that were shipped and

received by truck or railroad car. Anticipated contaminants include UF_6, UF_4, uranium trioxide (UO_3), and uranyl fluoride (UO_2F_2).

Because this compound is anticipated to contain contamination levels below sampling criteria contained in the WPA, no intrusive samples were taken. Therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.5 Drum Conveyor Shelter (8E)

The Drum Conveyor Shelter (8E) is a single-level, structural steel structure with a 15-foot-high sloped metal roof that shelters a reinforced concrete pad. It is an extension of the Rotary Kiln/Drum Reconditioning Building (8C). The primary function of the shelter is to provide protection to the drum conveyor, which was installed to transport drums from the pad to the drum reconditioning equipment inside the Rotary Kiln/Drum Reconditioning Building (8C). The Drum Conveyor Shelter is a new addition to the Plant 8 complex and is currently used for the storage of miscellaneous equipment, empty drums, and wooden pallets containing 55-gallon drums.

Since an inspection indicated no visible chemical contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1644 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 53 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.6 Plant 8 Old Drum Washer (8F)

The Plant 8 Old Drum Washer (8F) is located adjacent to the west wall of the Recovery Plant (Component 8A) on the Plant 8 West Pad (74D). The Old Drum Washer was used to wash drums for reuse. This unit has been abandoned in place because a new drum reconditioning unit has been installed in the Rotary Kiln/Drum Reconditioning Building (8C) to the south. Because the unit is located on another component, the Plant 8 Old Drum Washer consists of the enclosed, steel equipment only and not the concrete beneath it.

The Plant 8 Old Drum Washer constitutes a single process area used to wash empty drums in preparation for reconditioning at the Drum Reconditioning Building (66). The drums were manually placed in the unit. Caustic (NaOH) and water were used to accomplish the washing, and the wash water was discharged to a grated concrete trench in the Plant 8 West Pad that parallels the west wall of the Recovery Plant. That trench discharged into the Recovery Plant for treatment. Anticipated contaminants are uranium metal, thorium, and NaOH.

One steel coatings sample was collected to characterize the contamination in this component. The following represents the results of the analyses of this samples.

Summary Of Radiological Contamination

No media in this component were analyzed for radiological contamination.

Summary Of Inorganic Contamination

Steel Coatings

In steel coatings, 16 of the 23 inorganics for which analyses were performed were detected. The concentrations of two detected (copper and magnesium) exceeded OU3 concrete baseline values. The most significant of these was copper which exceeded the concrete baseline by a factor of 1.06. The concentrations of two inorganics (chromium and lead) exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.9.7 Plant 9 Dust Collector (9C)

Plant 9 Dust Collector (9C) consists of a steel dust collector housing mounted on a concrete base and adjoins the west side of the Special Products Plant (9A). The dust collector contains the dust collector G42-615, a Hoffman vacuum pump, and two cyclones. The dust collector was used to filter exhausts from the Special Products Plant reduction processes. Anticipated contaminants for Component 9C include UF_4, MgF_2, and dolomite.

One concrete chip sample and one steel coating sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 13 (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238) were detected. For five of the detected radioactive constituents (cesium-137, lead-210, radium-226, radium-228, and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value.

Elemental uranium exceeded its baseline concentration by a factor of 460, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chip

In concrete, 12 of the 23 inorganics for which analyses were performed were detected. The concentrations of seven detected (barium, chromium, iron, lead, sodium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 22.5. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Steel Coatings

In steel coatings, 20 of the 23 inorganics for which analyses were performed were detected. The concentrations of chromium exceeded OU3 paint baseline value by a factor of 1.3. The concentrations of two inorganics (chromium and lead) for which there are TCLP limits exceeded 20 times the TCLP limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

A.IV.9.8 Building 14 Emergency Operations Center Generator Set (14B)

The Building 14 Emergency Operations Center Generator (14B) is a diesel-powered electrical generator located near the northwest corner of the Administration Building (14A). The component contains a diesel-powered engine, a diesel fuel tank, an electrical generator, and a cement dike built under and around the diesel fuel tank.

The Building 14 Emergency Operations Center Generator Set was installed in 1986 to provide electrical power to the site Emergency Operations Center in the event of a primary power loss. The anticipated contaminants are radiological elements and diesel fuel.

The component is located outside of radiologically controlled areas. Furthermore the size of the component is insignificant, and there is little or no evidence of contamination. Therefore, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 53 dpm/100 cm^2 (alpha), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline

concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.9 Main Electrical Station (16A)

The Main Electrical Station (16A) is a gravel-covered area with electrical equipment, transformers, and oil circuit breakers, some of which are mounted on concrete pads. The Main Electrical Station provides the main electrical feeder for the FEMP site. The station receives 132 kV feeds from off-site, transforms the electricity to 13.2 kV, and feeds the power to local substations around the facility. The Main Electrical Station consists of a single process area. PCB oils are the only anticipated contaminants.

Two concrete chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (neptunium-237, plutonium-238, plutonium-239/240, and technetium-99) were detected. For nine of the detected radioactive constituents (americium-241, cesium-137, lead-210, polonium-210, radium-228, thorium-228, elemental uranium, uranium-234, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 3.5, a larger margin than any other radioactive constituent.

Summary Of Chemical Contamination

Concrete Chips

In concrete, 19 of the 23 inorganics for which analyses were performed were detected. The concentrations of 12 detected (aluminum, arsenic, barium, calcium, chromium, copper, lead, potassium, selenium, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was zinc which exceeded the concrete baseline by a factor of 65. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit. The duplicate concrete chip sampled at the same location had similar results.

Summary Of Semivolatile Organic Contamination

No media for this component were analyzed for semivolatile organic contamination.

Summary Of Volatile Organic Contamination

No media for this component were analyzed for volatile organic contamination.

Summary Of Pesticides/PCB Contamination

Concrete Chip

In concrete, 2 of the 26 pesticides/PCB for which analyses were performed were detected. None of those detected exceeded 20 times TCLP.

A.IV.9.10 Electrical Panels and Transformer (16C)

The Electrical Panels and Transformer (16C) is a wooden, two-sided structure on a concrete that shelters a transformer and electrical meter. The component is located south of the Heavy Equipment Building (46). The Electrical Panels and Transformer was used as a secondary unit substation that received 480 V and transformed it down to 208 V to provide electrical power to the east Trailers. CB oils are the only anticipated contaminants.

One concrete chip, one loose media, and one wood sample were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, and thorium-228) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Supplemental Media

One loose media and one wood sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, and strontium-90) were detected in the loose media and all except ten (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, technetium-99, thorium-230, thorium-232, and uranium-235/236) in the wood.

Summary Of Chemical Contamination

Concrete Chips

In concrete, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of 11 detected (aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, lead, nickel, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was lead which exceeded the concrete baseline by a factor of 1.4. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Loose Media

One loose media sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except five (beryllium, mercury, selenium, silver, and thallium) were detected. The concentration of no inorganics in this sample exceeded 20 times the TCLP limit.

Wood

One wood sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except nine (beryllium, cadmium, cobalt, mercury, potassium, selenium, silver, thallium, and vanadium) were detected. The concentration of inorganics in this sample exceeded 20 times the TCLP limit for the following: arsenic and chromium.

Summary Of Semivolatile Organic Contamination

Supplemental Media

For the loose media sample, 15 out of the 65 Semivolatile organic analytes were detected. There were no detects for greater than 20 times TCLP.

Wood

For the wood sample, 10 out of 65 Semivolatile organic analytes were detected. There were no detects for greater than 20 times TCLP.

Summary Of Volatile Organic Contamination

Supplemental Media

For the loose sample, 4 out of the 33 volatile organic analytes was detected. There were no detects reported for greater than 20 times TCLP.

Wood

For the wood sample, there were no detections reported.

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Summary Of Pesticides/PCB Contamination

Supplemental Media

For the loose media sample, 1 out of the 26 pesticide/PCB analytes were detected. There were no detects for greater than 20 times TCLP.

Wood

For the wood sample, 2 out of 26 Semivolatile organic analytes were detected. There were no detects for greater than 20 times TCLP.

A.IV.9.11 Main Electrical Transformers (16E)

The Main Electrical Transformers (16E) consists of the main site electrical transformers mounted on a concrete pad. The component is located within the fence that surrounds the Main Electrical Station (16A). Component 16E receives the 132-kV main electrical feed and transforms it to 13.2-kV feeds to local substations around the facility. The only anticipated contaminants are PCBs.

Two concrete chip sample were collected to characterize the contamination in this component. The following represents the results of the analyses of this sample.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Summary Of Chemical Contamination

Concrete Chips

In concrete, 17 of the 23 inorganics for which analyses were performed were detected. The concentrations of eight detected (aluminum, antinomy, chromium, lead, nickel, potassium, sodium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was sodium which exceeded the concrete baseline by a factor of 2.0. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary Of Semivolatile Organic Contamination

No media in this component were analyzed for semivolatile organic contamination.

Summary Of Volatile Organic Contamination

No media in this component were analyzed for volatile organic contamination.

Summary Of Pesticides/PCB Contamination

Concrete Chips
None of the 26 PCB/Pesticide for which analyses were performed were detected.

A.IV.9.12 Trailer Substation 1 (16F)
Trailer Substation 1 (16F) is a concrete pad with a small fiberglass enclosure for a transformer, main circuit breaker, fuse disconnect, and electrical meters. It is located north of Trailer 11 (T-11).

Trailer Substation 1 is a power distribution point that receives 480 V from the Electrical Substation (16B) and transforms 208 V to power the local office trailers. PCB oils are the only anticipated contaminants.

One concrete chip sample was collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips
Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2.5, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips
In concrete, 18 of the 23 inorganics for which analyses were performed were detected. The concentrations of nine detected (Aluminum, arsenic, barium, cadmium, calcium, chromium, lead, mercury, and potassium) exceeded OU3 concrete baseline values. The most significant of these was potassium which exceeded the concrete baseline by a factor of 2.4. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary of Organic Contamination

No media from this component was analyzed for organic constituents.

Summary of Pesticide/PCB Contamination

Concrete Chips
None of the 26 pesticides/PCBs for which analyses were performed were detected.

A.IV.9.13 Trailer Substation 2 (16G)
Trailer Substation 2 (16G) is a concrete pad with a small fiberglass enclosure for a transformer, main circuit breaker, fuse disconnect, and electrical meters. It is located north of Trailer 14 (T-14).

Trailer Substation 2 is a power distribution point that receives 480 V from the Electrical Substation (16B) and transforms it to 208 V to power the local office trailers. PCBs are the only anticipated contaminants.

A total of two concrete chip samples were collected to characterize the contamination in this component. The following represents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips
A total of two concrete chips samples was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-239/240, plutonium-241, strontium-90, and technetium-99) were detected. For two of the detected radioactive constituents (lead-210 and elemental uranium), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 7.5, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips
In concrete, 12 of the 23 inorganics for which analyses were performed were detected. The concentrations of three detected (chromium, vanadium, and zinc) exceeded OU3 concrete baseline values. The most significant of these was vanadium which exceeded the concrete baseline by a factor of 1.9. The concentrations of all inorganics for which there are TCLP limits were below 20 times the limit.

Summary Of Semivolatile Organic Contamination

The media collected from this component were not analyzed for semivolatile organic constituents.

Summary Of Volatile Organic Contamination

The media collected from this component were not analyzed for volatile organic constituents.

Summary Of Pesticides/PCB Contamination

Concrete Chips
None of the 26 pesticides/PCBs for which analyses were performed were detected.

A.IV.9.14 10-Plex North Substation (16H)
The 10-Plex North Substation (16H) is located west of the Parking Lot (89). The 10-Plex North and South Substations (16H and 16J, respectively) were constructed in the early 1990s to support four 10-plex office trailers (T-76, T-77, T-80, and T-81) and two duplex office trailers (T-78 and T-79).

The 10-Plex North Substation was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.15 10-Plex South Substation (16J)
The 10-Plex South Substation (16J) is located west of the Parking Lot (89). The 10-Plex North and South Substations (16H and 16J, respectively) were constructed in the early 1990s to support four 10-plex office trailers (T-76, T-77, T-80, and T-81) and two duplex office trailers (T-78 and T-79).

The 10-Plex South Substation was not considered in the RI/FS WPA, since it was under construction at the time of writing. It is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.16 Cooling Towers (20C)
The Cooling Towers (20C) measures approximately high. The towers consist of a wooden structure and a poured concrete base.

The Cooling provide air cooling of site process water in mechanical draft-type towers. This component comprises four cooling towers; however, originally there were only three. The anticipated contaminants are chromium and pentachlorophenol.

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One concrete chip sample was collected to characterize the contamination in this component. The following presents the results of the analysis of this sample.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, and technetium-99) were detected. For six of the detected radioactive constituents (cesium-137, lead-210, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 4.6, a larger margin than any other radioactive constituent.

Summary Of Chemical Contamination

Concrete Chips

In concrete media, 11 of the 23 inorganics for which analyses were performed were detected. The concentrations of six detected (barium, chromium, lead, manganese, vanadium, and zinc) exceeded the OU3 concrete baseline values. The most significant of these was chromium, which exceeded the baseline value by a factor of 32. The concentration of only chromium exceeded 20 times TCLP by a factor 2.6.

Summary Of Organic Contamination

No media for this component were analyzed for organic contamination.

A.IV.9.17 Meteorological Tower (23)

The Meteorological Tower (23) is a steel structure located west of the Storm Water Retention Basin (18E). The tower is used for the placement of climate-monitoring instruments to measure the meteorological conditions of the area surrounding the site. The primary uses of the monitoring data include day-to-day weather conditions, severe weather conditions, and development of air dispersion models for the Emergency Operations Center in the event of an airborne radiological release.

There are no anticipated contaminants for this component, and it is located outside of radiologically controlled areas. Furthermore, an inspection indicated no visible chemical contamination, and the size of the component is insignificant. Therefore, no intrusive samples were planned for this component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 1000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2. Therefore, no intrusive

samples were taken, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.18 Cylinder Filling Station (38B)

The Cylinder Filling Station (38B) is a single-story building consisting of a steel frame and reinforced concrete floor located east of the Propane Storage Building (38A). Within the Cylinder Filling Station pressurized steel cylinders were filled with propane that was required throughout the site. Access to the station interior was controlled with a chain-link fence that surrounds the area. The only anticipated contaminant is propane.

Since there is little or no evidence of contamination and its size is insignificant, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 2000 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 42 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. Therefore, no intrusive samples were taken, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.9.19 Sewage Treatment Plant Incinerator (39D)

The Sewage Treatment Plant Incinerator (39D) is aboveground equipment and sitting on a concrete pad. The Sewage Treatment Plant Incinerator consists of a poured concrete base and a structural steel frame.

The Sewage Treatment Plant Incinerator was operational from 1954 through 1979. Its primary purpose was to incinerate a variety of site process wastes. Anticipated contaminants include uranium and hydraulic and lubricating oil.

One concrete chip and one steel coating sample was collected to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except eight (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, radium-228 and strontium-90) were detected. For seven of the detected radioactive constituents (lead-210, technetium-99, thorium-230, elemental uranium, uranium-234, uranium-235/236 and uranium-238), the maximum concentration of each

exceeded its respective concrete baseline value. Elemental uranium exceeded its baseline concentration by a factor of 52, a larger margin than any other radioactive constituent.

Summary Of Inorganic Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except 14 (antimony, beryllium, cadmium, chromium, cobalt, copper, mercury, nickel, selenium, silver, sodium, thallium, vanadium and zinc) were detected. For two of the detected inorganics (barium and lead), the maximum concentration of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, lead was the most significant, exceeding the concrete baseline by a factor of 2.8.

Steel Coatings

Only one steel coatings sample was collected from this component for analysis of inorganics. Of 23 inorganic constituents, all except ten (antimony, beryllium, cadmium, chromium, mercury, potassium, selenium, silver, sodium and thallium) were detected. one samples exceeded 20 times the TCLP limit. Of these, aluminum was the most significant, exceeding the paint baseline by a factor of 1.9.

Summary Of Semivolatile Organic Contamination

No media for this component were analyzed for semivolatile organic contamination.

Summary Of Volatile Organic Contamination

No media for this component were analyzed for volatile organic contamination.

Summary Of Pesticide/PCB Contamination

Concrete Chips

One concrete chip sample was collected from this component for analysis of pesticide/PCB contaminants. Of 28 pesticides/PCBs for which analyses were performed, only three (aroclor-1248, aroclor-1254, and aroclor-1260) were detected. The maximum detected result was 3200 mg/kg, well below the TSCA limit of 50 ppm (i.e. 50,000 mg/kg).

A.IV.9.20 Pipe Bridges (G-008)

The Pipe Bridges (G-008) are steel braces that support aboveground utility lines, steam lines, and process piping. These structural steel members are used to support more than one mile of utility lines and piping lines found in the process and administrative areas. The anticipated contaminants include asbestos, uranium, and lead.

Because there is little or no evidence of contamination, no intrusive samples were planned for the component. A survey was performed to confirm the absence of significant radiological surface contamination. The results indicate an average total surface contamination of 17,205 dpm/100 cm^2 (beta-gamma), significantly above the sampling criteria of 5000 dpm/100 cm^2, and an average removable surface contamination of 38 dpm/100 cm^2 (beta-gamma), well below the sampling criteria of 1000 dpm/100 cm^2. However, because the modification to the WPA eliminated sampling of steel for this component, no intrusive samples were taken, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.10 Piping, Utilities, and Equipment - Belowground

The piping, utilities, and equipment belowground group category contains six structures. Some of these components contained or transported potentially hazardous substances. The interiors of such structures are contaminated; exteriors may be contaminated be leakage of contents. The leakage is also a potential source of contamination of soil and groundwater.

A.IV.10.1 Conveyor Tunnel from Plant 1 (2H)

The Conveyor Tunnel from Plant 1 (2H) houses a conveyor in a subgrade trench. The Conveyor Tunnel extends from the Plant 1 Ore Silos (1C) to the Ore Refinery Plant (2A). The Conveyor Tunnel was intended to transport milled uranium ores to the Ore Refinery Plant. This operation was aborted in 1955. This component housed the Ore Conveyor process, which was intended to transport milled uranium ores underground from the Plant 1 Ore Silos to the Ore Refinery Plant. The conveyor system had a problem with accountability of uranium and so was aborted. Anticipated contaminants include ores.

From this component, one concrete chip sample, one loose media sample, one sediment sample, one steel coating sample, and one unknown liquid were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (plutonium-239/240) were detected. For 13 of the detected radioactive constituents (americium-241, lead-210, neptunium-237, polonium-210, radium-226, radium-228, technetium-99, thorium-228, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Uranium-238 exceeded its baseline concentration by a factor of 430, a larger margin than any other radioactive constituent.

Supplemental Media

One loose media and one sediment sample were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (cesium-137, thorium-228, and thorium-232) were detected in the loose media and all except one (plutonium-238) in the sediment.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except nine (americium-241, cesium-137, plutonium-238, plutonium-239/240, polonium-210, radium-226, thorium-232, uranium-234, and uranium-238) were detected.

Summary of Inorganic Contamination

Concrete Chips

One concrete chip sample was collected for analysis of inorganic constituents. Of the 23 inorganic analytes, 17 were detected. Those not detected were beryllium, lead, mercury, silver and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for ten of the inorganic analytes. The most significant was selenium, which exceeded the baseline by a factor of 22. There were no detections at greater than 20 times the TCLP limits.

Steel Coatings

One steel coating sample was collected for analysis of inorganic constituents. Of the 23 inorganic analytes, detections in all analytes, except one, selenium, were reported. The maximum of the validated results exceeded the OU3 paint baseline for two of the inorganic analytes, arsenic and beryllium. The most significant was beryllium, which exceeded the baseline by a factor of four. For this sample, the following analytes were detected at concentrations greater than 20 times the TCLP limit: cadmium (greater than 29 mg/kg), chromium, and lead (both greater than 100 mg/kg).

Supplemental Media

One loose media sample, one sediment sample, and one unknown liquid sample were collected from this component for analysis of inorganic constituents.

For the loose media sample, 22 of the 23 inorganic analytes were detected. Beryllium was not detected. Of those analytes detected, two were detected at concentrations greater than 20 times their respective TCLP limits, chromium and lead (both greater than 100 mg/kg).

For the sediment sample, 20 of the 23 inorganic analytes were detected. Those not detected were beryllium, mercury, and thallium. Of those analytes detected, two were detected at concentrations greater than 20 times their respective TCLP limits, chromium and lead (both greater than 100 mg/kg).

For the unknown liquid sample, seven of the 23 analytes were detected. These analytes are arsenic, calcium, lead, magnesium, nickel, potassium, and sodium. There were no detections at greater than 20 times the TCLP limits.

Summary of Semivolatile Organic Contamination

No major media samples collected from this component were analyzed for semivolatile constituents.

Supplemental Media

One loose media sample, one sediment sample, and one unknown liquid sample were collected from this component for analysis of semivolatile organic constituents.

For the loose media sample, there were 17 detections reported out of the 65 total Semivolatiles. There were no detections at greater than 20 times the TCLP limits.

For the sediment sample, there were 19 detections reported out of the 65 total Semivolatiles. There were no detections at 20 times the TCLP limits.

For the unknown liquid sample, there was one detection reported, phenol. This detection did not exceed 20 times the TCLP limit.

Summary of Volatile Organic Contamination

No major media samples collected from this component were analyzed for volatile organic constituents.

Supplemental Media

The one loose media sample was analyzed for volatile organic constituents. There were detections reported in two of the 33 volatile analytes, ethylbenzene and xylenes, Total. Neither of the detections exceeded the 20 times TCLP limit.

The one sediment sample was analyzed for volatile organic constituents. There was only one detection reported of the 33 volatile analytes, xylenes, Total. This reported detection did not exceed 20 times the TCLP limit.

The one unknown liquid sample was analyzed for volatile organic constituents. There were no detections.

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Summary of Pesticides/PCB Contamination

No major or supplemental media samples collected from this component were analyzed for PCB/Pesticide constituents.

Since no major media were analyzed for organic constituents, supplemental media cannot support findings.

A.IV.10.2 Old Cooling Water Tower (3K)

Old Cooling Water Tower (3K) formerly was a one-story, redwood structure, similar to the Cooling Towers (20C). It was located at the intersection of A Street and 101st Street. The wooden tower has been removed, leaving a grade and below-grade structure consisting of a concrete basin and a diked pad.

The Old Cooling Water Tower consists of a single, wet process referred to as process water cooling. A redwood cooling tower provided process water to cool four of the towers of the Harshaw System (3F). This system was replaced by the Refrigeration Building (3G) in the mid-1960s. The original wooden equipment has been removed, but the concrete basin and diked pad remain. There are no anticipated contaminants for this component area.

From this component, one concrete core and one unknown liquid were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, strontium-90, and technetium-99) were detected. For eight of the detected radioactive constituents (lead-210, radium-228, thorium-227, thorium-230, elemental uranium, uranium-234, uranium-235/236, and uranium-238), the maximum concentration of each exceeded its respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 8, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, and technetium-99) were detected. For three of the detected radioactive constituents (thorium-227, thorium-230, and elemental uranium), the maximum concentration of each exceeded its

respective concrete baseline value. Thorium-230 exceeded its baseline concentration by a factor of 1.7, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, plutonium-241, polonium-210, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive exceeded its respective concrete baseline value.

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, technetium-99, thorium-228, and thorium-232) were detected.

Summary of Inorganic Contamination

Concrete Cores

One concrete core was collected for analysis of inorganic constituents.

At the 0 - 1/2 inch level of the core, there were 16 detections of the 23 inorganic analytes. Those not detected were beryllium, cadmium, mercury, nickel, selenium, silver, and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for 14 of the inorganic analytes. The most significant were chromium and lead, which exceeded the baseline by a factor of 52 and 16, respectively. At this core level, chromium (greater than 100 mg/kg) was detected at concentrations greater than 20 times TCLP limit. This sample was from the process water cooling area.

At the 1/2 - 1 inch level of the core, there were 15 detections of the 23 inorganic analytes. Those not detected were beryllium, cadmium, cobalt, mercury, nickel, selenium, silver, and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for 12 of the inorganic analytes. The most significant were lead and chromium, which exceeded the baseline by a factor of 78 and 34, respectively. At this core level, chromium and lead were both detected at concentrations greater than 20 times TCLP limit (both greater than 100 mg/kg). This sample was also from the process water cooling area.

At the 1 - 4 inch level of the core, there were 18 detections of the 23 inorganic analytes. Those not detected were mercury, nickel, selenium, silver, and thallium. The maximum of the validated results exceeded the OU3 concrete baseline for 12 of the inorganic analytes. The most significant were chromium and copper, both exceeding the baseline by a factor of three. The average of the validated results exceeded the baseline for 12 of the inorganic analytes. The most significant were chromium

and copper, both exceeding the baseline by a factor of 3. At this core level, there were no detections reported for greater than 20 times TCLP.

Supplemental Media

One unknown liquid sample was collected for analysis of inorganic constituents.
For this sample, there were six detections of the 23 inorganic analytes. They were barium, calcium, chromium, magnesium, potassium, and sodium. There were no detections at greater than 20 times TCLP.

Supplemental media results support findings in major media of inorganic constituents.

Summary of Semivolatile Organic Contamination

The major media sample collected from this component was not analyzed for semivolatile organic constituents.

Supplemental Media

One unknown liquid sample was analyzed for semivolatile organic constituents. There were no detections reported for any of the 65 Semivolatile analytes.

Summary of Volatile Organic Contamination

The major media sample collected from this component was not analyzed for volatile organic constituents.

Supplemental Media

One unknown liquid sample was analyzed for volatile organic constituents. There was one detection reported out of the 33 volatile organic analytes. This detection was reported for 1,1-dichloroethane. This detection did not exceed the 20 time TCLP limit.

Summary of Pesticides/PCB Contamination

No major or supplemental media samples from this component were analyzed for PCB/Pesticide constituents.

Since the major media sample was not analyzed for any organic constituents, supplemental media (unknown liquid sample) cannot support findings.

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A.IV.10.3 Utility Trench to K-65 Area (22E)

The Utility Trench to K-65 Area is a subgrade concrete trench and steel piping system. This Utility Trench was used in the pumping of high-radium raffinate slurry from the Hot Raffinate Building (3E) to K-65 Silos 1 and 2. Also, decant from the K-65 Silos was returned through the trench and collected in the tank located on the northwestern corner of the Hot Raffinate Building before being transferred for treatment. The Utility Trench also contained pneumatic lines running to Silo 3 and liquid lines used to connect water treatment processes and sources in the Pit Area to process area systems. Anticipated contaminants include: uranium (up to 0.71 percent E), MgF_2, raffinates, and ore raffinates.

From this component, one concrete core sample, one sediment sample, and one unknown liquid sample were collected. Following is a description of contamination.

Summary of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and uranium-235/236) were detected. For two of the detected radioactive constituents (lead-210 and radium-226), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 1.3, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (neptunium-237, plutonium-238, plutonium-239/240, polonium-210, radium-228, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. None of the detected radioactive constituents exceeded its respective concrete baseline value.

Supplemental Media

One sediment sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (americium-241, plutonium-239/240, and strontium-90) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, and thorium-228) were detected.

Summary of Inorganic Contamination

Concrete Cores

One concrete core was collected for analysis of inorganic constituents.

At the 0 - 1/2 inch level of the core, there were nine detections of the 23 inorganic analytes. Those detected were aluminum, arsenic, barium, calcium, iron, lead, magnesium, manganese, and vanadium. The maximum of the validated results exceeded the OU3 concrete baseline for four of the inorganic analytes. The most significant was vanadium, which exceeded the baseline by a factor of three. There were no detections reported for concentrations greater than 20 times TCLP.

At the 1/2 - 1 inch level of the core, there were eight detections of the 23 inorganic analytes. Those detected were aluminum, arsenic, barium, calcium, chromium, iron, magnesium, and manganese. The maximum of the validated results exceeded the OU3 concrete baseline for two of the inorganic analytes. The most significant was manganese, which exceeded the baseline by a factor of two. There were no detections reported for concentrations greater than 20 times TCLP.

At the 1 - 4 inch level of the core, there were 11 detections of the inorganic analytes. They were aluminum, arsenic, barium, calcium, cobalt, iron, lead, magnesium, manganese, silver, and vanadium. The maximum of the validated results exceeded the OU3 concrete baseline for five of the inorganic analytes. The most significant was silver, which exceeded the baseline by a factor of seven. There were no detections reported for concentrations greater than 20 times TCLP.

Supplemental Media

One sediment sample and one unknown liquid sample were collected from this component for analysis of inorganic constituents.

For the sediment sample, 19 of the 23 inorganic analytes were detected. Those not detected were beryllium, cadmium, sodium, and thallium. Of those analytes detected, barium was detected at concentrations greater than 20 times TCLP. The 20 times TCLP limit for barium is 2000 mg/kg.

For the unknown liquid sample, nine of the 23 inorganic analytes were detected. Those detected were aluminum, barium, calcium, copper, iron, lead, magnesium, potassium, and sodium. There were no detections reported for concentrations greater than the TCLP limit.

Supplemental media results support findings in major media of inorganic constituents.

Summary of Semivolatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for semivolatile organic constituents.

Supplemental Media

One sediment sample and one unknown liquid sample were collected from this component for analysis of semivolatile constituents.

For the sediment sample, two out of the 65 Semivolatile organic analytes were detected. Those reporting detections were fluoranthene and pyrene. There were no detects for greater than 20 times TCLP.

For the unknown liquid sample, there were no detections reported.

Summary of Volatile Organic Contamination

The major media sample (concrete core) collected from this component was not analyzed for volatile organic constituents.

Supplemental Media

One sediment sample and one unknown liquid sample were collected from this component for analysis of volatile organic constituents.

For the sediment sample, one out of the 33 volatile organic analytes was detected. This detection was reported for acetone. There were no detects reported for greater than 20 times TCLP.

For the unknown liquid sample, there were no detections reported.

Summary of Pesticides/PCB Contamination

No major or supplemental media samples from this component were analyzed for PCB/Pesticide constituents.

Since the major media sample was not analyzed for any organic constituents, supplemental media cannot support findings.

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A.IV.10.4 10-Plex Sewage Lift Station (25J)

The 10-Plex Sewage Lift Station (25J) is located west of the Parking Lot (89). This component was constructed in the early 1990s to support four 10-plex office trailers (T-76, T-77, T-80, and T-81) and two duplex office trailers (T-78 and T-79).

The 10-Plex Sewage Lift Station was not considered in the RI/FS WPA, since it was under construction at the time of writing. This component is not expected to have elevated levels of contamination; therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.10.5 Clearwell Line (88)

The Clearwell Line (88) is a pressurized transfer line (pipe) that runs from the Clearwell Area near the OU1 Waste Pits to the Biodenitrification Lagoon (18A). It has a diameter of six inches and is approximately 2000 ft long.

The Clearwell Line is considered one process area and is used as a transfer system for rainwater collected at the clearwell area of the waste pits. Water entering the Clearwell Area is collected and transferred via the six inch line to the Biodenitrification Lagoon (18A). There are no anticipated contaminants.

From this component, one unknown liquid sample was collected. Following is a description of contamination.

Summary of Radiological Contamination

Supplemental Media

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, plutonium-239/240, radium-226, radium-228, thorium-228, and thorium-230) were detected.

Summary of Inorganic Contamination

Supplemental Media

The one unknown liquid sample was analyzed for inorganic constituents.

For this sample, there were ten detections reported out of the 23 inorganic analytes. Those detected were barium, calcium, iron, lead, magnesium, manganese, nickel, potassium, silver, and sodium. There were no detections for greater than 20 times TCLP.

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Summary of Semivolatile Organic Contamination

Supplemental Media
The one unknown liquid sample was analyzed for semivolatile organic constituents.

For this sample, there were no detections for any of the 65 Semivolatile organic analytes.

Summary of Volatile Organic Contamination

Supplemental Media
The one unknown liquid sample was analyzed for volatile organic constituents.

For this sample, there was one detection reported out of the 33 volatile organic analytes. This detection was for 2-butanone. This detection did not exceed 20 times TCLP.

Summary of Pesticides/PCB Contamination

Supplemental Media
The one unknown liquid sample was not analyzed for pesticide/PCB constituents.

A.IV.10.6 Storm Sewer System (G-003)
The Storm Sewer System (G-003) is a subgrade piping and pumping system for handling storm-water runoff. It consists of drainage lines located throughout much of the FEMP property, two lift station pumps, and a diverter valve.

The Storm Sewer System is considered one process area and is used for handling storm-water runoff from much of the developed FEMP property. It is a network of piping, pumps, and associated equipment located throughout the site. The flow is continuously monitored and can be diverted or held in the storm-water retention basins on the basis of the levels of contamination encountered. Anticipated contaminants are uranium, lead, barium, and solvent wastes.

Although two liquid samples were collected from the contents of this component, no samples were collected from the Storm Sewer System itself. Therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

There were no major media samples collected from this component. The following is a description of contamination.

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Summary Of Radiological Contamination

Supplemental Media
Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (cesium-137, neptunium-237, plutonium-238, and plutonium-239/240) were detected.

Summary Of Inorganic Contamination

Supplemental Media
For the unknown liquid samples, detections were reported for 15 of the 23 inorganic analytes. Of those analytes detected, only lead was reported at concentrations greater than 20 times TCLP. The 20 times TCLP limit for lead is 100 mg/kg.

Summary of Semivolatile Organic Contamination

Supplemental Media
For the unknown liquid samples, only one detection, bis(2-Ethylhexyl)phthalate, was reported. This detection was below 20 times TCLP.

Summary of Volatile Organic Contamination

Supplemental Media
There were no detections reported for the unknown liquid samples.

Summary of Pesticides/PCB Contamination

No supplemental media were analyzed for pesticide/PCB constituents.

A.IV.10.7 Utility Lines (G-004)
Utility Lines (G-004) are located throughout the site and include all 24 types of on-property, above- and belowground utility lines, such as electrical, process, water, sewer, gas, and conduit lines, exterior to other components. These lines provide utility services to the site. Anticipated contaminants are asbestos and uranium (ores, raffinates, and compounds).

Most of these lines are not readily accessible, and the majority of expected contamination is on the interior. Furthermore, little or no evidence of exterior contamination exists. Therefore, no intrusive samples were planned for this component. Process knowledge will be used to estimate the source term associated with the interior of these lines, and baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

A.IV.11 Ponds and Basins

The ponds and basins are shown on Figure 3-12. This component category consists of eight structures or areas where liquids containing potentially hazardous substances are or can be, stored without secondary containment. Some of these components contain large volumes of water with relatively small amounts of contamination. They also contain sediments with more concentrated quantities of contamination.

A.IV.11.1 BDN Surge Lagoon (18A)

The Biodenitrification (BDN) Surge Lagoon (18A) is an 8.6 million gallon lagoon. The BDN Surge Lagoon is roughly 15 ft above-grade and has an average depth of 12 ft with a six foot differential over the sloping bottom. The BDN Surge Lagoon is lined with a 40-mil-thick, carbon-filled, high-density polyethylene (HDPE) liner, underlain by an 18-inch-thick soil/bentonite layer.

Wastewater effluent from the General Sump (18B) and the Clearwell Line (88) enters the northwestern corner of the BDN Surge Lagoon. Effluent leaves the lagoon from its southeastern corner and is pumped to the Biodenitrification Towers (18D) for nitrate removal. The BDN Surge Lagoon has been declared a HWMU. The anticipated contaminants for the BDN Surge Lagoon are uranium, 1,1,1-trichloroethylene, and perchloroethylene.

Seven sediment samples and thirteen unknown liquid samples were collected from the BDN Surge Lagoon to support characterization. Following is a description of contamination.

Summary Of Radiological Contamination

Supplemental Media

A total of 8 sediment samples were collected from this component for analysis of radioactive constituents. None of these 20 constituents were detected.

Eleven unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except four (americium-241, neptunium-237, plutonium-239/240, and plutonium-241) were detected.

Summary Of Inorganic Contamination

Supplemental Media

For eight sediment samples, 19 of the 23 inorganic analytes were detected. The four not detected were antimony, cobalt, selenium, and thallium. Half of the samples showed chromium and mercury concentrations that exceeded 20 times the TCLP limits. Also, all of the lead concentrations were above 20 times the TCLP limit.

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For eleven unknown liquid samples, eight of the 23 inorganic analytes were detected. Those detected were antimony, barium, calcium, lead, magnesium, potassium, selenium, and sodium. There were no detectable concentrations of inorganics that were greater than 20 times the TCLP limit.

Summary Of Semivolatile Organic Contamination

Supplemental Media

For eight sediment samples, 22 of the 65 Semivolatile organic analytes were detected. Those detected were 2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butyl benzyl phthalate, carbazole, chrysene, di-n-butylphthalate, dibenzo(a,h)anthracene, dibenzofuran, diethylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, phenanthrene, pyrene, and p-methylphenol. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

None of the 65 Semivolatile organics were detected in eleven unknown liquid samples.

Summary Of Volatile Organic Contamination

Supplemental Media

Of the 33 volatile organics, only acetone and toluene were detected in eight sediment samples. Neither had concentrations that exceeded 20 times the TCLP limits.

Of the 33 volatile organic analytes, only 2-hexanone and 4-methyl-2-pentanone were detected in eleven unknown liquid samples. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Summary of Pesticides/PCB Contamination

No supplemental media were analyzed for pesticides/PCB constituents.

A.IV.11.2 Coal Pile Runoff Basin (18C)

Coal Pile Runoff Basin (18C) is a 25,000-gal basin. The basin lies adjacent to the east side of the Cooling Towers (20C).

The Coal Pile Runoff Basin collects storm-water runoff from the Coal Pile (P-005) and receives continuous blowdown from boiler operations. It has been declared a HWMU. The component has been identified as a single process area. The anticipated contaminants for the basin are uranium and 1,1,1-trichloroethane.

DRAFT

No major media were collected for this component. Four sediment samples and four unknown liquid samples were collected from the Coal Pile Runoff Basin to characterize the contamination in this component. The following presents the results of the analyses of these samples.

Summary Of Radiological Contamination

Supplemental Media

A total of 4 sediment samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except six (americium-241, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected.

Two unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, polonium-210, strontium-90, technetium-99, thorium-228, thorium-230, and thorium-232) were detected.

Summary Of Inorganic Contamination

Supplemental Media

For three sediment samples, 18 of the 23 inorganic analytes were detected. Those not detected were antimony, cadmium, mercury, silver, and thallium. There were two inorganics (arsenic and lead) that exceeded 20 times the TCLP limits.

For two unknown liquid samples, 17 of the 23 inorganic analytes were detected. Those not detected were antimony, arsenic, lead, mercury, silver, and vanadium. Selenium was detected in both samples as exceeding 20 times the TCLP limit (greater than 20 mg/kg).

Summary Of Semivolatile Organic Contamination

Supplemental Media

For four sediment samples, 6 of the 65 Semivolatile organic analytes were detected. Those detected were 2-methylnaphthalene, dibenzofuran, fluoranthene, naphthalene, phenanthrene, and pyrene. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

For two unknown liquid samples, none of the 65 Semivolatile organic analytes were detected.

DRAFT

Summary Of Volatile Organic Contamination

Supplemental Media

Of the 33 volatile organic analytes, only 2-butanone was detected in four sediment samples. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Of the 33 volatile organic analytes, only toluene was detected in two unknown liquid samples. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Summary Of Pesticide/PCB Contamination

No samples for this component were analyzed for pesticide/PCB contamination.

A.IV.11.3 Storm-Water Retention Basin (18E)

The Storm-Water Retention Basin (18E) consists of two adjacently lined collection basins. They hold approximately 10.6 million gallon of rainwater. The basins are below-grade and have an average depth of 20 ft. The west (old) basin is lined with a 40-mil-thick, carbon-filled HDPE liner; the east (new) basin is lined with an XR5 liner. They are both underlain by an 18-inch-thick soil/bentonite layer.

The two basins have the capacity to store approximately ten million gallons of rainwater flow from the site. The retention time of the basins allows uranium-bearing solids to settle. After the solids have settled, the decanted liquids are pumped and sampled in the Manhole-175/Effluent Line/Sampling Building (25B) before release from the site. The only anticipated contaminant for the Storm-Water Retention Basin is uranium.

No major media was collected from this component. Seven sediment samples and five unknown liquid samples were collected from the Storm Water Retention Basin to characterize the contamination.
Following is a description of contamination.

Summary Of Radiological Contamination

Supplemental Media

A total of 7 sediment samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (americium-241 and thorium-227) were detected.

DRAFT

Six unknown liquid samples were collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, cesium-137, plutonium-238, thorium-228, and thorium-230) were detected.

Summary Of Inorganic Contamination

Supplemental Media

For seven sediment samples, 21 of the 23 inorganic analytes were detected. The two not detected were antimony and beryllium. For two samples, lead was the only inorganic that exceeded 20 times the TCLP limit.

For seven unknown liquid samples, 16 of the 23 inorganic analytes were detected. Those not detected were antimony, beryllium, cadmium, cobalt, nickel, silver, and thallium. For one sample, the concentration of lead exceeded 20 times the TCLP limit.

Summary Of Semivolatile Organic Contamination

Supplemental Media

For seven sediment samples, 24 of the 65 Semivolatile organic analytes were detected. Those detected were 2-methylnaphthalene, acenaphthalene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, di-n-octyl phthalate, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, pyrene, bis(2-ethylhexyl)phthalate, o-methylphenol, and p-methylphenol. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

For seven unknown liquid samples, eight of the 65 Semivolatile organic analytes were detected. Those detected were 4-chloro-3-methylphenol, anthracene, chrysene, fluoranthene, phenanthrene, phenol, pyrene, and bis(2-ethylhexyl)phthalate. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

Summary Of Volatile Organic Contamination

Supplemental Media

For seven sediment samples, six of the 33 volatile organic analytes were detected. The six detected were 2-butanone, carbon disulfide, styrene, tetrachloroethene, toluene, and total xylenes. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

DRAFT

Of the 33 volatile organic analytes, only acetone, tetrachloroethene, and toluene were detected in seven unknown liquid samples. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Summary of Pesticides/PCB Contamination

No supplemental media were sampled for pesticides/PCB contamination.

A.IV.11.4 Low Nitrate Tank (18K)

The Low Nitrate Tank (18K) is a 1-million gallon temporary open storage tank. The Low Nitrate Tank is lined with 40-mil, carbon-filled HDPE and underlain by an 18-inch-thick soil/bentonite layer.

The Low Nitrate Tank is a temporary tank used during the reconstruction of the Biodenitrification Surge Lagoon (18A) to hold low-nitrate wastewaters. Control of nitrate levels to the biodenitrification process was accomplished through blending the high- and low-nitrate tank flows. One process area has been identified for the component. The anticipated contaminants are uranium, nitrates, and 1,1,1-trichloroethane.

No major media were collected for this component. One unknown liquid sample and one sediment sample were collected to characterize the contamination in this component. Following is a description of contamination.

Summary Of Radiological Contamination

Supplemental Media

A total of one sediment sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (thorium-228) were detected.

One _unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except 11 (americium-241, cesium-137, lead-210, neptunium-237, plutonium-238, polonium-210, radium-226, radium-228, thorium-228, thorium-230, and thorium-232) were detected.

Summary Of Inorganic Contamination

Supplemental Media

In the sediment sample, 17 of the 23 inorganics for which analyses were performed were detected. Those not detected were antimony, beryllium, cadmium, cobalt, selenium, and thallium. Three (chromium, lead, and mercury) of the inorganics exceeded 20 times the TCLP limits.

DRAFT

For the unknown liquid sample, four of the 23 inorganic analytes were detected. Those detected were calcium, magnesium, potassium, and sodium. There were no detectable concentrations of inorganics that were greater than 20 times the TCLP limit.

Summary Of Semivolatile Organic Contamination

Supplemental Media

For the sediment sample, 16 out of the 65 Semivolatile organics were detected. Those detected were anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, di-n-octyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, phenol, pyrene, and p-methylphenol. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

For the unknown liquid sample, none of the 65 Semivolatile organic analytes were detected.

Summary Of Volatile Organic Contamination

Supplemental Media

None of the 33 volatile organics were detected in either the sediment and unknown liquid samples.

Summary Of Pesticides/PCB Contamination

No samples from this component were analyzed for PCB/Pesticide constituents.

A.IV.11.5 High Nitrate Tank (18L)

The High Nitrate Tank (18L) is a 1-million-gallon temporary open storage tank. The High Nitrate Tank is lined with 40-mil, carbon-filled HDPE and underlain by an 18-inch-thick soil/bentonite layer.

The High Nitrate Tank is a temporary tank used during the reconstruction of the Biodenitrification Surge Lagoon (18A) to hold high-nitrate wastewaters. Control of nitrate levels to the biodenitrification process was accomplished through blending the high- and low-nitrate tank flows. One process area was identified for the component. The anticipated contaminants for Component 18L are uranium, nitrates, and 1,1,1-trichloroethane.

No major media was sampled for this component. One sediment sample and one unknown liquid sample were collected from the High Nitrate Tank to characterize contamination. Following is a description of contamination.

Summary Of Radiological Contamination

Supplemental Media

A total of one sediment sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (thorium-227) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except ten (americium-241, cesium-137, neptunium-237, plutonium-241, polonium-210, radium-226, radium-228, thorium-228, thorium-230, and thorium-232) were detected.

Summary Of Inorganic Contamination

Supplemental Media

For the sediment sample, 18 of the 23 inorganic analytes were detected. Those not detected were antimony, beryllium, cadmium, cobalt, and thallium. None of the inorganics exceeded 20 times the TCLP limit.

For the unknown liquid sample, three of the 23 inorganic analytes were detected. Those detected were calcium, magnesium, and zinc. There were no detectable concentrations of inorganics that were greater than 20 times the TCLP limit.

Summary Of Semivolatile Organic Contamination

Supplemental Media

For the sediment sample, eight of the 65 Semivolatile organic analytes were detected. Those detected were benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, phenol, pyrene, and p-methylphenol. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

None of the 65 Semivolatile organics were detected in the unknown liquid sample.

Summary Of Volatile Organic Contamination

Supplemental Media

None of the 33 volatile organics were detected in either the sediment or unknown liquid samples.

Summary of Pesticides/PCB Contamination

No supplemental media samples were analyzed for pesticides/PCB constituents.

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A.IV.11.6 Sludge Drying Beds (25F)

The Sludge Drying Beds (25F) contains two below-grade concrete tanks. Site sewage wastes are settled in one of the two concrete basins. The sludge is then pumped to the anaerobic digester in the Digester and Control Building (25E), and liquids are pumped to the Trickling Filters (Component 25H). The anticipated contaminants for Component 25F include 1,1,1-trichloroethane; trichloroethylene; perchloroethylene; and uranium.

Therefore, this unit is considered a HWMU. This inactive unit will obtain closure will be attained through CERCLA response. For more information on HWMUs, see Appendix K, Table K-1.

One concrete chip sample, one sediment sample, and one unknown liquid sample were collected to characterize the contamination of the Sludge Drying Beds. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Chips

Only one concrete chips sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (cesium-137, neptunium-237, plutonium-238, plutonium-239/240, radium-228, strontium-90, and uranium-235/236) were detected. For one of the detected radioactive constituents (technetium-99), the maximum concentration of each exceeded its respective concrete baseline value. Technetium-99 exceeded its baseline concentration by a factor of 7, a larger margin than any other radioactive constituent.

Supplemental Media

One sediment sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except three (neptunium-237, plutonium-238, and strontium-90) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and neptunium-237) were detected.

Summary Of Inorganic Contamination

Concrete Chips

One concrete chip sample was collected from the Sludge Drying Beds and analyzed for inorganics. Of 23 inorganic constituents, seven (aluminum, arsenic, barium, calcium, iron, magnesium, and manganese) were detected. The concentrations of two of the detected inorganics (aluminum and barium) exceeded their respective concrete baseline values, both by a factor of 1.1. There were no detections exceeding 20 times the TCLP limits.

Supplemental Media

For the sediment sample, 22 of the 23 inorganic analytes were detected. The only inorganic not detected was potassium. Chromium was the only inorganic that exceeded 20 times the TCLP limit.

For the unknown liquid sample, 19 of the 23 inorganic analytes were detected. Those not detected were antimony, beryllium, cadmium, and potassium. Concentrations exceeding 20 times the TCLP limit were detected for six analytes, barium (greater than 2000 mg/kg), chromium (greater than 100 mg/kg), lead (greater than 100 mg/kg), mercury (greater than 4 mg/kg), selenium (greater than 20 mg/kg), and silver (greater than 100 mg/kg).

Summary Of Semivolatile Organic Contamination

Concrete Chips

The concrete chip sample taken from the Sludge Drying Beds was not analyzed for semivolatile organics.

Supplemental Media

For the sediment sample, 15 of the 65 Semivolatile organic analytes were detected. Those detected were 2,4,6-trichlorophenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, di-n-butylphthalate, di-n-octyl phthalate, diethylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, pentachlorophenol, phenanthrene, pyrene, bis(2-ethylhexyl)phthalate, and p-chloroaniline. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

For the unknown liquid sample, 11 of the 65 Semivolatile organic analytes were detected. Those detected were 1,4-dichlorobenzene, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, naphthalene, p-methylphenol, and phenanthrene. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

Summary Of Volatile Organic Contamination

Concrete Chips

The concrete chip sample taken from the Sludge Drying Beds was not analyzed for volatile organics.

Supplemental Media

None of the 33 volatile organic analytes were detected in either the sediment or unknown liquid samples.

Summary of Pesticide/PCB Contamination

No major or supplemental media for this component were analyzed for pesticide/PCB contamination.

A.IV.11.7 Primary Settling Basins (25G)

The Primary Settling Basins (25G) contains two concrete basins used as sludge filters for the anaerobic digester in the Digester and Control Building (25E). There are no anticipated contaminants for the component.

From this component, two concrete core samples, two sediment samples and one unknown liquid sample were collected. Following is a description of contamination.

Summary Of Radiological Contamination

Concrete Cores

Only one concrete core sample from the top ½-inch depth was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except five (americium-241, neptunium-237, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 6.8, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth of ½ to 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 2, a larger margin than any other radioactive constituent.

Only one concrete core sample from a depth greater than 1-inch was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except seven (americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, strontium-90, and technetium-99) were detected. For one of the detected radioactive constituents (lead-210), the maximum concentration of each exceeded its respective concrete baseline value. Lead-210 exceeded its baseline concentration by a factor of 5.2, a larger margin than any other radioactive constituent.

Supplemental Media

One sediment sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except one (lead-210) were detected.

One unknown liquid sample was collected from this component for analysis of radioactive constituents. Of these 20 constituents, all except two (cesium-137 and neptunium-237) were detected.

Summary Of Inorganic Contamination

Concrete Cores

A concrete core sample from the top 1/2-inch was collected from the Primary Settling Basins for analysis of inorganics. Of 23 inorganic constituents, 14 (aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc) were detected. For eight of the detected inorganics (aluminum, barium, calcium, chromium, lead, sodium, vanadium, and zinc), the concentrations of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, zinc was the most significant, exceeding the concrete baseline by a factor of 1.3. There were no detections greater than 20 times the TCLP limit.

A concrete core sample from a depth of 1/2 to 1-inch was collected from the Primary Settling Basins for analysis of inorganics. Of 23 inorganic constituents, 15 (aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc) were detected. For eight of the detected inorganics (aluminum, barium, chromium, lead, manganese, nickel, sodium, and vanadium), the concentrations of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, aluminum was the most significant, exceeding the concrete baseline by a factor of 1.4. There were no detections greater than 20 times the TCLP limit.

A concrete core sample from a depth greater than 1-inch was collected from the Primary Settling Basins for analysis of inorganics. Of 23 inorganic constituents, 15 (aluminum, arsenic, barium, calcium, chromium, copper, iron, magnesium, manganese, nickel, potassium, selenium, silver, sodium, and vanadium) were detected. For six of the detected inorganics (aluminum, arsenic, barium, chromium, potassium, and sodium), the concentrations of each exceeded its respective concrete baseline value. Of the inorganics with concentrations greater than baseline, arsenic was the most significant, exceeding the concrete baseline by a factor of 1.7. There were no detections greater than 20 times the TCLP limit.

Supplemental Media

For the two sediment samples, six of the 23 inorganic analytes were detected. Those detected were barium, copper, iron, manganese, potassium, and sodium. None of the inorganic concentrations exceeded 20 times the TCLP limit.

For the unknown liquid sample, six of the 23 inorganic analytes were detected. Those detected were calcium, iron, magnesium, manganese, potassium, and sodium. None of the inorganic concentrations exceeded 20 times the TCLP limit.

001202

Summary Of Semivolatile Organic Contamination

Concrete Cores
The concrete cores taken from the Primary Settling Basins were not analyzed for semivolatile organic constituents.

Supplemental Media
Of the 65 Semivolatile organic analytes, only p-methylphenol was detected in the two sediment samples. However, the concentration of p-methylphenol did not exceed 20 times the TCLP limit.

Of the 65 Semivolatile organic analytes, only diethylphthalate was detected in the unknown liquid sample. There were no detectable concentrations of semivolatile organics that exceeded 20 times the TCLP limits.

Summary Of Volatile Organic Contamination

Concrete Cores
The concrete cores taken from the Primary Settling Basins were not analyzed for volatile organic constituents.

Supplemental Media
For the two sediment samples, four of the 33 volatile organic analytes were detected. Those detected were ethylbenzene, styrene, toluene, and total xylenes. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Of the 33 volatile organic analytes, only styrene was detected in the unknown liquid sample. There were no detectable concentrations of volatile organics that exceeded 20 times the TCLP limits.

Summary of Pesticides/PCB Contamination

No major or supplemental media for this component were analyzed for pesticide/PCB contamination.

A.IV.11.8 Fire Training Pond (73B)
Final removal of the Fire Training Pond (73B) occurred in October 1994 as part of Removal Action 19. (For a complete list and explanation of removal actions, see Table 1-2). The Fire Training Pond was a 45 ft diameter pond and drain pit used as a fire brigade training area. It was located on the northern boundary of the site along B Street.

The pond was considered one process area and was used for training fire brigade members in fighting combustible liquid fires. A small horizontal elevated tank in the center of the pond was used to

simulate a combustible liquid tank (never filled). Excess water was drained from the area to the drain pit so that combustible liquids would not overflow the pond. Anticipated contaminants for the Fire Training Pond area are uranium, used oils (hydraulic, lubricating), toluene, waste paint solvents and thinners.

The Fire Training Pond was part of the Fire Training Facility and therefore part of the HWMU comprising that facility. For a description of this HWMU, see Section A.IV.1.12, the Fire Brigade Training Center Building. For more information on HWMUs, see Appendix K, Table K-1.

Because the pond was part of a removal action, this component was not scheduled for intrusive sampling. Therefore, baseline concentrations of contaminants within each material type associated with this component have been used for characterization.

DRAFT

TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: FINISHED PRODUCTS WAREHOUSE			
CALCIUM URANATE	123	60	15,700
CLEAN PRILL FOR DOUBLE MELTING	218	2	702
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	8	2,490
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	2	174
INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	103	17	26,600
MARK 15 EXTRUDED TUBES - INNER	451	1	31
MATERIAL HELD FOR HISTORICAL PURPOSES	098	1	54
METAL SPILLS AND EXTRUSION ENDS: METAL HIGH IN IMPURITIES AND SPILLS	104	3	1,340
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	1	19
OFF-SPEC UF4 OR THF4	082	4	2,400
OXIDES CLAD OR MIXED WITH STAINLESS STEEL	142	11	4,820
PARTIALLY OXIDIZED METAL FOR DISSOLVER	130	1	727
PICKLED PRIMARY INGOT SECTIONS CONTAINING FIRST GENERATION TOP CROPS	314	1	349
PICKLED PRIMARY INGOT SECTIONS CONTAINING NO TOP CROP METAL	315	2	1,190
ROCKWELL SPILLS	070	1	130
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	1	11
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	2	1,240
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	154	57,200
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	1	28
SCRAP UO2	102	1	84
SOLID METAL FOR PICKLING AND DOUBLE MELTING, OTHER THAN FIRST GENERATION TOP CROPS	238	1	5
U3O8 - NOT REQUIRING RE-OXIDATION	165	10	3,110
U3O8 -8 MESH FROM ROTEXING OF OTHER THAN PLANT 8'S OWN PRODUCTS - LOW FLUORIDE	155	5	3,530
U3O8, +8 MESH - LOW FLUORIDE	122	7	3,870
UF4 FROM PILOT PLANT UF6	211	3	497

001203

2121

TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
UF4 OR THF4	210	1	12
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	31	28,200
UO2 OR THO2 PRODUCT	202	1	105
UO3 PRODUCT	200	5	434
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	3	385
ZIRCONIUM CLAD METAL, FROM OFF-SITE, TO BE DECLAD BY ZIRNLO SYSTEM	113	19	8,430
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	95	129,000
FINISHED PRODUCTS WAREHOUSE Total:			**293,000**
LOCATION: GENERAL IN-PROCESS WAREHOUSE			
CALCIUM URANATE	123	1	219
GENERAL IN-PROCESS WAREHOUSE Total:			**219**
LOCATION: HEALTH AND SAFETY BUILDING			
DUST COLLECTOR BAGS	029	4	237
OFF-SPEC UF4 OR THF4	082	8	1,070
REJECT UO3	157	1	71
SCRAP UO2	102	3	135
HEALTH AND SAFETY BUILDING Total:			**1,510**
LOCATION: OLD PLANT 5 WAREHOUSE			
UF4 OR THF4	210	113	572,000
UO3 PRODUCT	200	75	370,000
UO3 REACTOR RECYCLE TAILS	201	1	12,200
OLD PLANT 5 WAREHOUSE Total:			**954,000**

001206

TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: PILOT PLANT AREA			
OFF-SPEC UF4 OR THF4	082	3	521
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	1	12
UF4 OR THF4	210	2304	564,000
PILOT PLANT AREA Total:			**565,000**
LOCATION: PLANT 1 AREA			
CALCIUM URANATE	123	139	38,100
CHEMICAL REJECT SOLID METAL FOR PICKLING PRIOR TO REMELT	251	37	18,300
CHEMICAL REJECT SOLID REMELT METAL - DOES NOT REQUIRE PICKLING	322	2	1,210
CLAD URANIUM METAL: DECLAD BY MACHINING OR CHEMICAL TREATMENT	128	125	119,000
CLEAN PRILL FOR DOUBLE MELTING	218	47	28,700
CONTAMINATED ALUMINA - SODA LIME (HIGH C1)	018	2	283
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	2	56
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	2	57
CONTAMINATED CARBON FILTER ELEMENTS	026	6	1,100
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	5	86
DECLAD METAL, OTHER THAN ZIRNLO	337	22	24,900
DERBIES, CODE 1 AND CODE 3	300	2	617
DIRTY PRILL, CODE 5 DERBIES, AND PLANT 1 TITAN MILL CLEAN-OUT, HIGH U CONTENT	129	2	1,050
DUST COLLECTOR BAGS	029	73	5,470
DUST COLLECTOR RESIDUE, HIGH FLUORIDE, GREATER THAN 20% ASSAY	135	8	2,040
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	50	17,600
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	10	2,420
DUST COLLECTOR RESIDUES, PYROPHORIC, HIGH FLUORIDE	064	1	56
EXPERIMENTAL SHAPES - INCLUDING CLASSIFIED SHAPES NOT TO BE CRUSHED	306	2	301

001207

1212

TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
EXTRUSION BUTTS TO BE PICKLED	236	102	83,100
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	20	4,500
INCINERATOR ASHES - MATERIAL PASSING THROUGH GRATE OR SCREEN	032	2	27.3
INCINERATOR CINDERS - MATERIAL NOT PASSING THROUGH GRATE OR SCREEN	033	11	6,510
INGOT CROPS AND DUDS	308	3	3,720
INGOTS FROM OFF-SITE TO BE REWORKED	246	18	17,400
LEAD AND LEAD-CONTAMINATED MATERIALS	049	5	2,310
MATERIAL HELD FOR HISTORICAL PURPOSES	098	19	448
METAL FROM SPILLS FOR DOUBLE MELTING	219	107	86,100
METAL SAMPLES FOR DOUBLE MELTING	227	19	5,220
METAL SPILLS AND EXTRUSION ENDS: METAL HIGH IN IMPURITIES AND SPILLS	104	1	112
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	2	3
NON-BURNABLE METAL WITH URANIUM CONTENT	053	1	112
OFF-SPEC UF4 OR THF4	082	63	23,500
OXIDES CLAD OR MIXED WITH ZIRCONIUM	140	7	243
OXIDES SUITABLE FOR CASCADE FEED	152	1	3.9
PARTIALLY OXIDIZED METAL FOR DISSOLVER	130	1	14
PARTIALLY OXIDIZED METAL FOR SORTING CONTAINING METL-X	080	2	801
PARTIALLY OXIDIZED METAL OXIDATION FEED	131	7	4,540
PICKLED CHEMICAL REJECT CROPS	333	30	18,700
PICKLED CROPS FROM HW METAL	313	8	5,790
PICKLED EXTRUSION BUTTS	336	3	2,050
PICKLED PRIMARY INGOT SECTIONS CONTAINING FIRST GENERATION TOP CROPS	314	12	14,400
PICKLED PRIMARY INGOT SECTIONS CONTAINING NO TOP CROP METAL	315	4	2,120
PRIMARY INGOT SECTIONS, NOT PICKLED, CONTAINING FIRST GENERATION TOP CROPS	330	4	2,410
REJECT ELEMENTS - INNER	324	3	2,080
REJECT ELEMENTS - OUTER	323	5	2,520

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
REJECT UO3	157	4	554
ROASTED MGF2 (BLENDED WITH OTHER MATERIALS)	031	37	21,500
ROCKWELL CLEANINGS	071	5	1,950
ROCKWELL SPILLS	070	8	6,340
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	54	2,540
SAWED SECTIONS, REQUIRING PICKLING, FROM PRIMARY INGOTS CONTAINING FIRST GENERATION TOP CROPS	230	12	12,900
SAWED SECTIONS, REQUIRING PICKLING, FROM PRIMARY INGOTS CONTAINING NO TOP CROP METAL	231	4	5,620
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	97	31,000
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	1	832
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	92	32,400
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	60	1,930
SCRAP UO2	102	50	7,200
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	1	692
SOLID METAL - INCLUDES PHYSICAL BUT NOT CHEMICAL REJECT INGOTS; TO BE SAWED OR CRUSHED AND PICKL	222	22	25,600
SOLID METAL FOR PICKLING PRIOR TO REMELT DOES NOT REQUIRE BLENDING (<12")	221	1	586
SOLID METAL TO BE PICKLED	228	591	590,000
SOLID METAL TO BE SAWED, SHEARED OR CRUSHED, BUT NOT PICKLED PRIOR TO REMELT	223	5	2,730
SOLID METAL, NOT PICKLED, OTHER THAN SPILLS AND TOP CROPS, FOR DOUBLE MELT	224	14	13,000
SOLID REMELT METAL - LOW IMPURITIES - DOES NOT REQUIRE BLENDING OR PICKLING - NOT FROM DOUBLE MEL	304	2	829
SR STANDARD SOLID METAL - FOR REMELT	311	6	5,320
U3O8 - NOT REQUIRING RE-OXIDATION	165	122	2,390
U3O8 -8 MESH FROM ROTEXING OF OTHER THAN PLANT 8'S OWN PRODUCTS - LOW FLUORIDE	155	159	151,000
U3O8 FROM RECYCLE UO3 (ROR PROCESS)	214	2	1,580
U3O8, +8 MESH - LOW FLUORIDE	122	11	5,490
UF4 FROM HANFORD UO3	212	21	2,950
UF4 FROM PILOT PLANT UF6	211	209	87,400
UF4 OR THF4	210	60	13,200

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	301	225,000
UNROASTED BUT MILLED MGF2 (BLENDED WITH OTHER MATERIALS)	088	151	93,900
UO2 (OR THO2) PELLETS - REFINERY FEED	166	84	1,310
UO2 (OR THO2) POWDER - REFINERY FEED	167	23	154
UO2 OR THO2 PRODUCT	202	7	5,770
UO3 PRODUCT	200	29	20,800
UO3 REACTOR RECYCLE TAILS	201	155	98,900
URANIUM ALLOYED OR CANNED WITH ELEMENTS OTHER THAN ALUMINUM, MOLYBDENUM OR ZIRCONIUM	139	1	23
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	84	22,000
ZIRCONIUM CLAD METAL, FROM OFF-SITE, TO BE DECLAD BY ZIRNLO SYSTEM	113	29	11,600
ZIRNLO; PARTIALLY DECLAD FUEL ELEMENTS	124	3	1,870
PLANT 1 AREA Total:			**2,060,000**
LOCATION: PLANT 4 AREA			
UO3 REACTOR RECYCLE TAILS	201	1	778
PLANT 4 AREA Total:			**778**
LOCATION: PLANT 4 WAREHOUSE			
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	52
UF4 FROM PILOT PLANT UF6	211	1	250
UF4 OR THF4	210	9514	2,430,000
PLANT 4 WAREHOUSE Total:			**2,430,000**
LOCATION: PLANT 5 AREA			
CHEMICAL REJECT SOLID METAL FOR PICKLING PRIOR TO REMELT	251	14	6,340
CHEMICAL REJECT SOLID REMELT METAL - DOES NOT REQUIRE PICKLING	322	19	13,200

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
CHIPS EMBEDDED IN CONCRETE - HIGH CALCIUM	106	2	104
CLEAN PRILL FOR DOUBLE MELTING	218	8	2,880
CODE 2 DERBIES FOR DOUBLE MELTING OR SHOT CLEANING	220	1	370
CONTAMINATED ALUMINA - SODA LIME (HIGH C1)	018	1	270
CONTAMINATED CARBON FILTER ELEMENTS	026	2	390
DERBIES, CODE 1 AND CODE 3	300	1069	397,000
DIRTY PRILL, CODE 5 DERBIES, AND PLANT 1 TITAN MILL CLEAN-OUT, HIGH U CONTENT	129	8	4,540
DOUBLE MELT INGOTS TO BE SAWED, BUT NOT PICKLED, PRIOR TO REMELT	241	906	734,000
DUST COLLECTOR BAGS	029	73	4,440
DUST COLLECTOR RESIDUE, HIGH FLUORIDE, GREATER THAN 20% ASSAY	135	1	103
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	98	35,900
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	41	15,000
EXTRUSION BUTTS TO BE PICKLED	236	14	6,140
INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	103	120	205,000
INGOTS FROM OFF-SITE TO BE REWORKED	246	26	39,800
LEAD AND LEAD-CONTAMINATED MATERIALS	049	24	16,900
METAL FROM SPILLS FOR DOUBLE MELTING	219	13	14,000
METAL SAMPLES FOR DOUBLE MELTING	227	6	365
METAL SPILLS AND EXTRUSION ENDS: METAL HIGH IN IMPURITIES AND SPILLS	104	8	6,670
N REACTOR RAW BILLETS - SAWED EXTRUSIONS	454	2	1,320
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	2	177
OFF-SPEC UF4 OR THF4	082	5	2,820
PARTIALLY OXIDIZED METAL FOR DISSOLVER	130	32	11,000
PHYSICAL REJECT BILLETS TO BE SAWED PRIOR TO REMELT	234	6	6,650
PICKLED CHEMICAL REJECT CROPS	333	2	2,850
PICKLED CROPS FROM HW METAL	313	57	38,100
PICKLED EXTRUSION BUTTS	336	1	646

TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
PICKLED PRIMARY INGOT SECTIONS CONTAINING FIRST GENERATION TOP CROPS	314	19	14,000
PICKLED PRIMARY INGOT SECTIONS CONTAINING NO TOP CROP METAL	315	18	12,700
PRIMARY INGOT SECTIONS, NOT PICKLED, CONTAINING FIRST GENERATION TOP CROPS	330	3	1,050
REJECT UO3	157	4	280
ROCKWELL CLEANINGS	071	5	2,320
ROCKWELL SPILLS	070	5	1,370
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	17	1,160
SAWED SECTIONS, REQUIRING PICKLING, FROM PRIMARY INGOTS CONTAINING FIRST GENERATION TOP CROPS	230	7	5,680
SAWED SECTIONS, REQUIRING PICKLING, FROM PRIMARY INGOTS CONTAINING NO TOP CROP METAL	231	33	22,500
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	75	25,800
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	261	107,000
SCRAP UO2	102	2	1,650
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	1	337
SOLID METAL - INCLUDES PHYSICAL BUT NOT CHEMICAL REJECT INGOTS; TO BE SAWED OR CRUSHED AND PICKL	222	90	71,200
SOLID METAL FOR PICKLING AND DOUBLE MELTING, OTHER THAN FIRST GENERATION TOP CROPS	238	1	85
SOLID METAL TO BE PICKLED	228	155	123,000
SOLID METAL, OTHER THAN CORES, WITH EMBEDDED STEEL	119	5	1,120
SOLID REMELT METAL - LOW IMPURITIES - DOES NOT REQUIRE BLENDING OR PICKLING - NOT FROM DOUBLE MEL	304	3	1,150
SR STANDARD SOLID METAL - FOR REMELT	311	1	585
TUBULAR ELEMENTS TO BE CRUSHED	235	1	10
U3O8 - NOT REQUIRING RE-OXIDATION	165	25	11,000
U3O8 -8 MESH FROM ROTEXING OF OTHER THAN PLANT 8'S OWN PRODUCTS - LOW FLUORIDE	155	16	13,000
U3O8, +8 MESH - LOW FLUORIDE	122	78	42,400
UF4 FROM PILOT PLANT UF6	211	5	527
UF4 OR THF4	210	19	2,390
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	29	25,200
UO3 PRODUCT	200	391	436,000

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
UO3 REACTOR RECYCLE TAILS	201	7	1,320
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	28	4,240
ZIRCONIUM CLAD METAL, FROM OFF-SITE, TO BE DECLAD BY ZIRNLO SYSTEM	113	95	54,700
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	38	24,200
ZIRNLO PRODUCT	307	12	8,450
ZIRNLO; PARTIALLY DECLAD FUEL ELEMENTS	124	6	5,910
PLANT 5 AREA Total:			**2,590,000**
LOCATION: PLANT 6 AREA			
CALCIUM URANATE	123	994	237,000
CHEMICAL REJECT SOLID METAL FOR PICKLING PRIOR TO REMELT	251	18	25,700
CODE 2 DERBIES FOR DOUBLE MELTING OR SHOT CLEANING	220	5	1,350
CRUSHED TUBULAR ELEMENTS	335	17	19,000
DERBIES, CODE 1 AND CODE 3	300	917	279,000
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	305	118,000
INGOT CROPS AND DUDS	308	2	2,090
INGOTS FROM OFF-SITE TO BE REWORKED	246	1	1,800
MARK 25 ELEMENTS - INNER	509	13	13,700
MARK 25 ELEMENTS - OUTER	510	28	16,900
METAL FROM SPILLS FOR DOUBLE MELTING	219	9	12,700
METAL SAMPLES FOR DOUBLE MELTING	227	25	3,150
PARTIALLY OXIDIZED METAL FOR DISSOLVER	130	2	992
PICKLED CHEMICAL REJECT CROPS	333	1	1,740
REJECT ELEMENTS - INNER	324	2	493
ROASTED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	143	514	201,000
ROASTED MGF2 (BLENDED WITH OTHER MATERIALS)	031	2	1,160

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
ROASTED, MILLED AND/OR SCREENED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	159	355	74,900
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	1	57
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	11	4,760
SCRAP UO2	102	2	232
SOLID METAL - INCLUDES PHYSICAL BUT NOT CHEMICAL REJECT INGOTS; TO BE SAWED OR CRUSHED AND PICKL	222	3	3,930
SOLID METAL TO BE PICKLED	228	287	290,000
SOLID METAL, NOT PICKLED, OTHER THAN SPILLS AND TOP CROPS, FOR DOUBLE MELT	224	2	60
SOLID METAL, OTHER THAN CORES, WITH EMBEDDED STEEL	119	1	670
SR STANDARD SOLID METAL - FOR REMELT	311	3	3,570
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	6	4,310
UF4 FROM PILOT PLANT UF6	211	419	37,700
UF4 OR THF4	210	1	178
UNROASTED BUT MILLED MGF2 (BLENDED WITH OTHER MATERIALS)	088	27	17,800
UO3 PRODUCT	200	1	439
PLANT 6 AREA Total:			**1,370,000**
LOCATION: PLANT 6 WAREHOUSE			
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	27	6,340
PLANT 6 WAREHOUSE Total:			**6,340**
LOCATION: PLANT 8 WAREHOUSE			
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	1	60
PLANT 8 WAREHOUSE Total:			**60**
LOCATION: SIX TO FOUR REDUCTION FACILITY #1			
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	2	122

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TABLE A.IV-1

Summary of Inventory Materials
Product Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	2	570
SIX TO FOUR REDUCTION FACILITY #1 Total:			692
LOCATION: TENSION SUPPORT STRUCTURE #5			
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	251	89,700
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	6	1,250
TENSION SUPPORT STRUCTURE #5 Total:			91,000
LOCATION: UNKNOWN			
UF4 OR THF4	210	3	706
UNKNOWN Total:			706
GRAND TOTAL:			10,400,000

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TABLE A.IV-2

Summary of Inventory Materials
Product RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
LOCATION: CP STORAGE WAREHOUSE				
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	9	2,280	D011
CP STORAGE WAREHOUSE Total:			2,280	
LOCATION: KC-2 WAREHOUSE				
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	1	336	D001, D010
KC-2 WAREHOUSE Total:			336	
LOCATION: PLANT 1 AREA				
IMPURE URANYL OR THORIUM NITRATE - SOLID	160	12	148	D001
PURIFIED URANYL OR THORIUM NITRATE SOLUTION	204	1	216	D001, D002
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	2	1,110	F002
PLANT 1 AREA Total:			1,470	
LOCATION: PLANT 5 AREA				
IMPURE URANYL OR THORIUM NITRATE - SOLID	160	2	13	D001
PLANT 5 AREA Total:			13	
LOCATION: PLANT 6 WAREHOUSE				
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	1	192	D008
ROASTED MGF2 (BLENDED WITH OTHER MATERIALS)	031	7	5,170	D004, D008
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	1	185	D005
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	1	445	D007

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TABLE A.IV-2

Summary of Inventory Materials
Product RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	211	48,000	D011
PLANT 6 WAREHOUSE Total:			**54,000**	
LOCATION: PLANT 8 WAREHOUSE				
DUST COLLECTOR BAGS	029	2	64	D007
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	2	114	F001
PLANT 8 WAREHOUSE Total:			**178**	
LOCATION: TENSION SUPPORT STRUCTURE #5				
OFF-SITE SUMP AND FILTER CAKES AFTER ROASTING AT FMPC	144	36	19,500	D007
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	751	D007, D008
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	6	2,540	D004
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	3	41	F002
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	244	118,000	F002
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	5	1,060	D011
TENSION SUPPORT STRUCTURE #5 Total:			**142,000**	
GRAND TOTAL:			**200,000**	

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TABLE A.IV-3

Summary of Inventory Materials
Product Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: FINISHED PRODUCTS WAREHOUSE			
CLAD METAL FOR ACID DISSOLUTION - NOT FOR ZIRNLO PROCESSING	141	2	102
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	100	74,400
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	1	249
FINISHED PRODUCTS WAREHOUSE Total:			**74,800**
LOCATION: OLD PLANT 5 WAREHOUSE			
UO3 REACTOR RECYCLE TAILS	201	112	1,030,000
OLD PLANT 5 WAREHOUSE Total:			**1,030,000**
LOCATION: PILOT PLANT AREA			
UF4 FROM PILOT PLANT UF6	211	2315	579,000
PILOT PLANT AREA Total:			**579,000**
LOCATION: PLANT 1 AREA			
CHEMICAL REJECT SOLID METAL FOR PICKLING PRIOR TO REMELT	251	5	7,370
CLAD METAL FOR ACID DISSOLUTION - NOT FOR ZIRNLO PROCESSING	141	3	25
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	4	1,120
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	2	272
OXIDE FOR SCREENING AND MILLING	192	1	18
OXIDES CLAD OR MIXED WITH STAINLESS STEEL	142	3	420
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	2	22.5
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	2	206
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	3	142
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	2	135
SOLID METAL TO BE PICKLED	228	1	238

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TABLE A.IV-3

Summary of Inventory Materials
Product Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
U3O8 FOR REOXIDATION	134	1	60
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	94	64,400
UF4 OR THF4	210	2	305
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	4	2,530
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	4	592
PLANT 1 AREA Total:			**77,900**
LOCATION: PLANT 4 WAREHOUSE			
OFF-SPEC UF4 OR THF4	082	9	704
UF4 FROM HANFORD UO3	212	3238	598,000
UF4 FROM PILOT PLANT UF6	211	4258	882,000
PLANT 4 WAREHOUSE Total:			**1,480,000**
LOCATION: PLANT 5 AREA			
CHARGED UF4 POTS, WIP	216	1	1,000
CHEMICAL REJECT SOLID REMELT METAL - DOES NOT REQUIRE PICKLING	322	2	2,120
CODE 2 DERBIES FOR DOUBLE MELTING OR SHOT CLEANING	220	198	67,500
DOUBLE MELT INGOTS TO BE SAWED, BUT NOT PICKLED, PRIOR TO REMELT	241	2	1,870
DUST COLLECTOR BAGS	029	4	727
INGOT CROPS AND DUDS	308	3	2,590
MARK 31 CASTINGS - FINISHED - OUTER	409	1	1,020
MARK 31 CASTINGS - RAW - INNER	406	16	9,130
MARK 31 CASTINGS - RAW - OUTER	407	670	748,000
METAL FROM SPILLS FOR DOUBLE MELTING	219	2	1,810
METAL SAMPLES FOR DOUBLE MELTING	227	24	6,440
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	1	50

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TABLE A.IV-3

Summary of Inventory Materials
Product Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
PICKLED PRIMARY INGOT SECTIONS CONTAINING FIRST GENERATION TOP CROPS	314	1	166
PICKLED PRIMARY INGOT SECTIONS CONTAINING NO TOP CROP METAL	315	1	479
PICKLED REJECT BILLETS OR BILLET SECTIONS	327	1	1,880
PRIMARY INGOT SECTIONS, NOT PICKLED, CONTAINING FIRST GENERATION TOP CROPS	330	55	40,800
REJECT BILLETS, INCLUDING SAWED BILLET SECTIONS	326	6	4,640
U3O8 FOR REOXIDATION	134	1	25
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	12	7,610
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	4	2,790
PLANT 5 AREA Total:			**901,000**
LOCATION: PLANT 6 AREA			
CHEMICAL REJECT SOLID REMELT METAL - DOES NOT REQUIRE PICKLING	322	2	1,260
DOUBLE MELT INGOTS TO BE SAWED AND PICKLED PRIOR TO REMELT	240	191	274,000
MARK 31 ELEMENTS - INNER	500	378	388,000
MARK 31 ELEMENTS - OUTER	501	1099	941,000
METAL FROM SPILLS FOR DOUBLE MELTING	219	1	1,600
N REACTOR INGOTS - FINISHED	410	208	323,000
N REACTOR INGOTS - RAW	404	28	40,400
SPECIAL MACHINED SHAPES	506	1	459
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	131	88,200
ZIRCONIUM CLAD METAL, FROM OFF-SITE, TO BE DECLAD BY ZIRNLO SYSTEM	113	1	45
PLANT 6 AREA Total:			**2,060,000**
GRAND TOTAL:			**6,200,000**

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TABLE A.IV-4

Summary of Inventory Materials
Thorium Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: GENERAL IN-PROCESS WAREHOUSE			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	0
GENERAL IN-PROCESS WAREHOUSE Total:			
LOCATION: OLD PLANT 5 WAREHOUSE			
OXIDES CLAD OR MIXED WITH ZIRCONIUM	140	1	35
THORIUM HYDROXIDE, DRY	215	4031	1,790,000
OLD PLANT 5 WAREHOUSE Total:			1,790,000
LOCATION: PLANT 1 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	5
CONTAMINATED STEEL AFTER WASHING AND/OR CLEANING	004	1	1,770
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	18	7,800
NON-BURNABLE METAL WITH URANIUM CONTENT	053	1	929
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	6	65
PLANT 1 AREA Total:			10,600
LOCATION: PLANT 2/3 AREA			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	12,600
PLANT 2/3 AREA Total:			12,600
LOCATION: PLANT 9 WAREHOUSE			
THORIUM RESIDUES	090	150	591,000
PLANT 9 WAREHOUSE Total:			591,000

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TABLE A.IV-4

Summary of Inventory Materials
Thorium Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: QUONSET HUT #1			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	423
OFF-SPEC THO2; FRENCH SOURCE	151	1	398
OFF-SPEC UF4 OR THF4	082	27	19,100
OXIDES CLAD OR MIXED WITH ZIRCONIUM	140	5	8,550
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	1	312
THORIUM RESIDUES	090	134	372,000
U OR TH NITRATE SOLUTIONS, HIGH IMPURITY SUCH AS ZIRNLO DECOPPERING SOLUTIONS FOR REFINERY PROCE	072	6	187
QUONSET HUT #1 Total:			401,000
LOCATION: THORIUM WAREHOUSE			
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	2	128
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	5	34
THORIUM RESIDUES	090	129	536,000
THORIUM WAREHOUSE Total:			536,000
LOCATION: UNKNOWN (BLANK)			
UO2 (OR THO2) POWDER - REFINERY FEED	167	1	496
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	2	304
UNKNOWN (BLANK) Total:			800
GRAND TOTAL:			3,340,000

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TABLE A.IV-5

Summary of Inventory Materials
Thorium RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
LOCATION: KC-2 WAREHOUSE				
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	4	613	D001
KC-2 WAREHOUSE Total:			**613**	
LOCATION: PILOT PLANT WAREHOUSE				
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	2	128	D005
THORIUM RESIDUES	090	5	10,100	D001, D002, D007, D008
TRAILER CAKES, WASTE SLURRIES, RAFFINATES NOT MEETING DISCARD SPECIFICATION	007	1	402	D002, D005, D009
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	1	2	D001, D003
UO2 (OR THO2) POWDER - REFINERY FEED	167	1	68	D008
URANYL OR THORIUM NITRATE SOLUTION	150	2	1,140	D002, D007, D008
PILOT PLANT WAREHOUSE Total:			**11,800**	
GRAND TOTAL:			**12,500**	

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TABLE A.IV-6

Summary of Inventory Materials
Thorium Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight
LOCATION: OLD PLANT 5 WAREHOUSE			
THORIUM HYDROXIDE, DRY	215	1536	686,000
WET SUMP OR FILTER CAKE, HALIDE CONTAMINATED	067	34	10,200
OLD PLANT 5 WAREHOUSE Total:			696,000
LOCATION: PILOT PLANT WAREHOUSE			
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	1	5
DUST COLLECTOR BAGS	029	1	61
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	3
SAWDUST FOR OXIDATION	109	1	38
PILOT PLANT WAREHOUSE Total:			107
LOCATION: PLANT 1 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	40	26,900
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	41	14,300
CONTAMINATED ASBESTOS MATERIALS	028	1	1,030
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	7	525
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	13	1,660
PLANT 1 AREA Total:			44,400
LOCATION: PLANT 1 THORIUM WAREHOUSE			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	5	170
PLANT 1 THORIUM WAREHOUSE Total:			170

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TABLE A.IV-6

Summary of Inventory Materials
Thorium Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight
LOCATION: QUONSET HUT #1			
METAL SAMPLES FOR DOUBLE MELTING	227	2	12
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	35	7,600
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	8	52
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	144	37,300
SOLID METAL TO BE PICKLED	228	1	376
TRAILER CAKES, WASTE SLURRIES, RAFFINATES NOT MEETING DISCARD SPECIFICATION	007	2	68
QUONSET HUT #1 Total:			**45,400**
LOCATION: THORIUM WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	2	68
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	1	7
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	262
SAWDUST FOR OXIDATION	109	4	1,580
SOLID METAL TO BE PICKLED	228	2	10
THORIUM RESIDUES	090	1	4,010
U OR TH CHLORIDE OR FLUORIDE SOLUTIONS, HIGH IMPURITY - SUCH AS PLANT 8 METAL DISSOLVER PRODUCT -	073	2	18
U OR TH NITRATE SOLUTIONS, HIGH IMPURITY SUCH AS ZIRNLO DECOPPERING SOLUTIONS FOR REFINERY PROCE	072	5	60
THORIUM WAREHOUSE Total:			**6,020**
GRAND TOTAL:			**792,000**

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: BOILER PLANT			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	11	53,800
BOILER PLANT Total:			53,800
LOCATION: CHEMICAL WAREHOUSE			
CO-PACKAGED URANIUM RESIDUES	094	11	0
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	3	983
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	23	42,700
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	1	0
CHEMICAL WAREHOUSE Total:			43,700
LOCATION: CORRAL - FERMCO STORAGE AREA			
CO-PACKAGED URANIUM RESIDUES	094	12	54,400
CORRAL - FERMCO STORAGE AREA Total:			54,400
LOCATION: CP STORAGE WAREHOUSE			
CONTAMINATED OIL - SOLUBLE; COOLANT	009	1	316
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	2	387
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	3	951
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	2	833
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	9	3,160
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	3	915
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	1	615
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	14	3,690
CP STORAGE WAREHOUSE Total:			10,900

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: D&D BUILDING			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	9,050
D&D BUILDING Total:			**9,050**
LOCATION: DECONTAMINATION BUILDING			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	9	73,000
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	3	0
DECONTAMINATION BUILDING Total:			**73,000**
LOCATION: FINISHED PRODUCTS WAREHOUSE			
CO-PACKAGED URANIUM RESIDUES	094	8	31,600
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	1	708
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	4	1,800
DUST COLLECTOR BAGS	029	16	629
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	5	1,880
MGF2 FOR MILLING OR DISCARD	034	2	276
OFF-SPEC UF4 OR THF4	082	20	1,740
REJECT UO3	157	3	77
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	7	1,680
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	7	1,420
SCRAP UO2	102	9	1,550
UO2 OR THO2 PRODUCT	202	2	896
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	100	101,000
FINISHED PRODUCTS WAREHOUSE Total:			**145,000**

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: GENERAL IN-PROCESS WAREHOUSE			
CO-PACKAGED URANIUM RESIDUES	094	8	10,600
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	12	10,200
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	1	126
CONTAMINATED CARBON FILTER ELEMENTS	026	3	471
CONTAMINATED GRAPHITE - CRUSHED	024	1	198
CONTAMINATED METALLIC FILTER ELEMENTS	025	1	29
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	1	38
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	22	33,600
DEPLETED U METAL - NOT SUITABLE FOR REACTOR PRODUCT STREAMS (NOT TOP CROPS)	055	19	19,600
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	524
DRUM DECONTAMINATION RESIDUES: WET MGF2	021	3	1,000
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	5	497
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	16	6,030
GRIT BLAST RESIDUE	008	3	1,420
HIGH LEVEL CLEANING RESIDUES	054	1	153
INCINERATOR CINDERS - MATERIAL NOT PASSING THROUGH GRATE OR SCREEN	033	2	7,230
INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	103	4	7,130
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	6	2,730
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	100	16,400
ROASTED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	143	1	342
ROASTED MGF2 (BLENDED WITH OTHER MATERIALS)	031	17	9,820
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	3	852
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	4	1,560
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	2	562
SLUDGES, NON-OILY, FOR OXIDATION, INCLUDING HIGH OR LOW FREE METAL	046	1	241

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
WET SUMP OR FILTER CAKE, HALIDE CONTAMINATED	067	16	3,780
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	6	1,370
GENERAL IN-PROCESS WAREHOUSE Total:			**137,000**
LOCATION: HEALTH AND SAFETY BUILDING			
DUST COLLECTOR BAGS	029	8	419
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	7	413
OFF-SPEC UF4 OR THF4	082	5	1,050
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	1	6
SCRAP UO2	102	1	278
HEALTH AND SAFETY BUILDING Total:			**2,170**
LOCATION: KC-2 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	73	0
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	1	34
CONTAMINATED OIL, INSOLUBLE	015	3	302
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	507
SLUDGES, OILY	039	1	572
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	1	14
KC-2 WAREHOUSE Total:			**1,430**
LOCATION: MAIN TANK FARM			
CONTAMINATED ASBESTOS MATERIALS	028	1	0
MAIN TANK FARM Total:			

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: OLD PLANT 5 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	2	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
REJECT UO3	157	116	2,390
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	11	0
OLD PLANT 5 WAREHOUSE Total:			**2,390**
LOCATION: PILOT PLANT ANNEX			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	7	0
PILOT PLANT ANNEX Total:			
LOCATION: PILOT PLANT AREA			
OFF-SPEC UF4 OR THF4	082	2	478
REJECT UO3	157	2	600
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	1	57
SCRAP UO2	102	1	16
PILOT PLANT AREA Total:			**1,150**
LOCATION: PILOT PLANT WAREHOUSE			
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	1	68
CONTAMINATED CARBON FILTER ELEMENTS	026	1	26
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	20	4,130
PCB MATERIALS, BALLAST, PCB-CONTAMINATED RAGS	050	1	70
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	6	624
PILOT PLANT WAREHOUSE Total:			**4,920**

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: PILOT PLANT WET SIDE			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
PILOT PLANT WET SIDE Total:			
LOCATION: PLANT 1 AREA			
BIRD CARCASSES, DROPPINGS, AND CONTAMINATED MATERIALS	093	5	2,690
CHEMICAL REJECT PRIMARY INGOTS	120	2	667
CHIPS AND TURNINGS CONTAMINATED WITH NON-U MATERIALS - FOR OXIDATION	107	1	149
CLAD METAL FOR ACID DISSOLUTION - NOT FOR ZIRNLO PROCESSING	141	3	94.8
COLD METAL OXIDES - NON RADIUM-BEARING	095	7	0
CONTAMINATED ALUMINA - SODA LIME (HIGH C1)	018	43	11,700
CONTAMINATED COPPER - FOR DISCARD	016	147	117,000
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	290	92,000
CONTAMINATED OIL - SOLUBLE; COOLANT	009	4	1,280
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1605	1,070,000
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	12	5,260
CONTAMINATED STEEL AFTER WASHING AND/OR CLEANING	004	2	537
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	327	109,000
CONTAMINATED ZIRCONIUM	005	2	126
CONTAMINATED ASBESTOS MATERIALS	028	663	277,000
CONTAMINATED CAF2 - MGO	058	38	9,540
CONTAMINATED CARBON FILTER ELEMENTS	026	53	9,080
CONTAMINATED GRAPHITE - CRUSHED	024	12	3,910
CONTAMINATED MAGNESIUM	019	4	1,140
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	57	17,000
CONTAMINATED METALLIC FILTER ELEMENTS	025	26	2,960

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
CONTAMINATED OIL, INSOLUBLE	015	58	18,300
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	230	23,000
CONTAMINATED TBP AND/OR KEROSENE MIXTURES AND SLUDGES	022	68	26,700
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	1	712
DEPLETED U METAL - NOT SUITABLE FOR REACTOR PRODUCT STREAMS (NOT TOP CROPS)	055	41	33,300
DIRTY PRILL, CODE 5 DERBIES, AND PLANT 1 TITAN MILL CLEAN-OUT, HIGH U CONTENT	129	255	227,000
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	451	199,000
DRUM DECONTAMINATION RESIDUES: WET MGF2	021	296	145,000
DRY CRUSHED SLAG FROM FURNACE POT BLOWOUTS	077	295	193,000
DUST COLLECTOR BAGS	029	517	43,000
DUST COLLECTOR RESIDUE, HIGH FLUORIDE, GREATER THAN 20% ASSAY	135	64	21,200
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	268	114,000
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	159	49,900
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	55	32,600
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	406	122,000
GLASS AND SAMPLE BOTTLES	014	72	3,500
GLASS FROM VITRIFICATION	603	27	8,440
GRIT BLAST RESIDUE	008	46	25,100
HIGH LEVEL CLEANING RESIDUES	054	5	936
INCINERATOR ASHES - MATERIAL PASSING THROUGH GRATE OR SCREEN	032	1	1
INCINERATOR CINDERS - MATERIAL NOT PASSING THROUGH GRATE OR SCREEN	033	574	156,000
LEAD AND LEAD-CONTAMINATED MATERIALS	049	2	2,080
MAGNESIUM OXIDE AND MAGNESIUM ZIRCONATE FROM CRUCIBLE CLEANOUT	030	137	60,800
MATERIAL HELD FOR HISTORICAL PURPOSES	098	4	304
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	1	12
METAL SPILLS AND EXTRUSION ENDS: METAL HIGH IN IMPURITIES AND SPILLS	104	9	2,280
METAL TO BE OXIDIZED	136	1	0

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
MGF2 FOR MILLING OR DISCARD	034	226	64,100
MGF2 OR CAF2, GOOD LINER MATERIAL	035	6	1,870
MGF2, +20 MESH, LOW U CONTENT, TO BE CRUSHED	038	13	5,960
MGF2, -20 MESH, HIGH FREE METAL FOR PLANT 8 ROASTING (ENRICHED ONLY)	036	25	15,000
MGF2, GROUND	037	11	2,130
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	16	9,850
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	1	255
NON-BURNABLE METAL WITH URANIUM CONTENT	053	41	30,100
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	374	220,000
OFF-SPEC UF4 OR THF4	082	143	50,200
OILY MGF2	023	2	624
ORE CONCENTRATE - MISCELLANEOUS	170	7	327
OXIDES CLAD OR MIXED WITH ALUMINUM	133	5	1,050
OXIDES CLAD OR MIXED WITH STAINLESS STEEL	142	2	108
OXIDES CLAD OR MIXED WITH ZIRCONIUM	140	22	6,570
PARTIALLY OXIDIZED METAL FOR DISSOLVER	130	3	4,570
PARTIALLY OXIDIZED METAL FOR SORTING CONTAINING METL-X	080	1	747
PARTIALLY OXIDIZED METAL FOR SORTING CONTAINING NO METL-X	081	3	1,150
PARTIALLY OXIDIZED METAL OXIDATION FEED	131	1	103
RADIUM-BEARING MATERIALS - SAMPLES, K-65, INCLUDING Q-11 CONTAMINATED MATERIALS	097	2	210
REJECT UO3	157	5	280
ROASTED, MILLED AND/OR SCREENED AMMONIUM-PRECIPITATED SUMP AND FILTER CAKES	163	2	1,280
ROCKWELL CLEANINGS	071	37	21,100
ROCKWELL SPILLS	070	106	89,700
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	68	7,070
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	223	105,000
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	73	25,900

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	168	50,700
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	4	525
SCRAP UO2	102	19	2,920
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	385	138,000
SLUDGES, NON-OILY, FOR OXIDATION, INCLUDING HIGH OR LOW FREE METAL	046	30	9,050
SLUDGES, OILY	039	17	7,560
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	7	2,290
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	5	2,310
SLUDGES, SALT, SOFT, NON-CHLORIDE	045	4	2,730
SOLID METAL, OTHER THAN CORES, WITH EMBEDDED STEEL	119	12	2,350
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	49	11,600
TRAILER CAKES, WASTE SLURRIES, RAFFINATES NOT MEETING DISCARD SPECIFICATION	007	50	16,300
U3O8 - NOT REQUIRING RE-OXIDATION	165	189	79,600
U3O8 - ROTEXED - OTHER THAN PLANT 8'S OWN PRODUCT	085	2	487
U3O8, +8 MESH - LOW FLUORIDE	122	28	18,300
UF4 FROM HANFORD UO3	212	1	140
UF4 OR THF4	210	1	158
UNRECYCLED SLAG +20 MESH, BALL MILL PRODUCT	125	36	34,700
UNROASTED BUT MILLED MGF2 (BLENDED WITH OTHER MATERIALS)	088	27	7,970
UO2 (OR THO2) PELLETS - REFINERY FEED	166	2	0.71
UO2 (OR THO2) POWDER - REFINERY FEED	167	2	2
URANIUM ALLOYED OR CANNED WITH ELEMENTS OTHER THAN ALUMINUM, MOLYBDENUM OR ZIRCONIUM	139	1	600
URANIUM CARBIDE, UC	161	1	4
WET CRUSHED SLAG FROM FURNACE POT BLOWOUTS	057	61	37,500
WET SUMP OR FILTER CAKE, HALIDE CONTAMINATED	067	494	121,000
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	1188	430,000
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	1	584

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	3	1,960
PLANT 1 AREA Total:			**4,880,000**
LOCATION: PLANT 2 AREA			
WET CRUSHED SLAG FROM FURNACE POT BLOWOUTS	057	1	658
PLANT 2 AREA Total:			**658**
LOCATION: PLANT 2/3 AREA			
CONTAMINATED COPPER - FOR DISCARD	016	1	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	8	6,310
PLANT 2/3 AREA Total:			**6,310**
LOCATION: PLANT 4 WAREHOUSE			
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	1	272
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	411
SLUDGES, OILY	039	7	2,060
PLANT 4 WAREHOUSE Total:			**2,740**
LOCATION: PLANT 5 AREA			
BRIQUETTABLE CHIPS AND TURNINGS FROM STANDARD METAL	111	5	1,210
CO-PACKAGED URANIUM RESIDUES	094	13	56,000
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	159	63,800
CONTAMINATED ASBESTOS MATERIALS	028	1	0
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	1	271
CONTAMINATED METALLIC FILTER ELEMENTS	025	4	160
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	2	125

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	5	4,590
DEPLETED U METAL - NOT SUITABLE FOR REACTOR PRODUCT STREAMS (NOT TOP CROPS)	055	63	44,000
DIRTY PRILL, CODE 5 DERBIES, AND PLANT 1 TITAN MILL CLEAN-OUT, HIGH U CONTENT	129	43	35,500
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	3	1,240
DRY CRUSHED SLAG FROM FURNACE POT BLOWOUTS	077	4	2,950
DUST COLLECTOR BAGS	029	4	255
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	6	2,770
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	9	2,370
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	4	914
HIGH LEVEL CLEANING RESIDUES	054	1	131
MGF2 FOR MILLING OR DISCARD	034	17	6,530
MGF2 OR CAF2, GOOD LINER MATERIAL	035	42	220,000
MGF2, +20 MESH, LOW U CONTENT, TO BE CRUSHED	038	51	29,500
MGF2, GROUND	037	1	621
NON-BRIQUETTABLE CHIPS AND TURNINGS FOR OXIDATION	110	43	8,010
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	8	1,520
PARTIALLY OXIDIZED METAL OXIDATION FEED	131	1	132
ROCKWELL CLEANINGS	071	1	401
ROCKWELL SPILLS	070	1	244
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	3	421
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	387
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	9	3,600
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	1	140
SLUDGES, NON-OILY, FOR OXIDATION, INCLUDING HIGH OR LOW FREE METAL	046	5	1,310
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	7	2,770
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	100	37,100
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	1	0

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
WET CRUSHED SLAG FROM FURNACE POT BLOWOUTS	057	2	1,410
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	42	13,500
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	25	15,800
PLANT 5 AREA Total:			**560,000**
LOCATION: PLANT 6 AREA			
BAD REDUCTION (NO DERBY)	084	1	546
BIRD CARCASSES, DROPPINGS, AND CONTAMINATED MATERIALS	093	1	2,920
CHIPS AND TURNINGS CONTAMINATED WITH NON-U MATERIALS - FOR OXIDATION	107	1	423
CO-PACKAGED URANIUM RESIDUES	094	16	36,800
CONTAMINATED ALUMINA - SODA LIME (HIGH Cl)	018	1	82
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	4	1,310
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	184	69,500
CONTAMINATED CAF2 - MGO	058	2	419
CONTAMINATED CARBON FILTER ELEMENTS	026	3	349
CONTAMINATED GRAPHITE - CRUSHED	024	1	366
CONTAMINATED METALLIC FILTER ELEMENTS	025	4	848
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	4	5,100
DEPLETED U METAL - NOT SUITABLE FOR REACTOR PRODUCT STREAMS (NOT TOP CROPS)	055	4	7,190
DIRTY PRILL, CODE 5 DERBIES, AND PLANT 1 TITAN MILL CLEAN-OUT, HIGH U CONTENT	129	1	907
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	565
DRY CRUSHED SLAG FROM FURNACE POT BLOWOUTS	077	1	204
DUST COLLECTOR BAGS	029	10	477
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	59	23,600
GRIT BLAST RESIDUE	008	4	2,110
INGOT CROPS AND DUDS	308	5	4,460

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
MAGNESIUM OXIDE AND MAGNESIUM ZIRCONATE FROM CRUCIBLE CLEANOUT	030	2	363
METAL SAMPLES FOR DOUBLE MELTING	227	1	252
METAL SPILLS AND EXTRUSION ENDS: METAL HIGH IN IMPURITIES AND SPILLS	104	1	48
MGF2 FOR MILLING OR DISCARD	034	13	5,640
MGF2 OR CAF2, GOOD LINER MATERIAL	035	1	732
MGF2, +20 MESH, LOW U CONTENT, TO BE CRUSHED	038	70	41,700
MGF2, GROUND	037	15	9,700
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	2	432
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	23	1,980
OXIDES CLAD OR MIXED WITH ALUMINUM	133	3	2,490
PHYSICAL REJECT BILLETS TO BE SAWED PRIOR TO REMELT	234	2	1,240
REJECT UO3	157	2	214
ROASTED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	143	16	5,360
ROASTED, MILLED AND/OR SCREENED AMMONIUM-PRECIPITATED SUMP AND FILTER CAKES	163	61	33,200
ROASTED, MILLED AND/OR SCREENED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	159	35	7,990
ROCKWELL CLEANINGS	071	1	640
ROCKWELL SPILLS	070	1	840
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	4	467
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	13	2,000
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	5	1,660
SCRAP UO2	102	3	1,470
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	6	0
SLUDGES, NON-OILY, FOR OXIDATION, INCLUDING HIGH OR LOW FREE METAL	046	105	42,500
SOLID METAL TO BE SAWED, SHEARED OR CRUSHED, BUT NOT PICKLED PRIOR TO REMELT	223	1	791
SOLID METAL, OTHER THAN CORES, WITH EMBEDDED STEEL	119	3	1,770
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	2	2,000
UNRECYCLED SLAG +20 MESH, BALL MILL PRODUCT	125	1	278

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
UNROASTED BUT MILLED MGF2 (BLENDED WITH OTHER MATERIALS)	088	12	5,770
UO2 (OR THO2) PELLETS - REFINERY FEED	166	3	404
WET SUMP OR FILTER CAKE, HALIDE CONTAMINATED	067	4	876
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	272	100,000
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	6	4,410
PLANT 6 AREA Total:			**435,000**
LOCATION: PLANT 6 ELECTROSTATIC PRECIPITATOR CENTRAL			
MGF2 OR CAF2, GOOD LINER MATERIAL	035	1	14
PLANT 6 ELECTROSTATIC PRECIPITATOR CENTRAL Total:			**14**
LOCATION: PLANT 6 WAREHOUSE			
CONTAMINATED ALUMINA - SODA LIME (HIGH C1)	018	19	8,230
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	1	654
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	1	140
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	4	1,410
CONTAMINATED OIL, INSOLUBLE	015	1	129
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	44	12,900
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	6	2,140
SLUDGES, OILY	039	2	327
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	166	45,800
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	46	13,400
PLANT 6 WAREHOUSE Total:			**85,100**
LOCATION: PLANT 7 AREA			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	41,400

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
PLANT 7 AREA Total:			41,400
LOCATION: PLANT 8 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	36	16,800
CONTAMINATED OIL, INSOLUBLE	015	9	2,690
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	3	347
DRUM DECONTAMINATION RESIDUES: WET MGF2	021	1	414
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	6	3,360
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	11	4,280
HIGH LEVEL CLEANING RESIDUES	054	12	2,240
MAGNESIUM DIURANATE	091	5	2,390
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
ROCKWELL CLEANINGS	071	1	376
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	21	25,600
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	2	621
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	140	62,700
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	37	17,200
PLANT 8 AREA Total:			139,000
LOCATION: PLANT 8 WAREHOUSE			
CONTAMINATED ALUMINA - SODA LIME (HIGH Cl)	018	40	10,800
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	1	256
CONTAMINATED STEEL AFTER WASHING AND/OR CLEANING	004	2	647
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	9	3,080
CONTAMINATED METALLIC FILTER ELEMENTS	025	1	31
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	1	77

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	35	9,090
ROCKWELL CLEANINGS	071	2	990
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	8	2,010
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	3	475
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	1	242
PLANT 8 WAREHOUSE Total:			**27,700**
LOCATION: PLANT 9 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	0
CONTAMINATED ASBESTOS MATERIALS	028	1	916
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
PLANT 9 AREA Total:			**916**
LOCATION: PLANT 9 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	7	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	6	0
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	14	0
PLANT 9 WAREHOUSE Total:			
LOCATION: QUONSET HUT #1			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	15	0
QUONSET HUT #1 Total:			
LOCATION: QUONSET HUT #3			
RADIUM-BEARING MATERIALS - SAMPLES, K-65, INCLUDING Q-11 CONTAMINATED MATERIALS	097	7	601

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
QUONSET HUT #3 Total:			601
LOCATION: SIX TO FOUR REDUCTION FACILITY #1			
BIRD CARCASSES, DROPPINGS, AND CONTAMINATED MATERIALS	093	4	217
CONTAMINATED ALUMINA - SODA LIME (HIGH Cl)	018	5	1,470
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	475
OFF-SPEC UF4 OR THF4	082	2	417
REJECT UO3	157	2	562
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	2	1,570
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	2	195
ZIRNLO ENDS - TO BE CLASSIFIED FOR RECOVERY	076	78	104,000
SIX TO FOUR REDUCTION FACILITY #1 Total:			109,000
LOCATION: TENSION SUPPORT STRUCTURE #5			
CONTAMINATED ALUMINA - SODA LIME (HIGH Cl)	018	8	3,450
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	423
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	156	66,100
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	1	468
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	2	406
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	29,900
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	13	4,590
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	44	12,800
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	67	19,000
TENSION SUPPORT STRUCTURE #5 Total:			137,000

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TABLE A.IV-7

Summary of Inventory Materials
Other Non-RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: THORIUM WAREHOUSE			
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	3	1,090
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	6	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	48	1,120
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	52	19,700
THORIUM WAREHOUSE Total:			**21,900**
LOCATION: UNKNOWN (0012)			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
UNKNOWN (0012) Total:			
LOCATION: UNKNOWN (0015)			
CONTAMINATED GRAPHITE - CRUSHED	024	1	82
UNKNOWN (0015) Total:			**82**
LOCATION: UNKNOWN (0056)			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	2	0
UNKNOWN (0056) Total:			
LOCATION: UNKNOWN (BLANK)			
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	1	641
UNKNOWN (BLANK) Total:			**641**
GRAND TOTAL:			**6,990,000**

TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
LOCATION: CHEMICAL WAREHOUSE				
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	1	126	D009
CHEMICAL WAREHOUSE Total:			126	
LOCATION: CP STORAGE WAREHOUSE				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	550	F001
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	20	8,150	D001, D005, D007, D008, D009, D010, D011, D018, D019, D035, D039, F001, F002, F003, F005
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	1	373	D007, D008, D010
CONTAMINATED MERCO-DRI AND HILCO CAKE	020	1	447	D001, D039
CONTAMINATED OIL, INSOLUBLE	015	43	3,140	D001, D005, D006, D007, D008, D009, D010, D018, D039, F002
GRIT BLAST RESIDUE	008	1	412	D008
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	8	3,030	D007, D008, D010, F001
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	1	2	F002
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	4	1,320	D008, D019, F001, F002
SLUDGES, OILY	039	81	32,300	D001, D005, D008, D019, F002

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	9	2,430	D004, D019, D039, F002
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	043	22	8,110	D007, D009, D019, D029, D039, D040, F001, F002
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	20	7,260	D011, D039, D040, F002
CP STORAGE WAREHOUSE Total:			**67,500**	
LOCATION: FINISHED PRODUCTS WAREHOUSE				
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	1	171	D005
FINISHED PRODUCTS WAREHOUSE Total:			**171**	
LOCATION: GENERAL IN-PROCESS WAREHOUSE				
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	5	140	D007, D009, D011
GENERAL IN-PROCESS WAREHOUSE Total:			**140**	
LOCATION: KC-2 WAREHOUSE				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	18	7,950	D001, D007, D008, D018, D029, D030, D032, D033, D040, F002, F003, F005

TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	212	28,400	D001, D005, D006, D007, D008, D009, D010, D011, D018, D019, D021, D022, D028, D029, D035, D038, D039, D040, F001, F002, F003, F005
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	112	42,300	D001, D002, D006, D007, D008, D009, D010, D018, D019, D021, D022, D028, D029, D035, D038, D039, D040, D043, F002, F003, F005
CONTAMINATED ASBESTOS MATERIALS	028	3	2,170	D001
CONTAMINATED MAGNESIUM	019	6	1,020	D001, D003
CONTAMINATED OIL, INSOLUBLE	015	14	1,740	D001, D006, D007, D008, D009, D010, D018, D039, F001, F002
CONTAMINATED TBP AND/OR KEROSENE MIXTURES AND SLUDGES	022	18	5,500	D001, D002, D005, D008, D009, D018, D019, D022, D039, F002, F003
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	8	2,800	D001
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	6	2,210	D001, D004, D008
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	27	3,200	D001, D007, D008, D018, D026, D029, D030, D032, D033, D035, D040, F001, F002, F003, F005, U159
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	8	981	D001, D002, D018, D021, D035, D038, D039, D040, D043, F002, F005
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	67	19,100	D001, D039
SLUDGES, OILY	039	7	2,280	D001, D019, F002
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	56	12,700	D001, D008, D010, D039, D040, F001, F002
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	043	26	8,890	D001, D007, D008, D009, D018, D035, F001, F002, F005

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	149	66,000	D001
UF6, URANIUM HEXAFLUORIDE	203	1	16	D003
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	1	124	D001, F002, F003, F005
KC-2 WAREHOUSE Total:			207,000	
LOCATION: PILOT PLANT WAREHOUSE				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	129	61,300	D002, D004, D007, D008, D011, F002, F005
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	2	910	D002, D007, D008, D019, D028, D039, F001, F002, F005
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	75	30,800	D002, D004, D007, D008, D009, D010, D018, D019, D028, D038, D039, F001, F002, F005
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	5	1,240	D029, D039, D040, F001
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	851	D002
LEAD AND LEAD-CONTAMINATED MATERIALS	049	24	8,760	D002, D008
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	2	643	D002, D019
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	20	1,570	D007, F002, F005, U134
PCB MATERIALS, BALLAST, PCB-CONTAMINATED RAGS	050	2	162	D004, D005, D006, D007, D008, D010, D018, F002

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
SLUDGES, OILY	039	57	16,800	D007, D008, D018, D029, D030, D032, D033, D040, F002, F005
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	2	596	D002, D007
PILOT PLANT WAREHOUSE Total:			**124,000**	
LOCATION: PLANT 1 AREA				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	6	3,090	D008, F001, F002
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	3	290	D001
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	10	4,260	D002, D008, D018
CONTAMINATED ASBESTOS MATERIALS	028	5	579	D008
CONTAMINATED MAGNESIUM	019	3	718	D001
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	1	4	U123
CONTAMINATED TBP AND/OR KEROSENE MIXTURES AND SLUDGES	022	2	659	D002, D005
DUST COLLECTOR BAGS	029	6	674	D004, D006, D007, D008
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	1	215	D005, D008
IMPURE URANYL OR THORIUM NITRATE - SOLID	160	1	38	D001
LEAD AND LEAD-CONTAMINATED MATERIALS	049	1	170	D002, D008

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
NON-BURNABLE METAL WITH URANIUM CONTENT	053	1	14	D006
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	7	1,010	D001, D009, D011, D018, D026, D039, F002, F003
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	2	259	D007
SLUDGES, OILY	039	1	254	D001, F002
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	50	22,100	D005
URANYL OR THORIUM NITRATE SOLUTION	150	1	25	D001, D002
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	2	652	D039, F002
PLANT 1 AREA Total:			**35,000**	
LOCATION: PLANT 2/3 AREA				
URANYL OR THORIUM NITRATE SOLUTION	150	18	2,290,000	D002, D005, D007
PLANT 2/3 AREA Total:			**2,290,000**	
LOCATION: PLANT 5 AREA				
CONTAMINATED MAGNESIUM	019	13	3,890	D001
IMPURE URANYL OR THORIUM NITRATE - SOLID	160	2	22	D001
PLANT 5 AREA Total:			**3,910**	

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
LOCATION: PLANT 6 WAREHOUSE				
BARIUM-CONTAMINATED MATERIALS	052	15	4,120	D005
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	5	2,760	F001, F002
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	013	47	210,000	D001, D002, D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D021, D022, D028, D029, D035, D039, D040, F001, F002, F003, F005, U019
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	14	5,860	D002, D007, D008, D019, D028, D039, F001, F002
CONTAMINATED ASBESTOS MATERIALS	028	1	845	D001
CONTAMINATED CARBON FILTER ELEMENTS	026	2	837	D040
CONTAMINATED OIL, INSOLUBLE	015	51	281,000	D001, D004, D005, D006, D007, D008, D009, D010, D011, D012, D018, D019, D021, D022, D026, D028, D029, D035, D038, D039, D040, D043, F001, F002, F003, F005, U211
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	3	479	D018, D029, D039, D040, F001
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	29	10,500	D001, D005, D008, D010, D039
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	11	3,260	D004, D006, D007, D008, D011
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	3	687	D005, D008
LEAD AND LEAD-CONTAMINATED MATERIALS	049	5	798	D008
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	14	2,640	D006, D007, D008, D009
NON-BURNABLE METAL WITH URANIUM CONTENT	053	1	1,110	D010

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	59	7,650	D004, D005, D006, D007, D008, D009, D018, D019, D022, D039, F001, F002, F003, F005, U019, U211
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	3	146	D007, F001, F002, F005
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	12	D009
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	1	373	F001
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	12	5,760	D019, D039, F001
SLUDGES, FOR BLENDING AND SCREENING	040	2	457	D007
SLUDGES, OILY	039	107	41,700	D001, D005, D007, D008, D010, D018, D019, D021, D028, D029, D039, D040, D043, F001, F002
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	8	4,200	D005, D006, D007, D008, D009, D010, D035, F001
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	043	2	472	D007, D011, D029, D039, F001
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	27	16,000	D001, D005, D007
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	15	7,090	F002
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	8	2,200	D005, D039, F002
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	95	25,300	D001, D008, D010, D011, D039, D040, F002
PLANT 6 WAREHOUSE Total:			636,000	

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
LOCATION: PLANT 8 AREA				
ROASTED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	143	2	113	F002
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	1	1,200	D007, D008
PLANT 8 AREA Total:			**1,310**	
LOCATION: PLANT 8 WAREHOUSE				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	38	20,800	D004, D005, D007, D008, D010, D011, F001, F002
CONTAMINATED ASBESTOS MATERIALS	028	9	2,070	D008, D009
CONTAMINATED METALLIC FILTER ELEMENTS	025	2	537	D008, D010
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	17	1,670	D005, D008, D011, D018, D029, D039, D040, F001, U210
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	172	D006, D007, D008
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	63	35,100	D005, D008
GRIT BLAST RESIDUE	008	874	632,000	D008, F002
LEAD AND LEAD-CONTAMINATED MATERIALS	049	29	42,700	D008
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	1	40	D006, D008, D009
NON-BURNABLE METAL WITH URANIUM CONTENT	053	15	7,900	D010

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	53	6,360	D001, D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D021, D022, D029, D039, D040, F001, F002, F003, F005
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	12	799	F001, F002, F005
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	27	14,600	D004, D005, D008, F001
SLUDGES, OILY	039	1	444	D039
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	7	5,130	D005
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	043	1	33	D009, F001, F002
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	4	1,160	D039, F002
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	22	8,750	D011, D039, D040, F002
PLANT 8 WAREHOUSE Total:			**780,000**	
LOCATION: TENSION SUPPORT STRUCTURE #5				
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	117	643,000	F001, F002, F005
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	14	4,070	D002, D007, D008, D009, D039, F001, F002
CONTAMINATED MAGNESIUM	019	1	113	D001
CONTAMINATED OIL, INSOLUBLE	015	4	2,150	D006, D008, D018, D039

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	15	1,320	D007, F001, F002, F003, F005
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	3	137	D006, D008, F005
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	3	318	D004, D006, D007, D008, D011
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	27	6,490	D004, D011
FURNACE SALT, SOLIDIFIED, NON-CHLORIDE	061	49	28,600	D007, D008, D010
GRIT BLAST RESIDUE	008	3	1,830	D008
LEAD AND LEAD-CONTAMINATED MATERIALS	049	8	18,400	D008
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY OF TRASH)	003	52	145,000	D004, D005, D006, D007, D008, D022, F001, F002, F003, F005, U134
OFF-SITE SUMP AND FILTER CAKES AFTER ROASTING AT FMPC	144	21	13,400	D007
ROASTED CALCIUM-PRECIPITATED SUMP AND FILTER CAKES	143	182	47,300	F002
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	8	1,480	D007, D008
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	25	6,480	D007, F001
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	581	269,000	D004, F002
SCRAP U3O8 OR THO2, LOW FLUORIDE	100	39	13,600	F002
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	11	5,670	D007, D008, D019, D039, F001

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TABLE A.IV-8

Summary of Inventory Materials
Other RCRA

Material Description	Material Code	Number of Containers	Net Weight (lbs.)	EPA Codes
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	11	3,530	F002
SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8 RECOVERY)	044	69	31,300	D005, D007
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE)	043	1	677	D019, D039, F001, F002
U3O8 FOR REOXIDATION	134	24	7,840	D004
U3O8 ROTEXED PLANT 8 FURNACE PRODUCT	154	88	40,800	F002
U3O8, +8 MESH - LOW FLUORIDE	122	2	1,410	D007, F001, F002
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	17	5,960	D039, F002
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	3	912	D039, D040, F002
TENSION SUPPORT STRUCTURE #5 Total:			1,300,000	
GRAND TOTAL:			5,450,000	

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: BOILER PLANT			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	2	59,400
BOILER PLANT Total:			**59,400**
LOCATION: CHEMICAL WAREHOUSE			
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	1	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	12	26,200
CHEMICAL WAREHOUSE Total:			**26,200**
LOCATION: CP STORAGE WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	2	1,100
CONTAMINATED ASBESTOS MATERIALS	028	2	187
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	6
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	2	1,650
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	2	448
CP STORAGE WAREHOUSE Total:			**3,390**
LOCATION: D&D BUILDING			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	0
D&D BUILDING Total:			
LOCATION: DECONTAMINATION BUILDING			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	22	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	48	1,090
DECONTAMINATION BUILDING Total:			**1,090**

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: FINISHED PRODUCTS			
CONTAMINATED CARBON FILTER ELEMENTS	026	2	142
DUST COLLECTOR BAGS	029	17	502
OFF-SPEC UF4 OR THF4	082	1	18
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	1	129
UO2 OR THO2 PRODUCT	202	1	310
FINISHED PRODUCTS Total:			**1,100**
LOCATION: GENERAL IN-PROCESS WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	4	648
CONTAMINATED ASBESTOS MATERIALS	028	3	0
CONTAMINATED OIL, INSOLUBLE	015	2	1,330
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	521
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	1	0
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	3	1,780
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	391	121,000
GENERAL IN-PROCESS WAREHOUSE Total:			**125,000**
LOCATION: HEAVY EQUIPMENT BUILDING			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
HEAVY EQUIPMENT BUILDING Total:			
LOCATION: KC-2 WAREHOUSE			
CONTAMINATED OIL - SOLUBLE; COOLANT	009	1	272
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	8	6
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	15	2,800

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	2	164
CONTAMINATED TBP AND/OR KEROSENE MIXTURES AND SLUDGES	022	9	2,620
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	332
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	1	430
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	1	724
KC-2 WAREHOUSE Total:			**7,350**
LOCATION: MAIN TANK FARM			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
MAIN TANK FARM Total:			
LOCATION: OLD PLANT 5 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	55	0
CONTAMINATED STEEL AFTER WASHING AND/OR CLEANING	004	5	0
CONTAMINATED ASBESTOS MATERIALS	028	23	17,400
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	0
OLD PLANT 5 WAREHOUSE Total:			**17,400**
LOCATION: PILOT PLANT AREA			
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	11	4,190
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	282
OFF-SPEC UF4 OR THF4	082	314	76,100
PILOT PLANT AREA Total:			**80,600**
LOCATION: PILOT PLANT THORIUM TANK FARM			
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	0

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	2	0
PILOT PLANT THORIUM TANK FARM Total:			
LOCATION: PILOT PLANT WAREHOUSE			
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	1	70
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	40	13,300
PCB MATERIALS, BALLAST, PCB-CONTAMINATED RAGS	050	9	2,010
PILOT PLANT WAREHOUSE Total:			**15,400**
LOCATION: PLANT 1 AREA			
BIRD CARCASSES, DROPPINGS, AND CONTAMINATED MATERIALS	093	3	182
CHIPPED FLOOR SEALANT AND CONTAMINATED MATERIALS	099	3	996
CLEAN OR DECONTAMINATED EQUIPMENT	600	19	0
CLEAN SOIL - TREATED	601	190	104,000
COLD METAL OXIDES - NON RADIUM-BEARING	095	1	118
CONTAMINATED COPPER - FOR DISCARD	016	4	1,020
CONTAMINATED GRAPHITE - UNCRUSHED BUT BROKEN INTO LARGE PIECES	017	29	9,430
CONTAMINATED LEATHER GLOVES FOR LAUNDRY	006	3	582
CONTAMINATED OIL - SOLUBLE; COOLANT	009	8	1,650
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	3509	1,990,000
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	48	11,100
CONTAMINATED STEEL AFTER WASHING AND/OR CLEANING	004	4	1,260
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	801	140,000
CONTAMINATED WATER, CONTAINING CHLORIDES	010	16	6,540
CONTAMINATED ZIRCONIUM	005	4	606
CONTAMINATED ASBESTOS MATERIALS	028	166	287,000
CONTAMINATED CAF2 - MGO	058	1	74

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
CONTAMINATED GRAPHITE - CRUSHED	024	52	21,300
CONTAMINATED METALLIC FILTER ELEMENTS	025	6	839
CONTAMINATED OIL, INSOLUBLE	015	94	34,100
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	19	2,210
CONTAMINATED TBP AND/OR KEROSENE MIXTURES AND SLUDGES	022	36	21,600
DEPLETED U INGOT CROPS (TOP CROPS) FROM PRIMARY INGOTS	056	2	1,950
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	528	257,000
DUST COLLECTOR BAGS	029	9	725
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	20	3,900
DUST COLLECTOR RESIDUES, PYROPHORIC, HIGH FLUORIDE	064	1	138
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	188	121,000
GLASS AND SAMPLE BOTTLES	014	7	1,440
GLASS FROM VITRIFICATION	603	25	9,880
GRIT BLAST RESIDUE	008	8	4,200
HIGH LEVEL CLEANING RESIDUES	054	9	1,300
INCINERATOR CINDERS - MATERIAL NOT PASSING THROUGH GRATE OR SCREEN	033	3	1,110
LEAD AND LEAD-CONTAMINATED MATERIALS	049	1	158
MAGNESIUM DIURANATE	091	1039	554,000
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	1	32
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	2	244
NON-BURNABLE METAL WITH URANIUM CONTENT	053	3	196
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1455	413,000
OFF-SPEC UF4 OR THF4	082	3	282
ORE CONCENTRATE - MISCELLANEOUS	170	1	152
RADIUM-BEARING MATERIALS - SAMPLES, K-65, INCLUDING Q-11 CONTAMINATED MATERIALS	097	1	0
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	110	26,100
SCRAP SALTS, HIGH FLUORIDE, INCLUDING FLOOR SWEEPINGS	065	4	648

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
SCRAP SALTS, LOW FLUORIDE, INCLUDING FLOOR SWEEPINGS	066	1	318
SCRAP U3O8 OR THO2, HIGH FLUORIDE	101	2	63
SCRAP UO2	102	5	548
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	6	3,140
SLUDGES, FOR BLENDING AND SCREENING	040	3	1,860
SLUDGES, OILY	039	4	784
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	310	130,000
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	9	5,550
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	2	0
THO2 PRODUCED FROM UNPURIFIED HANFORD THORIUM NITRATE VIA THORIA GEL PROCESS	105	1	397
TRAILER CAKES, WASTE SLURRIES, RAFFINATES NOT MEETING DISCARD SPECIFICATION	007	32	8,600
U3O8 FOR REOXIDATION	134	30	12,000
UNFIRED REDUCTION CHARGES PLUS MGF2 FROM LINER CAVE-INS	079	21	23,300
UO2 (OR THO2) POWDER - REFINERY FEED	167	1	0.52
WET SUMP OR FILTER CAKE, HALIDE CONTAMINATED	067	2	469
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	4	1,660
WET SUMP OR FILTER CAKE, OIL CONTAMINATED	068	655	152,000
PLANT 1 AREA Total:			**4,370,000**
LOCATION: PLANT 2/3 AREA			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	7	0
SUMP CAKE - COPPER CONTAMINATED, LOW URANIUM	002	366	166,000
PLANT 2/3 AREA Total:			**166,000**
LOCATION: PLANT 4 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	13,300
CONTAMINATED ASBESTOS MATERIALS	028	1	0

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
PLANT 4 AREA Total:			**13,300**
LOCATION: PLANT 4 WAREHOUSE			
MATERIAL HELD FOR HISTORICAL PURPOSES	098	1	10
PLANT 4 WAREHOUSE Total:			**10**
LOCATION: PLANT 5 AREA			
CO-PACKAGED URANIUM RESIDUES	094	7	19,200
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	10	4,460
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	18	1,170
DEPLETED U METAL - NOT SUITABLE FOR REACTOR PRODUCT STREAMS (NOT TOP CROPS)	055	14	13,300
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	19	4,360
U3O8, +8 MESH - LOW FLUORIDE	122	1	444
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	36	9,870
PLANT 5 AREA Total:			**52,800**
LOCATION: PLANT 6 AREA			
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	1	175
CONTAMINATED ASBESTOS MATERIALS	028	1	140
MATERIAL HELD FOR HISTORICAL PURPOSES	098	1	3
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	4	0
OFF-SPEC UF4 OR THF4	082	2	500
REJECT ELEMENTS - OUTER	323	1	946
SAMPLES, NON-METALLIC, MISCELLANEOUS	047	1	3
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	1	348
SPECIAL SOLID INGOTS OR SLABS	401	4	5,040
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	29	10,000

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
PLANT 6 AREA Total:			**17,200**
LOCATION: PLANT 6 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	36	21,900
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	4	1,390
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	47	20,100
CONTAMINATED WATER, CONTAINING CHLORIDES	010	3	1,230
CONTAMINATED ASBESTOS MATERIALS	028	2	73
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	4	391
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	1	12
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	40	5,230
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	2	1,070
SLUDGES, OILY	039	3	157,000
SLUDGES, OILY, FOR OXIDATION, HIGH FREE METAL	041	36	8,000
PLANT 6 WAREHOUSE Total:			**216,000**
LOCATION: PLANT 7 AREA			
CONTAMINATED OIL, INSOLUBLE	015	1	347
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
PLANT 7 AREA Total:			**347**
LOCATION: PLANT 8 AREA			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	14	6,500
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	113	62,500
DUST COLLECTOR RESIDUES - HIGH FLUORIDE	062	1	218
DUST COLLECTOR RESIDUES, LOW FLUORIDE	132	3	572
FILTERED SEWAGE	092	219	72,900

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
MAGNESIUM DIURANATE	091	634	342,000
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	1	0
SLUDGES, CLEANOUT, NON-OILY, FOR ROASTING	042	1	448
WET SUMP OR FILTER CAKE, NON-OILY AND NON-HALIDE	069	1094	414,000
PLANT 8 AREA Total:			**899,000**
LOCATION: PLANT 8 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	170
CONTAMINATED ASBESTOS MATERIALS	028	1	47
CONTAMINATED RAGS, PAPER, AND POLYETHYLENE	027	26	3,840
FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLANT 8 RECOVERY)	060	3	832
MERCURY-CONTAMINATED MATERIALS, MERCURY BATTERIES	051	1	84
MISCELLANEOUS MATERIAL - RECOVERY METHOD TO BE DETERMINED (NOT FOR USE BY INDIVIDUAL PLANTS)	137	14	6,320
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	40	5,540
PLANT 8 WAREHOUSE Total:			**16,800**
LOCATION: PLANT 9 AREA			
DISCARD PROCESS RESIDUES, TRAILER CAKES, WASTE SLURRIES, RAFFINATES, ETC.	001	1	67,600
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	2	0
PLANT 9 AREA Total:			**67,600**
LOCATION: PLANT 9 WAREHOUSE			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	28	0
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	6	0
PLANT 9 WAREHOUSE Total:			

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
LOCATION: QUONSET HUT #3			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	52	24,900
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	21	6,320
RADIUM-BEARING MATERIALS - SAMPLES, K-65, INCLUDING Q-11 CONTAMINATED MATERIALS	097	8	0
QUONSET HUT #3 Total:			**31,200**
LOCATION: RECEIVING/INCOMING MATERIALS INSPECTION			
CLEAN OR DECONTAMINATED EQUIPMENT	600	2	0
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	1	931
RECEIVING/INCOMING MATERIALS INSPECTION Total:			**931**
LOCATION: SERVICE BUILDING			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	2	0
SERVICE BUILDING Total:			
LOCATION: SIX TO FOUR REDUCTION FACILITY #1			
OFF-SPEC UF4 OR THF4	082	1	11
SCRAP UO2	102	1	8
SIX TO FOUR REDUCTION FACILITY #1 Total:			**19**
LOCATION: TENSION SUPPORT STRUCTURE #5			
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	9	4,750
CONTAMINATED SOLVENT OR ORGANIC CHEMICAL - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT	013	1	11
CONTAMINATED WATER OR SUMP LIQUOR, NON-CHLORIDE	012	27	10,700
SLUDGES, OILY	039	7	4,790
SLUDGES, SOLVENT - STENCIL TYPE OF SOLVENT ON CONTAINER (SEE SOLVENT AND ORGANIC CHEMICAL TABLE	043	1	607

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TABLE A.IV-9

Summary of Inventory Materials
Other Uncharacterized

Material Description	Material Code	Number of Containers	Net Weight (lbs.)
TENSION SUPPORT STRUCTURE #5 Total:			20,900
LOCATION: THORIUM WAREHOUSE			
CLEAN OR DECONTAMINATED EQUIPMENT	600	5	0
CONTAMINATED ALUMINA - SODA LIME (HIGH C1)	018	1	693
CONTAMINATED SOIL, ROCKS, SAND, BRICKS AND CERAMICS	011	23	2,690
CONTAMINATED GRAPHITE - CRUSHED	024	4	1,500
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	18	0
THORIUM WAREHOUSE Total:			4,880
LOCATION: UNKNOWN (0012)			
CALCIUM URANATE	123	2	50
UNKNOWN (0012) Total:			50
LOCATION: UNKNOWN (0015)			
NON-RECOVERABLE TRASH - FOR STORAGE OR SHIPMENT FOR OFF-SITE BURIAL (SEE TABLE FOR CATEGORY	003	3	13,200
UNKNOWN (0015) Total:			13,200
LOCATION: UNKNOWN (0032)			
CLEAN OR DECONTAMINATED EQUIPMENT	600	1	0
UNKNOWN (0032) Total:			
GRAND TOTAL:			6,230,000

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TABLE A.IV-10

Summary of Inventory Materials
Totals

Material Description	Number of Containers	Net Weight (lbs.)
Active		
PRODUCT		
NON-RCRA	24,282	10,400,000
RCRA	547	200,000
UNCHARACTERIZED	13,213	6,200,000
THORIUM		
NON-RCRA	4,529	3,340,000
RCRA	16	12,500
UNCHARACTERIZED	1,891	792,000
OTHER		
NON-RCRA	15,327	6,990,000
RCRA	4,511	5,450,000
UNCHARACTERIZED	13,659	6,230,000
Shipped (as of August 21st, 1995)		
PRODUCT		
NON-RCRA	732	2,890,000
RCRA	0	0
UNCHARACTERIZED	118	633,000
THORIUM		
NON-RCRA	39	203,000
RCRA	0	0
UNCHARACTERIZED	0	0
OTHER		
NON-RCRA	16,204	33,400,000
RCRA	754	391,000
UNCHARACTERIZED	4,006	19,100,000
Totals		
PRODUCT		
NON-RCRA	25,014	13,300,000
RCRA	547	200,000
UNCHARACTERIZED	13,331	6,830,000
THORIUM		
NON-RCRA	4,568	3,550,000
RCRA	16	12,500
UNCHARACTERIZED	1,891	792,000
OTHER		
NON-RCRA	31,531	40,400,000
RCRA	5,265	5,840,000
UNCHARACTERIZED	17,665	25,300,000
GRAND TOTAL:	**199,656**	**96,200,000**

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ATTACHMENT A.V
CONSTITUENT OF CONCERN CALCULATIONS

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ATTACHMENT A.V

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A.V-1	Risk-Based Screening Levels for Radionuclides and Chemical in Soils/Sediments Residential Scenario

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A.V CONSTITUENTS OF CONCERN CALCULATIONS

Soil concentrations calculated from a risk basis according to the methodology prescribed in RAGS Part B for calculating preliminary remediation goals (PRGs). A detailed description of the process of calculating PRGs is included in the OU5 FS report (DOE, 1995). The model equations and parameter values used to calculate PRGs are also included in the risk-based methodology presented in the FEMP risk assessment work plan addendum (DOE 1992). The most recent EPA slope factors have been used to calculate the Part B reference criteria used for OU3. The Part B reference criteria concentration for carcinogens is calculated as the quotient of the target acceptable risk level (i.e., 1 x 10^{-7} lifetime risk) and the calculated risk per unit soil concentration. The Part B reference criteria concentrations for noncarcinogens are calculated as the quotient of the target acceptable hazard index (i.e, 0.1 hazard index) and the calculated hazard index per unit soil concentration. Numerical values for constituent Part B reference criteria concentrations are summarized in Table A.8.

<u>COC Calculations</u>

Equations used for calculation of risk based concentrations for all cases considered are listed below:

1). Calculation of risk-based concentration for radionuclides in soil:

$$C_S = TR/[SF_O \times EF \times IF_r \times CF_r) + (ED \times SF_e \times (1-S_e) \times T_e)]$$

2). Calculation of risk-based concentration for carcinogenic chemicals in soil:

2a.) Organics:

$$C_S = (TR \times AT_c)/(SF_o \times CF_o \times EF \times IF_c)$$

2b.) Inorganics:

$$C_S = (TR \times AT_c)/(SF_o \times CFi \times EF \times IF_c)$$

3.) Calculation of risk-based concentration for non-carcinogenic chemicals in soil:

3a.) Organics:

$$C_s = (THQ \times AT_n)/[(1/RfD_o) \times CF_o \times EF \times IF_c)]$$

3b.) Inorganics:

$$C_s = (THQ \times AT_n)/[(1/RfD_o) \times CF_i \times EF \times IF_c)]$$

4). Calculation of IF (age-adjusted soil ingestion factor):

4a.) Radionuclides:

$$IF_r = (IR_c \times ED_c) + (IR_a \times ED_a)$$

4b.) Chemicals:

$$IF_c = [(IR_c \times EDc)/BW_c] + [(IR_a \times ED_a)/BW_a]$$

Where:

C_s = Risk-based concentration of constituent in soils (pCi/g, ug/Kg, mg/Kg)

TR - Target risk level (unitless) = 1.0e-07

THQ = Target hazard quotient (unitless) = 1.0e-01

SF_o = Oral cancer slope factor (Risk/pCi; kg-day/mg)

SF_e = Cancer slope factor, external radiation (Risk-g/pCi-yr)

RfD_o = Oral reference dose (mg/kg/day)

BW_c = Body weight, child (kg) = 15

BW_a = Body weight, adult (kg) = 70

AT_c = Averaging time (carcinogen) = 70 years x 365 days/year = 25550

AT_a = Averaging time (noncarcinogen) = ED (30 years) x 365 days/year = 10950

IR_c = Daily water ingestion rate, chile (mg/day) = 200

Ir_a = Daily water ingestion rate, adult (mg/day) = 100

ED_c = Exposure duration, child (years) = 6

ED_a = Exposure duration, adult (years) = 24

ED = Exposure duration, (years) = 30

IF_r = Age-adjusted ingestion factor, radionuclides (mg-yr/day) = 0

IF_c = Age-adjusted ingestion factor, chemicals (mg-yr/kg-day)=0

EF = Exposure frequency (days/year) = 350

CF_r = Conversion factor, radionuclides (g/mg) = 1.0e-03

CF_o = Conversion factor, Organics (0.001 ug-chem/mg-chem x 0.000001 kg-soil/mg-soil) = 1.0e-09

CF_i = Conversion factor, Inorganics (kg/mg) = 1.0e-06

S_e = Gamma shielding factor (unitless) = 0.2

T_e = Gamma exposure time factor (unitless) = 1

The carcinogenic potential of uranium is caused solely by radiation release from three different uranium isotopes. It's screening criteria was calculated from the weight fractions of the different isotopes in natural uranium and the Part B reference criteria calculated from the individual isotopes.

where:

$$Cs_{Unat} = 1.478 \sum_{i=N}^{i=1} F_i \, Cs_i$$

Cs_{Unat} = Screening Concentration of natural uranium (ug/g)

Cs_{Ui} = Screening Concentration of uranium isotope i (pCi/g).

F_i = mass fraction of isotope i in natural uranium.

and

1.478 is the conversion factor from pCi to ug for natural Uranium.

For this summation, it was assumed natural uranium is made up of 99 percent U-238, 0.71 percent U-235 and .0054 percent U-234.

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TABLE A.V-1

RISK-BASED SCREENING LEVELS FOR RADIONUCLIDES AND CHEMICAL IN SOILS/SEDIMENTS RESIDENTIAL SCENARIO

Radionuclide/Chemical	SFo (Risk/Unit)	SFe (Risk-g/pCi-yr)	RfDo (mg/kg/day)	1/RfDo (1/mg/kg/day)	SF-Based (TR=1.0E-07)	RfD-Based (THQ=0.1)	SCREENING LEVEL
Radionuclides, pCi/g							
Americium-241	2.4E-10	4.9E-09	NA	NA	2.4E-01	NA	2.4E-01
Cesium-137+1D	2.8E-11	2.0E-06	NA	NA	2.1E-03	NA	2.1E-03
Lead-210+2D	6.6E-10	1.6E-10	NA	NA	1.2E-01	NA	1.2E-01
Neptunium-237+1D	2.2E-10	4.3E-07	NA	NA	9.4E-03	NA	9.4E-03
Polonium-210	1.5E-10	2.9E-11	NA	NA	5.3E-01	NA	5.3E-01
Plutonium-238	2.2E-10	2.8E-11	NA	NA	3.6E-01	NA	3.6E-01
Plutonium-239/240	2.3E-10	2.7E-11	NA	NA	3.4E-01	NA	3.4E-01
Plutonium-241	3.6E-12	0.0E+00	NA	NA	2.2E+01	NA	2.2E+01
Radium-226+5D [3]	1.2E-10	6.0E-06	NA	NA	6.9E-04	NA	6.9E-04
Radium-228	1.0E-10	0.0E+00	NA	NA	7.9E-01	NA	7.9E-01
Strontium-90	3.3E-11	0.0E+00	NA	NA	2.4E+00	NA	2.4E+00
Technetium-99	1.3E-12	6.0E-13	NA	NA	6.1E+01	NA	6.1E+01
Thorium-227	4.5E-12	1.6E-07	NA	NA	2.6E-02	NA	2.6E-02
Thorium-228+7D	5.5E-11	5.6E-06	NA	NA	7.4E-04	NA	7.4E-04
Thorium-230	1.3E-11	5.4E-11	NA	NA	5.7E+00	NA	5.7E+00
Thorium-232	1.2E-11	2.6E-11	NA	NA	6.4E+00	NA	6.4E+00
Uranium-234	1.6E-11	3.0E-11	NA	NA	4.8E+00	NA	4.8E+00
Uranium-235/236	1.6E-11	2.4E-07	NA	NA	1.7E-02	NA	1.7E-02
Uranium-238+2D	2.8E-11	3.8E-08	NA	NA	1.1E-01	NA	1.1E-01
Metals, mg/kg							
Aluminum	NA	NA	NA	NA			NA
Antimony	NA	NA	4.0E-04	2.5E+03		1.1E+01	1.1E+01
Arsenic	1.8E+00	NA	3.0E-04	3.3E+03	3.7E-02	8.2E+00	3.7E-02
Barium	NA	NA	7.0E-02	1.4E+01		1.9E+03	1.9E+03
Beryllium	4.3E+00	NA	5.0E-03	2.0E+02	1.5E-02	1.4E+02	1.5E-02
Cadmium	NA	NA	5.0E-04	2.0E+03		1.4E+01	1.4E+01
Calcium	NA	NA	NA	NA			NA
Chromium	NA	NA	5.0E-03	2.0E+02		1.4E+02	1.4E+02
Cobalt	NA	NA	6.0E-02	1.7E+01		1.6E+03	1.6E+03
Copper	NA	NA	3.7E-02	2.7E+01		1.0E+03	1.0E+03
Iron	NA	NA	NA	NA			NA
Lead	NA	NA	NA	NA			NA
Magnesium	NA	NA	9.7E+00	1.0E-01		2.7E+05	2.7E+05
Manganese	NA	NA	5.0E-03	2.0E+02		1.4E+02	1.4E+02
Mercury	NA	NA	3.0E-04	3.3E+03		8.2E+00	8.2E+00
Nickel	NA	NA	2.0E-02	5.0E+01		5.5E+02	5.5E+02
Potassium	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	5.0E-03	2.0E+02		1.4E+02	1.4E+02
Silver	NA	NA	5.0E-03	2.0E+02		1.4E+02	1.4E+02
Sodium	NA	NA	NA	NA	NA	NA	NA

TABLE A.V-1

RISK-BASED SCREENING LEVELS FOR RADIONUCLIDES AND CHEMICAL IN SOILS/SEDIMENTS RESIDENTIAL SCENARIO

Radionuclide/Chemical	SFo (Risk/Unit)	SFe (Risk-g/pCi-yr)	RfDo (mg/kg/day)	1/RfDo (1/mg/kg/day)	SF-Based (TR=1.0E-07)	RfD-Based (THQ=0.1)	SCREENING LEVEL
Metals, mg/kg (Cont'd)							
Thallium	NA	NA	7.0E-05	1.4E+04		1.9E+00	1.9E+00
Uranium, Total	NA	NA	3.0E-03	3.3E+02	2.5E-01	8.2E+01	2.5E-01
Vanadium	NA	NA	7.0E-03	1.4E+02		1.9E+02	1.9E+02
Zinc	NA	NA	3.0E-01	3.3E+00		8.2E+03	8.2E+03
Volatile Organics, ug/kg							
1,1-Dichloroethane	NA	NA	NA	NA			NA
1,1-Dichloroethene	6.0E-01	NA	9.0E-03	1.1E+02	1.1E+02	2.5E+05	1.1E+02
1,1,1-Trichloroethane	NA	NA	NA	NA			NA
1,1,2-Trichloroethane	5.7E-02	NA	4.0E-03	2.5E+02	1.1E+03	1.1E+05	1.1E+03
1,1,2,2-Tetrachloroethane	2.0E-01	NA	NA	NA	3.2E+02		3.2E+02
1,2-Dichloroethane	9.1E-02	NA	NA	NA	7.0E+02		7.0E+02
1,2-Dichloroethene (total)	NA	NA	9.0E-03	1.1E+02		2.5E+05	2.5E+05
1,2-Dichloropropane	NA	NA	NA	NA			NA
2-Butanone	NA	NA	6.0E-01	1.7E+00		1.6E+07	1.6E+07
2-Hexanone	NA	NA	4.0E-02	2.5E+01		1.1E+06	1.1E+06
4-Methyl-2-pentanone	NA	NA	5.0E-02	2.0E+01		1.4E+06	1.4E+06
Acetone	NA	NA	1.0E-01	1.0E+01		2.7E+06	2.7E+06
Benzene	2.9E-02	NA	NA	NA	2.2E+03		2.2E+03
Bromodichloromethane	6.2E-02	NA	2.0E-02	5.0E+01	1.0E+03	5.5E+05	1.0E+03
Bromoform	7.9E-03	NA	2.0E-02	5.0E+01	8.1E+03	5.5E+05	8.1E+03
Bromomethane	NA	NA	1.4E-03	7.1E+02		3.8E+04	3.8E+04
Carbon disulfide	NA	NA	1.0E-01	1.0E+01		2.7E+06	2.7E+06
Carbon tetrachloride	1.3E-01	NA	7.0E-04	1.4E+03	4.9E+02	1.9E+04	4.9E+02
Chlorobenzene	NA	NA	2.0E-02	5.0E+01		5.5E+05	5.5E+05
Chloroethane	NA	NA	2.0E-02	5.0E+01		5.5E+05	5.5E+05
Chloroform	6.1E-03	NA	1.0E-02	1.0E+02	1.0E+04	2.7E+05	1.0E+04
Chloromethane	1.3E-02	NA	NA	NA	4.9E+03		4.9E+03
cis-1,3-Dichloropropene	1.8E-01	NA	3.0E-04	3.3E+03	3.5E+02	8.2E+03	3.6E+02
Dibromochloromethane	8.4E-02	NA	2.0E-02	5.0E+01	7.6E+02	5.5E+05	7.6E+02
Ethylbenzene	NA	NA	1.0E-01	1.0E+01		2.7E+06	2.7E+06
Methylene chloride	7.5E-03	NA	6.0E-02	1.7E+01	8.5E+03	1.6E+06	8.5E+03
Pyridine	NA	NA	1.0E-03	1.0E+03		2.7E+04	2.7E+04
Styrene	3.0E-02	NA	2.0E-01	5.0E+00	2.1E+03	5.5E+06	2.1E+03
Tetrachloroethene	5.2E-02	NA	1.0E-02	1.0E+02	1.2E+03	2.7E+05	1.2E+03
Toluene	NA	NA	2.0E-01	5.0E+00		5.5E+06	5.5E+06
Xylenes, Total	NA	NA	2.0E+00	5.0E-01		5.5E+07	5.5E+07
trans-1,3-Dichloropropene	1.8E-01	NA	NA	NA	3.5E+02		3.5E+02
Trichloroethene	1.1E-02	NA	6.0E-03	1.7E+02	5.8E+03	1.6E+05	5.8E+03
Trichlorofluoromethane	NA	NA	3.0E-01	3.3E+00		8.2E+06	8.2E+06
Vinyl Chloride	1.9E+00	NA	NA	NA	3.4E+01		3.4E+01

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TABLE A.V-1

RISK-BASED SCREENING LEVELS FOR RADIONUCLIDES AND CHEMICAL IN SOILS/SEDIMENTS RESIDENTIAL SCENARIO

Radionuclide/Chemical	SFo (Risk/Unit)	SFc (Risk-g/pCi-yr)	RfDo (mg/kg/day)	1/RfDo (l/mg/kg/day)	SF-Based (TR=1.0E-07)	RfD-Based (THQ=0.1)	SCREENING LEVEL
Semi-Volatile Organics, ug/kg							
1,2,4-Trichlorobenzene	NA	NA	1.0E-02	1.0E+02		2.7E+05	2.7E+05
1,2-Dichlorobenzene	NA	NA	9.0E-02	1.1E+01		2.5E+06	2.5E+06
1,3-Dichlorobenzene	NA	NA	NA	NA			NA
1,4-Dichlorobenzene	2.4E-02	NA	NA	NA	2.7E+03		2.7E+03
2,2-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	1.0E-01	1.0E+01		2.7E+06	2.7E+06
2,4,6-Trichlorophenol	1.1E-02	NA	NA	NA	5.8E+03		5.8E+03
2,4-Dichlorophenol	NA	NA	3.0E-03	3.3E+02		8.2E+04	8.2E+04
2,4-Dimethylphenol	NA	NA	2.0E-02	5.0E+01		5.5E+05	5.5E+05
2,4-Dinitrophenol	NA	NA	2.0E-03	5.0E+02		5.5E+04	5.5E+04
2,4-Dinitrotoluene	6.8E-01	NA	2.0E-03	5.0E+02	9.4E+01	5.5E+04	9.4E+01
2,6-Dinitrotoluene	6.8E-01	NA	1.0E-03	1.0E+03	9.4E+01	2.7E+04	9.4E+01
2-Chloronaphthalene	NA	NA	8.0E-02	1.3E+01		2.2E+06	2.2E+06
2-Chlorophenol	NA	NA	5.0E-03	2.0E+02		1.4E+05	1.4E+05
2-Methylnaphthalene [5]	NA	NA	NA	NA			1.1E+06
2-Nitroaniline	NA	NA	NA	NA			NA
2-Nitrophenol	NA	NA	NA	NA			NA
3,3-Dichlorobenzidine	4.5E-01	NA	NA	NA	1.4E+02		1.4E+02
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA			NA
4-Bromophenyl-phenyl ether	NA	NA	5.8E-02	1.7E+01		1.6E+06	1.6E+06
4-Chloro-3-methylphenol [6]	NA	NA	NA	NA			1.4E+06
4-Chlorophenyl phenyl ether	NA	NA	NA	NA			NA
4-Nitroaniline	NA	NA	3.0E-03	3.3E+02		8.2E+04	8.2E+04
4-Nitrophenol	NA	NA	6.2E-02	1.6E+01		1.7E+06	1.7E+06
Acenaphthene	NA	NA	6.0E-02	1.7E+01		1.6E+06	1.6E+06
Acenaphthylene	NA	NA	NA	NA			NA
Anthracene	NA	NA	3.0E-01	3.3E+00		8.2E+06	8.2E+06
Benzo(a)anthracene	1.1E+00	NA	NA	NA	5.8E+01		5.8E+01
Benzo(a)pyrene	7.3E+00	NA	NA	NA	8.8E+00		8.8E+00
Benzo(b)fluoranthene	9.0E-01	NA	NA	NA	7.1E+01		7.1E+01
Benzo(g,h,i)perylene	NA	NA	NA	NA			NA
Benzo(k)fluoranthene	3.8E-01	NA	NA	NA	1.7E+02		1.7E+02
bis(2-Chloroethoxy) methane	NA	NA	NA	NA			NA
bis(2-Chloroethyl) ether	NA	NA	NA	NA			NA
Bis(2-Chloroisopropyl)ether	7.0E-02	NA	4.0E-02	2.5E+01	9.1E+02	1.1E+06	9.1E+02
bis(2-Ethylhexyl)phthalate	1.4E-02	NA	2.0E-02	5.0E+01	4.6E+03	5.5E+05	4.6E+03
Butylbenzlphthalate	NA	NA	2.0E-01	5.0E+00		5.5E+06	5.5E+06
Carbazole	2.0E-02	NA	NA	NA	3.2E+03		3.2E+03
Chrysene	3.2E-02	NA	NA	NA	2.0E+03		2.0E+03
Di-n-butylphthalate	NA	NA	1.0E-01	1.0E+01		2.7E+06	2.7E+06
Di-n-octylphthalate	NA	NA	2.0E-02	5.0E+01		5.5E+05	5.5E+05

TABLE A.V-1

RISK-BASED SCREENING LEVELS FOR RADIONUCLIDES AND CHEMICAL IN SOILS/SEDIMENTS RESIDENTIAL SCENARIO

Radionuclide/Chemical	SFo (Risk/Unit)	SFe (Risk-g/pCi-yr)	RfDo (mg/kg/day)	1/RfDo (l/mg/kg/day)	SF-Based (TR=1.0E-07)	RfD-Based (THQ=0.1)	SCREENING LEVEL
Semi-Volatile Organics, ug/kg (Cont'd)							
Dibenzo(a,h)anthracene	7.3E+00	NA	NA	NA	8.8E+00		8.8E+00
Dibenzofuran [7]	NA	NA	4.0E-03	2.5E+02		1.1E+05	1.1E+05
Diethyl phthalate	NA	NA	8.0E-01	1.3E+00		2.2E+07	2.2E+07
Dimethyl phthalate	NA	NA	1.0E+01	1.0E-01		2.7E+08	2.7E+08
Fluoranthene	NA	NA	4.0E-02	2.5E+01		1.1E+06	1.1E+06
Flucrene	NA	NA	4.0E-02	2.5E+01		1.1E+06	1.1E+06
Hexachloro-1,3-butadiene	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	1.6E+00	NA	8.0E-04	1.3E+03	4.0E+01	2.2E+04	4.0E+01
Hexachlorobutadiene	7.8E-02	NA	2.0E-04	5.0E+03	8.2E+02	5.5E+03	8.2E+02
Hexachlorocyclopentadiene	NA	NA	7.0E-03	1.4E+02		1.9E+05	1.9E+05
Hexachloroethane	1.4E-02	NA	1.0E-03	1.0E+03	4.6E+03	2.7E+04	4.6E+03
Ideno(1,2,3-cd)pyrene	2.0E+00	NA	NA	NA	3.2E+01		3.2E+01
Isophorone	9.5E-04	NA	2.0E-01	5.0E+00	6.7E+04	5.5E+06	6.7E+04
m-Methylphenol	5.0E-02	NA	NA	NA	1.3E+03		1.3E+03
N-Nitroso-di-n-dipropylamine	7.0E+00	NA	NA	NA	9.1E+00		9.1E+00
N-Nitroso-diphenylamine	4.9E-03	NA	NA	NA	1.3E+04		1.3E+04
Napthalene	NA	NA	4.0E-02	2.5E+01		1.1E+06	1.1E+06
Nitrobenzene	NA	NA	5.0E-04	2.0E+03		1.4E+04	1.4E+04
o-Methylphenol	NA	NA	5.0E-02	2.0E+01		1.4E+06	1.4E+06
p-Chloroaniline	NA	NA	NA	NA	NA	NA	NA
p-Methylphenol (cresol)	NA	NA	5.0E-02	2.0E+01		1.4E+06	1.4E+06
Pentachlorophenol	1.2E-01	NA	3.0E-02	3.3E+01	5.3E+02	8.2E+05	5.3E+02
Phenanthrene	NA	NA	NA	NA			NA
Phenol	NA	NA	6.0E-01	1.7E+00		1.6E+07	1.6E+07
Pyrene	NA	NA	3.0E-02	3.3E+01		8.2E+05	8.2E+05
Pesticides/PCBs, ug/kg							
4,4'-DDD	2.4E-01	NA	NA	NA	2.7E+02		2.7E+02
4,4'-DDE	3.4E-01	NA	NA	NA	1.9E+02		1.9E+02
4,4'-DDT	3.4E-01	NA	5.0E-04	2.0E+03	1.9E+02	1.4E+04	1.9E+02
beta-BHC	1.8E+00	NA	NA	NA	3.5E+01		3.5E+01
alpha-Chlordane	1.3E+00	NA	6.0E-05	1.7E+04	4.9E+01	1.6E+03	4.9E+01
delta-BHC	NA	NA	NA	NA			NA
Dieldrin	1.6E+01	NA	5.0E-05	2.0E+04	4.0E+00	1.4E+03	4.0E+00
Endosulfan II	NA	NA	6.0E-03	1.7E+02		1.6E+05	1.6E+05
Endosulfan sulfate	NA	NA	NA	NA			1.6E+05
Endosulfan-I	NA	NA	6.0E-03	1.7E+02		1.6E+05	1.6E+05
Endrin	NA	NA	3.0E-04	3.3E+03		8.2E+03	8.2E+03
Endrin aldehyde [10]	NA	NA	NA	NA			8.2E+03
Endrin ketone	NA	NA	NA	NA			NA
gamma-BHC (Lindane)	1.3E+00	NA	3.0E-04	3.3E+03	4.9E+01	8.2E+03	4.9E+01

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RISK-BASED SCREENING LEVELS FOR RADIONUCLIDES AND CHEMICAL IN SOILS/SEDIMENTS RESIDENTIAL SCENARIO

Radionuclide/Chemical	SFo (Risk/Unit)	SFe (Risk-g/pCi-yr)	RfDo (mg/kg/day)	1/RfDo (L/mg/kg/day)	SF-Based (TR=1.0E-07)	RfD-Based (THQ=0.1)	SCREENING LEVEL
Pesticides/PCBs, ug/kg (Cont'd)							
gamma-Chlordane	NA	NA	NA	NA			4.9E+01
Heptachlor	4.5E+00	NA	5.0E-04	2.0E+03	1.4E+01	1.4E+04	1.4E+01
Heptachlor epoxide	9.1E+00	NA	1.3E-05	7.7E+04	7.0E+00	3.6E+02	7.0E+00
Methoxychlor	NA	NA	5.0E-03	2.0E+02		1.4E+05	1.4E+05
Toxaphene	1.1E+00	NA	NA	NA	5.8E+01		5.8E+01
Aroclor-1016	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1221	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1232	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1242	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1248	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1254	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00
Aroclor-1260	7.7E+00	NA	NA	NA	8.3E+00		8.3E+00