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DATA SUMMARY 2
OPERABLE UNIT NO. 8
700 AREA

U.S. Department of Energy
Rocky Flats Environmental Technology Site
Golden, Colorado

ENVIRONMENTAL RESTORATION PROGRAM

September 1995

Volume 1 - Text

ADMIN RECORD
IA-A-000567

1 OF 4/90

This OU8 Data Summary Draft Report is not complete because of instructions to downsize the final product per DOE stop work orders. Sections and tables of the text that have not been finalized due to the stop work orders are noted as such. The OU8 Data Summary Draft Report can be revised with all sections and tables completed upon direction from RMRS.

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LIST OF ACRONYMS AND ABBREVIATIONS

Am-241	americium-241
BNA	base/neutral acid extractable
BSCP	Background Soils Characterization Program
cm	centimeter
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
COPC	constituent of potential concern
cpm	counts per minute
Cs-137	cesium-137
DOE	U.S. Department of Energy
dpm	disintegrations per minute
DQO	Data Quality Objective
D&D	Decontamination and Decommissioning
EG&G	EG&G Rocky Flats Inc.
EM31	a type of ground conductivity meter
EM61	a type of high-resolution metal detector
EPA	U.S. Environmental Protection Agency
ERPD	Environmental Restoration Program Division
FIDLER	Field Instrument for the Detection of Low-Energy Radiation
g	gram
GIS	Geographic Information System
GPR	ground penetrating radar
GPS	Global Positioning System
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
HPGe	high purity germanium

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LIST OF ACRONYMS AND ABBREVIATIONS

HRR	Historical Release Report
IAG	Interagency Agreement
IFSP	Integrated Field Sampling Plan
IHSS	Individual Hazardous Substance Site
K-40	potassium-40
KeV	kilo electron-volts
kg	kilogram
KOH	potassium hydroxide
L	liter
m	meter
MDA	minimum detectable activity
MDL	Method Detection Limit
mg	milligram
mg/kg	milligrams per kilogram
MHz	megahertz
mL	milliliter
mm	millimeter
NaI	sodium iodide
NaOH	sodium hydroxide
nCi/g	nanocuries per gram
OPWL	original process waste line
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi/g	picocuries per gram

LIST OF ACRONYMS AND ABBREVIATIONS

pCi/L	picocuries per liter
ppb	parts per billion
ppm	parts per million
PRG	preliminary remediation goal
PSZ	Perimeter Secured Zone
Pu-239/240	plutonium-239/240
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
Ra-226	radium-226
RAAMP	Radiological Ambient Air Monitoring Program
RCRA	Resource Conservation and Recovery Act
RF	Rocky Flats
RFEDS	Rocky Flats Environmental Data System
RFETS	Rocky Flats Environmental Technology Site
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
RPD	relative percent difference
SOP	Standard Operating Procedure
SQL	sample quantitation limit
Sr-89/90	strontium-89/90
SVOC	semivolatile organic compounds
TAL	target analyte list
TCA	trichloroethane
TCE	trichlorethene

LIST OF ACRONYMS AND ABBREVIATIONS

TCL	target compound list
TCLP	toxicity characteristic leaching procedure
Th-232	thorium-232
TPH	total petroleum hydrocarbon
U-233/234	uranium-233/234
U-235	uranium-235
U-238	uranium-238
UTL	upper tolerance limit
$UTL_{99/99}$	upper tolerance limit with 99 percent confidence and 99 percent coverage
VOC	volatile organic compound
VSP	vertical soil profiles
μg	micrograms
%	percent
$\pm$	plus or minus

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1.0 INTRODUCTION

Preparation of this document meets the Stage 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI) Work Plan requirements to present the results of the nonintrusive Stage 2 activities for Operable Unit No. 8 (OU8) at the U.S. Department of Energy (DOE) Rocky Flats Environmental Technology Site (RFETS) located in Golden, Colorado. Figure 1-1 illustrates the site location and local topography. The nonintrusive Stage 2 (screening level) activities include visual inspections, surface radiological surveys (i.e., high purity germanium [HPGe] and sodium iodide [NaI] surveys), geophysical surveys, tank inspection/sampling, vertical soil profile (VSP) sampling, air sampling, surface-soil sampling, soil-gas surveys, asphalt sampling, and sediment sampling.

The Stage 2 activity is the second of a three-stage RFI/RI. These activities are pursuant to an Interagency Agreement (IAG) among DOE, the U.S. Environmental Protection Agency (EPA), and the State of Colorado Department of Public Health and Environment (CDPHE), dated January 22, 1991 (DOE et al. 1991). The IAG program addresses both RCRA and CERCLA requirements. The purpose of this Data Summary is to report analytical data resulting from the Stage 2 activity.

1.1 BACKGROUND

OU8 consists of 25 Individual Hazardous Substances Sites (IHSSs) located throughout the RFETS Industrial Area (Figure 1-2). Complete documentation of these IHSSs is detailed in the OU8 RFI/RI Work Plan (DOE 1994a).

All IHSSs in the Industrial Area were evaluated according to criteria in the draft Proposed Plan for Reorganization and Remediation of the Industrial Area Operable Units (EG&G Rocky Flats Inc. [EG&G] 1994a) to assist in identifying those IHSSs that are candidates for closure or accelerated cleanup. The intention of the categorization is to allow for the expedited risk-based closure of the Industrial Area IHSSs by issuing a decision matrix equivalent to a Record of Decision (ROD) for each IHSS or group of IHSSs. This would occur before RODs are issued for each Industrial Area OU. This categorization process is designed to manage potential changes of previously planned work scopes based on the collection and interpretation of new data. In this Data Summary data collected during the Stage 2 activity are compared with the remedial categories.

1.2 PURPOSE AND SCOPE

The purposes of this Data Summary are as follows:

- Describe the nonintrusive activities implemented during the Stage 2 investigation and compare these activities to the outline in the OU8 RFI/RI Work Plan (DOE 1994a).
- Relate current data to the categorization of IHSSs in the draft Proposed Plan for Reorganization and Remediation of the Industrial Area Operable Units (EG&G 1994a).
- Present analytical data for those nonintrusive activities in order to further characterize the IHSSs.

The Stage 2 activities for OU8 are designed to detect contamination at each IHSS primarily using non- or limited-intrusion screening-level surveys. These surveys will provide an assessment of the presence of contamination, and they will also be a step toward defining the nature and extent of the contamination that is present. The following are the activities for the Stage 2 investigations at each IHSS:

- visual inspections of the physical setting;
- surface radiological surveys using both HPGe and NaI instruments;
- geophysical surveys;
- tank inspections and sampling;
- VSP sampling (6 inches);
- air sampling;
- surface-soil sampling including sampling under asphalt or concrete;
- soil-gas survey;
- asphalt sampling; and
- sediment sampling.

This document presents the results of these inspections, surveys, and sampling events for each individual IHSS. All results of the surface radiological surveys are included as appendices or tables. Once the investigations for the Stage 2 activities are completed, a comprehensive RFI/RI document will be prepared to summarize all of the information and fulfill the initial objectives of the RFI/RI as defined in the OU8 RFI/RI Work Plan (DOE 1994a).

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2.0 ANALYTICAL METHODS, DATA EVALUATION, AND COMPARISON METHODS

This section describes the investigative methodologies used during the data collection activities, and the data evaluation and comparison methods used for the implementation of the OU8 RFI/RI Work Plan (DOE 1994a). Data for individual IHSSs are presented in Section 3.0. Historical and background information on the IHSSs is detailed in the OU8 RFI/RI Work Plan and the Historical Release Report (DOE 1992a).

Analytical results from the various sampling activities were obtained from the Rocky Flats Environmental Data System (RFEDS). Data for OU8 were generated and are discussed in the text on an IHSS-specific basis.

A site reconnaissance was conducted at each of the 25 IHSSs in OU8 to accomplish the following: observe the physical conditions of each IHSS, identify hazards that may exist, identify special needs or requirements for collecting samples at each IHSS, and plan the sampling strategies. In IHSSs where a specific sampling grid was not specified by the OU8 RFI/RI Work Plan (DOE 1994a), surface-soil sample locations were located based on this site reconnaissance. The OU8 Technical Memorandum 1 (DOE 1994b) specified additional sample locations and analytes for those IHSSs that were not adequately addressed by the OU8 RFI/RI Work Plan (DOE 1994a). Sites selected for sampling were approved by DOE, EPA, and CDPHE before sampling.

2.1 GEOPHYSICAL SURVEYS AT IHSS 163.2

IHSS 163.2 is believed to consist of an 8 by 8 foot concrete slab that was believed to have been buried in the vicinity of Building T771A. The slab may be contaminated with

americium-241 (Am-241) and could be buried up to 10 feet below the current ground surface. It is not definitively known if the slab is in one piece or if it contains any type of steel reinforcement. Three different geophysical methods were employed to survey for the location of the slab: ground penetrating radar (GPR), a high-resolution metal detector (EM61), and a ground conductivity meter (EM31). If the concrete slab contains metal rebar the EM61 and the EM31 systems would probably be the most effective at detecting it. If there is no metal in the slab, then GPR would have the highest potential for identification of the slab. However, if the slab is located too near or under any of the metal objects in the area (e.g., the fencing or trailer T771A), then detection of the slab by these geophysical methods would not be likely. Details of the geophysical survey field methods used at IHSS 163.2 are provided below.

The survey grid area was marked with paint on the ground every 20 feet along lines spaced at 5-foot intervals. Marked plastic pin flags or wooden stakes were placed at locations 0,0; 0,60; 0,120; 45,60; and 45,80. Station locations along survey lines were obtained from measuring tapes for the GPR and EM31. Station locations for the EM61 were determined from an odometer within the equipment.

The GPR data were collected continuously along survey lines using both the 300 Megahertz (MHz) and the 500 MHz antennae. The data were graphically recorded and annotated for each survey line.

The EM61 data were collected at 0.62-foot intervals along each survey line and were recorded in a data logger. After completion of the EM61 survey the data were transferred from the data logger to a computer for processing.

The EM31 data were collected at 5-foot spacings along the survey lines and were also recorded in a data logger. After completion of the EM31 survey the data were transferred to a computer for further processing.

2.2 GLOBAL POSITIONING SYSTEM SURVEYING

Maps from the OU8 RFI/RI Work Plan (DOE 1994a) and Technical Memorandum 1 (DOE 1994b) were used to locate surface-soil and soil-gas sample collection points. Fixed locations such as building corners and fences were used as reference points to locate the sample points. Measurements were made off the maps and locations were determined with a tape and compass. Each location was flagged in the field. After all the locations in each IHSS were sampled, Global Positioning System (GPS) equipment was used to survey each sample location to obtain state plane and latitude and longitude coordinates for the location.

These GPS data will be uploaded into the Geographic Information System (GIS) database. At the time of production of this Data Summary the surface-soil and soil-gas locations have just begun to be GPS surveyed. Because the GPS information is not complete at this time, it was not used in this Data Summary.

2.3 GEOGRAPHIC INFORMATION SYSTEM/ARC INFO™

All maps and spatially referenced data have been created in a GIS format using ARC/INFO™ software. RFETS map coverages, including OU and IHSS outlines, were obtained from EG&G. Analytical data were imported into the software to spatially represent analyte concentrations.

2.4 TANK AND PIPELINE COMPILATION

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

2.5 AIR SAMPLING PROGRAM

Ambient air monitoring during OU8 field activities was conducted using a mini-RAM™ aerosol monitoring device. This instrument was placed directly adjacent to and within one meter downwind of the field activities, such as soil sampling, to determine the maximum concentration of respirable airborne particulates released during the field activities. Readings from the mini-RAM™ instrument were taken intermittently during sampling and the instrument was always monitored during any activity that was expected to potentially emit airborne particulates, such as during sieving of the soil.

Organic vapor detection was also monitored during field sampling activities.

Data from the Radiological Ambient Air Monitoring Program (RAAMP) for onsite monitoring stations, including stations S-101, S-103, S-105, S-117, S-120, and S-121, were obtained for several months in 1994. However, the monitoring stations were not necessarily adjacent to the OU8 IHSSs; further, the RAAMP stations can easily be biased by airborne particulates emanating from sources other than OU8 IHSSs and field activities, so data from these stations cannot necessarily be well correlated with any particulates emitted from OU8 IHSSs or activities. Therefore, the direct field monitoring of the activities was assumed to more accurately reflect the airborne particulate dispersion caused by OU8 field activities.

2.6 OVERLAPPING AND ADJACENT IHSSs

Samples were analyzed for additional parameters in areas considered to be adjacent to (within 100 feet) or to overlap other IHSS areas according to the Integrated Field Sampling Plan (IFSP) (EG&G 1994b).

2.7 HIGH PURITY GERMANIUM SURVEY

In situ HPGe surveys were conducted at all 25 of the OU8 IHSSs. A total of 58 separate sites in OU8 were surveyed by in situ HPGe. The HPGe surveys were conducted in accordance with Environmental Restoration Program Division (ERPD) Standard Operating Procedure (SOP) GT.30 (EG&G 1994c). These in situ surveys were conducted to identify broad areas that are potentially contaminated with radionuclides. Included in the data are measurements for background.

Expected background activities were evaluated based on background HPGe data, the May 1995 Geochemical Characterization of Background Soils Characterization Program (BSCP) (DOE 1995a), and a literature search of background activities. These background values are shown in Table 2-1. The in situ HPGe data for OU8 were compiled on an IHSS-specific basis. Table 2-2 summarizes a comparison of in situ HPGe, lab HPGe, and laboratory radiochemistry.

The purpose of the in situ HPGe survey was to screen large areas potentially contaminated with a variety of radionuclides. The information was used to assist in identifying surface-soil sampling locations.

The HPGe in situ data collection assumptions are as follows:

- soil density = 1.5 grams (g) per cubic centimeter (cm^3);
- soil moisture = 10 percent;
- vertical distribution = homogeneous;
- averaging depth = 3.0 cm; and
- air density = 0.001293 g/cm^3.

An HPGe detector is a semiconductor radiation detector that measures X ray and gamma ray photons. The HPGe detector has a broad energy range, exhibits high resolution, excellent gain stability, moderate area averaging, and the ability to identify and quantify gamma-emitting radionuclides (EG&G 1993a). The HPGe detector allows detection and calculation of radionuclide concentrations in soil at the picocuries per gram (pCi/g) level for gamma-emitting radionuclides including, but not limited to, potassium-40 (K-40), radium-226 (Ra-226), thorium-232 (Th-232), cesium-137 (Cs-137), Am-241, uranium-233/234 (U-233/234), uranium-235 (U-235), and uranium-238 (U-238). The HPGe detects and calculates plutonium-239/240 (Pu-239/240) at the nanocuries per gram (nCi/g) level. The nominal detection radius for the instrument is 147.5 feet. The draft HPGe data, which include the percent error and Field of View information for each OU at RFETS, are included in Appendix A.

In general, the HPGe detector is extremely accurate in identifying the presence of specific radionuclides by resolution of the measured gamma spectrum. In addition, some HPGe results indicate that inadequate shielding during HPGe surveys may lead to elevated activity readings resulting from "shine" from local buildings that process or store radionuclides. Building shine may be defined as the influence of buildings that contain radioactive materials and are located within the radius of detection of the HPGe instrument. For example, HPGe

surveys in the vicinity of Building 444, which processed significant quantities of U-238, would be expected to identify elevated U-238 HPGe data. Similarly, Building 664 stores mixed waste, which can contain U-238, Pu-239/240, Am-241, and other radionuclides. HPGe surveys near this building may show elevated activities of these radionuclides due to shine from this building. Results are affected by other site characteristics such as irregular or sloping topography, soil moisture, soil density, and distribution of the sources throughout the soil. Therefore, these factors, as well as many others, limit the accuracy of the in situ HPGe data. Thus, all such data should be treated as qualitative rather than quantitative, and should be interpreted using the discretion appropriate for any screening data.

A brief description of the various radionuclides measured by in situ HPGe follows. Specific discussions on each IHSS group are then presented.

Potassium-40. Potassium-40 is a naturally occurring radionuclide that was not used in significant quantities at RFETS. However, K-40 above background activities may be present in RFETS soils because of the use of Polar Melt® deicer, which is composed of potassium chloride (EG&G 1992a). Based on background activities identified in the literature search, the range of reasonable background activities for K-40 is from 1.89 to 21.8 pCi/g. One of the primary reasons for generating K-40 data was for use in calibration of the HPGe detector.

Radium-226. Radium-226 is a naturally occurring radionuclide. Background values shown in Table 2-1 for this radionuclide are as high as 1.13 pCi/g. The upper tolerance limit with 99 percent confidence and 99 percent coverage ($UTL_{99/99}$) for Ra-226 in background soils near RFETS is 1.20 pCi/g (DOE 1995a). In situ HPGe data for Ra-226 were obtained primarily for in situ HPGe detector calibration purposes and for comparison of the total activities of Ra-226 and U-238 in the surface soils. Nothing in the history of the IHSSs at

OU8 leads to the conclusion that Ra-226 might be present in excess of natural background concentrations at any of the OU8 IHSSs.

Thorium-232. Thorium-232 is the most abundant of the naturally occurring thorium isotopes. Thorium is not known to have been used in significant quantities for production purposes at RFETS. Background activities of Th-232 could be expected to range up to 1.35 pCi/g. In situ HPGe data for Th-232 were obtained primarily to calibrate the in situ HPGe detector.

Uranium-238. Uranium-238 is a radionuclide that was used at RFETS, especially in the 400-area buildings. Table 2-1 indicates that background activities of U-238 could be expected to be as high as 2.83 pCi/g based on wet-chemistry analysis, while background values measured with in situ HPGe were as high as 2.3 pCi/g.

Uranium-238 activities above 2.83 pCi/g were further analyzed, and the ratio of Ra-226 activity to the U-238 activity was determined. In naturally occurring materials, these two radionuclides should be in secular equilibrium. At equilibrium, the total activity of Ra-226 and U-238 should be approximately equal (Cember 1978; Faure 1977) and the ratio of the activities should be near unity. The in situ HPGe data for background soils indicate that this ratio is less than unity, varying from 0.35 to 0.51. The limits of analytical capability of the HPGe method may account for the variation and a ratio of less than unity. For this evaluation, activity ratios of Ra-226 to U-238 that exceed 0.35 are considered to be indicative of naturally occurring U-238 activities. In summary, only U-238 activities that exceed 2.83 pCi/g and are present with Ra-226 in a ratio of less than 0.35 (radium to uranium) were identified as anthropogenic.

Uranium-235. Uranium-235 is a radionuclide with a very low abundance in naturally occurring uranium. Background activities of U-235 could be expected to be as high as 0.13 pCi/g based on wet-chemistry analyses and 0.10 pCi/g for in situ HPGe data. Building 883 was the site of U-235 usage at RFETS.

Cesium-137. Cesium-137 is a man-made radionuclide that is found in surface soils due to fallout from atmospheric testing of nuclear weapons. Soils that have remained undisturbed in recent years could have Cs-137 activities up to 1.37 pCi/g. Background concentrations up to 2.25 pCi/g were identified in the RFETS area in recent work. Disturbed soils would have lower activities of Cs-137 because of the mixing of surface soils with less contaminated deeper soils. No data are available that suggest fission by-product materials were ever used in OU8 or that an accidental criticality had occurred at RFETS. Therefore, all Cs-137 present is considered to have come from atmospheric fallout.

Americium-241. Americium-241 is an anthropogenic radionuclide and is a daughter product of the radioactive decay of Pu-239/240. Americium has been detected historically at RFETS at above-background concentrations. For the purposes of this evaluation, only HPGe americium measurements above 0.1 pCi/g were considered to be above background. In addition, many of these locations were considered to be elevated because of shine from buildings that handled either plutonium- or plutonium- and americium-contaminated waste. In situ HPGe survey locations and the specific activity data for Am-241 are presented on Plate 1. Results of the in situ HPGe survey indicated concentrations of Am-241 in the environment in some locations above those that would be expected from the history of uses and releases of Pu-239/240 and Am-241 within OU8. These areas could be contaminated with Am-241 or the high concentrations of Am-241 could be due to Th-234 interference with the Am-241 analysis. Thorium-234 is a daughter of naturally occurring U-238. It is suspected that the software program, Nuclear Materials Analysis Program, does not

differentiate between the two isotopes Am-241 and Th-234. The 60 kilo electron-volt (KeV) gamma emission of Am-241 is about 3 KeV less than the 63 KeV gamma emission of Th-234 (U.S. Public Health Service 1970) and, as a result, some detections of americium may be Th-234 interference. Evaluation of the Am-241 and U-238 data should indicate how much of the interference from Th-234 is responsible for elevated Am-241 concentrations. Plate 1 illustrates the location of elevated americium activity compared to OU8 IHSSs.

Plutonium-239/240. Plutonium-239/240 is a man-made radionuclide that has been used in numerous machining, casting, and chemical operations at RFETS. Plutonium has been detected historically at RFETS and is present at concentrations above background. The minimum detectable activity (MDA) of Pu-239 with the in situ HPGe detector used at RFETS is three orders of magnitude higher than with the laboratory wet-chemistry method (nCi/g). Plutonium-239/240 values above the MDA of the in situ HPGe detector (0 nCi/g) are usually considered to be potentially above background.

2.8 SODIUM IODIDE SURVEYS

The NaI scintillation detector, also referred to as Field Instrument for Detection of Low Energy Radiation (FIDLER), is used for detecting gamma photons (EG&G 1993a). The detector consists of a single crystal of NaI to which a small amount of thallium has been added. The detector has a narrow field of view of approximately 1 foot in diameter when held 2 inches above the ground. This instrument is designed to measure the low-energy gamma rays and X rays that are characteristic of americium and plutonium. The procedure for use of the FIDLER at RFETS is outlined in SOP FO.16 (EG&G 1992b).

NaI surveys were conducted at each sampling location in OU8 for health and safety purposes and to evaluate and compare NaI readings to HPGe results in each IHSS.

In addition, selected areas for NaI surveys were also identified based on in situ HPGe results. Field notes and data logs for NaI detector results and additional information on the NaI surveys are provided in Appendix B.

2.9 VERTICAL DEPTH SOIL PROFILE SAMPLING

The purpose of VSP sampling is to supplement and verify the field HPGe data by defining the vertical distribution of radionuclides that contribute to the gamma spectra in the top 6 inches of soil. VSP samples were collected at 22 locations in OU8 in accordance with ERPD SOP GT.08 (EG&G 1993b). Table 2-3 lists the analytes for VSP sampling.

VSP sampling is accomplished by collecting discrete soil samples at 2-inch intervals corresponding to depths from 0 to 2 inches, 2 to 4 inches, and 4 to 6 inches (EG&G 1993b). These samples were collected only in exposed soil sites to determine the vertical distribution of gamma-emitting radionuclides contributing to the in situ HPGe survey readings. VSP samples were not collected under concrete or asphalt due to the shielding of these dense surface materials. The VSP samples were analyzed by laboratory HPGe. Analytical data, MDAs, and error terms from these analyses are included in Appendix C. To identify VSP values potentially above background, the error term was subtracted from the sample value and compared to background activities from the May 1995 BSCP (DOE 1995a).

2.10 ASPHALT SAMPLING

Six locations were sampled for asphalt in OU8. These asphalt samples were collected from paved areas at locations that exhibited radionuclide concentrations above background levels (based on the in situ HPGe survey data evaluation). Samples were collected following the methodology specified in ERPD SOP GT.08 (EG&G 1993b). The samples were collected

to determine whether the levels of radioactivity detected were a result of surface contamination or a result of "breakthrough" from a radiological source below the asphalt. Samples were collected using a core drill and 4- to 6-inch-diameter bits. The asphalt/concrete was cored completely through to the underlying soil. The core was then removed, wrapped in aluminum foil, and shipped to RUST Geotech, Grand Junction, Colorado, for analysis. A listing of the radionuclides analyzed is presented in Table 2-4. Results were compared to Preliminary Remediation Goals (PRGs) and surface-soil background concentrations (DOE 1995b).

2.11 SOIL-GAS SURVEYS

Soil-gas samples were collected from locations specified in Section 6.0, Field Sampling Plan, of the OU8 RFI/RI Work Plan (DOE 1994a). A total of 41 locations were sampled in accordance with ERPD SOP GT.09 (EG&G 1992c) and were analyzed using modified EPA Method 524.2.

Thirteen different target compounds were specified for analyses in Section 6.0, Field Sampling Plan, of the OU8 RFI/RI Work Plan (DOE 1994a). The compounds are carbon tetrachloride, benzene, ethylbenzene, toluene, xylene, dichloromethane, 1,1,1-trichloroethane, methylethylketone, perchloroethene, trichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, and acetone. However, modified EPA Method 524.2 allows for the detection of 64 different compounds of which these 13 target compounds are a part. A listing of the 64 compounds analyzed for via method 524.2 and their corresponding method detection limits (MDLs) is provided in Table 2-5.

Before soil-gas surveys were conducted, all sampling locations were cleared for underground utilities. After a location was cleared for underground utilities, a small-diameter stainless-

steel probe was driven into the soil either hydraulically or with an electric rotary hammer to a depth of 5 feet below the ground surface. A vacuum was then applied to the probe to induce soil-vapor flow. The soil-gas samples were collected in adsorbent cartridges that were transported to a mobile laboratory and analyzed for volatile organic compounds (VOCs) (Table 2-5) according to EPA modified Method 524.2.

Results of the soil-gas survey were used as a screening technique to identify VOCs that exceeded the target detection limit of 1.0 micrograms (μg) per liter (L). All sample results are listed in Appendix D. All discussions of soil-gas results for OU8 are in Section 3.0.

Detection limits of 0.1 μg/L were used as guidelines for the mobile laboratory. Field-laboratory chemists flagged all data associated with method blank contaminants with a "B." These data were assessed and no significant bias was found for blank contaminants. In any case where an analyte in a blank was detected above the action level of 1.0 μg/L the task manager requested resampling for all associated sample locations. The mobile laboratory reported all analytical results. Values found to be outside the linear calibration range were flagged as "J," indicating an estimation by the field chemists.

Typical field procedures included collecting only a 1-liter volume of soil gas for most of the sample locations. However, at locations where substantially higher concentrations of VOCs were suspected, 100-milliliter (mL) and 10-mL samples were collected in addition to the 1-liter sample.

All sample results were evaluated by the onsite task manager to ensure the data generated by the mobile laboratory during the soil-gas survey met Data Quality Objectives (DQOs) as specified in the Quality Assurance Addendum, Section 10.0 of the OU8 RFI/RI Work Plan (DOE 1994a). In addition, the mobile laboratory operations and procedures were audited

by CDPHE and DOE chemists. These audit findings primarily addressed the calibration criteria of plus or minus (±) 50 percent. The auditors noted that the SW-846 methodology specifying ±30 percent was not followed by the laboratory personnel. After review of the actual calibration data, the field laboratory chemists determined that a majority of calibration check compounds met the ±30 percent criteria. Because of the complexity of the soil gases, it was not always possible to meet the more stringent criteria. No formal data validation is required for Level II field analyses (EPA 1992). The data generated for the soil-gas survey met their intended use by providing a preliminary assessment for site characterization.

Duplicates, other quality control (QC) samples, resamples, and various dilutions were analyzed during the soil-gas investigation at OU8. The data assessment for soil-gas data included a comparison of the primary real sample with its corresponding duplicate and/or dilution sample analysis. One sample was selected from each unique sample location based on the following criteria:

- Resamples are selected over the real sample if the original analysis was not valid.
- If the duplicate or dilution sample contained the same number of compounds detected as the real sample, or no compounds were detected in either sample, the primary sample was selected.
- The real, duplicate, and/or dilution sample was selected over other samples from a unique location when the number of compounds detected in that sample was higher.
- Multiple samples from a unique location were evaluated together when one sample contained more detected compounds, and any additional sample(s) contained significantly higher concentrations of detected compounds.

Appendix D indicates with an "at" symbol (@) which analytical result was used.

A comparison of relative percent difference (RPD) was not calculated because the soil-gas data are screening-level data (EPA 1992).

Forty-three of the soil-gas locations were not sampled. The sites were not sampled for a variety of reasons. In many cases, utility clearances could not be obtained because of underground pipes, tanks, or electrical lines. Some locations were inaccessible due to their location under Conexes™ or trailers. Other sites were not sampled because either the Geoprobe encountered refusal or a high vacuum occurred due to saturated soil. A high vacuum occurs when the vacuum pump on the Geoprobe has a pressure of more than 12 inches of mercury, making it impossible to obtain a volume of air that is reliable. Whenever possible the location was moved in order not to have to abandon the site. However this was not possible in all cases.

Some data from sample locations were rejected because internal response standards were outside laboratory criteria. Resampling was done and the results are shown in Appendix D with all the soil-gas data. Rejected data are also shown in Appendix D. Resampled data are identified with an "R" at the end of the sample identification number.

In Section 3.0, soil-gas data are presented in tables and figures that display all data that exceed the target detection limit of 1.0 μg/L, except for methane and hydrogen sulfide. For methane, values reported are those that exceed the instrument detection level of 20 parts per million (ppm) and estimated values of 10 ppm. For hydrogen sulfide, values reported are those that exceed the instrument detection level of 5 ppm.

2.12 SURFACE-SOIL SAMPLING

Surface-soil samples were collected from locations specified in Section 6.0 of the OU8 RFI/RI Work Plan (DOE 1994a) and Technical Memorandum 1 (DOE 1994b). A total of 110 surface-soil locations were sampled in OU8. No surface-soil sampling was performed for IHSSs 118.1, 118.2, 150.2, 163.2, and 184. Table 2-6 summarizes the analytes for each IHSS's surface-soil sampling.

Two methods of collecting surface-soil samples were employed during Phase I sampling at OU8. Both methods of sampling were conducted in accordance with ERPD SOP GT.08 (EG&G 1993b). In exposed soil areas, the Rocky Flats (RF) Method was used to collect the sample. The RF Method was modified in GT.08 to require a five-point rather than 10-point composite for surface-soil sampling at IHSSs because there was no need for the extra volume of soil produced by a 10-point composite. In areas where asphalt pavement or concrete covered the ground surface, grab samples were collected from the soil underlying the surface covering after first cutting a hole through the asphalt pavement or concrete with an electric coring device. If there was no change in the lithology of the soil underlying the surface covering within the first 6 inches, then only one grab sample was collected from that location. If a second soil horizon (i.e., change in lithology) was observed in the first 6 inches, a grab sample of each soil lithology was collected.

Analytes for surface-soil sampling are summarized in Table 2-6. The analytical results of surface-soil sampling were used to characterize contamination at each IHSS by identifying detected analytes including those reported as estimated concentrations below the MDL, examining the detection frequency, delineating locations and areas of detection, and identifying areas that require additional characterization. Areas of potential concern were identified by comparing reported concentrations with chemical-specific background levels and

PRGs. Results of the *Background and Soils Characterization Program Report, Rocky Flats Environmental Technology Site* (DOE 1995a) comprise the background database. For each analyte, a $UTL_{99/99}$ was calculated assuming the background data were normally distributed. Surface-soil concentrations were compared to the reported $UTL_{99/99}$. Tables 2-7, 2-8, and 2-9 list the analytes and background comparisons.

PRGs were obtained from the *Programmatic Risk-Based Preliminary Remediation Goals for the Rocky Flats Plant* (DOE 1995b). Table 2-10 lists the February 1995 PRGs used for comparison in this report. Programmatic PRGs have been calculated for various scenarios at RFETS to obtain contaminant- and medium-specific levels of exposure that will protect human health. Ecological effects were not considered in the development of PRGs. For screening purposes, the residential PRGs were used because they are the most conservative concentrations among the various surface-soil exposure scenarios. Decisions on future land use will provide the basis for the PRGs that will be used to determine remediation levels.

If both a PRG and a background concentration were available for an analyte (e.g., for most of the inorganic analytes) the process was to make a comparison to background first, and then compare to the PRG. If a particular analyte exceeded background it was carried forward through the PRG comparison. If the analyte was present at less than background it was dropped from further consideration. This helped prevent characterization of existing background levels as site contamination and removed the consideration of potential risks associated with naturally occurring levels. Arsenic and beryllium PRGs are less than the background $UTL_{99/99}$ concentrations and were not identified for further evaluation unless background concentrations were exceeded. Background was assumed to be zero for organic analytes. PRGs are not available for lead, cobalt, cesium, lithium, aluminum, iron, magnesium, potassium, sodium, Cs-137, and gross alpha and beta.

An average concentration for the detected analytes was calculated from data for each IHSS using positive reported values including estimated, or "J" (for organics) and "B" (for metals) qualified concentrations, and using one-half the sample quantitation limit (SQL) for samples reported as nondetects. In determining the frequency of detection of a particular analyte, one duplicate sample result was selected over the other according to the following criteria:

- the higher of two positive values was used; or
- a positive value was used over a reported SQL; or
- the lower of two SQLs was used.

Tables presenting sampling results and summaries for each IHSS are presented in the Tables section of Volume I and in Appendix E.

Figures that show surface-soil sampling locations and concentrations of analytes detected at the various IHSSs, respectively, have also been developed. These graphical representations of the data are cited throughout the report. Forty-four figures have been prepared for Section 3.0 of this draft report. Each figure contains plotted concentrations of detected analytes. Inorganics shown are those concentrations that exceeded $UTL_{99/99}$ background levels. Organic analytes shown are those concentrations that exceeded PRGs.

Handling of Duplicate Values. The surface soil tables present both real and duplicate sample data. Site-specific maps/plates showing surface-soil sampling locations and analyte concentrations detected at the various IHSSs do not present both real and duplicate data. If the real and the duplicate sample results both exceed either PRGs or background concentrations, the larger of the two results is shown on the map/plate. If the real does not exceed the PRG or background concentration but the duplicate does, only the duplicate result is presented on the map/plate.

No Arsenic or Beryllium Above PRGs Shown on Site-Specific Maps/Plates. Surface soil tables present exceedances of all analytical data for which there are PRGs and/or background concentrations available. However, the site-specific maps/plates do not depict any exceedances of arsenic or beryllium above PRGs. This is because background levels identified for arsenic and beryllium in the Background Soils Characterization Program (DOE 1995a) are greater than the PRG values (DOE 1995b) used in this data summary. Therefore, only reported values above the background for arsenic and/or beryllium are shown on the maps/plates.

"B" Qualified Data Not Shown on Site-Specific Maps/Plates. Data found to be qualified by the laboratory or qualified during the data validation process with a "B" qualifier required specific action during the data compilation process. For volatile, semivolatile, and radiological analyses, positive sample results found to be less than 10 times the blank level were considered to be false positive values and were not plotted on the site-specific maps and plates. (Metals analyses did not fall in this category and were plotted on the maps/plates.) Data assessment and qualification procedures described in the EPA's National Functional Guidelines for Data Validation include a description of this process (EPA 1988a, 1988b). Also, the Guidance Document for Data Usability describes the process (EPA 1992).

No Available Background Values for Base/Neutral Acid (BNA) Extractable Analysis. Organic chemicals of potential concern found in background samples are not considered to be naturally occurring. No additional site-specific background sampling was conducted for this investigation. Therefore, the background levels for all semivolatiles were set at a concentration of zero.

2.13 STATISTICAL ANALYSES OF SURFACE-SOIL DATA

Phase I, Stage 2 surface-soil sampling at the various IHSSs was based on the statistical design outlined in the OU8 RFI/RI Work Plan (DOE 1994a). In accordance with EPA guidance (EPA 1990), the acceptable probability (β) of not finding a contaminated area is 0.10 or 10 percent. The statistical analysis indicated that a triangular grid spacing of approximately 25 feet would have a 10 percent or less probability of missing an elliptical contaminated area of approximately 50 by 25 feet, and a triangular grid with 100-foot spacing would have a 10 percent or less probability of missing an elliptical contaminated area of approximately 50 feet by 100 feet. Consequently, the surface-soil samples were generally collected at nodes of a 25-foot triangular grid at most OU8 IHSSs with areas less than 10,000 square feet and on 50-foot nodes within those IHSSs with greater areas.

Because Phase I, Stage 2 surface-soil data have now been obtained, it is possible to investigate the variability of data within each IHSS and to examine whether the number of soil samples collected was sufficient to reliably estimate mean concentrations of chemicals within each IHSS. For cases where the number of samples collected during Phase I, Stage 2 is not sufficient to estimate mean concentrations with the desired degree of confidence, plans for collecting additional samples during Phase I, Stage 3 investigations can be developed.

The assessment of Phase I, Stage 2 data involved two steps: data screening and parametric statistical computations. The procedures used in the data assessment are described in this section. Applications of these procedures to the data collected at each individual IHSS are described in Sections 3.3 through 3.26. Surface-soil data statistical summary tables are provided for each IHSS.

Data Screening. To determine the sufficiency of the number of samples, the Phase I, Stage 2 data were screened through a hierarchy of processes:

1. Duplicates (i.e., concentrations for duplicate samples collected from the same nominal location) were treated in a manner consistent with that of Section 2.12. If both analyses detected analytes, the higher value was used to represent the concentration at the location. If one analysis indicated a detected concentration and the other analysis was below the detection level, the detected value was used to represent the concentration at the location. If both analyses were below the detection level, the value with the lower detection level was used to represent the concentration at that location.

2. The frequency of detections for each chemical was examined. Those chemicals for which all analytical results were less than the SQL were not assessed further in the statistical analysis because no parametric statistical computations are possible with such data.

3. For those chemicals for which more than approximately one-half of the analytical results were less than the detection level, parametric statistical computations were not calculated. However, in the following sections, the detected data were examined for consistency with trends observed from more complete data sets (e.g., presence of "hot spots").

4. For data sets that included fewer than approximately one-half nondetects, and included detected values that generally exceeded the detection levels of the nondetected data, parametric statistical computations were conducted by replacing the nondetected values with one-half the detection level (SQL) to obtain unbiased estimates of the means of the data distributions. Although RCRA guidance suggests

that nonparametric methods be used to compare site data against standards whenever the frequency of nondetects exceeds 15 percent (EPA 1989), the selected approach is consistent with RFETS data treatment for risk assessment. At this preliminary stage, the data are not being compared against standards. Furthermore, the draft *Human Health Risk Assessment Methodology* (EG&G 1994d) indicates that nondetected values should be replaced with one-half the reported detection limit and that graphical presentations of the data using box plots and histograms should be used when the percentage of nondetected values is 50 percent or less. In addition, recent information (Chromec 1994) suggests that simple substitution methods, such as replacing nondetected values with one-half the detection level, are nearly as accurate as the generally-preferred Maximum Likelihood Estimation method for dealing with nondetected values when the proportion of nondetected values is less than 80 percent.

5. For data sets for which all values were reported as detected (including qualification as estimated), the entire data set was used for parametric statistical computation as described in the following sections. The only data that were excluded from the analyses were those data that were "rejected" by the data validation process.

The application of each of these screening steps is presented in the IHSS-specific discussions of Sections 3.3 through 3.26.

Parametric Statistical Computations. For those data sets that were not eliminated from further analyses by the screening process described above, the following statistical computations were conducted:

1. The number of physical samples (sample size), mean, standard deviation, and coefficient of variation (ratio of standard deviation to mean) were calculated.

2. The Shapiro-Wilk test (Gilbert 1987; EPA 1992) was used to test whether the set of physical samples from a specified IHSS were drawn from a normal population. The test was applied to the original data and logarhythmic (base *e*) transformed data. The nature of the test is such that the data (or log-transformed data) are assumed to be drawn from a normal population unless the calculated statistic (W) indicates otherwise (i.e., greater than the critical value).

3. For data sets that the Shapiro-Wilk test qualified as log-normal, the mean (μ^*), standard deviation (s^*), and coefficient of variability (s^*/μ^*) were estimated from formulas given by Gilbert (1987):

   $\mu^* = \exp(y + s_y^2/2)$

   and $s^{*2} = \mu^{*2}[\exp(s_y^2) - 1]$

   where y and s_y^2 are, respectively, the arithmetic mean and variance of the log-transformed data.

4. The OU8 RFI/RI Work Plan (DOE 1994a) indicates that summary statistics, including coefficient of variation and power, should be determined for each constituent at each IHSS. The coefficient of variation is the ratio of the standard deviation to the mean of a statistical sample, and provides a measure of the variability of the sample. The power of a statistical hypothesis test is given by $1-\beta$, where β is the false-negative (Type II) error rate of the test. Power was estimated in a manner consistent with the statistical analyses conducted for the assessment of the OU10 surface-soil data (DOE 1995c). In that document, the required sample size was addressed using a formula given by Gilbert (1987) that defined the sample size required to ensure the following:

$\text{Prob}[|x - \mu| \geq d\mu] = \alpha$

where x = sample mean

μ = true population mean

d = relative error = $|x - \mu|/\mu$

$1 - \alpha$ = confidence level.

This condition can be considered as a test of the hypothesis H: x_o: $- \mu < d\mu$, or H_o:$x < (1+d)\mu$. For this hypothesis test, the power of the test can be determined from graphs of power versus the parameter

$$\delta = [|(1+d)\mu| - \mu]n^{1/2}/\sigma$$

where n is the sample size and σ is the population standard deviation (Guenther 1965). Letting η be the coefficient of variation σ/μ, the following applies:

$$\delta = dn^{1/2}/\eta.$$

Assuming η can be approximated by the ratio of the sample standard deviation to the sample mean (i.e., $\eta = s/x$), the following applies:

$$\delta = dn^{1/2}x/s.$$

5. The statistical power was calculated for values of the relative error (*d*) ranging from 0.2 to 0.5. This same range of relative error was used in the OU10 analysis (EG&G 1994d). This allows an analysis of the sensitivity of the power to the relative error in estimating the mean of the data population within a specified IHSS. This sensitivity analysis can be used to determine whether adequate power has been attained, per constituent and per IHSS, to provide confidence in the estimated mean concentration determined from the

collected field samples. In some cases, the sensitivity analysis may indicate that the power is adequate and the numbers of samples already collected are sufficient to characterize the mean concentrations within the IHSS or are sufficient if relative error requirements can be relaxed slightly. In other cases, the calculated power can be used to determine estimates of the numbers of additional samples required, using techniques outlined in the OU8 RFI/RI Work Plan (DOE 1994a). The analysis may also identify constituents with such high data variability that they must be assessed more thoroughly before any conclusions can be made regarding the numbers of field samples required.

IHSS-specific results of these statistical analyses are discussed in the IHSS-specific subsections. The conclusions of this statistical assessment will be referred to during the development of the Phase I, Stage 3 work plan. In that work plan, numbers and locations of additional samples will be recommended to meet appropriate and protective statistical assumptions.

2.14 SEDIMENT SAMPLING

Sediment samples were collected from locations specified in Section 6.0 of the OU8 RFI/RI Work Plan (DOE 1994a) and Technical Memorandum 1 (DOE 1994b). A total of seven sediment locations were sampled in OU8. Sediment sampling was performed in IHSSs 139.1(N) and 144(N). Table 2-11 summarizes the analytes for each IHSS's sediment sampling. Sediment samples were collected according to ERPD SOP SW.06, "Sediment Sampling" (EG&G 1992d).

The sediment sampling analytical results were evaluated using the same methodology as the surface-soil sampling analytical results. Refer to Section 2.12 for a description of this methodology.

2.15 DATA QUALITY ASSESSMENT

Table 2-12 provides a comparison of the work performed versus the original scope of work. Remaining text in this section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

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3.0 DATA SUMMARY

This section presents the results of the data collection for the nonintrusive Stage 2 activities for the OU8 Phase I RFI/RI. A summary of the air-sampling program for OU8 is presented in Section 3.1, and a summary of the tank and pipeline compilation is presented in Section 3.2. Sections 3.3 through 3.26 present, for each IHSS, the IHSS background, previous studies and recommendations, overlapping and adjacent IHSSs, and a summary of the data collected during the HPGe survey, the NaI survey, the soil-gas survey, surface geophysical survey, VSP sampling, asphalt sampling, sediment sampling, surface-soil sampling, and a statistical summary of the surface-soil sampling. The background information and previous studies and recommendations for each IHSS are summarized from the OU8 RFI/RI Work Plan (DOE 1994a) and the HRR (DOE 1992a).

3.1 AIR SAMPLING PROGRAM FOR OU8

Monitoring for respirable aerosol emissions was a health and safety requirement in addition to being an investigative technique for dispersion of airborne particulates. A mini-RAM™ aerosol monitoring device placed within the active OU8 work zone was used to measure ambient air monitoring of OU8 field activities. Readings from the mini-RAM™ instrument were taken regularly during sampling and the instrument was continuously monitored during any potential dust generating activity, such as during sieving of the soil.

All readings from the mini-RAM™ instrument during sampling activities indicated that fugitive airborne particulates were at background levels. These readings were taken at a distance of approximately 1 meter downwind of the sampling activities. The field sampling teams achieved these results by taking precautions to minimize fugitive airborne particulate

emissions, such as covering the stainless steel collection bowl during sieving of dry soil and carefully transferring the soil to sampling containers.

Further, all soil sampled during OU8 activities was field monitored for both alpha and beta activity. No soil from which any fugitive dust could be generated that was field monitored indicated either alpha or beta activity above background levels.

The absence of any finding of fugitive dust emissions by the field teams in addition to the absence of any alpha or beta activity above background levels negated the need to analyze the data from the RAAMP stations for determination of the impact of OU8 field activity on fugitive airborne particulate emissions. It is unlikely that any fugitive dust emission or series of fugitive dust emissions large enough to show an effect on the RAAMP station could be wholly missed by the field monitoring, especially when radiological monitoring of the soil did not reflect any activity above background. Therefore, analysis of the data from the RAAMP stations was not deemed necessary. Table 3-1, a tracking summary of the air monitoring data, was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.2 TANK AND PIPELINE COMPILATION FOR OU8

Text for this section and Table 3-2, a summary of the tank and pipeline compilation, were not completed due to a change in scope for this Data Summary Report as the DOE Stop Work Order.

3.3 IHSS 118.1 - MULTIPLE SOLVENT SPILLS WEST OF BUILDING 730

IHSS 118.1 is associated with a 5,000-gallon underground steel storage tank that contained carbon tetrachloride that was located adjacent to the west side of Building 730, just north of Building 776. The tank was configured with its long axis running north to south, with the south head of the tank exposed in a valve pit. The north end of the tank was buried directly in soils. The east side of the valve pit was approximately 10.1 feet west of the exposed portion of the Building 730 pump house. A sump in the valve pit reportedly discharged to the ground surface (DOE 1992a). It is stated in the HRR that the location of the IHSS presented in the IAG is inaccurate and that the IHSS should be redefined as a 20 by 40 foot area located adjacent to the west side of Building 730. Information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that IHSS 118.1 should be further redefined as a 30 by 13 foot area located adjacent to the east side of Building 701. The area is relatively flat and includes both paved and unpaved surfaces.

There have been numerous releases from the tank and associated piping throughout its operational history, which was from prior to 1970 to 1981. Drawings of the tank referenced in the HRR are dated 1963. In the 1970s, tank overflows occurred during filling operations. On February 26, 1976, it was discovered that corroded piping (or possibly a valve) was leaking carbon tetrachloride into the tank's sump pit. On June 18, 1981, the tank failed, releasing carbon tetrachloride into the sump. Liquids released into the sump were subsequently pumped onto the ground surface. The tank was removed following its failure (DOE 1992a).

It is also stated in the HRR that prior to 1970 a spill of 100 to 200 gallons of trichloroethene (TCE) occurred north of Building 776. Due to conflicting information, it was postulated in the HRR (DOE 1992a) that the spill was actually carbon tetrachloride.

3.3.1 Previous Studies and Recommendations

Stage 1 activities performed for IHSS 118.1 included investigations to determine if the concrete containment (sump pit) was removed at the time the tank was removed. The results from this investigation were inconclusive. It appears that the sump pit was removed at the time the tank was removed, but it may have been buried at the former tank location. A detailed discussion is provided in OU8 Technical Memorandum 1 (DOE 1994b).

Additional Stage 1 activities included the identification of building foundation drains and storm sewers that could potentially be impacted by IHSS 118.1 and contribute to contaminant migration. Foundation drains were not identified on Building 701 or Building 776. However, foundation drains are suspected on Building 776 due to its underground structures, but this was not confirmed during the investigation. Foundation drains were identified on Buildings 771 and 774. With the direction of groundwater flow believed to be to the northeast, there is the potential that those foundation drains could be impacted by the carbon tetrachloride releases at IHSS 118.1. Utility drawings do not show any storm sewers near IHSS 118.1. A detailed discussion of the foundation drains is provided in OU8 Technical Memorandum 1 (DOE 1994b).

3.3.2 Overlapping IHSSs

A portion of the sample grid for OU8 IHSS 144(N) overlaps with the sample grid for IHSS 118.1. There were no changes to the sampling plan for IHSS 118.1 due to the overlap.

3.3.3 Adjacent IHSSs

There are two IHSSs located adjacent to IHSS 118.1:

- OU14 IHSS 131 is located adjacent to the north side of Building 776 and is associated with radioactive contamination caused by incidents within the building. There were no changes to the sampling plan for IHSS 118.1 due to IHSS 131.

- OU9 IHSS 132 is associated with the underground process waste and laundry waste holding tanks located in Building 730. There were no changes to the sampling plan for IHSS 118.1 due to IHSS 132. However, visual observations during borehole drilling for OU9 indicated that contamination probably exists in the subsurface soil. Results from the OU9 investigations will be presented in the forthcoming OU9 Data Summary.

3.3.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.3.5 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-1. Table 3-3 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of carbon tetrachloride within IHSS 118.1. In addition, analyses were performed for the other chemicals listed in Table 3-3. Seven sampling locations were sampled. 1,1,1-Trichloroethane and carbon tetrachloride were found at SG00194;

trichlorofluoromethane at SG000394; tetrachlorethene, carbon tetrachloride, and chloroform at SG000494; and carbon tetrachloride and trichlorofluoromethane at SG000594.

3.4 IHSS 118.2 - SOLVENT SPILL, SOUTH END OF BUILDING 776

IHSS 118.2 is associated with a 5,000-gallon aboveground carbon tetrachloride tank located adjacent to the north side of Building 707, in the alleyway between Building 707 and Building 778. According to the OU8 RFI/RI Work Plan (DOE 1994a), in addition to carbon tetrachloride the tank may have held various degreasing solvents, including petroleum distillates, benzene and dichloromethane paint thinner, 1,1,1-trichloroethane, and methyl ethyl ketone. The OU8 RFI/RI Work Plan defines IHSS 118.2 as an area 30 by 20 feet, adjacent to the north side of Building 707. The area is mostly flat and is fully paved.

There have been numerous leaks, spills, and overflows that have occurred from the tank during routine filling operations. The most significant release occurred in June 1981 when the tank ruptured and released an unknown quantity of carbon tetrachloride to the environment. The tank and the area of the spill were subsequently cleaned up. However, no documentation has been found to support any sampling and analysis conducted to verify the complete removal of contaminated soil.

3.4.1 Previous Studies and Recommendations

Part of the Stage 1 activities for IHSS 118.2 proposed in the OU8 RFI/RI Work Plan (DOE 1994a) included determining if the tank is still present. A 5,000-gallon aboveground tank containing approximately 3,500 gallons of carbon tetrachloride is currently located at the site. The tank is surrounded by a concrete containment wall approximately 4 feet high. It is not known if this is the same tank that ruptured in 1981 or if it is a replacement tank.

The HRR (DOE 1992a) states that the tank ruptured and leaked solvent onto the ground, "contaminating the soil." Information obtained for the development of OU8 Technical Memorandum 1 (DOE 1994b) indicated that the IHSS was paved in 1981 at the time of the release. There is no mention in the HRR or the OU8 RFI/RI Work Plan (DOE 1994a) of pavement being affected by the release.

Additional Stage 1 activities included the identification of building foundation drains and storm sewers that could potentially be impacted by IHSS 118.2 and contribute to contaminant migration. There were no foundation drains identified on Building 778, but foundation drains were identified on Building 707. The drains are connected to a storm sewer at the southwest corner of Building 707. The storm sewer discharges at the 750 Culvert. There has been historical sampling of the 750 Culvert since the 1970s. However, samples were not analyzed for VOCs. Therefore, no conclusions can be made with regard to the foundation drains and contaminant migration from IHSS 118.2.

3.4.2 Overlapping IHSSs

IHSS 118.2 overlaps with OU9 IHSS 121 (the Original Process Waste Lines [OPWL]). There were no changes to the sampling plan due to the overlap. IHSS 118.2 also overlaps with OU8 IHSS 150.7. There were no changes to the sampling plan for either IHSS due to the overlap. The two surficial soil below-asphalt samples collected within the alleyway for IHSS 150.7, at sites SS809993 and SS810093, were analyzed for radionuclides only.

3.4.3 Adjacent IHSSs

There are no adjacent IHSSs within 100 feet of IHSS 118.2.

3.4.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.4.5 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-2. Table 3-4 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of carbon tetrachloride, methyl ethyl ketone, trichloroethane (TCA), dichloromethane, and benzene within IHSS 118.2. In addition, analyses were performed for the other chemicals listed in Table 3-4. Five locations were sampled. Exceeding 1.0 μg/L were carbon tetrachloride, tetrachloroethene (PCE), toluene, and TCE from SG001094; carbon tetrachloride, chloroform, PCE, and total xylenes from SG001194; benzene, carbon tetrachloride, chloroform, chloromethane, and TCE from SG001294; carbon tetrachloride and chloroform from SG001394; and carbon tetrachloride and TCE from SG001494.

3.5 IHSS 123.1 - PROCESS WASTE SPILL, VALVE VAULT 7, SOUTHWEST OF BUILDING 707

IHSS 123.1 is associated with leaks at Valve Vault 7, a part of the New Process Waste Line system. Process wastes generated in Buildings 889, 866, 865, 883, and 881 flow through the valve vault. The current valve vault was constructed to replace a valve vault on the OPWL that was located west of Building 707. The original valve vault was abandoned in-

place, and had handled process wastes from the 800 area buildings, 400 area buildings, and Building 123.

On April 4, 1983, a check valve in Valve Vault 7 malfunctioned, allowing process wastewater to backflow into the sump. The vault filled with wastewater and overflowed. The high-water-level alarm system in Valve Vault 7 was apparently inoperative at the time of the overflow. Process wastewater drained into an adjacent storm runoff ditch near Eighth Street and Sage Avenue and flowed east toward South Walnut Creek and the B-Series ponds. Runoff was noticed flowing across the former Building 750 parking lot and through the Building 991 drainage ditch. The ditch was excavated and the excavated material was stored in the Building 771 parking lot.

IHSS 123.1 was originally defined as a 30- by 30-foot area southwest of Building 708 centered around Valve Vault 7, and immediately adjacent to the Protected Area between the inner security fence and the perimeter road (EG&G 1990). The HRR (DOE 1992a) stated that the IAG maps mislocated this IHSS in the same area as the OPWL valve vault, which is several hundred feet to the north. Based on this information, the HRR suggested that the proposed boundaries defining IHSS 123.1 should be extended to include the storm runoff collection ditch near Eighth Street and Sage Avenue and continue to the dam at Pond B-1. Specifically, this would include the area south of Sage Avenue (an area approximately 40 by 40 feet) and the drainage ditch south of Sage Avenue and west of Ninth Street. The currently defined IHSS does not extend beyond the point where the spill entered a pipeline at the intersection of Sage Avenue and Ninth Street, but does include the old Building 771 parking lot.

3.5.1 Previous Studies and Recommendations

There are no buildings located within the IHSS 123.1 boundaries and there were no foundation drains identified that could have been impacted by releases associated with the IHSS.

The release at IHSS 123.1 entered the storm sewer surface inlet located at the eastern edge of the IHSS boundary near Portal 1. The discharge point for this storm sewer is the 750 Culvert, which is located east of the 750 Pad. As shown in the OU8 Technical Memorandum 1 (DOE 1994b), the storm sewer is located in a region of potential infiltration as opposed to exfiltration. Therefore, it is not suspected that soil or groundwater around the storm sewer system was affected by the release.

3.5.2 Overlapping IHSSs

OU8 overlays the OU9 pipeline system. OU8 radiation survey data were used to help interpret OU9 radiation surveys.

3.5.3 Adjacent IHSSs

No adjacent IHSS has been identified for IHSS 123.1.

3.5.4 High Purity Germanium Survey and Sodium Iodide Survey

Four HPGe surveys were conducted within IHSS 123.1. Of the eight radionuclides analytically determined, only Pu-239/240 was not detected. Five radionuclides (K-40, Ra-226, Th-232, U-235, and U-238) were found at activity levels well in excess of their

respective MDAs. However, K-40, Ra-226, and Th-232 are radionuclides that were not used in significant quantities in production activities at RFETS, and the detected concentrations were comparable to, or lower than, expected background concentrations (Table 3-1). Uranium-235, Cs-137, and Am-241 were identified below expected background activities. The maximum activity of U-238 (5.6 pCi/g), which was identified at station 7X-8, was approximately twice the $UTL_{99/99}$, but was below the PRG of 80 pCi/g. Both Cs-137 and Am-241 were detected, but only at their respective MDA levels. An NaI detector survey completed before surface-soil and soil-gas sample collection also supported a lack of radionuclide contamination in IHSS 123.1. The NaI detector survey did not identify any sites in which activities exceeded expected background activities. The HPGe survey locations used for IHSS 123.1 are illustrated on Plate 1, the Americium Activity Map.

3.5.5 Vertical Soil Profiles

This section, including Table 3-5, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.5.6 Soil-Gas Survey

The soil-gas survey was conducted on a 20-ft grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-3. Table 3-6 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, PCE, and TCE within IHSS 123.1. In addition, analyses were performed for the other chemicals listed in Table 3-6. Nine sampling locations were planned to be sampled. However, the presence of underground

utilities prevented samples from being collected at two locations, SG001594 and SG002394. The remaining seven locations (Figure 3-3) were sampled, with only a single organic chemical, dichlorodifluoromethane, being found at a concentration of 1.1 μg/L. No other volatile compound exceeded the 1.0 μg/L detection limit at any other sampling location within IHSS 123.1.

3.5.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from nine locations within IHSS 123.1. Duplicate samples were collected at location SS800793. There were no areas of stressed vegetation or soil staining noted in this IHSS, so samples were collected at equally spaced intervals along the IHSS axis. Figures 3-4 and 3-5 and Tables 3-7 and 3-8 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-4 and 3-5.

Based on the history of the original Valve Vault 7 process waste line, organic compounds, metals, and radionuclides were selected for analyses.

The only organic compound detected was the polycyclic aromatic hydrocarbon (PAH) benzo(a)pyrene, ranging from 93 to 160 micrograms per kilogram (μg/kg), which exceeded the PRG of 87.7 μg/kg (all organics are considered to have a background level of zero). All nine sampled locations within IHSS 123.1 contain concentrations of arsenic and beryllium that exceeded the PRG but not the background.

While calcium exceeded the background concentration at all locations, the compound is an essential human nutrient and does not exceed normal human intake levels. Sodium and magnesium were also detected at concentrations exceeding background at location SS800993 but they are also essential nutrients and are not considered further.

At location SS800193 silver exceeded the background value of 0.22 milligrams per kilogram (mg/kg) but not the PRG of 1,370 mg/kg. Zinc exceeded the background level of 0.08 mg/kg, but not the PRG of 82,300 mg/kg, at four locations (SS800193, SS800293, SS800593, and SS800893). Copper exceeded the background level of 22.75 mg/kg at locations SS800693 and SS800993 but not the PRG of 11,000 mg/kg. Thus, these metals do not represent a potential hazard to human health.

Two radionuclides were found within IHSS 123.1. Plutonium-239/240 was detected at locations SS800293 and SS800493 at activity levels exceeding background (0.08 pCi/g) but less than the PRG of 3.43 pCi/g. Uranium-238 was found at seven of the sampled locations, ranging from 0.86 to 1.1 pCi/g, which exceeded the PRG of 0.8 pCi/g but not the background level of 2.83 pCi/g.

IHSS 123.1 was contaminated as a result of a valve malfunction and the resulting wastewater overflow. While several constituent concentrations exceeded background concentrations, only benzo(a)pyrene exceeded both background and PRG concentrations.

3.5.8 Statistical Summary

Surface-soil samples collected from IHSS 123.1 were analyzed for semivolatile organic compounds (SVOCs), standard and additional metals, radionuclides, and the water-quality parameters fluoride and nitrate/nitrite. Based on the sampling design described in Section

5.1 of the OU8 RFI/RI Work Plan (DOE 1994a), 10 surface-soil samples, including one duplicate, were collected from within this IHSS. None of the SVOCs were measured in concentrations in excess of their quantitation limits of 330 μg/kg. The paucity of data for these analytes precludes their inclusion in the statistical analyses.

As expected, metals and all of the radionuclides except U-235 were found, to a greater or lesser extent, in all of the surface-soil samples. Uranium-235 was measured in four of the six samples subjected to analysis. The first statistical analysis to which the data were subjected was the Shapiro-Wilk test for population distribution (Gilbert 1987; EPA 1989; EPA 1992). Table 3-9 is a listing of the population distributions for the metals and radionuclides detected in samples from IHSS 123.1. The statistical backup data that were used in calculating the Shapiro-Wilk statistic (W) are contained in Appendix F. Seven metals (aluminum, arsenic, barium, calcium, chromium, iron, and lead), four radionuclides (gross alpha, gross beta, U-233/234, and U-238), and the two water-quality parameters were all normally distributed. Four metals (lithium, copper, vanadium, and zinc) and one radionuclide (Pu-239/240) are lognormally (base *e*) distributed. Finally, two metals (magnesium and manganese) and two radionuclides (Am-241 and U-235) did not fit either the normal or lognormal distributions and are considered nonparametric.

In order to evaluate the sufficiency of the sampling effort, calculated values of power were compared to a threshold value of 0.8 or 80 percent. A power of 0.8 corresponds to a false-negative error (Type II) rate of 20 percent in the test of the null hypothesis that the mean of the sample population ($\bar{x}$) is within a percentage (d) of the true mean (μ) of all of the possible samples from the IHSS: H_0:$\bar{x} < (1\_d)\mu$. Table 3-10 is a summary of the results of the tests of power for the metal and radionuclide analyses of samples collected from IHSS 123.1. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less

than 20 percent of the true population mean for seven metals, three radionuclides, and the two water-quality parameters, fluoride and nitrate/nitrite. When the difference in means is increased to 30 percent, three additional metals reach a power of at least 0.8: strontium, barium, and lead. Increasing the allowable difference in means to 50 percent adds cobalt and gross alpha to the list of metallic elements and radionuclides with powers in excess of 0.8. Eight metals (aluminum, calcium, copper, iron, magnesium, manganese, potassium, and zinc) and three radionuclides (Am-241, Pu-239/240, and U-235) have powers in the range of 0.19 to 0.74 (i.e., four out of five to one out of four chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant considering that the sample population mean for these species are from five to 10 times less than their respective background concentrations or PRGs. Thus, if the sample mean is too low by as much as 50 percent (i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment.

In order to increase the confidence in the decisions made from the sample data, it would be necessary to collect additional samples for analysis of those species with a wide variation in the measured concentrations. The number of samples (n) sufficiency test statistic is calculated by using the standard normal deviate ($Z_{1-\alpha/2}$) for a normal population distribution, the absolute margin of error (d), and the coefficient of variation (η):

$$n=\left(Z_{1-\alpha/2}\eta/d\right)$$

Table 3-11 is a listing of the number of additional samples required to reach a 90 or 95 percent confidence that the differences in sample and true population means are less than 20, 30, and 50 percent. The species for which an insufficient number of samples were collected are shaded. For example, a sufficient number of samples was collected and analyzed for

cobalt for one to have a 90 percent confidence that there is no more than 20 percent difference in the sample population mean and the true population mean. In order to raise that confidence to 95 percent, an additional four samples would need to be collected (nine collected, 13 required). With the exception of Am-241 and U-235, sufficient samples have been collected for a 90 percent confidence that the difference in the sample and population means is no greater than 50 percent. In order to reach this confidence for these two radionuclides, two additional samples would need to be analyzed for U-235 and seven for Am-241. If it were necessary to reach a 95 percent confidence that the differences in the means were less than 20 percent, an estimated additional 148 samples would need to be analyzed for Am-241 and 101 for U-235. As stated previously, achieving higher levels of confidence or smaller estimated differences in the sample and population means is not necessary because the measured concentrations are well below their respective background or PRG concentrations.

3.6 IHSS 135 - COOLING TOWER BLOWDOWN

This section presents the results of the data collection for IHSS 135. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 135 is associated with the Building 373 cooling tower that was constructed in the mid-1970s to serve Building 374. On June 12, 1981 the cooling tower was cleaned and the slurry portion was pumped into a small retention pond. During the night, some of the water leaked through the dirt dike and gate valve and drained into North Walnut Creek (DOE 1994a).

The retention pond is located south of the cooling towers, across a paved drive and currently serves as secondary containment for Tanks 808A and 808B. The pond was originally clay

lined and was used to contain surface runoff from around Building 374. The pond was concreted in approximately 1986 for the purpose of serving as secondary containment for Tanks 808A and 808B which were constructed in 1986, as well as containing surface runoff. A sluice gate is located at the northeast corner of the pond with a connecting culvert that directs water into a drainage toward North Walnut Creek. IHSS 135 is 115 feet by 40 to 50 feet with a panhandle that extends approximately 50 feet to the northeast (DOE 1994a). This IHSS is shown in Figures 3-6 and 3-7.

Cooling tower water is composed of filtered, untreated raw water from the onsite raw water reservoir. The Building 373 cooling tower also has the ability to accept recondensed evaporator water from Building 374. Chemicals were added to the water for the prevention of biological growth, corrosion, scaling, and other effects that can foul heat-transfer surfaces and degrade performance. In the past, chromates were added to cooling waters as a corrosion-inhibitor. In the late 1970s, Rocky Flats began using phosphate-containing compounds instead of chromate. Because the cooling tower was cleaned at about the same time the switch was made from chromates to phosphates, it is possible that chromates may have been present in the slurry and cooling water blowdown. It is also possible that prior to use of the pond, effluent from the cooling tower may have contained tritium, although it is not certain what the source would be (DOE 1994a).

The cooling tower blowdown from Building 373 is currently piped to the sanitary sewer.

3.6.1 Previous Studies and Recommendations

According to the OU8 RFI/RI Work Plan (DOE 1994a), samples that were collected from the cooling tower pond and from Pond A-3 following the 1981 incident showed no detectable quantities of phosphates. The OU8 RFI/RI Work Plan also states the analytical results from

the monitoring wells closest to IHSS 135. The nearest downgradient well, well 1986, is located approximately 500 feet northeast of the IHSS. Analysis of samples collected from well 1986 indicate that several VOCs, metals, and radionuclides, including tritium, are present at high levels. However, there are several other IHSSs that could be impacting this well.

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify foundation drains and storm sewers that could be impacted by the IHSS and contribute to contaminant migration. Foundation drains were identified on Building 371/374 around the basement and sub-basement structures. The outfalls for the drains are located east of the southeast corner of Building 371/374 in a drainage that leads to North Walnut Creek. The outfalls have been historically sampled since the mid-1970s. The layout of the foundation drains and results from historical sampling of the outfalls are presented in detail in OU8 Technical Memorandum 1 (DOE 1994b).

The outfall for the basement foundation drains is identified as FD-371-2. Metals analysis was performed on samples from this outfall on only one occasion, on June 15, 1991. The metals that were detected at levels above the $UTL_{99/99}$ for surface water (sitewide) include barium, calcium, magnesium, manganese, and sodium. Low levels of gross alpha, gross beta, and tritium have also been detected in samples from this outfall. The outfall has not been sampled since June 15, 1991 (DOE 1994b).

The outfall for the sub-basement foundation drains is identified as FD-371-3. Metals analysis has been performed on samples from this outfall since October 1988. There have been numerous metals detected at levels above the $UTL_{99/99}$ for surface water (sitewide). The metals detected include arsenic, barium, calcium, lead, magnesium, manganese, sodium, potassium, strontium, vanadium, and zinc. Chromium was detected above the $UTL_{99/99}$ for

background groundwater, upper hydrostratigraphic unit, in one sample collected on December 15, 1988. Mercury was detected above the $UTL_{99/99}$ for background groundwater, upper hydrostratigraphic unit, in one sample collected on June 9, 1990. Gross alpha activity exceeded the $UTL_{99/99}$ for surface water (sitewide) in several samples collected during 1988 and 1989. Gross alpha activity has been below the $UTL_{99/99}$ for surface water (sitewide) in all samples since December 17, 1989. Gross beta activity exceeded the $UTL_{99/99}$ for seeps/springs in almost every sample collected between 1981 and 1990. Gross beta activity has been below the $UTL_{99/99}$ for seeps/springs in all samples since June 9, 1990. Low levels of tritium was detected in a sample collected in March 1981. Tritium has not been analyzed for at this location since 1981 (DOE 1994b).

The sub-basement foundation drains are located at a depth approximately 30 to 35 feet below ground surface. The direction of groundwater flow is away from the foundation drains with respect to IHSS 135.

Utility drawings do not show any storm sewers in the vicinity of the IHSS.

3.6.2 Overlapping IHSSs

There are no overlapping IHSSs.

3.6.3 Adjacent IHSSs

IHSS 135 is adjacent to OU10 IHSS 206, a hazardous waste storage tank located at the northeast corner of Building 374. IHSS 206 surface-soil sample sites SS010693, SS010993, SS011093, SS011393, and SS011493 are located within 100 feet of IHSS 135. Per the IFSP (EG&G 1994b), the analyte suite for IHSS 135 was modified to include Target Analyte List

(TAL) metals instead of total chrome for the surface-soil samples due to IHSS 206. OU8 IHSS 151, an underground storage tank containing No. 2 diesel fuel, is located northwest of IHSS 135. There are no samples within 100 feet of IHSS 151, but an analysis of total petroleum hydrocarbons (TPH) (diesel-range organics) was added to surface-soil samples collected in IHSS 135.

3.6.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.6.5 Surface-Soil Samples

Surface-soil samples were collected from five locations within IHSS 135. There were no areas of stressed vegetation or soil staining, so samples were collected at equally spaced intervals. Figures 3-6 and 3-7 and Tables 3-12 and 3-13 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-6 and 3-7.

Based on the history of the IHSS, radionuclides, metals, TPH, and tritium were selected for analyses. Inorganics detected include antimony, which exceeded the background of 110 mg/kg, and arsenic, which exceeded the PRG (0.366 mg/kg) at all five sample locations. Copper, sodium, and zinc exceeded their backgrounds (22.75, 110.02, and 95.92, respectively). Sodium is an essential nutrient and is not considered further. Beryllium exceeded its PRG of 0.149 mg/kg at SS801393. Molybdenum exceeded background (0.90 mg/kg) at SS801493.

Of the seven radionuclides analyzed, Am-241 exceeded the background 2.37 pCi/g at SS801193, SS801293, and SS801393. Plutonium-239/240 exceeded the background level of 0.08 pCi/g at SS801193 and SS801293. Uranium-235 exceeded its background of 0.13 pCi/g at location SS80193.

3.6.6 Statistical Summary of Surface-Soil Data

Surface-soil samples collected from IHSS 135 were analyzed for standard and additional metals and radionuclides. Based on the sampling design described in Section 5.1 of the OU8 RI/RFI Work Plan (DOE 1994a), five surface-soil samples were collected from within this IHSS.

As expected, metals and all of the radionuclides were found, to a greater or lesser extent, in all of the surface-soil samples. The first statistical analysis to which the data were subjected was the Shapiro-Wilk test for population distribution (Gilbert 1987; EPA 1989; EPA 1992). Table 3-14 is a listing of the population distributions for the metals and radionuclides detected in samples from IHSS 135. The spreadsheets that were used in calculating the Shapiro-Wilk statistic (W) are contained in Appendix F. All of the metals and radionuclides except copper, potassium, zinc, gross alpha, and Pu-239/240 were normally distributed. Potassium, gross alpha, and Pu-239/240 are lognormally (base *e*) distributed. Finally, copper and zinc did not fit either the normal or lognormal distributions and are nonparametric.

In order to evaluate the sufficiency of the sampling effort, calculated values of power were compared to a threshold value of 0.8 or 80 percent. A power of 0.8 corresponds to a false-negative error (Type II) rate of 20 percent in the test of the null hypothesis that the mean of the sample population ($\overline{x}$) is within a percentage (d) of the true mean (μ) of all of the

possible samples from the IHSS: $H_0: \overline{x} < (1 \pm d)\mu$. Table 3-15 is a summary of the results of the tests of power for the metal and radionuclide analyses of samples collected from IHSS 135. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less than 20 percent of the true population mean for gross beta. When the difference in means is increased to 30 percent, two additional metals reach a power of at least 0.8 (arsenic and lead) and two radionuclides (U-233/234 and U-238). Increasing the allowable difference in means to 50 percent adds lithium, strontium, chromium, nickel, potassium, sodium, and gross alpha to the list of metallic elements and radionuclides with powers in excess of 0.8. Ten metals (aluminum, barium, calcium, cobalt, copper, iron, magnesium, manganese, vanadium, and zinc) and two radionuclides (Am-241 and Pu-239/240) have powers in the range of 0.15 to 0.70 (i.e., six out of seven to one out of three chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant considering that the sample population mean for these species are from 10 to 1,000 times less than their respective PRGs. Thus, if the sample mean is too low by as much as 50 percent (i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment.

In order to increase the confidence in the decisions made from the sample data, it would be necessary to collect additional samples for analysis of those species with a wide variation in the measured concentrations. The number of samples (n) sufficiency test statistic is calculated by using the standard normal deviate ($Z_{1-\alpha/2}$) for a normal population distribution, the absolute margin of error (d), and the coefficient of variation (η):

$$n = \left(Z_{1-\alpha/2}\eta/d\right)$$

Table 3-16 is a listing of the number of additional samples required to reach a 90 or 95 percent confidence that the difference in sample and true population means are less than 20, 30, and 50 percent. The species for which an insufficient number of samples were collected are shaded. For example, a sufficient number of samples were collected and analyzed for arsenic, lead, gross alpha, gross beta, and U-238 for one to have a 95 percent confidence that there is no more than 20 percent difference in the sample population mean and the true population mean. If a 90 percent confidence is sufficient, six metals (lithium, strontium, chromium, nickel, potassium, and sodium) have also been detected in enough samples to demonstrate that the difference in the means is less than 20 percent. With the exception of copper and Pu-239/240, sufficient samples have been collected for a 90 percent confidence that the difference in the sample and population means is no greater than 50 percent. One additional samples would need to be collected in order to reach this confidence for copper and 11 for Pu-239/240. If it were necessary to reach a 95 percent confidence that the differences in the means were less than 20 percent, an estimated additional 158 samples would need to be analyzed for Pu-239/240. As stated previously, achieving higher levels of confidence or smaller estimated differences in the sample and population means is not necessary because the measured concentrations are well below their respective background or PRG concentrations.

3.7 IHSS 137 - COOLING TOWER BLOWDOWN, BUILDINGS 712 AND 713

This section presents the results of the data collection for IHSS 137. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, the surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 137 is associated with the cooling towers, Buildings 712 and 713, that serve Buildings 776 and 777. The cooling towers are located adjacent to each other, in the area south of Building 774 and north of Building 777. IHSS 137 was originally defined as a 50- by 150-foot area. Information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that the boundary should be enlarged from the south end of the cooling towers to the entire area surrounding and between the cooling towers. The proposed area of investigation included a zone approximately 10 feet beyond the foundation of Buildings 712 and 713 (DOE 1994a). The IHSS is shown in Figures 3-8 and 3-9.

Building 712, the westernmost of the two, was constructed in 1962 to service Buildings 776 and 777. Building 713 was constructed in 1966 to provide additional cooling tower capacity. There were several laundry and process waste lines in the area where Building 713 was constructed. It is not known if these underground pipes were removed, rerouted, or abandoned in-place. Buildings 702 and 703 are pumphouses for Buildings 712 and 713, respectively. The cooling tower sump for Building 712 is located between the cooling tower and the 702 Pumphouse. In the past, operations of the towers have been alternated seasonally; the west tower (Building 712), which has a higher cooling capacity, operated in the summer, while the east tower (Building 713) operated in the winter.

In the past, utilities workers have cleaned out the sump and scraped slime off the cooling tower slats. The material removed in these operations was placed on the ground immediately adjacent to the cooling towers (DOE 1992a).

The cooling towers have been damaged by wind and rain and the west tower (Building 712) has been re-sided at least once. Building 712 currently has open panel siding; Building 713 currently has open slat siding. The slat siding allows some water to spray out of the tower onto the surrounding ground surface. The ground immediately around the east side of

Building 713 was puddled from overspray during an August 20, 1992 visit. Building 712 was not operational on that day and has been inoperative for quite some time (DOE 1994a).

Cooling tower water is composed of filtered, untreated raw water from the onsite raw water reservoir. Chemicals were added to the water for the prevention of biological growth, corrosion, scaling, and other effects that can foul heat-transfer surfaces and degrade performance. Prior to approximately 1976, chromates were added to the water as a rust inhibitor. Sodium silicate has also been used in cooling tower water as a corrosion inhibitor (DOE 1994a).

Water is removed from the cooling tower system from blowdown and drift. Drift water is water that is released to the atmosphere and sprayed to the ground surrounding the tower. Water is periodically blown down to maintain a specified range of total dissolved solids (DOE 1994a). Before the early 1970s, it was routine for the cooling towers to blow down effluent onto the soil outside the buildings. The blowdown water evaporated, infiltrated into the soil, or flowed into the storm water culverts and pipes and was directed to North Walnut Creek. In September 1973, a proposal was developed to connect all cooling tower blowdown to the sanitary sewers. Although the details have not been found, it is believed that since approximately 1974 the blowdown from Buildings 712 and 713 has been piped to the sanitary sewers (DOE 1994a).

The HRR (DOE 1992a) states that the cooling tower blowdown pipes are thought to leave the towers on their south sides, and that these pipes are considered the most probable source of any blowdown water contamination around the cooling towers. The Plutonium Area Underground Piping Plan, Section & Detail (RF-14264-9; As-Built, 6/30/67) shows the blowdown pipes for Building 713 exiting the tower on the west side. These pipes are shown to be connected to a 4-inch storm sewer that encircles the tower and discharges at an outfall

northeast of the cooling tower, near the southeast corner of Building 774. The effluent from this storm sewer would enter North Walnut Creek. No documentation has been found that would indicate that the outfall has ever been sampled (EG&G 1994b).

In September 1990, a leaking cooling tower behind Building 777 was checked by RCRA personnel. The cooling tower was reportedly releasing about 20 to 40 gallons per minute. It is unclear how long the leak had occurred prior to the RCRA response to the incident. The releases were caused by leaks from corroded sides of the cooling tower (DOE 1994a). No environmental cleanup occurred in response to this occurrence.

It is stated in the HRR (DOE 1992a) that the released water contained 50 mg/L total chromium. It was speculated that the interviewees were referring to the release from the Building 779 cooling tower (IHSS 138) in December 1976. This seems likely since the water released in the 1976 incident was reportedly sampled and found to contain 50 ppm total chromium. There is no mention of samples being collected during the 1990 incident in the HRR or the OU8 RFI/RI Work Plan (DOE 1994a).

3.7.1 Previous Studies and Recommendations

In 1979, a project was implemented to upgrade cooling towers sitewide. The project included the collection of samples for determination of subsequent waste disposal as a result of demolition of some of the cooling towers. Buildings 712 and 713 were included in the study. Materials sampled included wood siding and soil samples. The results of the sampling indicated that none of the materials sampled qualified as toxic or hazardous material based on EPA guidance and extraction tests. Therefore, material removed for the upgrades was disposed of in the present onsite landfill (DOE 1994a).

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify building foundation drains and storm drains that could be impacted by releases at OU8 IHSSs. Foundation drains were identified around Building 774. The available analytical data from Building 774 foundation drain sampling is presented in OU8 Technical Memorandum 1. Chromium and sodium have been detected in samples from the foundation drains. However, due to the proximity of several other IHSSs, it cannot be determined if IHSS 137 is the source of the chromium and sodium.

There are no monitoring wells located upgradient of this IHSS. The nearest downgradient monitoring wells are P209289 and P209389, which are located approximately 50 feet north of Building 713. The data available for these wells were presented in the OU8 RFI/RI Work Plan (DOE 1994a). Based on the current understanding of the material released from this IHSS, these data do not indicate any contamination that would be attributable to this IHSS. Chromium was not detected in borehole or groundwater samples obtained from these wells. Several VOCs and radionuclides have been detected in borehole and groundwater samples from these locations. It appears that the VOCs detected may be attributable to releases from other IHSSs such as IHSS 118.1, however, additional data are needed to determine the source of these compounds. The monitoring wells are also located downgradient of several other OU8 IHSSs that may have contributed to the contamination detected. In particular, these monitoring wells are downgradient of IHSS 144(S), which may account for the above-background concentrations of radionuclides detected.

3.7.2 Overlapping IHSSs

IHSS 137 overlaps with the sample grid for OU9 Tank 207 (T-29). Borehole location 04395 is located within the IHSS 137 boundary. Borehole locations 04495, 04595, and 04695 and surface-soil sites SS001495 and SS001595 are located within 100 feet of the IHSS border.

Per the IFSP (EG&G 1994b), the analyte suite for IHSS 137 samples was modified to include SVOC and radiological analyses and total chrome analysis was changed to TAL metals. The analytical data for the OU9 samples were not yet available for inclusion in this report. Groundwater was not encountered in any of the boreholes drilled around Tank 207 (T-29) during the OU9 investigations.

3.7.3 Adjacent IHSSs

IHSS 137 is adjacent to OU8 IHSS 139.1(S). Surface-soil locations SS803993 and SS804193 are within 100 feet of the IHSS 137 border. Per the IFSP (EG&G 1994b), pH analysis was added to the IHSS 137 surface-soil samples.

3.7.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.7.5 Surface-Soil Samples

Surface-soil samples were collected and analyzed from seven locations within IHSS 137. Figures 3-8 and 3-9 and Tables 3-17 and 3-18 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-8 and 3-9.

Based on the history of the site, organic compounds, metals, and radionuclides were selected for analyses.

Of the organic compounds analyzed, only PAHs were identified. Benzo(a)anthracene, benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene exceed their PRG of 877 mg/kg at all locations, except benzo(a)anthracene at SS802193. Benzo(a)pyrene, and dibenzo(a,h) anthracene exceeded their PRG of 87.7 mg/kg at all sampled locations.

Of the metals analyzed, molybdenum and strontium exceeded their backgrounds of 0.9 mg/kg and 67.92 mg/kg, respectively, at nearly all locations. They did not exceed their respective PRGs of 13,700 and 165,000 mg/kg. Tin exceeded the background value of 2.90 mg/kg, but not the PRG, at location SS801693. Arsenic exceeded the PRG of 0.366 mg/kg at all sampled locations. Beryllium exceeded the PRG of 0.149 mg/kg at five of the seven sampled locations. Calcium exceeded the background of 5,839 mg/kg at all locations except SS802193, but as an essential nutrient is excluded from further consideration. Antimony exceeded background (0.47 mg/kg) but not the PRG at locations SS802093 and SS802193. Barium exceeded the background of 176 mg/kg, but not the PRG at locations SS801893 and SS801993. Cadmium exceeded the background of 2.34 mg/kg, but not the PRG, at locations SS801893 through SS802193. Chromium exceeded the background of 22.21 mg/kg at all locations. Copper also exceeded the background of 22.75 mg/kg, but not the PRG, at all locations. Iron exceeded background (23,063 mg/kg) at three locations (SS801593, 801693, and 801793). Lead exceeded the background of 73.87 mg/kg at four locations. Silver exceeded the background of 0.22 mg/kg, but not the PRG, at all sampled locations. While sodium exceeded the background of 119.02 mg/kg at six locations, it is an essential nutrient and is not addressed further. Zinc exceeded the background of 95.92 mg/kg, but not the PRG, at all locations.

Of the radionuclides analyzed, Am-241 exceeded the PRG of 2.37 pCi/g at all locations, as did Pu-239/240 (PRG of 3.43 pCi/g). Uranium-235 exceeded both the PRG (0.173 pCi/g) and background (0.13 pCi/g) at SS80193, SS811993, and SS802093. Uranium-233/234

exceeded the background of 3.31 pCi/g, but not the PRG. Uranium-238 exceeded the background of 0.8 pCi/g at SS801593, SS801693, SS801793, SS802093, and SS802193. It exceeded both the PRG and background (2.83 pCi/g) at SS80193, SS801993, and SS802093.

3.7.6 Statistical Summary

This section, including Tables 3-19, 3-20, and 3-21, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.8 IHSS 138 - COOLING TOWER BLOWDOWN, BUILDING 779

This section presents the results of the data collection for IHSS 138. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 138 is associated with the cooling towers near Building 779. Figures 3-10 and 3-11 show the location of the IHSS. The original Building 779 cooling towers were built in 1964 when construction of Building 779 was completed. The original cooling towers were relatively small structures located south of the present Building 779 cooling towers. The original cooling towers were removed when the present cooling towers, Building 784, 785, 786, and 787 were constructed in 1986. Building 783 is a pumphouse associated with the current towers and contains much of the ancillary piping (DOE 1994a).

The area surrounding the towers is unpaved and relatively flat. It is heavily congested with trailers and storage containers. The area is marked by an abundance of aboveground and underground utilities and other structures (DOE 1994a).

IHSS 138 is defined by two areas. The first area is a 50- by 50-foot area east of Building 779 and north of Building 727. On December 8, 1976, a leak occurred in an underground pipeline connected to the original cooling towers. This encompasses the 50- by 50-foot area. The leak discharged approximately 400 gallons of cooling tower effluent, which was released into a storm sewer east of Building 779 and northwest of Building 727. At the time, it was stated that the spilled effluent drained toward Trench No. 6. Trench No. 6 was a part of the original surface water and shallow groundwater collection system north of the solar ponds (DOE 1994a).

Utilities personnel at RFETS recalled that this spill occurred when an underground cooling tower water line broke east of Building 779 and adjacent to the northwest of Building 727. The ruptured line was excavated and repaired. The cooling tower water line that ruptured in the incident was removed when the original cooling towers were replaced. The cooling tower water was sampled following the incident and found to contain 50 mg/L total chromium and approximately 3,000 disintegrations per minute (dpm) per liter alpha activity. A FIDLER survey was conducted along the course of the spill. No readings above background were observed. Additionally, soil samples were taken in the area and submitted for analysis. The results of the soil samples are not known. Samples were also reportedly collected daily from Trench No. 6; however, the sample analyses or results are not known (DOE 1994a).

The second area is approximately 10 by 20 feet and to the east of Building 785. On December 8, 1990, an estimated 1,000 gallons of cooling tower water overflowed from the Building 785 Cooling Tower Number 2 onto the ground. The event occurred when the sump filled and water backwashed into the cooling tower and spilled out of the fan on the east side of the structure. The spray from the backwash extended no more than 5 to 6 feet east of the building according to utilities personnel in Building 779. The released water was sampled

and was known to contain "Nalco 2826," an inorganic phosphate rust inhibitor. An Occurrence Report prepared after the incident indicated that a sample was taken for analysis, but the type of analyses or results are not known (DOE 1994a). There is no documentation to describe clean-up efforts for this spill (DOE 1992a). It is possible that surficial materials in the vicinity of the tower have been impacted by such releases (DOE 1994a).

According to the OU8 RFI/RI Work Plan (DOE 1994a), IHSS 138 was originally defined as a 75- by 75-foot area northeast of Building 779. The area of the cooling tower water line break is of smaller extent and located farther to the east than as presented for IHSS 138 in the IAG. It was proposed that IHSS 138 be redefined as a 50- by 50-foot area north of Building 727. It was concluded that the IHSS boundary presented in the IAG was too large and too far west of where the 1976 event occurred. The re-identification of the site in the HRR (DOE 1992a), is considered to be adequate for the location of the 1976 pipe leak. The effluent spilled toward Trench No. 6, presumably through the storm water drains and channels. At the time, these were monitored for radioactivity and were considered to be uncontaminated. The exact route the spill took is not known at this time and therefore cannot be mapped with accuracy. For the OU8 RFI/RI Work Plan (DOE 1994a), this portion of this IHSS was considered to be a 50- by 50-foot area north of Building 727. The location of the 10- by 20-foot area resulting from the 1990 incident was defined as being along the east side of Building 785 extending six feet out from the building.

3.8.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 138.

Both the subsurface and the ground surface were potentially affected by cooling tower water. The subsurface was affected by an underground pipe failure and the surface was impacted

by a release from an overflowing sump. Based on sampling conducted following the release and on process knowledge, the cooling tower water may have contained chromium, Nalco 2826, and alpha activity.

The nearest downgradient sampling points are bedrock groundwater monitoring wells 2586, P207589, and P209089, and alluvial monitoring well 2686. Groundwater samples have been collected from well 2586 on a quarterly basis since March 1987. Borehole samples were collected from wells P207589 and P209089 during drilling, and groundwater samples have been collected from these wells on a quarterly basis since 1990.

Several VOCs and radionuclides were detected in concentrations greater than background in groundwater samples from well 2586. VOCs were detected in borehole samples, and metals were detected in concentrations exceeding background in samples of surficial materials taken from well P207589. No VOCs or metals were detected in concentrations exceeding background in groundwater samples from well P207589.

The only VOCs detected in borehole samples from well P209089 were acetone and methylene chloride. Numerous metals and radionuclides were detected in concentrations exceeding their respective upper tolerance limits or background in samples of surficial materials and/or bedrock. Nitrate/nitrite was detected in relatively high concentrations in two samples of bedrock. VOCs were detected in groundwater samples from well P209089. Gross alpha, U-238, bicarbonate, and sulfate were detected in concentrations exceeding background.

Section 2.4.1.6 of the OU8 RFI/RI Work Plan (DOE 1994a) summarizes the specific analytes detected in surficial materials, bedrock, and groundwater samples. It should be

noted that the results discussed in the OU8 RFI/RI Work Plan are from sampling conducted prior to December 1992.

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, a 6-inch, cast iron storm drain runs north from a catchment basin north of Building 782. This storm drain makes a 90-degree turn to the east and flows through the middle of the 50- by 50-foot portion of IHSS 138, to a catchment basin on the east boundary of the IHSS. From this catchment basin, a 15-inch, corrugated metal pipe storm drain flows north approximately 425 feet, where it discharges at an outfall to the hillside north of the Solar Ponds. It is believed that this is the outfall that has been sampled since the 1970s as station FD-779-1. However, some discrepancy exists concerning the exact location of sampling station FD-779-1. Approximately 150 feet north of the north boundary of IHSS 138, a foundation drain ties into this 15-inch storm drain. This foundation drain originates along the north wall of Building 779.

3.8.2 Overlapping IHSSs

This IHSS overlaps with OU9 IHSS 121 (the OPWL). No samples were collected in this area.

3.8.3 Adjacent IHSSs

OU8 IHSSs 150.6 and 150.8 are adjacent to IHSS 138. Surface-soil sample locations SS808793, SS809093, SS809393, and VSP sample location VP41394 are within 100 feet of the IHSS border. Based on the IFSP (EG&G 1994b), SVOC analyses was added to the IHSS 138 analytical suite, and TAL metals were analyzed for rather than just total chromium.

3.8.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.8.5 Vertical Soil Profile

This section, including Table 3-22, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.8.6 Surface-Soil Samples

Surface-soil samples were collected and analyzed from nine locations within IHSS 138. Figures 3-10 and 3-11 and Tables 3-23 and 3-24 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-10 and 3-11.

Based on the history of the site, organic compounds, metals, and radionuclides were selected for analyses.

Of the organic compounds analyzed, only the PAHs benzo(a)pyrene and pentachlorophenol were detected at levels exceeding background (8.77 mg/kg and 5,340 mg/kg, respectively). Benzo(a)pyrene was found at seven of the nine sample locations, while pentachlorophenol was found only at location SS802893. Lithium and strontium exceeded background values (15.08 mg/kg and 67.92 mg/kg, respectively), but not the PRGs (5,490 mg/kg and 165,000 mg/kg, respectively). Antimony exceeded the background level of 0.47 mg/kg at SS802293

and SS802693. Both arsenic and beryllium exceeded their PRGs (0.366 mg/kg and 0.149 mg/kg, respectively) at all sampling locations. However, they did not exceed the background value of 13.75 mg/kg for arsenic and 1.25 mg/kg for beryllium. Calcium exceeded the background value of 5,839 mg/kg at all locations except SS802993. However, the chemical is an essential nutrient for human health and is not addressed further. Copper exceeded the background value of 22.75 mg/kg, but not the PRG at SS802293, SS802393, and SS802693. Iron exceeded the background value of 23,063 mg/kg at locations SS802293 and SS802393. Magnesium exceeded the background value of 3,707 mg/kg at four locations, SS802293, SS802393, SS802493, and SS802693. Manganese was found at levels exceeding background (482.1 mg/kg) at SS802293 and SS802393. Nickel exceeded the background value of 19.74 mg/kg at SS8902293. Silver exceeded the background value of 0.22 mg/kg at all sample locations. Sodium exceeded the background (119.02 mg/kg) at several locations but it is an essential human nutrient and is not addressed further. The background value for zinc of 95.92 mg/kg was exceeded at locations SS802293, SS802393, SS802693, and SS802893, but the PRG was not.

Of the detected radionuclides, Am-241 exceeded the background value of 0.04 pCi/g at all locations. It also exceeded the PRG of 2.37 pCi/g at locations SS8902293, SS902493, SS902593, SS802693, and SS802793. Plutonium-239/240 also exceeded both background (0.08 pCi/g) and the PRG (3.43 pCi/g) at all locations except SS802293, SS802393, and SS802993 where it exceeded background only. Uranium-238 exceeded the background (2.83 mg/kg) but not the PRG (0.8 mg/kg) at six of the nine sample locations.

3.8.7 Statistical Summary

This section, including Tables 3-25, 3-26, and 3-27, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.9 IHSS 139.1(N) - HYDROXIDE TANK AREA, BUILDING 774

This section presents the results of the data collection for IHSS 139.1(N). It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, sediment sampling, surface-water sampling, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 139.1(N) consists of two separate sites located north of Building 774. One of these sites consists of an above-ground sodium hydroxide (NaOH) tank and is adjacent to the north wall of Building 774. The other site is located about 80 feet north of the NaOH tank and consists of two large aboveground steam condensate tanks (DOE 1994a) (Figures 3-12 through 3-14).

The first site is an area approximately 20 by 20 feet around a vertical 6,500-gallon NaOH tank. The tank was built some time between 1955 and 1964. The tank is covered by insulation, which is a degraded condition based on visual observations. Through holes in the insulation, it was observed that the sides of the tank are corroded, as is the base of the tank. A concrete berm approximately 18 inches high surrounds the tank and appears to be corroded (DOE 1994a).

The second site consists of two 8,000-gallon steam condensate tanks, (tanks T-107 and T-108), which have riveted construction. They are located approximately 80 feet north of the NaOH tank and at a lower elevation. These tanks were built some time between 1971 and 1978. The two tanks are located on a concrete slab and have badly corroded bottoms (DOE 1994a). Originally, the tanks held "clean" condensate from an evaporative waste concentration system formerly used in Building 774. The condensate was tested for the presence of radioactive contamination and then released (if free of contamination) to the

tanks or to the west of the tanks depending on the valve positions (DOE 1992a). The area to the west of the tanks has standing water present and is known as Bowman's Pond or as the 774 footing drain pond. The tanks have not received condensate since approximately 1980. Since that time the western condensate tank receives overflow and precipitation runoff from the bermed area surrounding the NaOH tank. The berm area directs flow through a pipe and into the western condensate tank. The eastern condensate tank receives overflow from the western tank. Standing water has been noted around the tanks (DOE 1994a).

In May 1978, a spill occurred during routine filling of a caustic tank near Building 771. The specific tank or the quantity spilled was not documented. The spilled caustic was contained by a berm below the tank and was not released to the environment. The HRR (DOE 1992a) states that this occurrence is believed to have involved the potassium hydroxide tank south of Building 771 [IHSS 139.1(S)].

In May 1985, a small leak was found at the fitting of a thermocouple in the NaOH tank. The caustics had solidified at the fitting, and therefore had not run into the pit. The fitting was repaired (DOE 1994a).

On June 22, 1987, there was an overflow of NaOH during a delivery operation to the caustic supply tank north of Building 774 because of a faulty level indicator. Approximately 100 gallons of caustic material flowed into the berm containment area of the tank and then drained to the caustic "catch" tank (T-108). Due to cracks in and deterioration of the concrete berm, caustic seeped onto the road. Tank T-108 was also found to be deteriorating, and showed signs of seepage. In response to the incident, the 1 to 2 gallons that had seeped onto the road was diluted with water and rinsed off the road. Work orders to repair the cracks in the berm and to replace the deteriorating catch tank, T-108, were initiated. The

liquid in T-108 was sampled and was to be subsequently pumped to the sanitary sewer system or Building 774. The level indicator on the caustic tank was repaired (DOE 1994a).

Some time around 1988, the sodium hydroxide tank north of Building 774 was overfilled. No documentation was found that further detailed the event (DOE 1992a).

It is estimated that during the 30-year history of the NaOH tank, 80 to 100 gallons of caustics have been spilled (DOE 1994a).

It is likely that the area around the condensate receiving tanks is contaminated. The foundation drains for Building 774, and possibly Building 771, have discharged to that location since the early 1950s. Included in the OU8 Technical Memorandum 1 appendices are memos that address sampling of the water in the pond and the fate of the water depending on the activity levels. Based on the memos, historically the water in the pond has contained significant activity levels. (One memo states that water containing greater than 95,000 pCi [per liter?] of tritium will be released to North Walnut Creek). In addition, IHSS 149.1 (OU9) is associated with a release of approximately 1,400 gallons of process waste from the Solar Evaporation Ponds that flowed into the area around the tanks and the pond. The vegetation in the area was damaged. Analysis of the spilled liquid from this incident detected 2,500 pCi/L alpha, 4,000 pCi/L beta, 10,000 μg/L nitrate, and a pH of 12.

3.9.1 Previous Studies and Recommendations

The ground surface has potentially been affected by NaOH due to a number of spills and probable seepage from the NaOH tank and deteriorating condensate tanks.

Very minimal previous IHSS-specific environmental studies have been conducted at IHSS 139.1(N). On September 27, 1994, the Surface Water program collected samples for the Decontamination and Decommissioning (D&D) Group. The D&D Group was to remove the steam condensate and NaOH tanks at IHSS 139.1(N). Three surface-water samples were collected and analyzed for gross alpha, gross beta (i.e., rad-screen), pH, and total polychlorinated biphenyls (PCBs) in support of the removal action. No PCBs were detected in any of the samples.

The only monitoring well located near to or downgradient from IHSS 139.1(N) is well P219089. This well is located adjacent to an NaOH tank near Building 774. Analytical data for well P219089 are limited to analysis of radionuclides and inorganic constituents in one groundwater sample collected in December 1989. It is not known if this well has been sampled since December 1989. Chloride, Pu-239/240, and U-233/234 have been detected in concentrations exceeding background in this well. Well P219189 is located west-northwest of the tanks in this IHSS and is not downgradient of the IHSS (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, an unspecified diameter, corrugated metal pipe storm drain runs from an outfall in the northwest portion of IHSS 139.1(N) west to an outfall near Bowman's Pond. A 6-inch corrugated metal pipe storm drain runs north from near the northwest corner of the IHSS and outfalls to the surface at surface-water sampling station SW-91. Additionally, a section of the OU4 drain (OU4 Interceptor Trench System) originates near Bowman's Pond and runs west to east through the middle of IHSS 139.1 (N). It is reported that water from the pond is collected in the OU4 Interceptor Trench System where it is then treated. This does not appear to be the case. Based on observations made during site visits, it appears that

much of this water from the area flows overland into North Walnut Creek, and does not infiltrate to be captured by the Interceptor Trench.

Foundation drains were also identified for Building 774 that could have been affected by the spills at the NaOH tank and also by releases from OU9 tanks T-14, T-15, T-16, and T-17. Refer to OU8 Technical Memorandum 1 (DOE 1994b) for additional information concerning the drains and historical sampling of the Bowman's Pond Area.

3.9.2 Overlapping IHSSs

IHSS 139.1(N) overlaps OU8 IHSS 172 at surface-soil sampling location SS811593 (below asphalt).

3.9.3 Adjacent IHSSs

IHSS 139.1(N) is adjacent to OU8 IHSS 163.1. Surface-soil sampling locations SS810993, SS811093, and SS811293 are located within 100 feet of the NaOH tank area. Surface-soil sampling locations SS810693, SS810793, SS810993, and SS811093 are located within 100 feet of the condensate receiving tanks.

The OU8 RFI/RI Work Plan (DOE 1994a) proposed only pH analysis for surface-soil samples. TAL metals, nitrate, and TPH (gasoline-range organics) were added to the analytical suite due to IHSS 139.1 (N) adjacency to IHSS 163.1. In addition, VOC analysis was added to the sediment sample analytical suite due to odors noted by the field crews during sampling, and the possibility that VOCs could be present from process waste line leaks and foundation drain discharges.

3.9.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.9.5 Surface-Soil Samples

Surface-soil samples were collected and analyzed from two locations in IHSS 139.1(N). Figures 3-12 and 3-13 and Tables 3-28 and 3-29 summarize the detected analytes, their concentration, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-12 and 3-13.

Based on the history of the site, only metals and nitrates/nitrites were analyzed.

Of the metals analyzed, arsenic exceeded the PRG of 0.366 mg/kg at all locations, but did not exceed the background (13.75 mg/kg). Beryllium also exceeded the PRG of 0.149 mg/kg, but not the background (1.25 mg/kg) at all locations. Silver exceeded the background of 0.22 mg/kg, but not the PRG (1370 mg/kg) at location SS803193. Sodium exceeded the background of 119.02 mg/kg at all locations, but is an essential nutrient and is not further addressed. Zinc exceeded the background of 95.92 mg/kg, but not the PRG, at location SS803293.

3.9.6 Statistical Summary

This section, including Tables 3-30, 3-31, and 3-32, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.9.7 Sediment Samples

Sediment samples were not proposed for IHSS 139.1(N) in the OU8 RFI/RI Work Plan (DOE 1994a). However, because the condensate receiving tank area was under approximately 6 inches of water, the proposed surface-soil samples were changed to sediment samples. Five locations were sampled. Figure 3-14 and Table 3-33 and 3-34 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan), background concentrations, and established PRGs. Sample concentrations are identified in Figure 3-14.

Only metals were analyzed. Arsenic and beryllium exceeded their PRGs (0.366 mg/kg and 0.149 mg/kg), but not the background, at all locations, except arsenic at location SED80393. Strontium exceeded the background of 67.92 mg/kg, but not the PRG, at location SED80393. At that same location barium exceeded the background value (176 mg/kg) as did chromium (background of 22.2 mg/kg), magnesium (background of 3,707 mg/kg), and zinc (background of 95.92 mg/kg). Calcium exceeded the background of 5,839 mg/kg, but as an essential nutrient it is not further addressed. Silver exceeded the background level of 0.22 mg/kg at all locations. Sodium exceeded the background level of 119.02 at all locations. However, sodium is an essential element and is not further addressed. At SED80593 several metals not already discussed were found that exceeded their background values, but not the PRG, including: chromium (22.21 mg/kg), copper (22.75 mg/kg), lead (73.87 mg/kg), mercury (0.19 mg/kg), and zinc (95.92 mg/kg).

3.10 IHSS 139.1(S) - HYDROXIDE TANK AREA, BUILDING 771

This section presents the results of the data collection for IHSS 139.1(S). It includes a discussion of the IHSS background, previous studies and recommendations, overlapping

IHSSs, adjacent IHSSs, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 139.1(S) is associated with a 5,400-gallon aboveground potassium hydroxide (KOH) storage tank, located 55 feet south and 35 feet east of the southeast corner of Building 771. The tank was installed some time between 1955 and 1964. The tank is of welded construction and appears to be in good condition. It is on a concrete base and is surrounded by a small earthen berm. The berm was constructed before 1973 (DOE 1994a).

The HRR (DOE 1992a) proposed that IHSS 139.1(S) consist of an "L"-shaped area 25 feet wide and 140 feet long that included the KOH tank and the line that transfers the hydroxide into Building 771. Subsequent information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that IHSS 139.1(S) should be redefined as a 35- by 25-foot area around the tank. The IHSS is unpaved, except for the concrete pad, and is bordered by paved roads on the north, east, and south sides, and by Building 714 on the west side.

The HRR (DOE 1992a) states that there have been several spills and releases of KOH during routine filling operations. The following is a description of the reported KOH releases:

- There was an overfill of the potassium hydroxide tank before 1973. The quantity spilled is not stated. The HRR states that "As a result of this incident, it is likely that the caustic seeped through the soil and infiltrated beneath the building." This, however, is an unlikely scenario given the depth to which the KOH would have to infiltrate, the properties of KOH, and the nature of Rocky Flats soils, unless the spill involved a very large quantity.

- During the week ending May 5, 1978, a spill occurred at a caustic tank near Building 771. The spill occurred during a routine filling operation and was contained by the dike surrounding the tank. This occurrence is believed to have involved the KOH tank.

- On November 13, 1989, the potassium tank was overfilled. Approximately 5 gallons of 12-molar potassium hydroxide spilled into the earthen berm that surrounds the tank. Approximately 100 pounds of "oil dry" was used to absorb the KOH. The contaminated soil and oil dry were removed and placed into drums. The fire department hazardous materials team verified that the contaminated area was adequately cleaned up by taking soil samples and performing pH tests. The area was backfilled with new gravel.

3.10.1 Previous Studies and Recommendations

There are no monitoring wells in the vicinity of IHSS 139.1(S) that could verify if the KOH releases had an impact on the groundwater in the region.

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify foundation drains and storm sewers in the vicinity of OU8 IHSSs. Foundation drains have been identified around Building 771. The engineering drawings reviewed show a foundation drain located along the south wall of Building 771 at a depth of approximately 30 feet below ground surface. The historical sampling of Building 771 foundation drains showed pH results ranging from 7.1 to 8.3. However, it is believed that the sampling that was performed is not representative of the segment of the drain located along the south wall of the building (EG&G 1994b). Utility drawings do not show any storm sewers in the vicinity of IHSS 139.1(S).

3.10.2 Overlapping IHSSs

There are no IHSSs that overlap with IHSS 139.1(S).

3.10.3 Adjacent IHSSs

IHSS 139.1(S) is located within 100 feet of OU8 IHSS 137, 139.2 and 144(N). Per the IFSP (EG&G 1994b), the analyte suite was modified to include pH at those IHSSs. The pH results for those three IHSSs ranged from 6.15 to 9.7. The highest value, 9.7, was measured at site SS804493 in IHSS 139.2. This was the closest sample point to IHSS 139.1(S).

IHSS 139.1(S) is also located within 100 feet of OU9 IHSS 132 (T-9 and T-10). Groundwater samples collected from boreholes in this IHSS were analyzed for pH. However, the boreholes are located upgradient from IHSS 139.1(S). The results from these samples were not available for inclusion in this report.

3.10.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.10.5 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from two locations in IHSS 139.1(S). Figures 3-13 and 3-14 and Tables 3-35 and 3-36 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE

1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-13 and 3-14.

Due to the history of adjoining IHSSs, organic compounds, metals, and radionuclides were selected for analyses.

The only organics detected were PAHs. Of those, benzo(a)pyrene was detected at all locations, exceeding the PRG of 87.7 mg/kg. Benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene all exceeded the PRG of 877 mg/kg at locations SS804093 and SS804193.

Of the metals, tin exceeded the background of 2.9 mg/kg, but not the PRG. Arsenic exceeded the PRG of 0.366 mg/kg at all locations, as did beryllium (PRG is 0.149), but did not exceed the background. Calcium exceeded the background of 5,839 mg/kg at SS804093, but is an essential nutrient and is not further addressed. Chromium exceeded the background of 22.21 mg/kg at SS80393. Silver exceeded the background of 0.22 mg/kg at all locations.

Of the detected radionuclides, Am-241 exceeded the background value of 0.04 pCi/g, but not the PRG, at locations SS804093 an SS804193. At the same locations, Pu-239/240 also exceeded the background value of 0.08 pCi/g. At location SS804093 U-238 exceeded the PRG of 0.8 pCi/g, but not the background.

3.10.6 Statistical Summary

This section, including Tables 3-37, 3-38, and 3-39, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.11 IHSS 139.2 - HYDROFLUORIC ACID TANK AREA, BUILDING 714

This section presents the results of the data collection for IHSS 139.2. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 139.2 is related to two horizontal 1,300-pound hydrofluoric cylinders, each with a 1,200-pound capacity, which are located in Building 714. Figures 3-15 and 3-16 show the location of IHSS 139.2. Building 714 is a small shed approximately 4 feet east and 29 feet south of the southeastern corner of Building 771. Hydrofluoric acid had reportedly infiltrated the soil in the vicinity of the storage area. Numerous small spills and leaks are reported to have occurred during routine filling and transfer operations. The hydrofluoric acid is delivered in portable tanks that replace the empty tanks, thus requiring no open transfer. These portable tanks are sealed cylinders. The acid is piped to, and used in, Building 771. The area is flat, includes both paved and unpaved surfaces, and is heavily used. A large aboveground KOH storage tank is immediately east of the site (DOE 1994a).

In May 1971, a leak in a hydrofluoric connection outside Building 771 was reported. A small amount of vapor was released but no personnel exposures occurred. No further details of this incident are available (DOE 1994a).

During the week ending August 13, 1976, a hydrofluoric acid leak above Building 771 was repaired. Apparently the hoses had collected small amounts of the acid that appeared when the line was pressurized (DOE 1994a).

A portable, refillable, nitric acid dumpster is located at the southeast corner of Building 771, just north and west (approximately 25 feet) of the hydrofluoric acid storage area discussed above. This is not part of IHSS 139.2 or any other OU8 IHSS, nor is it identified as a Personnel Access Control. However, the OU8 RFI/RI Work Plan (DOE 1994a) planned investigations for this area. These investigations included a 10-foot area around the dumpster (DOE 1994a).

This dumpster supplies nitric acid to the Building 771 chemical makeup area. The acid is delivered to the 218 tank farm near Building 444 by an outside supplier. One of two available dumpsters is picked up at Building 771 and taken to the bulk supply where it is filled by Building 774 Chemical Operators. The dumpster is then returned to Building 771. This activity occurred on a daily basis while Building 771 was operational as a plutonium recovery facility (DOE 1994a).

According to Supervisor Investigation Report #87-7-771.1 - Acid Spill, there was a release of approximately 35 gallons of 12-normal nitric acid at the dumpster on July 1, 1987. The cause was a leak in the supply hose. Neutralization was attempted by the use of KOH flake and sodium bicarbonate. The following day, the soil was loosened and more sodium bicarbonate was added. An asphalt layer was discovered approximately 6 inches below ground surface. The affected soil was removed to hazardous waste unit number 1 or to IHSS 203. New road mix was to be placed on the asphalt pad (DOE 1994a).

IHSS 139.2 was originally defined as a 40- by 60-foot area that encompasses the hydrofluoric shed south of Building 771. The information compiled on IHSS 139.2 for the HRR (DOE 1992a) indicated the location presented in the IAG was inaccurate. For the OU8 RFI/RI Work Plan, it was proposed that the location of IHSS 139.2 be redefined to represent the location the hydrofluoric storage shed (Building 714). This is approximately 350 feet

south and 250 feet west of the location presented in the IAG as IHSS 139.2 (DOE 1994a). More recent information (Doty & Associates 1992) indicates the IHSS 139.2 should be located approximately 45 feet south of the southeast corner of Building 771 and that its boundaries be reduced to approximately 25 by 35 feet.

3.11.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 139.2.

The hydrofluoric acid release at this IHSS consisted of a vapor release. It is improbable that there is residual impact on the air from this release. Also it is not likely that soil, surface water, or groundwater has been impacted by this release. However, leaks and spills from the refillable nitric acid dumpster located approximately 25 feet northwest of this site have probably impacted the surrounding ground surface (DOE 1994a).

There are no monitoring wells located immediately downgradient of this IHSS (DOE 1994a). The nearest downgradient monitoring wells are approximately 210 feet northeast of IHSS 139.2 and are immediately downgradient of IHSS 137.

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, there are no foundation drains or storm drains in IHSS 139.2. However, a 6-inch, tile foundation drain runs along the south wall of Building 771. This foundation drain appears to run under where the nitric acid dumpster is located at the southeast corner of Building 771. This foundation drain is part of the entire Building 771 foundation (and roof drain) system. This drain system eventually discharges to Manhole #3 near the

northwest corner of Building 771. Refer to OU8 Technical Memorandum 1 (DOE 1994b) for additional information concerning the drains and historical sampling of Manhole #3.

3.11.2 Overlapping IHSSs

No other Industrial Area IHSSs overlap with IHSS 139.2.

3.11.3 Adjacent IHSSs

IHSS 139.2 is adjacent to IHSS 139.1(S) with surface-soil sample locations SS803993, SS804093, and SS804193 within 100 feet of the IHSS boundary. IHSS 139.2 is also adjacent to OU9 Tanks T-9 and T-10, IHSS 137 surface-soil sample locations SS801593 and SS801793, and IHSS 144(N) surface-soil sample locations SS804593 and SS804694. Based on the IFSP (EG&G 1994b), all surface-soil sample locations in IHSS 139.2 and 139.1(S) were sampled for pH, SVOCs, TAL metals, and nitrate due to their adjacency to IHSS 144(N). VOCs and radionuclide analyses were added to the IHSS 139.2 analytical suite due to its adjacency to OU9 Tanks T-9 and T-10.

3.11.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.11.5 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from three locations within IHSS 139.2. Figures 3-15 and 3-16 and Tables 3-40 and 3-41 summarize the detected analytes, their

concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-15 and 3-16. Due to the history of adjoining IHSSs, organic compounds, metals, and radionuclides were selected for analyses.

The only organics detected were PAHs. Found to be exceeding the PRG of 877 mg/kg were benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene at all sample locations. Also exceeding the PRG of 877 mg/kg was indeno(1,2,3-cd)pyrene at locations SS804293 and SS804393. Benzo(k)fluoranthene exceeded the PRG of 877 mg/kg at SS804393.

Of the detected metals, arsenic and beryllium exceeded their PRGs (0.366 mg/kg and 0.149 mg/kg, respectively). Both cobalt and copper exceeded the background (14.22 mg/kg and 22.75 mg/kg), but not the PRGs, at location SS80439. Mercury was found in excess of the background (0.19 mg/kg), but not the PRG at locations SS804393 and SS804493. Potassium, an essential nutrient, exceeded the background of 3,797 mg/kg at location SS804393. Silver exceeded the background level of 0.22 mg/kg at all sample locations.

Only two radionuclides were detected, both from location SS804293. Americium-241 and Pu-239/240 exceeded the background level (0.04 pCi/g and 0.08 pCi/g, respectively), but not the PRG.

3.11.6 Statistical Summary

This section, including Tables 3-42, 3-43, and 3-44, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.12 IHSS 144(N) SEWER LINE BREAKS NEAR BUILDING 730, TANKS 776 A-D

This section presents the results of the data collection for IHSS 144(N). It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, HPGe survey and NaI survey, soil-gas survey, surface-soil sampling, VSP sampling, sediment sampling, and a statistical summary of the surface-soil sampling.

Since IHSSs 144(N) and 144(S) are so close to each other geographically, the discussion of IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSS, HPGe survey and NaI survey, and soil-gas for this IHSS were combined with IHSS 144(S).

IHSS 144(N & S) is associated with the release of radioactive laundry waste water during a transfer of the waste water from the laundry waste holding tanks, which are located beneath the Building 730 pumphouse, to the sanitary sewer system. The Building 730 pumphouse is located north of Building 776 and east of Building 701. The Building 776 laundry waste water was stored in two 22,500-gallon concrete underground tanks that are designated Tanks 776A and 776B. The tanks are co-located with two 4,500-gallon concrete process waste holding tanks that are designated Tanks 776C and 776D. The four tanks, which were constructed in 1956 or 1957, are designed so that if Tanks 776C and 776D overflowed, the excess material could drain into Tanks 776A and 776B, and vice versa. Although no documentation has been found that shows that this situation ever occurred, it is possible that the release of the laundry waste water could have included constituents of the process waste tanks (i.e., VOCs, SVOCs, metals, and radionuclides) (DOE 1994a).

All four tanks have been taken out of service, but the date that they were taken out of service is unclear. The OU8 RFI/RI Work Plan (DOE 1994a) states that the tanks were taken out

of service in the 1980s and the laundry waste tanks were converted to fire water plenum deluge tanks. A 1977 engineering drawing, drawing number 25845-X065 (exact date and title illegible on copy) denotes that the four tanks are to be decontaminated and the laundry waste tanks are to be converted to two-stage plenum fire water storage. It is not known if the decontamination and conversion of the tanks occurred in the late 1970s or early 1980s.

According to the OU8 RFI/RI Work Plan (DOE 1994a), from approximately 1969 until 1973, laundry waste could be transferred through the sanitary sewer lines to the Building 995 sewage treatment facility. A pipe header located in the Building 730 pumphouse allowed for alternatives of pumping the laundry waste water to either the sanitary sewer system, the Solar Evaporation Ponds, or Building 774. A drawing entitled "Piping; Process Waste Storage Tanks, Bldgs 76 & 77" (RF-76-13216; As Built, August 13, 1957) shows the pipe header with the three alternatives for transferring the waste. Based on this drawing, it appears that the ability to transfer the waste to the sanitary sewer system had existed since 1957.

The discharge pipes from the laundry waste tanks exit Building 730 on the north side. The three pipes then run to the east, to the south side of Building 702. From there, the sanitary sewer pipe runs to the south, underneath the addition that was constructed on the east side of Building 777 in the mid-1960s. Utility drawings show the pipe as being constructed of vitrified clay. The sanitary sewer line was apparently rerouted to the area between Building 777 and 779 in order to provide sanitary sewer service to the addition that was constructed on the north side of Building 779 in 1968. Utility drawings show that the section of the sewer that ran underneath Building 777 was abandoned, and a new polyvinyl chloride (PVC) sewer line ties into the existing sewer at the north side of the Building 777 addition. The PVC pipe runs east along the north wall of Building 777, then turns to the south and runs through the alley between Buildings 777 and 779.

On approximately June 1, 1972, a revision of a Building 776 radiography vault floor drain was completed. Apparently, previous transfers of laundry waste water from Tanks 776A and 776B resulted in backflow into the vault. The revision to the floor drain would allow the laundry waste to be transferred at higher pressures (DOE 1994a).

On June 7 or 8, 1972, the increased pumping rate during a transfer of laundry waste water from the tanks to Building 995 caused suspension of high level radioactive sediment in the tanks and pressurization of the sanitary waste line. The pressurization of the line caused a commode and sink in Building 701 to overflow, and a patch to rupture in the line east of the tanks. Due to the overflow of the commode and sink, the toilet, sink, and floor of Building 701, as well as the ground east of the building, were contaminated. The patch that ruptured was apparently located between Buildings 777 and 779 (DOE 1994a). The HRR (DOE 1992a) states that the pressurization of the transfer line also caused sanitary waste to back up and overflow at a clean-out plug. Maintenance personnel were reportedly working at a clean-out near Building 701 at the time of the incident.

Activity levels of samples taken from the toilet bowl in Building 701 were as high as 136,000 pCi/L on June 7 and 8. The presence of black sludge was noted in the samples. A sludge sample taken from a clean-out plug in the Building 701 sanitary sewer line contained only minimal radioactivity. Analysis of the sediments from the bottom of Tanks 776A, B, and D indicated liquid phase activities of 68,000 pCi/L, 9,100 pCi/L, and 302,000 pCi/L, respectively (DOE 1994a).

Following the 1972 pressurization incident, the Building 995 outfall and other downstream points were sampled daily. There was increased radioactivity in the Building 995 effluent. The highest sample concentration of total alpha-emitting radionuclides in the effluent was 417 pCi/L, on June 11, 1972 (DOE 1994a).

The location of the rupture in the sanitary sewer line is unclear. Persons interviewed for the Comprehensive Environmental Assessment and Response Program report recalled a break in the sewer line between Buildings 777 and 779. The HRR (DOE 1992a) states that this location is suspect in that no documentation was found to support that location. Additionally, the sewer line between Buildings 777 and 779 was constructed of PVC pipe and was relatively new, installed in approximately 1968. The original sanitary sewer pipe, between Buildings 730 and 702, was constructed of vitrified clay and was installed in the late 1950s. It seems likely that the rupture would have occurred in the older section of vitrified clay pipe as opposed to the newer PVC pipe. Also, the HRR states that approximately 50 drums of contaminated soil were removed from "east of the holding tanks." A conflicting document states that 38 drums of soil were removed (DOE 1994a). This information seems to support the probability that the rupture of the sewer occurred in the older vitrified clay pipe.

The contaminated soil around Building 701 was apparently removed also. As of June 8, 1972, 19 drums of soil had been removed. According to an employee logbook, no soil count was detected at that time (DOE 1994a). It is not known if the drums were disposed of in the onsite landfill or in Idaho.

The HRR (DOE 1992a) states that it was determined that the pump line for the transfer of the laundry waste would be physically separated from the sanitary sewer line. It is not known if this occurred. The 1977 drawing (25845-X065) does not indicate that the pipe was separated.

IHSS 144 was originally defined as a 20- by 50-foot area between Buildings 777 and 779. Based on information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a), IHSS 144 was divided into two separate sites, IHSS 144(N) and IHSS 144(S). IHSS 144(N) has dimensions of 25- by 70-feet and is located adjacent to the east side of Building

730. IHSS 144(S) has dimensions of approximately 15- by 170-feet and is located in the alley between Buildings 777 and 779. The surface-soil sampling grid proposed in the OU8 RFI/RI Work Plan for IHSS 144(N) also included an area adjacent to the east side of Building 701. The ground surface in IHSS 144(N), and on the east side of Building 701, is relatively flat and is unpaved. The alley between Buildings 777 and 779 [IHSS 144(S)] has been paved since 1968, and slopes to the south (DOE 1994a). The IHSSs are shown in Figures 3-17 through 3-20.

3.12.1 Previous Studies and Recommendations

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify building foundation drains and storm sewers that could potentially be impacted by OU8 IHSSs. Foundation drains were not identified on Building 701 or Building 776/777. However, foundation drains are suspected on Building 776/777 due to the underground structures. A foundation drain was identified on the west and north walls of the addition that was constructed on Building 779. The discharge point for this drain is located on the hillside north of the Solar Evaporation Ponds. The foundation drain pipe is located adjacent to the sanitary sewer pipe in the alley between Buildings 777 and 779. If the rupture of the sewer line did occur in that area, the foundation drain probably would have been affected.

Historically, samples have been collected from an outfall on the hillside north of the Solar Evaporation Ponds since 1977. The location code assigned to these samples was FD-779-1. Most of the samples have indicated slightly elevated levels of gross alpha activity and gross beta activity. Tritium was also detected in a sample collected in March 1980. A September 15, 1989 sample indicated elevated levels of potassium, calcium, magnesium, sodium, and zinc. However, as stated in the OU8 Technical Memorandum 1 (DOE 1994b), it appears

that the outfall that has been sampled is actually a storm sewer outfall and not the foundation drain outfall. Additionally, the elevated sample results could be attributable to the Solar Evaporation Ponds. Therefore, no definitive correlation can be made between the FD-779-1 sample results and the release from IHSS 144(N&S).

There are no upgradient groundwater monitoring wells in the vicinity of IHSS 144(N) or 144(S). The nearest downgradient monitoring wells are P209289 and P209389, which are located north of Building 713. Due to the lack of analytical data from these wells and the vicinity of several OU8 and OU9 IHSSs, no conclusions can be made regarding the affect of IHSS 144(N&S) on the groundwater quality of the region. The OU8 RFI/RI Work Plan (DOE 1994a) summarizes the analytical data for these wells that were available at the time the work plan was written (1992).

The radiometric survey performed with a FIDLER in the late 1970s and early 1980s indicated no extremely contaminated (500,000 to 1,000,000 pCi/g) areas at or near the IHSS.

3.12.2 Overlapping IHSSs

IHSS 144(N) overlaps with OU9 IHSS 132 (Tanks 776A-D; also referred to as T-9, T-10). Samples were taken from inside the tanks and from boreholes 02695, 02795, 02895, and 02995. The analytical data for these borehole and groundwater samples were not available for inclusion in this report. However, field monitoring during the drilling activities with colorimetric tube did detect carbon tetrachloride at every borehole location, from just below the ground surface to bedrock. The groundwater samples from the boreholes appeared to contain free product.

The sample grid for IHSS 144(N) also overlaps with OU8 IHSS 118.1. IHSS 118.1 had soil gas investigations only. IHSS 144(S) does not overlap with any IHSSs.

There were no changes to the field sampling plan for IHSS 144 as a result of the overlapping IHSSs. Radionuclide analysis was added to the analyte suite for surface-soil samples in both IHSS 144(N) and 144(S) due to the nature of the release.

3.12.3 Adjacent IHSSs

IHSS 144(N) is adjacent to OU14 IHSS 131, and surface-soil sites SS431194, SS432594, and SS432694 are located within 100 feet of the IHSS 144(N) border. There was no change to the field sampling plan for IHSS 144(N) due to IHSS 131.

IHSS 144(N) is adjacent to OU8 IHSS 139.1(S), and surface-soil sites SS803993 through SS804193 are located within 100 feet of the IHSS 144(N) border. Per the IFSP (EG&G 1994b), pH and nitrate analyses were added to surface-soil samples in IHSS 144(N).

IHSS 144(N) is adjacent to OU8 IHSS 139.2, but no samples lie within 100 feet of the IHSS 144(N) border. IHSS 144(S) is adjacent to OU9 IHSS 121 (the OPWLs) but there were no changes to the field sampling plan due to IHSS 121.

3.12.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report, as per the DOE Stop Work Order.

3.12.5 Vertical Soil Profiles

This section, including Table 3-45, was not completed due to a change in the scope for this Data Summary Report, as per the DOE Stop Work Order.

3.12.6 Soil-Gas Survey

Five soil-gas locations were sampled in IHSS 144(N). No locations were lost due to utilities or inaccessibility in this IHSS. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-17. Table 3-46 lists the detected compounds and their concentrations. The OU8 RFI/RI Work Plan (DOE 1994a) specified the following soil gas analytes: carbon tetrachloride, methyl ethyl ketone, TCE, PCE, TCA, benzene, dichloromethane, toluene, and xylene. In addition, analyses were performed for the other chemicals listed in Table 3-46.

There was only one location in IHSS 144(N) that had a detection above 1.0 μg/L. At this location, SG002494 in the northwest corner of the IHSS, carbon tetrachloride was present in a concentration of 3.2 μg/L. No other analytes exceeded 1.0 μg/L at location SG002494.

Seven soil-gas locations were proposed for IHSS 144(S). However, none of these locations could be sampled due to inaccessibility or utilities.

3.12.7 Surface-Soil Samples

Surface-soil samples were collected and analyzed from eight locations within IHSS 144(N). Figures 3-18 and 3-19 and Tables 3-47 and 3-48 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE

1994a]), background concentrations, and established PRGs. Sample locations that exceed either of the reference concentrations are identified in Figures 3-18 and 3-19.

Based on the history of the site, organic compounds, metals, and radionuclides were selected for analyses.

Organic analyses indicate the only compounds present were PAHs. Benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene all exceeded the PRG of 877 mg/kg at all locations except SS804793 and SS805293. Benzo(a)pyrene exceeded the PRG of 87.7 mg/kg at all locations. Dibenzo(a,h)anthracene exceeded the PRG of 87.7 mg/kg at all locations except SS805293.

Of the metals analyzed, arsenic and beryllium exceeded the PRG (0.366 mg/kg and 0.149 mg/kg, respectively) at all locations. Antimony exceeded the background level of 0.47 mg/kg at location SS805193. Calcium, while exceeding the background level of 5,839 mg/kg at two locations, is not considered further because of its value as an essential nutrient. Chromium exceeded the background value of 22.21 mg/kg at locations SS80493 and SS805093. Copper exceeded the background level of 22.75 mg/kg at locations SS804993, SS805093, and SS805293. Lead was found in excess of the background value of 73.87 mg/kg at location SS904993. Magnesium, an essential nutrient, was found in excess of the background value (3,707 mg/kg) at location SS805293. Silver exceeded the background value of 0.22 mg/kg at all sampled locations. Zinc exceeded the background value of 95.92 mg/kg at all locations except SS804793.

Radionuclide analyses indicated the presence of three compounds plus gross alpha. Americium-241 was found at all sampled locations except SS804193. It exceeded the background value of 0.04 pCi/g, but not the PRG, at all locations and exceeded the PRG

(2.37 pCi/g) at SS80493. Plutonium-239/240 also exceeded the background value of 0.08 pCi/g at all locations, and also exceeded the PRG of 3.43 pCi/g at locations SS804393 and SS804993. Uranium-238 exceeded the PRG, but not background, at location SS804893.

3.12.8 Statistical Summary

This section, including Tables 3-49, 3-50, and 3-51, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.12.9 Sediment Samples

Collection of sediment samples from IHSS 144N were proposed in the OU8 RFI/RI Work Plan (DOE 1994a). Two locations were sampled (SED80093 and SED80193). Figure 3-20 and Tables 3-52 and 3-53 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figure 3-20.

The only organic compound found in exceedance was benzo(a)pyrene. It exceeded the PRG of 87.7 mg/kg at location SED80193.

Of the metals detected, tin was found at location SED80193 exceeding the background of 2.90 mg/kg. Arsenic and beryllium exceeded their PRGs (0.355 mg/kg and 0.149 mg/kg, respectively). Calcium and sodium exceeded the background levels, but both are essential human nutrients and are not addressed further. Zinc exceeded the background of 95.92 mg/kg at all sample locations.

Americium-241 and Pu-239/240 exceeded their background values (0.04 pCi/g and 0.08 pCi/g, respectively), but not the PRGs. Uranium-238 exceeded the PRG of 2.83 pCi/g, but not the background, at location SED80193.

3.13 IHSS 144(S) - SEWER LINE BREAK NEAR BUILDINGS 777 AND 779, TANKS 776 A-D

Since IHSSs 144(N) and 144(S) are so close to each other geographically, the discussion of IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, HPGe survey and NaI survey, and soil-gas for this IHSS (Sections 3.13, 3.13.1, 3.13.2, 3.13.3, 3.13.4, and 3.13.5, respectively) were combined with IHSS 144(N). See Section 3.12 for these discussions.

3.13.6 Surface-Soil Samples

Surface-soil samples were collected and analyzed from seven locations within IHSS 144(S). Figures 3-18 and 3-19 and Tables 3-54 and 3-55 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-18 and 3-19.

Based on the history of the site, organic compounds, metals, and radionuclides were selected for analysis.

No organic compound was detected at a level exceeding either a background value or PRG. Of the metals analyzed, only arsenic was found at an elevated level. It exceeded the PRG of 0.366 mg/kg at all sampled locations. The only radionuclide that exceeded a reference

concentration was Pu-239/240. It exceeded the background concentration of 0.08 pCi/g, but not the PRG, at locations SS805593 and SS805893.

3.13.7 Statistical Summary

This section, including Tables 3-56, 3-57, and 3-58, was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.14 IHSS 150.1 - LIQUID LEAKS RADIOACTIVE SITE

This section presents the results of the data collection for IHSS 150.1. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, the soil-gas survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 150.1 was originally defined as a 50- by 450-foot area north of Building 771 (EG&G 1990b). Information from the HRR (DOE 1992a) indicated that the waste storage and handling also occurred west of Building 770 and possibly north of Building 774. Due to a leaking tank incident in June 1968, it was proposed that the IHSS boundaries presented in the IAG be extended to the east approximately 120 feet. In addition, photographs show that in March 1974, more than 30 cargo containers were present immediately west of Building 770. Thus, it was proposed to extend the boundaries of IHSS 150.1 to include the area west of Building 770 (DOE 1992a). Therefore, the present IHSS 150.1 is an area approximately 360 by 60 feet immediately adjacent to the north side of Building 771 (Figures 3-21 through 3-23) (DOE 1994a).

This IHSS consists of an area north of Building 771 affected by various radioactive leaks. The specific locations of these leaks were not recorded; however, the paved area north of Building 771 and west of Building 770 was used for storage probably as early as 1964. The storage area was bounded on the north by a fence that was parallel to Building 771 and extended north to enclose the west entrance of Building 770. The material stored was destined for plutonium recovery in Building 771 and consisted of residues with a high plutonium content, stored in drums on pallets or in cargo containers. The area encompassing this IHSS is paved, occupied by numerous trailers, auxiliary buildings, and storage areas. A small prefabricated building used for storage is located west of Building 770 (DOE 1994a).

The primary incidents of spills and leaks include the following:

- In September 1957, a major fire occurred in Building 771. A plenum was breached releasing an unknown amount of radioactivity around the building, particularly to the north (DOE 1994a).

- Between 1962 and 1968, a 5000-gallon stainless steel tank was located approximately 30 feet north of Building 771. The tank was used in the Filtrate Recovery Ion Exchange system, which concentrated plutonium and americium for recovery. In approximately 1968, a leak was discovered in the tank that dripped onto the concrete slab foundation. The tank was taken out of service and eventually disposed of offsite. The concrete slab was decontaminated, reportedly moved to a ditch area north of the IHSS, and buried (IHSS 163.2). The location of the tank was paved before 1969 (DOE 1994a).

- In June 1968, during removal of drums from the 903 Storage area, a drum leaked on the roadway as it was being transported to Building 774. The forklift carrying the leaking drum traveled across the area north of Building 771 (DOE 1994a).

- The paved area between Buildings 771 and 770 was used for storage of residue in drums prior to processing in Building 771. A June 1969 photograph shows more than 100 drums stored in rows on the pavement. Drums were also stored in the area south of Building 770 between the access road and the building. Building 770, located north of Building 771 was used as residue and equipment storage (DOE 1994a).

- In November 1970, residue leaked out of a drum of filters as it was being transported from a storage area to Building 771 for processing. The ground near the dock at Building 771, the transport truck, and a cargo container the drum came in contact with were all contaminated (DOE 1994a).

- In March 1971, it was noted that there was a significant increase in the number of "hot waste" drums stored in the area north of Building 771. The drums contained residues for the Building 771 incinerator (DOE 1994a).

- In June 1971, a leaking drum placed on the pavement contaminated approximately 115 square feet of asphalt. Soil and approximately 200 square feet of asphalt were removed for disposal. Shortly afterward, in July 1971, a leaking waste drum containing nitric acid from non-line-generated waste was discovered. A rainstorm spread the contamination, impacting approximately 2,500 square feet of asphalt and gravel with 500 to 1,000,000 counts per minute (cpm) of plutonium. It was determined that these two incidents in 1971 resulted in contamination of the area ranging from 100,000 to 300,00 dpm/100 square centimeters (cm^2) on the asphalt (DOE 1994a).

- In August 1972, a scrap box stored inside Building 770 was punctured and contaminated 3,600 square feet inside and 500 square feet outside of the building. Levels of contamination ranged up to 200,000 dpm/cm^2. Affected asphalt and soil was removed immediately for off-site disposal (DOE 1994a).

- In September 1972, a drum containing spent ion exchange resin residue leaked inside Building 770 onto the concrete floor. Contamination was tracked between Buildings 771 and 770 and covered 600 square feet, including 50 drums and a forklift with contamination levels ranging from 5,000 to 100,000 cpm plutonium. The area was noted to be decontaminated (DOE 1994a).

No documentation was found that indicated any hazardous waste may have been associated with the plutonium residue. However, decontamination activities would have focused on radioactive contamination, and it is likely that residual contamination from hazardous constituents may have remained. The Building 771 area was used for storage until approximately 1974 when Building 776 was used for such storage. Building 770 was then used for storage of equipment and a facility for equipment assembly prior to installation in other buildings (DOE 1994a).

Surface water in this IHSS generally drains to the west. Before the mid-1960s, surface runoff was able to drain onto an exposed area west of Building 770, but the area was paved in the late-1960s. The area immediately north of Building 770 has a grated collection channel that directs surface water to the east into a small pond (Bowman's Pond). The soil beneath the pavement is expected to be compacted fill material because the area had been a steep hillside sloping to the north before the area was leveled and buildings erected (DOE 1994a).

3.14.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 150.1.

The results of a plant-wide Radiometric Survey performed during the late 1970s and early 1980s did not identify any extremely contaminated areas (500,000 to 1,000,000 pCi/g) north of Building 771 (DOE 1994a).

Samples from a piezometer (P219189), completed in 1989, in alluvium near the northeast corner of the IHSS provided the following results:

- 1,1-Dichloroethane was detected in concentrations less than the method detection limit in several samples.

- Methylene chloride was detected in several samples but blank contamination was indicated for those samples.

- Arsenic, barium, copper, iron, lead, magnesium, manganese, and zinc were detected in concentrations greater than background in surficial materials. Aluminum, arsenic, barium, chromium, iron, lead, magnesium, nickel, vanadium, and zinc concentrations exceeded background in bedrock samples.

- Concentrations of Am-241, Ra-226, Ra-228, tritium, U-233/234, and U-238 in samples of surficial materials, and Ra-226, Ra-228, and tritium in bedrock samples exceeded maximum background values. None of the samples were analyzed for plutonium.

These data indicate that RFETS operations have impacted surficial materials and bedrock in the vicinity of IHSS 150.1. However, the data are not sufficient to determine if the impact is attributable to IHSS 150.1 or to releases from other IHSSs (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, a foundation drain constructed of 6-inch vitrified clay pipe runs along the northern edge of Building 771 and crosses the southwestern corner of IHSS 150.1. This foundation drain discharges into Manhole No. 3 (proposed foundation drain sampling station FD-771-4) which is approximately 10 feet west of IHSS 150.1.

A storm drain system containing a network of cast iron pipes is located beneath Building 771. The system presumably connects to the building roof drains and floor drains within the building. This system connects to a storm drain, constructed of 15-inch vitrified clay pipe, which runs from east to west through the middle of IHSS 150.1. This storm drain also discharges to Manhole No. 3. Manhole No. 3 (FD-774-4) has not been an historical sampling location (DOE 1994b).

3.14.2 Overlapping IHSSs

IHSS 150.1 overlaps with OU8 IHSS 172 and OU9 IHSSs 126.1 and 126.2 (Tank T-8), and OU9 pipelines. For OU8 IHSSs 150.1 and 172, the HPGe survey was the only activity that had overlapping survey locations. The HPGe survey locations were modified so the survey locations provided complete coverage of the overlapping portions of both IHSSs. No modification of the analytical suite for either IHSS 150.1 or 172 was required.

The analytical suite for samples from borings in OU9 IHSSs 126.1 and 126.2 encompassed the required analytical suite for IHSS 150.1. Therefore, no modifications were made. No sampling of the OU9 pipelines was performed.

3.14.3 Adjacent IHSSs

IHSS 150.1 is adjacent to OU8 IHSS 150.2. The only activity performed in IHSS 150.2 was VSP sampling. One IHSS 150.2 VSP sample location (VP41494) fell within the overlapping portion of IHSS 150.1.

OU8 IHSS 163.2 is also adjacent to IHSS 150.1, but a geophysical survey was the only activity. No sampling was required in IHSS 163.2.

3.14.4 High Purity Germanium Survey and Sodium Iodide Survey

Five HPGe survey locations were monitored within IHSS 150.1. These HPGe survey locations consisted of stations 7E-8, 7F-8, 7G-8, 7FB-8, and 7H-8 (Plate 1). One additional HPGe survey station, 7I-8, a survey point conducted for IHSS 172, also covers a portion of IHSS 150.1. Of the eight radionuclides analyzed by HPGe, all of them were detected in at least one location in concentrations in excess of their MDA. However, K-40, Ra-226, and Th-232 are radionuclides that were not used in significant quantities in production-related activities at RFETS. The detected activities of these radionuclides were comparable to or lower than expected background activities as identified in Table 2-1. The concentrations measured of U-238, U-235, and Cs-137 were above their respective MDAs, but below background activities as identified in Table 2-1.

The maximum detected activity of Am-241 was 1.2 pCi/g, which is above the maximum expected background concentration of 0.037 pCi/g. Similarly, the maximum detected activity of Pu-239/240 was 8.8 nCi/g, which is also above the maximum expected background concentration of 0.084 pCi/g. However, the high activities for Am-241 and Pu-239/240 occurred at HPGe stations 7H-8 and 7I-8, which are both located on the east end of this IHSS. This portion of the IHSS is in close proximity to Building 771C (the Building 771 Annex). It is believed that these elevated readings for Am-241 and Pu-239/240 are due to shine from the materials stored in the Building 771 Annex.

This statement regarding shine from the Building 771 Annex is supported by the fact that most of the HPGe readings taken within 250 feet of the Building 771 Annex (stations 7M-8, 7N-8, 9J-9, 9K-9, 7S-8, and 7R-8, in addition to 7H-8 and 7I-8) had elevated americium or plutonium concentrations. Further evidence pointing to shine as the source of the elevated HPGe readings is available from the NaI survey done at IHSS 150.3, which is on the opposite side of the Building 771 Annex from IHSS 150.1. At IHSS 150.3, some elevated NaI readings were found, but when the axis of the detector was rotated towards the Building 771 Annex, the count rate increased to 150,000 cpm.

Twelve locations were surveyed using NaI detector equipment. The activity identified at each of these sites did not exceed expected background values based on NaI detector work.

3.14.5 Vertical Soil Profile

VSP samples were not collected at this IHSS because asphalt covers the ground surface of this IHSS. However, 11 surface-soil samples were collected and analyzed by wet-chemistry methods. The results of these analyses indicate that the concentrations of U-233/234, U-235, and U-238 were below background concentrations as identified in Table 2-1, as well as

below PRGs as identified in Table 2-10. Americium-241 was found in surface-soil samples at this IHSS in concentrations up to 0.26 $\pm$0.033 pCi/g (Table 2-2). This activity concentration is approximately one order of magnitude greater than expected background concentrations of this radionuclide, but is also approximately one order of magnitude less than the PRG of 2.37 pCi/g (Table 2-10) for this radionuclide. Plutonium was found in concentrations up to 0.27 $\pm$0.023 pCi/g (Table 2-2), which is in excess of expected background concentrations for this radionuclide. However, the PRG for plutonium in surface soils is 3.43 pCi/g, which is approximately one order of magnitude greater in concentration than the maximum concentration in surface soils.

3.14.6 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-21. Table 3-59 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, PCE, TCE, carbon tetrachloride, and 1,1-dichloroethane within IHSS 150.1. In addition, analyses were performed for the other chemicals listed in Table 3-59. Ten locations were planned to be sampled. However, the presence of underground utilities prevented samples from being collected at all but two locations, SG003694 and SG004094.

At location SG003694 three replicates were analyzed. Chemicals that exceeded the 1.0 μg/L reference concentration included 1,1-dichloroethane, 1,1-dichloroethene, chloroethane, xylenes (total), trichlorofluoranthene, cis-1,2-dichloroethene, m and p xylenes, o xylene, and trans-1,2-dichloroethene. No exceedance was found in SG004094.

3.14.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from eight locations in IHSS 150.1. Based on the history of the site, organic compounds, metals, and radionuclides were analyzed. Figures 3-22 and 3-23 and Tables 3-60 and 3-61 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-22 and 3-23.

Of the organic chemicals detected, only PAHs exceeded the PRG reference value. Benzo(a)anthracene exceeded the PRG of 877 mg/kg at SS806193. At that same location, benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene also exceeded the PRG of 877 mg/kg. Benzo(a)pyrene exceeded the PRG of 87.7 mg/kg at locations SS806193, SS806293, and SS806793. Dibenzo(a,h)anthracene exceeded the PRG of 87.7 mg/kg at location SS806193.

A variety of metals were found to exceed either background values or the PRG. Antimony exceeded background at SS806093. Both arsenic and beryllium exceeded the PRG (0.366 mg/kg and 0.149 mg/kg, respectively) at all sample locations, except for beryllium at location SS806893. Calcium exceeded the background level of 5,839 mg/kg at four locations, but is an essential human nutrient and is not addressed further. Cobalt was found in excess of background (14.22 mg/kg) at location SS806993. Copper exceeded the background level of 22.75 mg/kg at locations SS806293, SS806493, SS806593, and SS806993. At location SS806993, several metals exceeded background values, including the following: iron (23,063 mg/kg), magnesium (3,707 mg/kg), manganese (482.1 mg/kg), and silver (0.22 mg/kg). Sodium exceeded the background level at several locations, but is an essential nutrient and is not addressed further.

Radionuclides detected included Am-241, Pu-239/240, and U-238. Americium-241 exceeded the background value of 0.04 pCi/g but not the PRGs at five locations (SS806093, SS806193, SS806293, SS806493, and SS806593). Plutonium-239/240 also exceeded the background value but not the PRG at five locations including SS806093, SS806193, SS806293, SS806493, and SS806593. It did not exceed the PRG of 3.43 pCi/g, however. Uranium-238 exceeded the PRG (2.83 pCi/g), but not the background value, at five locations (SS806093, SS806293, SS806493, SS806593, and SS806793).

3.14.8 Statistical Summary of Surface-Soil Data

Surface-soil samples collected from IHSS 150.1 were analyzed for SVOCs, standard and additional metals, and radionuclides. Based on the sampling design described in section 5.1 of the OU8 RFI/RI Work Plan (DOE 1994a), 11 surface-soil samples, including one duplicate, were collected from within this IHSS. Only one or two samples contained SVOCs in concentrations in excess of their quantitation limits of 330 μg/kg. The paucity of data for these SVOCs precludes their inclusion in the statistical analyses. However, the power and number of samples for sufficiency testing were calculated.

As expected, metals and all of the radionuclides were found, to a greater or lesser extent, in all of the surface-soil samples. The first statistical analysis to which the data were subjected was the Shapiro-Wilk test for population distribution (Gilbert 1987; EPA 1989; EPA 1992). Table 3-62 is a listing of the population distributions for the metals and radionuclides detected in samples from IHSS 150.1. The spreadsheets that were used in calculating the Shapiro-Wilk statistic (W) are contained in Appendix F. Four metals (barium, lead, nickel, and potassium) and four radionuclides (gross beta, Pu-239/240, U-233/234, and U-238) were all normally distributed. Seven metals (aluminum, arsenic, barium, calcium, lead, nickel, and potassium) and four radionuclides (gross beta, Pu-

239/240, U-233/234, and U-238) were all normally distributed. Six metals (lithium, strontium, cobalt, manganese, vanadium, and zinc) and two radionuclides (Am-241 and gross alpha) are lognormally (base *e*) distributed. Finally, four metals (chromium, copper, iron, and magnesium) did not fit either the normal or lognormal distributions and are considered nonparametric.

In order to evaluate the sufficiency of the sampling effort, calculated values of power were compared to a threshold value of 0.8 or 80 percent. A power of 0.8 corresponds to a false-negative error (Type II) rate of 20 percent in the test of the null hypothesis that the mean of the sample population $\bar{x}$ is within a percentage *(d)* of the true mean (μ) of all of the possible samples from the IHSS: $H_0: \bar{x} < (1 \pm d)\mu$. Table 3-63 is a summary of the results of the tests of power for the metal and radionuclide analyses of samples collected from IHSS 150.1. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less than 20 percent of the true population mean for one metal (chromium) and three radionuclides (gross beta, U-233/234, and U-238). When the difference in means is increased to 30 percent, two additional metals reach a power of at least 0.8 (nickel and potassium). Increasing the allowable difference in means to 50 percent adds lithium, aluminum, arsenic, barium, lead, zinc, gross alpha, and U-235 to the list of metallic elements and radionuclides with powers in excess of 0.8. Ten metals (beryllium, calcium, cobalt, copper, iron, magnesium, manganese, sodium, strontium, and vanadium) and two radionuclides (Am-241 and Pu-239/240) have powers in the range of 0.25 to 0.75 (i.e., three out of four to one out of four chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant considering that the sample population mean for these species are from five to 10 times less than their respective background concentrations or PRGs. Thus, if the sample mean is too low by as much as 50 percent

(i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment.

In order to increase the confidence in the decisions made from the sample data, it would be necessary to collect additional samples for analysis of those species with a wide variation in the measured concentrations. The number of samples (n) sufficiency test statistic is calculated by using the standard normal deviate ($Z_{1-\alpha/2}$) for a normal population distribution, the absolute margin of error (d), and the coefficient of variation (η):

$$n=\left(Z_{1-\alpha/2}\eta/d\right)$$

Table 3-64 is a listing of the number of additional samples required to reach a 90 or 95 percent confidence that the difference in sample and true population means are less than 20, 30, and 50 percent. The species for which an insufficient number of samples were collected are shaded. For example, a sufficient number of samples were collected and analyzed for barium, chromium, magnesium, nickel, potassium, gross alpha, U233/234, and U-238 for one to have a 95 percent confidence that there is no more than 20 percent difference in the sample population mean and the true population mean. If a 90 percent confidence is sufficient, lithium and U-235 have also been detected in enough samples to demonstrate that the difference in the means is less than 20 percent. With the exception of sodium, sufficient samples have been collected for a 90 percent confidence that the difference in the sample and population means is no greater than 50 percent. Five additional samples would need to be collected in order to reach this confidence for sodium. If it were necessary to reach a 95 percent confidence that the differences in the means were less than 20 percent, an estimated additional 144 samples would need to be analyzed for sodium. As stated previously, achieving higher levels of confidence or smaller estimated differences in the sample and

population means is not necessary because the measured concentrations are well below their respective background or PRG concentrations.

3.15 IHSS 150.2 - RADIOACTIVE SITE WEST OF BUILDINGS 771 AND 776

This section presents the results of the data collection for IHSS 150.2 (Figure 1-2). It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey and VSP sampling.

The IAG and the First Draft Work Plan (EG&G 1990) originally defined the IHSS 150.2 boundaries as a 70- by 250-foot area west of Building 771. Subsequent information obtained for the Final OU8 RFI/RI Work Plan (DOE 1994a) indicates that IHSS 150.2 should be divided into two separate areas. The northern portion is located adjacent to the west side of Building 771. The southern portion is located adjacent to the west side of Building 776 and extends south to the northwest corner of Building 778. The IHSS is shown in Figure 1-2.

IHSS 150.2 is associated with radiological contamination that resulted from the two major industrial fires that occurred at RFETS, the September 11, 1957, fire in Building 771 and the May 11, 1969 fire in Building 776/777. There are other IHSSs that are also associated with the fires. IHSS 150.2 is primarily related to radiological contamination that was spread as a result of the firefighting activities.

On September 11 and 12, 1957, a fire occurred that caused considerable damage to Building 771 and considerable radiological contamination of areas inside and outside of the building. The fire started in Room 180, (some sources state Room 108), located at the southwest corner of Building 771, and spread into the main filter plenum. The breach of the plenum

resulted in the release of an unknown amount of radioactivity around the building, particularly to the north. An explosion that occurred in the main exhaust duct probably contributed to the release of plutonium from the stack (DOE 1994a). IHSS 150.1 (Section 3.14) addresses radiological contamination along the north side of Building 771.

The west side of the building was also contaminated as a result of the firefighting activities. Although no documentation was found that details specific activities in the area, a review of documents pertaining to the fire indicates that the west side of the building was used quite extensively during extinguishing activities. Since the fire was located in the southwest corner of the building, the west entrance would have provided the best access for firefighters. Firefighters probably gained access to the main filter plenum through a hatchway on the west side of the building. The area was paved at the time of the fire. Currently, there is a dock located at the access door. No documentation was found that details contamination of the surrounding environment and no details of cleanup activities were found (DOE 1994a).

On May 11, 1969, a major fire occurred in Building 776/777. The fire released as much as 210 microcuries of plutonium to the atmosphere with significant property loss (DOE 1992a). Plutonium was tracked outside of Building 776 by firefighting and support personnel and was detectable on the ground around the building. One source stated that the tracking of contamination was confined to an area of 20 by 100 feet adjacent to the west of the building. Another source stated that the contaminated area extended from the south wall of Building 778 to the north wall of the maintenance addition to Building 776 in a strip about 30 feet wide along the west wall of Building 776. Following the fire, rain carried the contamination into the soil. Airborne contamination from the May 1969 fire was carried predominately to the west-southwest, the average wind direction at the time. Contamination was found outside the building to a maximum of 200 feet following the fire (DOE 1994a).

Oil and gravel were placed on areas of contaminated soil in order to stabilize the contamination. The soil, oil, and gravel were removed on July 19, 1969. An estimated 320 tons of asphalt and soil, containing 7 dpm/g, was removed and buried in a location east of Building 881, at IHSS 130. At least a portion of the sidewalk on the west side of Building 776 was also removed. A new asphalt road had been constructed on top of the affected area by the end of July 1969 (DOE 1994a).

Surveys of the area just south of Door 6, in the northern half of the west side of the building, showed contamination of between 100 and 300 μg/meter^2. Documentation also indicates that the steps, dock, and ramp areas on the west side of Building 776 were contaminated to 6,000 cpm. In May 1971, contaminated steps, dock, and ramp areas on the west side of Building 776 were covered with an epoxy paint. Areas of contamination outside Building 776 were covered with asphalt (DOE 1994a).

In January 1972, the soil at the southwest corner of Building 776 was considered to be contaminated. The cause of the contamination was not stated (DOE 1994a).

In 1973, a survey was conducted on the asphalt road west of Building 776 to determine contamination levels prior to widening of the road. The maximum soil activity found was 70 dpm/g plutonium (DOE 1994a).

In June 1980, contaminated asphalt was removed from the west side of Building 776 and boxed as hot waste (DOE 1994a).

The ground surface west of Building 771 steps down steeply to the north, with numerous retaining walls, paved and unpaved storage pads, and loading docks. The surface west of

Building 776 is relatively flat and mostly paved. The area was first paved in 1968 (DOE 1994a).

3.15.1 Previous Studies and Recommendations

The results of the Radiometric Survey, performed at Rocky Flats during the late 1970s and early 1980s with a FIDLER, indicate no extremely contaminated areas (stated to be 500,000 to 1,000,000 pCi/g) around the west sides of Buildings 771 or 776 (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify building foundation drains and storm sewers within OU8 IHSSs. An 8-inch foundation drain, vitrified clay pipe, is located along the west wall of Building 771. A 6-inch foundation drain, vitrified clay pipe, is located around the addition that was constructed onto the west side of Building 771 in 1970. There are very limited analytical data on the sampling of Building 771 foundation drains. The available data showed low levels of gross alpha, gross beta, and tritium from station FD771-4 (location unknown). Carbon tetrachloride and chloroform were detected at station FD771-1, which is located near the northwest corner of the building. Foundation drains are suspected to exist on Buildings 776/777 because of the underground structures, but this has not been confirmed.

Utility drawings show a storm sewer located on the west side of Building 776, with a catch basin located at the southwest corner of the building. The outfall for the storm sewer is shown as being located on the hillside northwest of the building. As part of the OU12 Surface Water and Sediment Sampling Program, a sediment sample was collected from site SED07595, which is located downgradient from where the outfall location is shown to be on the utility drawings. It is likely that the storm sewer was affected by water from the

firefighting activities and/or the rain that occurred after the 1969 fire. The results from the OU12 sediment sampling were not available for inclusion in this report.

There are no monitoring wells or boreholes located in the immediate vicinity of this IHSS 150.2. The nearest downgradient well, well 1986, is located approximately 250 feet west of the northwest corner of the IHSS. There are no wells upgradient of the IHSS. The available analytical data for well 1986 are presented in the OU8 RFI/RI Work Plan (DOE 1994a). Several VOCs have been detected in groundwater samples collected from this well. Several metals, radionuclides, and inorganic constituents have been detected in concentrations exceeding background.

The analytical data available for well 1986 suggest that groundwater in the vicinity of IHSS 150.2 may have been affected by releases from this IHSS. The presence of above-background concentrations of several radionuclides in groundwater samples from this well may be attributable to releases from this IHSS (DOE 1994a).

3.15.2 Overlapping IHSSs

IHSS 150.2 overlaps with OU8 IHSS 150.1 at the northwest corner of Building 771. Surface soil below asphalt-sample site SS806893 falls within the overlap. IHSS 150.1 is partially related to the 1957 fire.

IHSS 150.2 overlaps with OU14 IHSS 162 along the west side of Building 776. Surface soil below asphalt-sample sites SS452294 through SS452694 fall within the overlap. The samples were collected from beneath the roadway along the west side of Building 776. Uranium 238 was the only isotope detected, with the maximum quantity measured at 1.1 pCi/g.

3.15.3 Adjacent IHSSs

IHSS 150.2 is adjacent to OU14 IHSS 131, located adjacent to the north side of Building 776 (Figure 1-2). IHSS 131 is also related to contamination resulting from the 1969 fire. Surface-soil sites SS430094 through SS430294 and SS431794 through S431994 are within 100 feet of the IHSS border.

Two sediment-sample locations, SED07595 and SED07695, are located adjacent to IHSS 150.2. The samples were collected under the OU12 Surface Water and Sediment Sampling Program. Site SED07595 is located downgradient from the outfall of the storm sewer located along the west side of Building 776. Site SED07695 is located upgradient from site SED07595, on the hillside near the northwest corner of Building 776.

3.15.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.15.5 Vertical Soil Profile

This section, including Table 3-65, was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.16 IHSS 150.3- LIQUID LEAKS RADIOACTIVE SITE

This section presents the results of the data collection for IHSS 150.3. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping

IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, the soil-gas survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

This IHSS consists of an area between Buildings 771 and 774 that contains a concrete tunnel. The tunnel was originally built as an exhaust ventilation duct for Building 774 but also contains process waste lines (DOE 1994a). IHSS 150.3 was originally defined as a 100- by 140-foot area east of Building 771 (EG&G 1990). More recent information (Doty & Associates 1992), indicated that the boundaries of this IHSS should be changed to include an area surrounding the entire tunnel. This change makes the IHSS an approximately 155- by 25-foot area with the east end extending up to the southwest portion of Building 774 (Figures 3-24 through 3-26).

The ground surface above the tunnel has been modified as a result of construction and slope stabilization activities over the years. As a result, the tunnel is now partially exposed. Currently, the ground surface slopes steeply to the north to a retaining wall approximately 10 feet high, which was constructed adjacent to the north wall of the tunnel. The area north of the retaining wall, the Building 771/774 courtyard, is flat and is paved. The western portion of the hillside is covered with approximately 3 inches of spray foam, overlain with chicken wire. It is assumed that the foam and wire are for slope stabilization and erosion control. South of the IHSS the area is relatively flat and mostly paved (DOE 1994a).

In August 1971, leaks of liquid into Building 771 at the west end of the tunnel were attributed to releases from the process waste lines where the pipes entered the building through the wall. Also in August 1971, contaminated soil was removed from beneath the tunnel. It is unknown if the soil removal was a response to the leaks into Building 771 (DOE 1994a).

In September 1971, continued construction exposed more of the tunnel and three cracks in the concrete walls were found to be contaminated. This incident reportedly released plutonium into the soil. As a result, the contaminated cracks were sealed and eight drums of soil with approximately 24 dpm/g activity were removed for offsite disposal. Samples of wastewater from the pipelines indicated activity of 1,000 pCi/L (the type of radiation detected was not specified). Soil samples from the area were found to be slightly contaminated (DOE 1994a).

In the late 1970s or early 1980s, personnel recall an incident when the flange on a process waste line separated, releasing an unspecified amount of aqueous process waste that reached the surface. The area was reportedly cleaned up (DOE 1992a).

3.16.1 Previous Studies and Recommendations

No sampling has been performed prior to these OU8 investigations to determine the nature and extent of contamination associated with IHSS 150.3. A piezometer (P219189) constructed in 1989 in alluvium is located downgradient of this IHSS. Results from samples collected in this piezometer boring were discussed in Section 3.15.2. The nearest wells to the south of this IHSS are P209289, an alluvial monitoring well, and P209389, a bedrock monitoring well. Based on water table maps, these wells may be upgradient of a portion of IHSS 150.3.

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, a storm drain, constructed of 18-inch corrugated metal pipe, runs east-west through IHSS 150.3 in the Building 771/774 courtyard. Two additional storm drains, of like construction, connect to the east-west drain within IHSS 150.3 and run to the north,

discharging at outfalls near the southeast corner of Building 770 in IHSS 172. There are two catch basins for this storm drain system located within IHSS 150.3.

An 8-inch corrugated metal pipe foundation drain was added along the south and west walls of an addition on the south side of Building 774. As a result, the foundation drains for Building 774 may discharge to the storm drain discussed above. The outfall at sampling station FD-774-1 is the discharge pipe for this storm drain (DOE 1994b). Results of historical sampling at FD-774-1 compiled for the OU8 Technical Memorandum 1 (DOE 1994b), indicated that gross alpha and/or gross beta was detected at levels exceeding background for nearly every sampling event between June 1979 and December 1989. Tritium was detected at levels exceeding background during sampling events in March, June, and September of 1980, and in September of 1981.

3.16.2 Overlapping IHSSs

IHSS 150.3 overlaps with portions of OU9 IHSS 121 (OPWL). No modification of the sampling locations or the analytical suite for either IHSS 150.3 or 121 was required.

3.16.3 Adjacent IHSSs

IHSS 150.3 is adjacent to OU9 IHSSs 124.1, 124.2, and 124.3 process waste holding tanks (Tanks T-14, 15, 16, and 17). During the OU9 tank investigation, soil samples were obtained from borehole numbers 03495 to 03895. No groundwater was encountered in these borings. There were no changes to the sampling plan for IHSS 150.3 due to the OU9 tanks.

OU12 surface-water and sediment sampling location SED07895 is also adjacent to IHSS 150.3. This sampling location is located at the outfall of the storm sewer at the base of the

IHSS 150.3 tunnel. This is also the discharge point for some of the Building 774 foundation drains and has been historically sampled as location FD-774-1. These analyses were not available during the preparation of this Data Summary.

3.16.4 High Purity Germanium Survey and Sodium Iodide Survey

Two HPGe survey locations were monitored within IHSS 150.3. These HPGe survey locations consisted of stations 7R-8 and 7S-8 (Plate 1). Of the eight radionuclides analyzed by HPGe, all of them were detected in at least one location in concentrations in excess of their MDA. However, K-40, Ra-226, and Th-232 are radionuclides that were not used in significant quantities in production-related activities at RFETS. The detected activities of these radionuclides were comparable to or lower than expected background activities as identified in Table 2-1. The concentrations of the radionuclides U-238, U-235, and Cs-137 were above their MDAs, but below background activities (Table 2-1).

Americium-241 was measured at 0.8 and 1.5 pCi/g, which is considerably above the maximum expected background concentration of 0.037 pCi/g. Similarly, Pu-239/240 was found at concentrations of 11.4 and 13.7 nCi/g, which is also considerably above the maximum expected background concentration of 0.084 pCi/g. However, the high activities for Am-241 and Pu-239/240 at this IHSS are believed to be due to shine from Building 771C (the Building 771 Annex). Building 771C is a storage and shipping building for radioactive materials, and the gamma ray photons emitted by these materials may have impacted both the HPGe as well as the NaI detector readings. In fact, most of the HPGe readings taken within 250 feet of the Building 771 Annex (stations 7H-8, 7I-8, 7M-8, 7N-8, 9J-9, 9K-9, in addition to 7R-8 and 7S-8) had elevated americium or plutonium concentrations.

Further evidence pointing to shine as the source of the elevated HPGe readings is available from the NaI survey done at IHSS 150.3. At IHSS 150.3, some elevated NaI readings were found, but when the axis of the detector was rotated towards the Building 771 Annex, the count rate increased to 150,000 cpm. In summary, although Am-241 and Pu-239/240 concentrations as identified by in situ HPGe analyses indicated elevated activities of these radionuclides at this IHSS, the elevated activities noted by in situ HPGe analyses are considered to be due to shine from the Building 771 Annex.

Seven locations were surveyed using NaI detector equipment at this IHSS. The activity identified at each of these sites did not exceed expected background values based on NaI detector work, but a number of the background readings used for comparison purposes had high count rates as did some of the sample readings themselves. As explained above, the elevated count rates identified by both NaI as well as HPGe technology appear to be attributable to shine emanating from the Building 771 Annex.

3.16.5 Vertical Soil Profile

Two VSP samples were collected at this IHSS. Table 3-66, VSP results for IHSS 150.3, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. These samples were analyzed by HPGe detectors in the Building 123 laboratory. The analytical data from all of the VSP samples are listed in Appendix C. The analyses indicate that the radionuclide concentrations identified are less than the MDA for the given radionuclide. Activities in excess of the MDA and background concentrations were identified for Am-241 and U-235 in the 0- to 2-inch-depth sample at location VP41894. However, these Am-241 and U-235 activities are both approximately one order of magnitude less than the appropriate PRGs identified in Table 2-10. In addition to the Am-241 and U-235 detects discussed above, Th-234 was identified in the 2- to 4-inch-depth sample at

location VP41994. However, Th-234 is a radionuclide that has not been used in significant quantities in production-related activities at RFETS.

Eight surface-soil samples were collected and analyzed by wet-chemistry methods. The results of these analyses indicate that the concentrations of U-233/234, U-235, and U-238 in all of the samples were below background concentrations as identified in Table 2-1 as well as below PRGs as identified in Table 2-10. On the other hand, Am-241 and Pu-239/240 were typically found in surface-soil samples from this IHSS in excess of maximum expected background concentrations. The maximum identified activity for Am-241 was 2.7 $\pm$0.15 pCi/g, compared to a maximum expected background concentration of 0.037 pCi/g. This maximum Am-241 concentration did exceed the PRG of 2.37 pCi/g, but the other Am-241 analyses at this IHSS were less than the PRG. The maximum identified activity for Pu-239/240 was 1.9 $\pm$0.074 pCi/g, compared to a maximum expected background concentration of 0.084 pCi/g. However, the PRG for Pu-239/240 is 3.43 pCi/g, so not even the maximum concentration of Pu-239/240 identified at this IHSS exceeded the PRG.

3.16.6 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-24. Table 3-67 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, PCE, TCE, and carbon tetrachloride within IHSS 150.3. In addition, analyses were performed for the other chemicals listed in Table 3-7. Seven sampling locations were planned to be sampled. However, the presence of underground utilities prevented samples from being collected at four locations. The

remaining three locations (Figure 3-24) were sampled with no chemical being found at a concentration exceeding the 1.0 μg/L detection limit.

3.16.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from seven locations in IHSS 150.3. Based on the history of the site, organic compounds, metals, and radionuclides were analyzed. Figures 3-25 and 3-26 and Tables 3-68 and 3-69 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-25 and 3-26.

The only organic compounds detected were PAHs. Benzo(a)pyrene was detected at all sampling locations in excess of the PRG (87.7 mg/kg). Dibenzo(a,h)anthracene also exceeded the PRG of 87.7 mg/kg at locations SS807793, SS807993, and SS808093. Three additional compounds exceeded the PRG of 877 mg/kg: benzo(a)anthracene (locations SS807793, SS807893, SS807993, and SS808093), benzo(b)fluoranthene (locations SS807793, SS807893, SS807993, and SS808093), and indeno(1,2,3-cd)pyrene (locations SS807793, SS807893, SS807893, and SS808093).

Three metals were detected at all sampled locations including arsenic (which exceeded the PRG of 0.366 mg/kg), beryllium (which exceeded the PRG of 0.149 mg/kg), and calcium (which exceeded the background of 5,839 mg/kg). As an essential nutrient, calcium is not further addressed. Zinc was found to exceed the background level of 95.92 mg/kg at location SS807793.

Radionuclides that were detected included Am-241, which exceeded the background value of 0.04 pCi/g at all locations except SS807593, and exceeded both the background and PRG (2.73 pCi/g) at location SS807993. Plutonium-239/240 exceeded the background value of 0.08 pCi/g at all sampled locations. Uranium-238 exceeded the PRG of 0.8 pCi/g at locations SS807493, SS807593, SS807793, and SS808093.

3.16.8 Statistical Summary of Surface-Soil Data

Surface-soil samples collected from IHSS 150.3 were analyzed for SVOCs, standard and additional metals, and radionuclides. Based on the sampling design described in section 5.1 of the OU8 RFI/RI Work Plan (DOE 1994a), eight surface-soil samples, including one duplicate, were collected from within this IHSS. Several metals and one radionuclide were not analyzed in all ten of the samples: tin and U-235 (two samples), copper and mercury (five samples), and sodium (one sample). Only one or two samples contained any SVOCs in concentrations in excess of their quantitation limits of 330 μg/kg. The paucity of data for the SVOCs precludes their inclusion in the statistical analyses.

As expected, metals and all of the radionuclides were found, to a greater or lesser extent, in all of the surface-soil samples. The first statistical analysis to which the data were subjected was the Shapiro-Wilk test for population distribution (Gilbert 1987; EPA 1989; EPA 1992). Table 3-70 is a listing of the population distributions for the metals and radionuclides detected in samples from IHSS 150.3. The spreadsheets that were used in calculating the Shapiro-Wilk statistic (W) are contained in Appendix F. All of the metals and radionuclides except lithium, cobalt, and Am-241 were all normally distributed. Lithium and Am-241 are lognormally (base *e*) distributed. Finally, cobalt did not fit either the normal or lognormal distributions and is nonparametric.

In order to evaluate the sufficiency of the sampling effort, calculated values of power were compared to a threshold value of 0.8 or 80 percent. A power of 0.8 corresponds to a false-negative error (Type II) rate of 20 percent in the test of the null hypothesis that the mean of the sample population ($\overline{x}$) is within a percentage (d) of the true mean (μ) of all of the possible samples from the IHSS: $H_0: \overline{x} < (1 \pm d)\mu$. Table 3-71 is a summary of the results of the tests of power for the metal and radionuclide analyses of samples collected from IHSS 150.3. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less than 20 percent of the true population mean for nine metals (aluminum, arsenic, beryllium, chromium, copper, iron, magnesium, nickel, and vanadium) and three radionuclides (gross beta, U-233/234, and U-238). When the difference in means is increased to 30 percent, six additional metals reach a power of at least 0.8 (lithium, strontium, barium, manganese, mercury, and potassium). Increasing the allowable difference in means to 50 percent adds calcium and gross alpha to the list of metallic elements and radionuclides with powers in excess of 0.8. Three metals (tin, cobalt, and zinc) and two radionuclides (Pu-239/240 and U-235) have powers in the range of 0.19 to 0.67 (i.e., four out of five to one out of three chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant considering that the sample population mean for these species are from two to 1,000 times less than their respective PRGs. Thus, if the sample mean is too low by as much as 50 percent (i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment.

In order to increase the confidence in the decisions made from the sample data, it would be necessary to collect additional samples for analysis of those species with a wide variation in the measured concentrations. The number of samples (n) sufficiency test statistic is

calculated by using the standard normal deviate ($Z_{1-\alpha/2}$) for a normal population distribution, the absolute margin of error (d), and the coefficient of variation (η):

$$n=(Z_{1-\alpha/2}\eta/d)$$

Table 3-72 is a listing of the number of additional samples required to reach a 90 or 95 percent confidence that the difference in sample and true population means are less than 20, 30, and 50 percent. The species for which an insufficient number of samples were collected are shaded. For example, a sufficient number of samples were collected and analyzed for lithium, strontium, aluminum, arsenic, barium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, vanadium, gross alpha, gross beta, U-233/234, and U-238 for one to have a 95 percent confidence that there is no more than 20 percent difference in the sample population mean and the true population mean. If a 90 percent confidence is sufficient, tin and calcium have also been detected in enough samples to demonstrate that the difference in the means is less than 20 percent. With the exception of Am-241, sufficient samples have been collected for a 90 percent confidence that the difference in the sample and population means is no greater than 50 percent. Five additional samples would need to be collected in order to reach this confidence for sodium. If it were necessary to reach a 95 percent confidence that the differences in the means were less than 20 percent, an estimated additional 119 samples would need to be analyzed for Am-241. As stated previously, achieving higher levels of confidence or smaller estimated differences in the sample and population means is not necessary because the measured concentrations are well below their respective background or PRG concentrations.

3.17 IHSS 150.4 - LIQUID LEAKS RADIOACTIVE SITE

This section presents the results of the data collection for IHSS 150.4. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, soil-gas survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 150.4 is associated with potential radiological contamination in the 750 Courtyard resulting from airborne contamination during the 1969 fire in Building 776/777 and also from decontamination activities following the fire. There were also reports of "leaking manholes" in the area. IHSS 150.4 was originally defined as a 120- by 180-foot area northeast of Building 750. Information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that the IHSS should only include a 20- by 20-foot area around the sump, located south of Building 778 outside Door 3, where a leaking process waste line was discovered. The IHSS is shown in Figures 3-27 and 3-28.

According to the HRR (DOE 1992a), the tanks and pumps that handled the decontamination fluid from cleanup operations following the 1969 fire were staged in the Building 750 courtyard, on the southeast side of Building 778. This information is suspect because no documentation has been found that confirms the staging of decontamination equipment near Building 750. Also, present and former RFETS employees did not recall the use of the area for such activities. If the area was used for decontamination activities, it is unlikely that there is any residual contamination because detailed documentation exists for the fire cleanup, and if contamination had been found, it is likely that it would have been recorded (DOE 1994a). Additionally, Building 778 has been extended to the east since the time these activities supposedly occurred. It seems likely that if residual contamination from the fire existed in the area, it would have been discovered during the construction activities.

The HRR (DOE 1992a) also states that there were several leaks from manholes in the parking lot in 1980 and 1981. No documentation regarding "leaking" manholes was found. It is suspected that interviewees were referring to a leaking process waste line that was discovered in 1981 (DOE 1994a).

During routine foundation drain and building sump sampling, elevated levels of total dissolved solids, conductivity, gross alpha, and gross beta were found in a sump located south of Building 778, just outside Door 3. These high levels were discovered during the week ending November 20, 1981. Investigation into the high levels resulted in the finding of a leaking process waste line located above the sump. The leak was repaired. Specific isotopic analyses indicated 900 pCi/L uranium and no plutonium. Whether the analyses were performed on soil or water was not specified. No documentation regarding soil removal or other cleanup activities was found (DOE 1994a).

The surface in the area is flat, mostly paved, and used for storage, parking, and loading/unloading for Building 750. The area has been paved since construction of Building 750 in 1969 (DOE 1994a).

3.17.1 Previous Studies and Recommendations

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify building foundation drains and storm sewers that could be impacted by IHSSs and contribute to contaminant migration. Foundation drains were not identified but are suspected on Building 776/777 due to its underground structures. This was not confirmed during the Stage 1 activities. Foundation drains were identified on Building 707. A 6-inch-diameter foundation drain, surrounded by "graded filter material," exists around the Building 707 foundation and footings. The drains tie into the storm sewer at the

southwest corner of Building 707. The storm-sewer system outfalls east of Building 707 at the 750 culvert.

It was proposed in OU8 Technical Memorandum 1 (DOE 1994b) that a sampling location, FD-707-4, be added to the foundation drain and building sump monitoring program. This location is in the storm sewer located at the southeast corner of Building 707. This was the only feasible location for collecting samples that are representative of the Building 707 foundation drains water quality.

Utility drawings show that an 18-inch storm sewer runs along the north side of Building 707, parallel to the process waste line that leaked, and connects to a manhole just east of Door 3 on Building 778. From this manhole, the storm sewer runs south, through the 750 Courtyard, along the east side of Building 707. The storm sewer connects to the pipe that the Building 707 foundation drains tie into and discharges at the 750 Culvert.

Historically, samples have been collected, under the foundation drain and building sump monitoring program, at locations that were thought to be representative of Building 707 foundation drains. It was this sampling that led to the discovery of the leaking process waste line. In the late 1970s and 1980s it was thought that the sump outside Door 3 on Building 778 was a discharge point for Building 707 foundation drains. This site was assigned the location code FD-707-3. The earliest sample data that was available for this location was from September 1980. Elevated levels of gross beta activity were detected in every sample collected from this location between September 1980 and September 1989 (no data were available from September 1981 to April 1988). The highest measured activity was 182 pCi/L gross beta. Elevated levels of gross alpha activity were also detected in 1980 and 1981. The sample collected in September 1981 detected 7,900 pCi/L gross alpha activity. The OU8 RFI/RI Work Plan (DOE 1994a) states that the high activity levels in the sump

were discovered during the week ending November 20, 1981. Analytical data were not found for location FD-707-3 for the month of November 1981. Either there was another round of sampling in November 1981, or it took until the week of November 20, 1981, for the results from the September sampling event to reach the appropriate personnel. In any event, the process waste line was apparently leaking for several months before it was repaired.

The 750 Culvert was also sampled regularly under the foundation drain and building sump monitoring program. The location code that was used until 1991 was FD-707-1. Low levels of gross beta activity were detected and several metals were detected above background concentrations in samples collected from this outfall (DOE 1994b). However, since the 750 Culvert is the outfall that drains most of the 700 Area, the compounds detected cannot be attributed to IHSS 150.4.

There are no monitoring wells located upgradient of this IHSS. Bedrock groundwater monitoring wells 2386 and P207389, and alluvial monitoring wells 2486 and P207489, are located downgradient of IHSS 150.4. The available analytical data for samples collected from these wells are presented in the OU8 RFI/RI Work Plan (DOE 1994a). None of the samples were analyzed for radionuclides.

Several VOCs, generally in concentrations less than method detection limits, have been detected in groundwater samples from wells downgradient of this IHSS. At the location of wells 2386 and 2486, VOCs have only been detected in the bedrock well, well 2386, but have been detected in both the alluvial well and the bedrock well at locations P207489 and P207389, respectively (DOE 1994a).

3.17.2 Overlapping IHSSs

IHSS 150.4 overlaps with OU9 IHSS 121, the OPWL. The IFSP (EG&G 1994b) did not propose any changes to the OU8 RFI/RI Work Plan (DOE 1994a) based on this overlap.

3.17.3 Adjacent IHSSs

IHSS 150.4 is adjacent to OU8 IHSS 150.7. There are no samples within 100 feet of the IHSS border.

3.17.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.17.5 Vertical Soil Profile

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.17.6 Soil-Gas Survey

The OU8 RFI/RI Work Plan (DOE 1994a) recommended collecting soil-gas samples from IHSS 150.4. However, the nature and placement of utilities prevented the collection and analysis of samples.

3.17.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from five locations in IHSS 150.4. Based on the history of the site organic compounds, metals and radionuclides were analyzed. Figures 3-27 and 3-28 and Tables 3-73 and 3-74 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-27 and 28.

No organic compound was detected at a concentration in excess of background values or an established PRG. Of the metals detected, arsenic exceeded the PRG of 0.366 mg/kg at all locations. Sodium exceeded the background value of 119.02 mg/kg at all sample locations, but is an essential nutrient and is not further addressed. Beryllium exceeded the PRG of 0.149 mg/kg at all locations except SS808193.

Only two radionuclides were detected at concentrations in excess of reference concentrations. Uranium-235 exceeded the background level of 0.13 pCi/g, but not the PRG, at location SS808193. Uranium-238 at locations SS808393 and SS808593 exceeded the PRG (0.8 pCi/g) but not the background value. At location SS808193 it exceeded both the PRG and background (2.38 pCi/g).

3.17.8 Statistical Summary

This text section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. Statistical Tables 3-75, 3-76, and 3-77 were completed for this IHSS and are included in this report.

3.18 IHSS 150.6 AND 150.8 - RADIOACTIVE SITE SOUTH OF BUILDING 779

This section presents the results of the data collection for IHSS 150.6 and IHSS 150.8. It includes of discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, the soil-gas survey, asphalt sampling, the surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 150.6 and IHSS 150.8 are both associated with the spread of radioactive contamination within and around Building 779. IHSS 150.6 was originally defined as a 100- by 200-foot area south of Building 779. IHSS 150.8 was originally defined as an 80- by 120-foot area east of Building 779. Information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that the IHSS boundaries were incorrect. Also, because it was the same incident that led to the two areas being listed as IHSSs, the OU8 RFI/RI Work Plan proposed that the two IHSSs be combined. Investigations for the combined IHSS 150.6/150.8 included the dock area on the east side of Building 779 and a 40-foot-wide area extending around the southeast corner of the building, including the south entrance. The IHSS 150.6/150.8 is shown in Figures 3-29, 3-30, and 3-31.

On June 22, 1969, a drum containing residual oil contaminated with unspecified radionuclides was cut apart near a dock at Building 779. Contamination, measured at up to 50,000 dpm/100 cm^2 for gross alpha activity, was spread by pedestrian traffic across the first floor, the dock, and surrounding outdoor areas south and east of Building 779 (DOE 1992a). The main dock for Building 779 is located along the northern half of the east side of the building. Although the exact pathway along which workers walked is unknown, it is known that the building's south entrance was also contaminated. It is unclear whether workers got from the dock to the south entrance of the building by walking inside the building, or outside

and around the building (DOE 1994a). Because of the uncertainty, investigations for the combined IHSS 150.6/150.8 included the roadway from the cooling towers and dock to the south entrance of the building.

No incident report for this event was found. It is likely that one was not written due to the attention demanded by the May 11, 1969, fire in Buildings 776 and 777 and subsequent cleanup activities. However, one source indicated that following a release in 1969, an unknown number of drums of soil were removed for offsite disposal (DOE 1992a). It is not known whether all areas affected by this incident were included in cleanup activities. It is also not known if the removal of soil was in response to the incident described above or a separate incident.

The surface in this area is currently relatively flat and mostly paved. The area is heavily used by pedestrian traffic.

3.18.1 Previous Studies and Recommendations

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed to identify building foundation drains and storm drains that could be impacted by IHSS 150.6/150.8 and contribute to contaminant migration. Foundation drains were not identified on the original Building 779 but are suspected due to the building's underground structures, which extend to a depth approximately 16 feet below the seasonal high water table (DOE 1994b). A foundation drain was identified along the north wall of the Building 779 addition, which was constructed in 1968. The drawings that were reviewed show that the foundation drain discharges on the hillside north of the Solar Evaporation Ponds. A storm sewer was also identified east of the IHSS. Surface drainage from IHSS 150.6/150.8 collects in a catch basin, which is located in IHSS 138, and is discharged on the hillside north of the

Solar Evaporation Ponds. As discussed in OU8 Technical Memorandum 1, the two outfalls on the hillside have been historically sampled. However, it is believed that the outfall that has been sampled as FD-779-1 is actually the outfall for the storm sewer, and the outfall that has been sampled as SW85 (proposed location FD-779-2) is actually the foundation drain outfall. Discharges from these outfalls are probably collected in the french drain and treated in the OU4 treatment system.

Historical sampling of location FD-779-1 detected slightly elevated concentrations of gross alpha, gross beta, and tritium. However, these results are probably attributable to the Solar Evaporation Ponds and not releases from IHSS 150.6/150.8.

Additional Stage 1 activities performed included determining the pavement history of this IHSS. Results from this investigation are presented in the OU8 Technical Memorandum 1 (DOE 1994b). Review of aerial photographs and engineering drawings indicates that the areas affected by IHSSs 150.6 and 150.8 consist of both paved and unpaved areas. The eastern portion of the area outside Building 779 was paved before the 1969 incident. Portions of the IHSS that were unpaved or covered by gravel include the northernmost strip of the IHSS area, the area immediately adjacent to the north side of the building, and the southern portion of the IHSS directly adjacent to the southern side of the building. Some pavement to the south and the east of the area was removed in 1979 to improve surface drainage. The South 79 Drive, which runs north-south along the eastern side of the building, was repaved in 1984.

Based on the investigation of the paving history of IHSS 150.6/150.8, OU8 Technical Memorandum 1 (DOE 1994b) proposed the collection of three asphalt samples during the Stage 2 activities. It was proposed that the samples be analyzed by laboratory HPGe.

However, because a laboratory could not be located that could perform HPGe analysis, the samples were analyzed by standard radiochemistry methods.

Borehole SP03-87 is located east of the IHSS. A summary of the data available for samples from this borehole can be found in the OU8 RFI/RI Work Plan (DOE 1994a). VOCs and SVOCs were detected in samples taken from this borehole. Tritium and nitrate/nitrite concentrations exceeded background. Based on the current understanding of the materials released, the data for borehole samples from borehole SP03-87 do not indicate contamination attributable to IHSS 150.6/150.8

Monitoring wells 2386 and 2486 are located upgradient of IHSS 150.6/150.8. The data for these wells are presented in the OU8 RFI/RI Work Plan (DOE 1994a). Carbon tetrachloride, trans-1,2-dichloroethene, methylene chloride, and TCE have been detected in groundwater samples from well 2386.

Sampling locations downgradient of IHSS 150.6/150.8 include monitoring wells 2586, P207589, and 2686. VOCs were detected in well 2586. However, the VOCs detected in the downgradient well 2586 were in similar concentrations as those detected in the upgradient well 2386. Radionuclides and sulfate have been detected in concentrations exceeding background in well 2586. No VOCs or metals have been detected in concentrations exceeding background in samples taken from well P207589 (DOE 1994a).

3.18.2 Overlapping IHSSs

There are no IHSSs that overlap with IHSS 150.6/ 150.8.

3.18.3 Adjacent IHSSs

IHSS 150.6/150.8 is located adjacent to OU8 IHSS 138, which is associated with releases from the cooling towers east of Building 779. There were no changes to the sampling plan for IHSS 150.6/150.8 as a result of IHSS 138.

As part of the OU12 Surface Water and Sediment Sampling Program, sediment samples were collected at the outfall for the storm sewer that discharges to the hillside north of the Solar Evaporation Ponds. The analytical results for these samples were not available for inclusion in this report.

3.18.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.18.5 Vertical Soil Profile

This section, including Table 3-78, was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.18.6 Asphalt Samples

Asphalt samples were collected and analyzed from three locations in IHSS 150.6/150.8, locations SS808793, SS809193, and SS809493. Of the radionuclides analyzed (Figure 3-30 and Table 3-79), only U-238 exceeded a reference concentration, the PRG of 0.8 pCi/g, at all locations.

3.18.7 Soil-Gas Sampling

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-29. Table 3-80 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, PCE, TCE, and carbon tetrachloride within IHSS 150.6/150.8. In addition, analyses were performed for the other chemicals in Table 3-80. Ten sampling locations were planned to be sampled. However, the presence of underground utilities prevented samples from being collected at eight locations. Two locations were sampled, with 1,1-dichloroethane, benzene, dichlorodifluoromethane, trichlorofluoromethane, vinyl chloride, and cis-1,2-dichloroethene being detected at levels exceeding the 1.0 μg/L reference concentration at location SG005894. At location SG006094 exceedances of the reference concentration were shown by dichlorodifluoromethane, TCE, vinyl chloride, and cis-1,2-dichloroethene.

3.18.8 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from 10 locations in IHSS 150.6/150.8. Figures 3-30 and 3-31 and Tables 3-81 and 3-82 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-30 and 3-31.

Based on site history, organic compounds, metals, and radionuclides were analyzed. No organic chemical was detected in excess of the reference concentrations within IHSS 150.6/150.8.

Of the metals detected, antimony exceeded the background value of 0.47 mg/kg at SS808693 and SS809093. Arsenic exceeded the PRG of 0.366 mg/kg at all sampled locations. Beryllium exceeded the PRG of 0.149 mg/kg at locations SS808793, SS809193, SS809293, and SS809493. Cadmium exceeded the background concentration at location SS809293. Calcium, an essential nutrient, exceeded the background at locations SS808893, SS809093, and SS809293. Copper exceeded the background value of 22.75 mg/kg at location SS809093. Magnesium exceeded the background values of 3,707 mg/kg at locations SS808893 and SS809093. Silver exceeded the background concentration of 0.22 mg/kg at all sampled locations at which it was detected. Sodium, an essential nutrient, was detected at levels greater than the background concentration of 119.02 mg/kg from locations SS808693, SS808793, SS808893, SS808993, SS809093, and SS809193. Zinc exceeded the background value of 95.92 mg/kg at SS809293.

Three radionuclides were detected at concentrations in excess of reference values. Both Am-241 and Pu-239/240 exceeded background values (0.04 pCi/g and 0.08 pCi/g, respectively) at locations SS808793, SS808893, SS809293, and SS809593. They did not exceed the PRG. However, U-238 did exceed the PRG (0.8 pCi/g), but not the background at locations SS808793, SS809393, SS809493, and SS809593.

3.18.9 Statistical Summary

This text section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. Statistical Tables 3-83, 3-84, and 3-85 were completed for this IHSS and are included in this report.

3.19 IHSS 150.7 - LIQUID LEAKS RADIOACTIVE SITE SOUTH OF BUILDING 776

This section presents the results of the data collection for IHSS 150.7. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 150.7 is composed of areas between Building 776/777 and 778, and between Buildings 778 and 707 (Figure 3-32). These areas were affected by a fire that occurred in Building 776/777 on May 11, 1969. Plutonium was tracked outside of Building 776 by firefighting and support personnel and was detectable on the ground around the building. IHSS 150.7 was originally defined as a 100- by 500-foot area between Buildings 776 and 707. The OU8 RFI/RI Work Plan (DOE 1994a), proposed that IHSS 150.7 be redefined to a 40- by 350-foot area between Buildings 776 and 778 due to the contamination resulting from the May 1969 fire (DOE 1994a). Updated information (Doty & Associates 1992), indicated the boundaries of the IHSS to be approximately 40- by 330-feet, and that areas affected by contamination from this incident extend to the north wall of Building 707. The areas between Building 776/777 and 778, and between Buildings 778 and 707 are very narrow, flat "courtyards" that separate Building 778 from Building 707 on the south and Building 778 from Building 776/777 on the north. These courtyards are isolated by enclosed hallways between the buildings. The area between Building 776/77 and 778 is mostly unpaved. The area between Building 778 and 707 is paved. Much of the areas between buildings is inaccessible to vehicles and is used for light storage and by pedestrians (DOE 1994a).

Following the May 1969 fire, rain carried the contamination into the soil. The spread of contamination south of Building 776/777 can also be attributed to the runoff of fire water sprayed on the building to contain the fire. Sand and gravel between Building 776/777 and

Building 778 were also contaminated before the rain. Airborne contamination from the fire was carried predominantly to the west-southwest, the average wind direction at the time. Areas north, west, and south of the building were contaminated. The area north of Building 776/777 is included in OU14 IHSS 131 and the area west of the building is included in OU8 IHSS 150.2 (DOE 1994a).

Road oil and gravel were initially placed over the contaminated soil. An asphalt roadway was completed in the area on July 22, 1969. By December 1969, asphalt in the area, contaminated soil, and presumably the road oil and gravel were removed from between the buildings and buried in a location east of Building 881 (DOE 1994a).

In 1972, the soil at the southwest corner of Building 776/777 was considered to be contaminated. The levels and source of this contamination are unknown, and it is not known if it is related to the 1969 fire (DOE 1994a).

3.19.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 150.7.

A detailed study of contamination resulting from the fire were completed in May 1971. Contamination was found on the ground south of Building 776/777, as well as on the ground south of Building 778 to the north wall of Building 707. Contamination was detected in the soil approximately 200 feet from Building 776/777. The walkway area between Buildings 776/777 and 778 was contaminated to 200,000 cpm direct and 5,000 cpm removable (DOE 1994a).

Surface materials were affected at this IHSS due to the 1969 fire and related fire-fighting activities. The contaminant of concern is most likely plutonium.

The nearest downgradient sampling points to IHSS 150.7 are alluvial monitoring well P209289 and bedrock monitoring well P209389. Due to the limited quantity of groundwater data available for these wells (particularly with regard to radionuclides), the distance between these wells and IHSS 150.7, and the presence of other IHSSs between these wells and IHSS 150.7, the available data are not useful in helping define contamination associated with this IHSS (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, an 18-inch, corrugated metal pipe storm drain runs through the middle of that portion of IHSS 150.7 between Building 778 and 707 and discharges to a manhole northeast of the northeast corner of Building 707. A 6-inch, vitrified clay pipe storm drain, which originates in the western portion of IHSS 150.7 between Buildings 776/777 and 778, ties into this 18-inch storm drain. A 6-inch foundation drain runs along the north wall of Building 707 (partially through IHSS 150.7), then turns south and runs along the west wall of Building 707. Refer to OU8 Technical Memorandum 1 for additional information concerning the drains and their historical sampling in this area.

3.19.2 Overlapping IHSSs

IHSS 150.7 overlaps with OU8 IHSS 118.2. However, only soil-gas samples were collected in IHSS 118.2 and no soil-gas sampling was performed in IHSS 150.7. This IHSS also overlaps OU9 IHSS 121 (OPWL), but no sampling was performed in OU9 IHSS 121. IHSS

150.7 overlaps with OU14 IHSS 162 at surface-soil sample location SS452694. Results from this location were used for IHSS 150.7.

3.19.3 Adjacent IHSSs

IHSS 150.7 is adjacent to OU14 IHSS 162. Surface-soil sample locations SS452594 and SS452794 from OU14 IHSS 162 are located within 100 feet of the IHSS 150.7 boundary. No modifications to the IHSS 150.7 analytical suite were made based on the adjacent IHSS.

3.19.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.19.5 Vertical Soil Profile

This section, including Table 3-86, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.19.6 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from two locations in IHSS 150.7. Figure 3-32 and Tables 3-87 and 3-88 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs.

Based on the history of the site, only radionuclides were selected for analysis. No radionuclide was detected at a concentration exceeding either the PRG or background levels.

3.19.7 Statistical Summary

This section, including Tables 3-89, 3-90, and 3-91, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.20 IHSS 151 - FUEL OIL LEAK

This section presents the results of the data collection for IHSS 151. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, the surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 151 is associated with spills of No. 2 diesel fuel oil from an underground storage tank (Tank 262) located north of Building 371/374. Tank 262 is a 47,500-gallon steel underground storage tank that was installed in 1980. (A March 1992 report by Fluor Daniel identified the tank as a fiberglass-reinforced plastic tank that was installed in 1977 [DOE 1994b].) It is overlain by a 15- by 25-foot concrete pad containing control valves and gauges. The surface around the pad is flat and unpaved.

IHSS 151 was originally defined as a 30- by 35-foot area centered over the tank location. Information obtained during the development of the OU8 RFI/RI Work Plan (DOE 1994a) indicated that the IHSS boundary should be expanded to a 45- by 60-foot area. During OU8 field activities, it was determined that the Work Plan map had mislocated IHSS 151. The

tank is actually northwest of the location shown on the map, between the road and trailer T371K. The IHSS is shown in Figures 3-33, 3-34, and 3-35.

The first documented spill at this site was on August 12, 1981, when approximately 196 gallons of No. 2 diesel fuel were spilled on the ground. The spill area measured 30- by 35-feet and an estimated 400 cubic yards of soil were affected. A second spill released 50 gallons of No. 2 diesel fuel in July 1982. In October 1982, 120 liters were spilled. The last reported spill occurred in September 1988 when between 10 and 20 gallons were released from a vent that was left open while conducting a routine system circulation.

Reports from the 1981 incident indicated that cleanup would be initiated when the ground dried. It is documented that cleanup of the saturated soil occurred adjacent to the tank surface foundation after the 1988 spill and that the State Oil Inspector was notified. A site visit conducted for the Phase I RFI/RI indicated that only small areas of staining, 1 to 3 feet in diameter, remained around the pad, suggesting cleanup of the 1981 spill.

3.20.1 Previous Studies and Recommendations

The OU8 Technical Memorandum 1 (DOE 1994b) summarizes the Stage 1 activities performed for IHSS 151. Part of the Stage 1 activities performed included a document review of the tank inspection records to determine if the tank had been recently tested and what the results of the test showed. The documents reviewed showed that the tank and piping system passed tightness tests in November 1989, December 1990, and February 1992. No recommendations for further testing were made in OU8 Technical Memorandum 1.

Additional Stage 1 activities included the identification of building foundation drains and storm sewers that could be impacted by releases from IHSS 151. As stated in OU8

Technical Memorandum 1 (DOE 1994b), foundation drains were identified on Building 371/374 around the basement and sub-basement structures. The discharge location for the drains is east of the southeast corner of the building in the ditch that drains to North Walnut Creek. The foundation drain outfalls have been historically sampled since the mid-1970s. According to the data presented in OU8 Technical Memorandum 1, SVOCs were only analyzed for in one sampling event, which was on March 27, 1993. The sample was collected at location FD-371-3, which is the discharge point for the sub-basement foundation drains. The analyses did not detect any compounds for diesel-range organics. This could indicate that the releases were adequately cleaned up. However, the drains along the north side of the building are at a depth of approximately 30 to 35 feet below ground surface, and the direction of groundwater flow is to the north-northeast, away from the foundation drains. Utility drawings do not show any storm sewers in the vicinity of IHSS 151.

The nearest downgradient sampling location to IHSS 151 is bedrock groundwater monitoring well 2186. Groundwater data available for this well are presented in the OU8 RFI/RI Work Plan (DOE 1994a). Although several VOCs, metals, and radionuclides have been detected in concentrations greater than background in samples from this well, these data are not indicative of releases of No. 2 diesel fuel. The samples from this well were not tested for constituents that would be expected to result from a release of diesel fuel (DOE 1994a).

3.20.2 Overlapping IHSSs

There are no overlapping IHSSs.

3.20.3 Adjacent IHSSs

The IFSP (EG&G 1994b) proposed that sample locations in IHSS 151 share a common analytical suite with sample locations from adjacent IHSSs that are within 100 feet of

IHSS 151. The determination of adjacent IHSSs was made using maps that had mislocated IHSS 151 and showed it as being southeast of the actual tank location. Based on this, OU8 IHSS 135 and OU10 IHSS 206 were considered to be adjacent to IHSS 151. The analyte suite for IHSS 151 was modified to include TAL metals and tritium as a result. However, with the IHSS located correctly, there are no samples within 100 feet.

3.20.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.20.5 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-33. Table 3-92 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, and ethylbenzene within IHSS 151. In addition, analyses were performed for the other chemicals listed in Table 3-92. Five sampling locations were planned to be sampled. However, the presence of underground utilities prevented samples from being collected except at two locations, SG006894 and SG006994. Only a single organic chemical, trichlorofluoromethane, was found at a concentration of 17 μg/L. No other volatile compound exceeded the 1.0 μg/L detection limit at any other sampling location within IHSS 151.

3.20.6 Surface-Soil Samples

Surface-soil samples were collected and analyzed from five locations in IHSS 151. Based on the history of the site, metals and TPH were selected for analyses. No TPH was detected. Figures 3-34 and 3-35 and Tables 3-93 and 3-94 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-34 and 3-35.

Of the metals analyzed, arsenic exceeded the PRG of 0.366 mg/kg at all sample locations. Beryllium also exceeded the PRG (0.149 mg/kg) at locations SS810193, SS810293, and SS810493. Sodium exceeded the background value of 119.02 mg/kg at all sample locations, but because it is an essential nutrient it is not further addressed. Calcium, also an essential nutrient, was found in excess of the background value at location SS810493. Copper exceeded the background value of 22.75 mg/kg at locations SS810393 and SS810493. At those same locations, magnesium exceeded the background value of 3,707 mg/kg. Manganese exceeded the background value of 482.1 mg/kg at location SS810493.

3.20.7 Statistical Summary

This text section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. Statistical Tables 3-95, 3-96, and 3-97 were completed for this IHSS and are included in this report.

3.21 IHSS 163.1 - RADIOACTIVE SITE WASH AREA, 700 AREA SITE NO. 3, NORTH OF BUILDING 774

This section presents the results of the data collection for IHSS 163.1. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, the soil-gas survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 163.1 was originally defined as a 60- by 150-foot area northwest of Building 774 (EG&G 1990a). Based on evaluation of available information, the OU8 RFI/RI Work Plan (DOE 1994a) showed the boundary to be approximately 50 by 125 feet. The actual sampling grid was approximately 100 by 125 feet (Figures 3-36 through 3-38).

It was reported that an area north of Building 774 was used for washing equipment and vehicles that were contaminated with radioactive materials (DOE 1992a), and a former Rocky Flats Plant employee recalled that cleanup of trucks occurred near the dock at the northeast corner of the building (DOE 1994a). Reportedly, personnel would use nitric acid, soap, and water for the cleaning and the solution would flow onto the ground. The wash water may have contained low levels of unspecified radionuclides, nitric acid, and various organic and inorganic compounds. However, Building 774 personnel did not recall this area ever being used to wash equipment or vehicles (DOE 1992a). In addition, washing down a piece of equipment or vehicle where wash water would come in contact with the asphalt or ground surface would have been against Rocky Flats Plant policy. Decontamination of vehicles was reportedly performed by wiping the surfaces with kimwipes and monitoring until the surface was clean (DOE 1994a). There was no resulting wash water.

The area encompassed by IHSS 163.1 could have been impacted by IHSS 149.1, which was a break in a process waste transfer line. The Bowman's Pond area was impacted and the process waste would probably have flowed over IHSS 163.1.

The western half of the IHSS is mostly flat, is paved, and is covered in part by trailer T771G. The eastern half is unpaved, slopes to the north, and is crossed by an access road to the Solar Evaporation Ponds (EG&G 1990a).

3.21.1 Previous Studies and Recommendations

Results of the Radiometric Survey, performed at Rocky Flats from 1977 through 1984, indicated no radioactivity above background levels northeast of Building 774 (DOE 1992a). There are no wells or boreholes within, adjacent to, or downgradient of IHSS 163.1.

The OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. According to Technical Memorandum 1, a foundation drain constructed of 4-inch-diameter PVC is located on the south side of the east addition to Building 774. This foundation drain connects to a 6-inch-diameter corrugated metal pipe storm drain at the southeast corner of the east addition to Building 774 and runs southwest to northeast through IHSS 163.1. The outfall for this storm drain is located on the hillside northeast of Building 774 at sampling station FD-774-3. This outfall has never been sampled and is usually dry. Discharge from this outfall collects in the OU4 drain system where it is then treated.

3.21.2 Overlapping IHSSs

No other IHSSs overlap with IHSS 163.1. One of the foundation drain outfall sampling stations (FD-774-3) is located within IHSS 163.1 on the north side of trailer T771G.

3.21.3 Adjacent IHSSs

IHSS 163.1 is adjacent to OU8 IHSS 139.1(N) surface-soil sample locations SS803193 and SS803293 and sediment-sample locations SED80293 through SED80693. Per the IFSP (EG&G 1994b), pH analysis was added to the IHSS 163.1 analytical suite.

IHSS 163.1 is also adjacent to OU9 IHSSs 124.1, 124.2, 124.3, and 125 (Tanks T-14, 15, 16 and 17). As per the IFSP (EG&G 1994b), SVOC analysis was added to the IHSS 163.1 analytical suite. During the OU9 tank investigation, soil samples were collected from boreholes 03495 through 03895 surrounding the tanks and samples were collected from each of the tanks.

OU9 IHSS 149.1 is also adjacent to IHSS 163.1. However, no samples were collected in IHSS 149.1.

3.21.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.21.5 Vertical Soil Profile

This section, including Table 3-98, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.21.6 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-36. Table 3-99 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of benzene, toluene, xylenes, PCE, and TCE within IHSS 163.1. In addition, analyses were performed for the other chemicals listed in Table 3-99. Nine sampling locations were planned to be sampled. However, the presence of underground utilities prevented samples from being collected at four locations. The remaining five locations (Figure 3-36) were sampled, with no organic chemical being found at a concentration of 1.0 μg/L or greater.

3.21.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from nine locations in IHSS 163.1. Based on the history of the site, organic compounds, metals, and radionuclides were analyzed. Figures 3-37 and 3-38 and Tables 3-100 and 3-101 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-37 and 3-38.

Detected organic compounds include only PAHs. Two of the detected compounds exceeded the PRG of 87.7 mg/kg: benzo(a)pyrene (at all sampled locations except SS811393) and dibenzo(a,h)anthracene (at locations SS810693 and SS811493). Compounds that exceeded

the PRG of 877 mg/kg included benzo(b)fluoranthene (at locations SS810693, SS811193, and SS811493). Benzo(a)anthracene exceeded that PRG at location SS811493.

Arsenic exceeded the PRG (0.366 mg/kg) at all locations. Beryllium also exceeded the PRG (0.149 mg/kg) at all sampled locations. Calcium, an essential nutrient, exceeded the background value of 5,839 mg/kg at locations SS810793 and SS811493. Both copper and magnesium exceeded the background value (22.75 mg/kg and 3,707 mg/kg, respectively) at location SS810993. Silver exceeded the background value of 0.22 mg/kg at several locations, including SS810693, SS810793, SS810893, SS811193, and SS811493. The essential nutrient sodium exceeded the background value of 119.02 mg/kg at locations SS810893, SS811093, and SS811293. Zinc at locations SS810693 and SS811293 exceeded the background value of 95.92 mg/kg.

Three radionuclides were detected. Both Am-241 and Pu-239/240 exceeded background values (0.04 pCi/g and 0.08 pCi/g, respectively) but not the PRG at all locations except SS810993 and SS811393. Uranium-238 exceeded the PRG (0.8 mg/kg) but not the background value at locations SS810693, SS810793, SS810993, and SS811093.

3.21.8 Statistical Summary

This text section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. Statistical Tables 3-102, 3-103, and 3-104 were completed for this IHSS and are included in this report.

3.22 IHSS 163.2 - RADIOACTIVE SITE BURIED SLAB, 700 AREA SITE NO. 3, NORTH OF BUILDINGS 771 AND 774

This section presents the results of the data collection for IHSS 163.2. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, and a GPR and magnetometer survey.

IHSS 163.2 was originally defined as a 50- by 50-foot area north of Buildings 771 and 774, outside of the Protected Area southeast of Parking Area No. 71 (EG&G 1990). However, more recent information (Doty & Associates 1992) indicates that this IHSS is an area approximately 60 by 40 feet near the east end of trailer T771A (Figure 3-39).

Reportedly, an Am-241-contaminated concrete slab, approximately 8 feet square by 10 inches thick, is buried in the area near Building T771A. Between 1962 and 1968, the slab served as the foundation for a 5,000-gallon stainless steel tank located approximately 30-feet north of Building 771. (A report by Wright Water Engineers [WWE] says the tank was 5,000 liters [WWE 1995].) The tank was part of the Filtrate Recovery Ion Exchange system that concentrated Am-241 and Pu-239/240 for recovery. The Am-241 and Pu-239/240 were concentrated on an ion exchange column and then transferred to the tank. The resulting liquid contained in the tank was a nitrate solution high in Am-241 content with some Pu239/240 (DOE 1992a). In approximately 1968, a leak developed in the valve/piping on the bottom of the tank and some of the contents dripped onto the concrete slab. The flanges in the area of the leak were tightened, and the valve and piping were wrapped with plastic and yellow tape. The tank was emptied through the processing of the contained solution. The leakage of the radioactively contaminated liquid is not believed to be a chronic event, but rather a one-time occurrence (WWE 1995). Once the tank was emptied, it was removed

from service, and taken to the size reduction facility in Building 776 (DOE 1994a). When the tank was removed, the slab was decontaminated, with respect to removable contamination, until smear samples did not detect removable radioactivity. The slab was then painted to secure the fixed radioactivity. Following this decontamination effort, the slab was reportedly moved to a ditch or low area north/northeast of the former tank location and probably buried. In the late 1970s, Building T771A was constructed in the same general area. Reportedly, there was no subsequent excavation of the slab, and the slab is believed to be underground near or beneath the east end of Building T771A at a depth of less than 10 feet (WWE 1995).

The incident was not recorded as an environmental incident impacting the soil at Rocky Flats in a 1973 environmental summary report. However, the report does note the slab on a map of the area north of Building 771, in an area farther north of where the slab is believed to be buried. It also states that it was later excavated and the contaminated portion cut away for offsite disposal. This is not believed to be the case since the area shown on the map was paved several years before the slab became contaminated. Also, there is no verification that the slab was subsequently excavated (DOE 1994a).

There is no mention of contaminated soil being buried with the slab. However, it is possible that a small amount of the soil from beneath the slab was deposited when it was pushed into the ditch (DOE 1994a).

3.22.1 Previous Studies and Recommendations

No sampling has been performed before these OU8 investigations to determine the nature and extent of contamination associated with IHSS 163.2.

Results of the Radiometric Survey, conducted at the Rocky Flats during the late 1970s and early 1980s, indicate no extremely contaminated areas (stated to be 500,000 to 1,000,000 pCi/g) north of Building 771 (DOE 1994a).

An Aerial Radiological Survey of the Rocky Flats Plant conducted during July 1989 did not indicate anomalous concentrations of Am-241 in the area north of Building 771. However the survey was not structured to identify sources that occupied an area smaller than 200 meters in diameter (DOE 1994a).

There are no wells or boreholes located within, adjacent to, or downgradient of IHSS 163.2 (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, there are no foundation drains, storm drains, outfalls, or sampling stations within IHSS 163.2.

3.22.2 Overlapping IHSSs

IHSS 163.2 does not overlap with any other industrial area IHSS.

3.22.3 Adjacent IHSSs

IHSS 163.2 is adjacent to OU8 IHSSs 150.1 and 172. However, since only a geophysical survey was conducted in IHSS 163.2, and no samples were collected, modifications to the OU8 RFI/RI Work Plan (DOE 1994a) were not necessary.

3.22.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.22.5 Ground Penetrating Radar and Magnetometer Survey

GPR and magnetometer surveys were conducted at IHSS 163.2 in an attempt to identify the location of the buried concrete slab. The methodology used to conduct these surveys is presented in Section 2.1. In addition to these geophysical surveys, research of historical records and engineering drawings, interviews with personnel familiar with concrete design practices at the Rocky Flats Plant in the 1960s, and an aerial photograph review were conducted to assist with determining the location of the concrete slab. Both the GPR and the magnetometer survey were unsuccessful in identifying the presence of a buried concrete slab in the area targeted for investigation immediately east of Trailer T771A. Conclusions from this investigation are as follows:

1. The concrete pad is not buried beneath Trailer T771A since the general area around the trailer does not appear from review of aerial photographs to consist of fill material. Large amounts of fill material should be associated with the burial area of the slab.

2. The slab is not buried immediately east of Trailer T771A for a distance of approximately 50 feet. If the pad existed in this area, it would have been identified by one of the geophysical survey methods. The area east of Trailer T771A consists of only very shallow fill that would have been adequately penetrated by GPR for the purposes of identification of this buried slab

regardless of whether it contained steel reinforcing bars. Similarly, if the slab contained steel reinforcing bars, the magnetometer survey would have identified the buried slab.

3. Although design and construction drawings specifically addressing construction of the concrete slab were not found, it is likely that the americium tank slab contained steel reinforcing bars. This statement is made based on typical construction methods used in the early 1960s at Rocky Flats, as verified by personnel familiar with the engineering practices at the plant at that time.

4. The slab is not buried beneath Building 770 since the slab was constructed in approximately 1962 or 1963, while Building 770 was constructed in approximately 1964. The slab remained in use under the americium tank until the late 1960s.

5. The location of the security fence north of Building 771 and near the former location of the americium tank would have been a limiting factor in easily burying the slab. The security fence north of Building 771 had been relocated to the north during the time period of most interest for this slab. The security fence was located approximately 11 to 60 feet north of the former tank location during the time period of interest (approximately 50 to 120 feet north of the current north edge of Building 771).

6. The most probable location in which the slab could be buried is the strip of land approximately 15 feet south of Trailer T771A. This strip of land extends from approximately the center of T771A to the west edge of Building 770.

This area was low-lying land north of the Building 771 security fence during the time the americium tank was in use. This area was filled and graded in the time frame of April 25, 1970, to August 6, 1971, which is shortly after use of the tank ceased.

7. Filling, grading, and leveling of the land had progressed to approximately 150 feet northeast of the northeast corner of Building 770 by the time use of the tank had ceased (approximately the late 1960s). Since the slab is reported to have remained in place a few years after the tank had been removed, it seems unlikely that the slab would be present in any area closer than 150 feet northeast of the northeast corner of Building 770. All areas closer than 150 feet northeast of the northeast corner of Building 770 appear to have been filled and leveled prior to any time at which the slab would have been buried.

8. If the slab is not buried in the area identified in number 6 above, the next most probable location for burial of the slab is on the order of 150 feet northwest of the northwest corner of Building 770. The area approximately 150 feet northwest of the northwest corner of Building 770 does consist of fill placed a few years after use of the americium tank ceased. However, the constraint of the Building 771 security fence makes this possible burial location far less likely to contain the slab than the burial location identified in number 6 above.

9. It is possible that the concrete slab was not buried in any area near Building 771. Instead, the slab could have been hauled off and buried or placed in an area remote from the slab's original location (WWE 1995).

3.23 IHSS 172 - RADIOACTIVE SITE CENTRAL AVENUE WASTE SPILL

This section presents the results of the data collection for IHSS 172. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, VSP sampling, asphalt sampling, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 172 covers a distance of approximately 1 mile and originally included the westbound lane of Central Avenue between the 903 Pad and Sixth Street, the northbound lane of Sixth Street between Central Avenue and the northwest corner of Building 771, and the dock area at the northwest corner of Building 771 (DOE 1994a). This IHSS is the result of an incident on June 11, 1968, when a forklift was transporting drums from the 903 Pad drum storage area to Building 774 (some records denote the final destination as Building 771 rather than Building 774 [DOE 1992a]). One of the drums being transported was unknowingly damaged during transport and subsequently leaked radioactively contaminated liquid, thought to be plutonium-tainted oil and oils with lathe coolant, along its path. Records indicate that the drum only leaked a small portion of its contents, perhaps 10 gallons or less, at a rate of approximately one drop every three feet (DOE 1994a, 1992a). The spill was detected when the drum reached its destination, and the affected roadway was immediately cordoned off. An effort was made to clean up the spill and the roadway was seal-coated before being reopened to traffic.

Monitoring of this incident detected roadway alpha radioactivity contamination up to 100,000 cpm, with another report of approximately 140,000 dpm/100 cm^2 on the westbound lane of Central Avenue. In addition, a 500-square-foot area north of the west dock of Building 774 was found to be contaminated to a level of 50,000 cpm. The forklift was contaminated to a level of 100,000 cpm. The forklift was decontaminated and released (DOE 1992a).

During subsequent construction, a section of Central Avenue between Eighth and Tenth Streets was removed in August 1970 and placed in an asphalt dumping area east of Building 881 (IHSS 130). Also, a section of Sixth Street between Sage Avenue and the perimeter road within the Protected Area was removed during construction of the Perimeter Security Zone (PSZ) fence between late 1980 and late 1982. The fate of this asphalt is unknown (DOE 1994a). Because these sections of the original roadway were removed, the OU8 RFI/RI Work Plan (DOE 1994a) recommended that IHSS 172 be redefined to exclude the portions of Central Avenue between Eighth and Tenth Streets (approximately 1,050 linear feet) and Sixth Street between Sage Avenue and the Protected Area perimeter road (approximately 320 linear feet). This redefinition resulted in the present configuration of IHSS 172 as illustrated in Figure 3-40.

3.23.1 Previous Studies and Recommendations

No sampling has been performed before these OU8 investigations to determine the nature and extent of contamination associated with IHSS 172.

Because of the small quantities of material believed to have been released, and the cleanup efforts undertaken at the time of this incident, as well as the disturbance of the areas affected by construction activities and paving, it is unlikely that contamination from this release would be detected in boreholes or wells adjacent to or downgradient from the roadways. Any residual contamination from this release is likely to be confined to the immediate vicinity of the roadway and unloading points (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. The foundation and storm drains within the portion of IHSS 172 along the northern portion of Buildings 771 and

774 was previously discussed in the sections on IHSSs 150.1 and 150.2, Sections 3.14.1 and 3.15.1, respectively, since these IHSSs overlap IHSS 172 in this area

The section of IHSS 172 from the Protected Area perimeter road northeast to the western boundary of IHSS 150.2 contains complete sections, or portions of, five different storm drains. These storm drains are all constructed of corrugated metal pipe of various diameters. No foundation or storm drain sampling stations are located within this portion of IHSS 172.

The Central Avenue portion of IHSS 172 from the 903 Pad to Tenth Street does not contain any foundation or storm drains.

OU8 Technical Memorandum 1 (DOE 1994b) also summarizes the additional data compilation efforts to determine the paving history of the IHSS and if there has been any significant realignment of the roadways or drainage ditches within the IHSS. Based on the data compilation, OU8 Technical Memorandum 1 proposed Stage 2 activities to include the collection of three asphalt samples (one near the intersection of Central Avenue and Sixth Street, and two in the Central Avenue portion of the IHSS near the 903 Pad), one surface-soil sample (at the Building 774 dock area), and one VSP sample (in the northeast-bound portion of Sixth Street, southeast of Building 371). All of these proposed samples were collected.

3.23.2 Overlapping IHSSs

Due to the varied areal extent of IHSS 172, it overlaps with several other IHSSs. The IHSSs that overlap with IHSS 172 are as follows:

- OU8 IHSS 150.1 - surface-soil samples at locations SS806193 through SS806993;
- OU8 IHSS 150.2 - VSP sample at location VP41494;

- OU9 IHSS 126.1 and 126.2 (tank T-8) - borehole locations 02295 and 02595;
- OU13 IHSS 117.3 - surface-soil samples at locations SS308793 and SS308893, collected from the eastbound lane of Central Avenue and SS308393 collected from the ditch on the south side of Central Avenue;
- OU13 IHSS 186 - surface-soil samples at locations SS304893 through SS305393; and
- OU14 IHSS 162 - IHSS boundaries overlap but no sample locations overlap.

As directed by the IFSP (EG&G 1994b), overlapping sample locations were minimized and sampling was conducted for each IHSS as described in their respective work plans. No modifications to the overlapping IHSSs analytical suite were made.

3.23.3 Adjacent IHSSs

Due to the varied areal extent of IHSS 172, it is also adjacent to several other IHSSs. The IHSSs that are adjacent to IHSS 172 are as follows:

- OU13 IHSS 117.2 - surface-soil samples at locations SS305893 and SS305993 (a VSP sample was also collected at location SS305893);
- OU13 IHSS 158 - surface-soil samples at locations SS304293 through SS304593 (these locations are not likely to have been impacted by IHSS 172); and
- OU12 Surface Water and Sediment Sampling - 16 sediment samples collected at locations from the Central Avenue and Sixth Avenue ditch.

As directed by the IFSP (EG&G 1994b), adjacent sample locations were minimized and sampling was conducted for each IHSS as described in their respective work plans. No modifications to the adjacent IHSSs analytical suite were made.

3.23.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.23.5 Vertical Soil Profile

This section, including Table 3-105, was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.23.6 Asphalt Samples

Asphalt samples were collected and analyzed from three locations in IHSS 172 (SS811693, SS811793, and SS812693). Of the radionuclides analyzed (Table 3-106 and Figure 3-40), Pu-239/240 exceeded the background value of 0.08 pCi/g (but not the PRG) at location SS811793. Uranium-238 exceeded the PRG of 0.8 pCi/g, but not the background, at all sampled locations.

3.23.7 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from one location in IHSS 172. Based on the history of the site, organic compounds, metals, and radionuclides were analyzed. Figure 3-40 and Tables 3-107 and 3-108 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figure 3-40.

Arsenic and beryllium exceeded their PRGs (0.366 mg/kg and 0.149 mg/kg, respectively), while sodium, an essential nutrient, exceeded the background value of 119.02 mg/kg. Of the detected radionuclides, Am-241 exceeded the background value of 0.04 pCi/g, while Pu-239/240 exceeded the background of 0.08 pCi/g. Neither exceeded the established PRG.

3.23.8 Statistical Summary

This section, including Tables 3-109, 3-110, and 3-111, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.24 IHSS 173 - RADIOACTIVE SITE 900 AREA (STORAGE VAULTS NEAR BUILDING 991)

This section presents the results of the data collection for IHSS 173. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, the soil-gas survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

IHSS 173 originally encompassed Building 991 and associated underground storage vaults/tunnels 996, 997, 998, and 999. However, based on a proposal made in the HRR (DOE 1992a) and accepted by the regulatory agencies, the IHSS was reduced to include only the dock area of Building 991 (DOE 1994a). Figures 3-41 through 3-43 present the present configuration of this IHSS. Building 991 was the first active building at Rocky Flats Plant and was used for storage and loading/unloading of finished products. IHSS 173 is located at the southwest corner of the building and encompasses the south dock. The south dock is a loading facility for the vaults/tunnels. The surface around Building 991 is paved and is enclosed by a security fence. The area receives moderate to heavy traffic and has been

paved for more than 20 years. The pavement has been disrupted at times by construction and was extended to encompass Building 984 in the 1980s (DOE 1994a).

Final products containing plutonium and uranium were shipped form the dock. Final products were not considered radioactive because they were plated with nickel. Raw products were not involved in the Building 991 operations, although acetone, perchloroethene, and TCA solvents were used within the building. Reportedly, small parts and equipment were washed in the dock area along the north wall of the asphalt-covered courtyard. Acetone and other solvents were used for cleaning the parts and the spent solutions were stored in drums and removed for disposal. In the late 1950s and early 1960s, cleaning of depleted uranium parts was conducted in the courtyard of Building 991, which is located on the west side of the building near the dock. According to records, the dock and courtyard were often washed down with water that could have seeped into cracks and the edge of the asphalt. Spills and water could also have drained into the storm drains (DOE 1994a). No documentation has been found detailing releases to the environment or responses to occurrences in the dock area (DOE 1992a).

3.24.1 Previous Studies and Recommendations

No sampling has been performed before these OU8 investigations to determine the nature and extent of contamination associated with IHSS 173.

Results of a radiometric survey performed at RFETS during the late 1970s and early 1980s indicate no extremely contaminated areas (500,000 to 1,000,000 pCi/g) around the south dock of Building 991 (DOE 1994a). However, an August 1981 aerial radiological survey (it is unknown if this is the same as the radiometric survey) detected 8,000 to 16,000 cpm

of gross "man-made" radioactivity and 1,000 to 2,000 cpm of americium activity centered on Building 991 (EG&G 1990a).

One alluvial monitoring well (2187), and one bedrock monitoring well (2287) are located approximately 450 feet downgradient of IHSS 173. There are no wells located immediately upgradient of the IHSS. Groundwater samples have been collected from these wells quarterly since March 1988. In well 2187, detectable concentrations of acetone and PCE have been observed. In addition, calcium, copper, magnesium, nickel, sodium, zinc, U-233/234, U-235, bicarbonate, chloride, and sulfate have been detected above background values. In well 2287, detectable concentrations of PCE have been observed as well as calcium, Am-241, Cs-137, strontium-89/90, U-235, and sulfate concentrations above background values. These groundwater data indicate that groundwater downgradient of IHSS 173 has been impacted by RFETS operations. However, these wells are also downgradient of IHSS 184 (as well as several other Industrial Area IHSSs), which may have contributed to the levels of contaminants detected.

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains and storm drains. One 15-inch-diameter cast iron storm drain originates at the dock in IHSS 173 and flows south through IHSS 173 and 184. It connects with a east-flowing 30-inch-diameter corrugated metal pipe storm drain approximately 40 feet south of IHSS 184. There are no sampling stations associated with this storm drain.

Foundation drains exist for Building 991 and its associated vaults/tunnels. One of these foundation drains appears to run north-south along the west wall of Building 991, but its presence has not been confirmed. However, none of these foundation drains appear to

impact IHSS 173. See OU8 Technical Memorandum 1 (DOE 1994b) for details on these foundation drains.

3.24.2 Overlapping IHSSs

No other IHSSs overlap with IHSS 173.

3.24.3 Adjacent IHSSs

IHSS 173 is adjacent to OU8 IHSS 184 VSP location VP42294. Sampling was conducted for each IHSS as described in the OU8 RFI/RI Work Plan (DOE 1994a). No modifications to the adjacent IHSS's analytical suite were made.

3.24.4 High Purity Germanium Survey and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.24.5 Soil-Gas Survey

The soil-gas survey was conducted on a 20-foot grid. Locations with a soil-gas concentration greater than 1.0 μg/L are plotted in Figure 3-41. Table 3-112 lists the detected compounds and their concentrations.

Based on site history, the OU8 RFI/RI Work Plan (DOE 1994a) specifically requested chemical analyses of carbon tetrachloride, PCE, TCE, and acetone within IHSS 173. In addition, analyses were performed for the other chemicals listed in Table 3-112. Three

locations were sampled. Compounds found at a concentration greater than the reference value included acetone, benzene, PCE, TCE, and cis-1,2-dichloroethene from location SG008294, and cis-1,2-dichloroethene from SG008394.

3.24.6 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from three locations in IHSS 173. Figures 3-42 and 3-43 and Tables 3-113 and 3-114 summarize the detected analytes, their concentrations, sample locations (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs. Sample concentrations that exceed either of the reference concentrations are identified in Figures 3-42 and 3-43.

Based on the history of the site, organic compounds, metals, and radionuclides were analyzed.

No organic chemicals exceeded a reference concentration within this IHSS. Of the metals detected, arsenic exceeded the PRG (0.366 mg/kg) at all locations, and beryllium exceeded the PRG (0.149 mg/kg) at locations SS811893 and SS812093. Silver exceeded the background level of 0.22 mg/kg at location SS812093. Uranium-238 exceeded the PRG (0.8 pCi/g), but not the background value, at locations SS811893 and SS811993.

3.24.7 Statistical Summary of Surface-Soil Data

Surface-soil samples collected from IHSS 173 were analyzed for SVOCs, standard and additional metals, and radionuclides. Based on the sampling design described in section 5.1 of the OU8 RFI/RI Work Plan (DOE 1994a), three surface-soil samples were collected from within this IHSS. Only one or two samples contained SVOCs; these concentrations did not

exceed their quantitation limits of 330 μg/kg. The paucity of data for these analytes precludes their inclusion in the statistical analyses.

As expected, metals and all of the radionuclides were found to a greater or lesser extent in all of the surface-soil samples. The first statistical analysis to which the data were subjected was the Shapiro-Wilk test for population distribution (Gilbert 1987; EPA 1989; EPA 1992). Table 3-115 is a listing of the population distributions for the metals and radionuclides detected in samples from IHSS 173. The spreadsheets that were used in calculating the Shapiro-Wilk statistic (W) are contained in Appendix F. All but four metals and all radionuclides were normally distributed. These four metals (arsenic, lead, manganese, and nickel) did not fit either the normal or lognormal distributions and have nonparametric distributions.

In order to evaluate the sufficiency of the sampling effort, calculated values of power were compared to a threshold value of 0.8 or 80 percent. A power of 0.8 corresponds to a false-negative error (Type II) rate of 20 percent in the test of the null hypothesis that the mean of the sample population ($\bar{x}$) is within a percentage (d) of the true mean (μ) of all of the possible samples from the IHSS: $Ho: \bar{x} < (1 \pm d)\mu$. Table 3-116 is a summary of the results of the tests of power for the metal and radionuclide analyses of samples collected from IHSS 173. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less than 20 percent of the true population mean for one metal (chromium), and three radionuclides (gross beta, U-233/234, and U-238). When the difference in means is increased to 30 percent, two additional metals reach a power of at least 0.8 (nickel and potassium). Increasing the allowable difference in means to 50 percent adds lithium, aluminum, arsenic, barium, lead, zinc, gross alpha, and U-235 to the list of metallic elements and radionuclides with powers in excess of 0.8. Ten metals (beryllium, calcium, cobalt, copper, iron, magnesium,

manganese, sodium, strontium, and vanadium) and two radionuclides (Am-241, and Pu-239/240) have powers in the range of 0.25 to 0.75 (i.e., three out of four to one out of four chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant considering that the sample population mean for these species are from five to 10 times less than their respective background concentrations or PRGs. Thus, if the sample mean is too low by as much as 50 percent (i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment.

In order to increase the confidence in the decisions made from the sample data, it would be necessary to collect additional samples for analysis of those species with a wide variation in the measured concentrations. The number of samples (n) sufficiency test statistic is calculated by using the standard normal deviate ($Z_{1-\alpha/2}$) for a normal population distribution, the absolute margin of error (d), and the coefficient of variation (η):

$$n=\left(Z_{1-\alpha/2}\eta/d\right)$$

Table 3-117 is a listing of the number of additional samples required to reach a 90 or 95 percent confidence that the difference in sample and true population means are less than 20, 30, and 50 percent. The species for which an insufficient number of samples were collected are shaded. Sufficient sampling was conducted to indicate that there is at least 80 percent confidence that the difference between the sample mean and the true population mean is less than 20 percent of the true population mean for three metals (calcium, iron, and nickel). When the difference in means is increased to 30 percent, two additional metals and one radionuclide (chromium, manganese, and gross beta) reach a power of at least 0.8. Increasing the allowable difference in means to 50 percent add all the metals except arsenic to the list of metallic elements and radionuclides with powers in excess of 0.8. Two metals

(strontium and arsenic) and three radionuclides (gross alpha and U-233/234 and U-238) have powers in the range of 0.19 to 0.80 (i.e., four out of five to one out of five chances of having differences in the sample mean and true population means greater than 50 percent). This level of uncertainty is not significant for all but arsenic and U-238, considering that the sample population mean for these species are from five to 10 times less than their respective background concentrations or PRGs. Thus, if the sample mean is too low by as much as 50 percent (i.e., only half of the true population mean), the true concentrations should not represent a risk to human health or the environment. The average concentrations for arsenic and U-238 exceed their respective PRGs, but are less than their respective background concentrations.

3.25 IHSS 184 - RADIOACTIVE SITE BUILDING 991 STEAM CLEANING AREA

This section presents the results of the data collection for IHSS 184. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, and VSP sampling.

IHSS 184 was originally defined as a 50- by 50-foot area near Building 992, southwest of Building 991 (DOE 1994a). More recent information (Doty & Associates 1992) indicate that the boundaries of this IHSS are approximately 55 by 77 feet, but no documentation exists that defines the location of washing activities. However, the paved area between the south dock of Building 991 and Building 992 may have been used for steam cleaning. The OU8 RFI/RI Work Plan (DOE 1994a) proposed extending the IHSS boundaries to include the paved area. Figure 1-2 presents the location of IHSS 184.

The primary source of contamination at IHSS 184 is considered to be steam cleaning that was done in an area within the southwest corner of the Building 991.

The HRR (DOE 1992a) states that an area southwest of Building 991, near Building 992, was used between 1953 and 1978 to steam clean radioactively contaminated equipment and drums. The rinse water was collected in a sump for treatment in the Rocky Flats Plant's process waste system. Building 991 personnel indicated that steam cleaning was done in an area within the southwest corner of the Building 991, not beside the guard shack or elsewhere outside the building. This was discontinued around 1969 when new cleaning facilities became available. The area was used to clean stainless-steel containers needed to ship materials to other DOE facilities. These containers were returned empty to Building 991 by the other facilities and were steam cleaned before reuse. Reportedly, some of the equipment may have been radioactively contaminated. The cleaning was done on a concrete floor that is still in place. Wash water ran into an outside drain that flowed south and east beneath pavement before emptying into an unlined ditch just southeast of the building (DOE 1994a).

Reports indicate that there was a small contaminated spot on the ground that was cleaned up. Approximately 3 feet of soil were excavated during cleanup and disposed of in Idaho. It was stated that this occurred on the north side of Central Avenue, southwest of Building 991; however, the exact location was not stated. Many spots of contamination had been detected in the past in soil along Central Avenue in this area due to the presence of the Mound, Trench No. 1, and Oil Burn Pit No. 2. It is unlikely that the 3 feet of contaminated soil was associated with the steam cleaning activities (DOE 1994a).

The IAG indicates that spillage from IHSS 184 is visible on August 6, 1971, aerial photographs of the site. Originals of these photographs are relatively sharp but of small scale (approximately 1 inch = 2,200 feet), and spillage emanating from the steam cleaning area was not identified under 10x stereoscope magnification. Small discolored areas are evident on the ground east of Building 991, but do not appear to originate at the steam

cleaning area. Building 991 personnel indicated that steam cleaning was discontinued before the aerial photo date (DOE 1994a).

There is serious doubt that this steam cleaning incident actually occurred in the IHSS 184 area. Based on numerous other interviews during the course of the HRR, no one has been able to provide information on steam cleaning this area. The original description does have some language that makes it inherently inaccurate. Specifically, there was not a sump in the paved area north of Building 992 and there are no process waste lines associated with Building 991/992 (DOE 1992a).

3.25.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 184. Results of the Radiometric Survey, conducted during the late 1970s and early 1980s, indicate no extremely contaminated areas (500,000 to 1,000,000 pCi/g) at this site (DOE 1994a).

The nearest downgradient wells to IHSS 184 are wells 2187 and 2287. Acetone, PCE, several metals, and several radionuclides have been detected in concentrations exceeding background in these wells. According to the OU8 RFI/RI Work Plan, the levels of radionuclides detected in groundwater samples from these wells may be attributable, in part, to releases from this IHSS (DOE 1994a). However, it should be noted that groundwater in the area of this IHSS is downgradient of a significant portion of the Industrial Area.

During this phase of the OU8 RFI/RI, an attempt was made to better locate the concrete floor, sump, and outfall associated with IHSS 184. Based on this work, the sump is not believed to exist in the area. Based on review of engineering drawings, it is possible that this "sump" could be a trench drain in the paved area north of Building 992. The only real

sump known to exist in the area is in the southeast corner of the basement of Building 991, which is not the described location of the steam cleaning activities.

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, one 15-inch-diameter cast iron storm drain originates at the dock in IHSS 173 and flows south through IHSS 173 and 184. It connects with a east-flowing 30-inch-diameter corrugated metal pipe storm drain approximately 40 feet south of IHSS 184. There are no sampling stations associated with this storm drain.

Foundation drains exist for Building 991 and its associated vaults/tunnels. One of these foundation drains appears to run north-south along the west wall of Building 991, but its presence has not been confirmed. However, none of these foundation drains appear to impact IHSS 184. OU8 Technical Memorandum 1 provides additional details on these foundation drains.

3.25.2 Overlapping IHSSs

IHSS 184 does not overlap any other Industrial Area IHSS. However, OU8 IHSS 173 abuts the north boundary of IHSS 184. Surface-soil sample location SS812093 in IHSS 173 had to be moved from its proposed location, and the actual sample site is within the IHSS 184 boundary according to the OU8 RFI/RI Work Plan map. Soil-gas sample location SG008494 is co-located with surface-soil sample location SS812093.

3.25.3 Adjacent IHSSs

OU8 IHSS 173 is immediately adjacent to IHSS 184. IHSS 173 surface-soil (below asphalt) sample locations SS811893 and SS811993 and soil-gas sample locations SG008294 and

SG008394 are within 100 feet of IHSS 184. The analytical suite for IHSS 184 or 173 were not impacted because there was no surface-soil or soil-gas sampling planned for IHSS 184.

3.25.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.25.5 Vertical Soil Profile

This section, including Table 3-118, was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order.

3.26 IHSS 188 - ACID LEAK

This section presents the results of the data collection for IHSS 188. It includes a discussion of the IHSS background, previous studies and recommendations, overlapping IHSSs, adjacent IHSSs, the HPGe survey and NaI survey, surface-soil sampling, and a statistical summary of the surface-soil sampling.

The IAG originally defined IHSS 188 as an area of unspecified size southeast of Building 374. HRR (DOE 1992a) information indicates that the site should be closer to Building 371 and 374 than is indicated in the IAG. The OU8 RFI/RI Work Plan (DOE 1994a) shows the IHSS to be an area of approximately 65- by 110-feet located adjacent to the dock in the southwest corner where Building 371 and Building 374 intersect (Figure 3-44). The ground surface at IHSS 188 is presently flat and paved. The area was unpaved prior to the mid-1980s.

IHSS 188 is related to a 1983 incident in which a 55-gallon drum containing nitric and hydrochloric acid reportedly leaked near the east gate of Building 374. It is likely that the mixture was a waste metal-leaching solution originating from the 400 Area, which suggests that it might have contained some trace heavy metals. The area was unpaved at the time of the acid leak. The ground surface has potentially been contaminated with this waste metal-leaching solution as a result of the reported release from the 55-gallon drum (DOE 1994a).

The dock located in the southwest corner where Building 371 and Building 374 intersect normally handles drums of this type and contains a sump capable of handling a spill of this size. Therefore, the spill must have occurred on the ground next to the building.

3.26.1 Previous Studies and Recommendations

No previous IHSS-specific environmental studies have been conducted at IHSS 188.

Investigations have found no documentation regarding the incident or cleanup activities. The incident is not mentioned in the "Summary of Events or Environmental Analysis Weekly Highlights" for the 1983 time frame. Additionally, there were no event-specific reports found that detail the incident. Employees who were in positions to have responded to such an incident do not recall this incident and state that they know of no reason why a drum containing acids would have been in the area of Building 374 (DOE 1994a).

There is a limited amount of data available that would assist in characterizing the nature and extent of contamination potentially associated with this IHSS. Hydrogeologic conditions in the area are expected to be similar to that found in well P114789, which is more than 400 feet to the south of the IHSS. In this well, 26 feet of clayey sand overlie Arapahoe claystone. High water levels are within 6 feet of the ground surface. It is likely that a small

acid spill at the IHSS with similar hydrogeologic conditions would be rapidly diluted if it reached the water table, given the 20-plus feet of saturated material that exist during periods of high water levels (DOE 1994a).

Well 1986, the nearest downgradient well, is located approximately 900 feet to the northeast. Due to the distance between this well and the IHSS, the presence of other potential sources of contamination between the well and the IHSS, and the small quantity (55 gallons maximum) of liquid released during the incident, it is doubtful that any impacts attributable to this release would be detected in this well. Residual impacts from this release, if detectable, would probably be confined to surficial materials in the immediate area of the release (DOE 1994a).

OU8 Technical Memorandum 1 (DOE 1994b), prepared during Stage 1 of the OU8 RFI/RI, summarized the data compilation of RFETS building foundation drains. Based on Technical Memorandum 1, a 6-inch, porous concrete foundation drain runs west to east under the southern one-third of Building 371, and through the northern portion of IHSS 188. A second, 8-inch porous concrete foundation drain runs west to east along the southern wall of Building 371. This foundation drain turns to the north at the southwest corner of IHSS 188 and intersects the above mentioned 6-inch, porous concrete foundation drain near the northwest corner of IHSS 188. This foundation drain connects with an 8-inch, porous concrete foundation drain that runs north to south along the east wall of Building 374. This portion of the Building 371/374 foundation drain system discharges at Outfall 2, sampling station FD-371-2, approximately 150 feet southeast of Building 371. Gross alpha and gross beta concentrations at sample station FD-371-2 exhibited inconclusive trends from 1977 through 1991. Refer to OU8 Technical Memorandum 1 (DOE 1994b) for additional information concerning the drains and historical sampling of this area.

3.26.2 Overlapping IHSSs

No other Industrial Area IHSSs overlap with IHSS 188.

3.26.3 Adjacent IHSSs

No other Industrial Area IHSSs are adjacent to IHSS 188.

3.26.4 High Purity Germanium and Sodium Iodide Survey

This section was not completed due to a change in the scope for this Data Summary Report as per the DOE Stop Work Order.

3.26.5 Surface-Soil Sampling

Surface-soil samples were collected and analyzed from five locations in IHSS 188. Figure 3-44 and Tables 3-119 and 3-120 summarize the detected analytes, their concentrations, sample locations, the MDLs (as given in the OU8 RFI/RI Work Plan [DOE 1994a]), background concentrations, and established PRGs.

Sample concentrations that exceed either of the reference concentrations are identified in Figure 3-44. Based on the history of the site, only metals were analyzed.

Of the metals analyzed, cesium exceeded the background value of 7.0 mg/kg at location SS812193. Arsenic and beryllium exceeded the PRG (0.366 mg/kg and 0.149 mg/kg, respectively) at all sampled locations. Several metals exceeded the background value at all sampled locations, including calcium (5,839 mg/kg), an essential nutrient, cobalt (14.22

mg/kg), copper (22.75 mg/kg), magnesium (3,707 mg/kg), silver (0.22 mg/kg), and sodium (119.02 mg/kg), an essential nutrient.

3.26.6 Statistical Summary

This text section was not completed due to a change in the scope for this Data Summary Report per the DOE Stop Work Order. Statistical Tables 3-121, 3-122, and 3-123 were completed and are included in this report.

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TABLE 2-1
Background Activities of Specific Radionuclides

Radionuclide	Background Activities Identified in General Literature (pCi/g)	Source	BSCP Background Upper Tolerance Limit ($UTL_{99/99}$) † (pCi/g)	Maximim HPGe Activity Identified in Survey of Background Areas Near RFETS (pCi/g)
Potassium-40	1.89-21.8	Henderson (1982) Faure (1977) NCRP (1987)	NR	12.8
Radium-226	0.017-1.0	Henderson (1982) EG&G (1992) NCRP (1987)	1.20	1.13
Thorium-232	0.99-1.35	Henderson (1982) NCRP (1987)	NR	1.25
Uranium-238	1.08-1.78	Henderson (1982) NCRP (1987)	2.83	2.30
Uranium-235	0.01-0.09	NCRP (1987) EG&G (1992)	0.13	0.10
Cesium-137	0.01-1.37	Henderson (1987) EG&G-EM (1990) EG&G (1992c) Faure (1977)	2.25	0.84
Americium-241	0.01-0.05	EG&G (1992e) CDPHE (1992) Henderson (1987)	0.037	0.10
Plutonium-239 & 240	0.009-0.05	EG&G (1992e) CDPHE (1992) Henderson (1987)	0.084	††

Notes:

HPGe = high purity germanium
NR = not reported
pCi/g = picocuries per gram
RFETS = Rocky Flats Environmental Technology Site
$UTL_{99/99}$ = upper tolerance limit

†These numbers were reported in the "Geochemical Characterization of Background Surface Soils, Background Soils Characterization Program (BSCP), Rocky Flats Environmental Technology Site" (DOE 1995a). These values represent the 99/99 background upper tolerance limits ($UTL_{99/99}$) based on a normal distribution of data.

††HPGe technology is only capable of measuring plutonium-239 in the nanocurie per gram (nCi/g) range.

TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS	118.1	118.2	123.1								
HPGe (In situ)											
Station	7O	8F	7V		7W			7X			7Y
Americium-241	0.2	1.1	0.1		0.0			0.0			0.0
Plutonium-239	1.3	6.4	0.0		0.0			0.0			0.0
Thallium-232	1.23	1.70	1.44		1.56			1.62			1.55
Uranium-238	2.0	1.9	5.2		4.2			5.6			4.4
Uranium-235	0.08	0.07	0.09		0.08			0.07			0.10
VSP HPGe											
LOCATION			VP40694		VP40794			VP40894			VP40994
HPGe 0-2" (pCi/g)			0-2"		0-2"						
Sample ID:			VPG419		VPG423						
TOTAL ACTIVITY			45.70		49.24						
Americium-241			<0.49		<0.1						
Plutonium-239			<72900		<93800						
Thallium-234			4.4648		1.8618						
Uranium-235			<0.167		0.1848						
Uranium-237			<0.129		<0.0817						
HPGe 2-4" (pCi/g)			2-4"		2-4"/(DUP)			2-4"			2-4"
Sample ID:			VPG420		VPG424/VPG426			VPG428			VPG431
TOTAL ACTIVITY			48.48		37.32/36.61			50.37			34.19
Americium-241			<0.114		<0.409/<0.309			<0.609			<0.279
Plutonium-239			<65400		<61800/<65600			<113000			<82800
Thallium-234			2.1276		<2.47/<1.99			<3.82			<2.08
Uranium-235			<0.172		<0.142/<0.139			<0.204			<0.153
Uranium-237			<0.0902		<0.0998/<0.108			<0.15			<0.087
HPGe 4-6" (pCi/g)					4-6"			4-6"			4-6"
Sample ID:					VPG425			VPG429			VPG432
TOTAL ACTIVITY					44.05			38.56			35.78
Americium-241					<0.111			<0.224			<0.127
Plutonium-239					<108000			<140000			<126000
Thallium-234					1.2646			<2.19			1.4600
Uranium-235					<0.161			<0.159			<0.201
Uranium-237					<0.0877			<0.106			<0.102
SURFACE SOILS											
Sample Location:			SS800193	SS800293	SS800393	SS800493	SS800593	SS800693	SS800793	SS800793	SS800893
Sample ID:			SSG0001JE	SSG0002JE	SSG0003JE	SSG0004JE	SSG0005JE	SSG0006JE	SSG0007JE	SSG0145JE	SSG0008JE
Date Sampled:			2-Dec-94	2-Dec-94	1-Dec-94	1-Dec-94	1-Dec-94	1-Dec-94	1-Dec-94	1-Dec-94	1-Dec-94
Units: pCi/g											
Americium-241			.012(.012) U:Y	.017(.013) U:Y	.026(.018) :Y	.025(.012) :Y	.023(.014) :Y	.022(.012) :Y	.014(.013) U:Y	.014(.011) U:Y	.028(.014) :Y
Gross Alpha			17(3.2) :Y	18(3.4) :Y	22(3.5) :Y	24(3.9) :Y	20(3.4) :Y	18(3.5) :Y	20(3.5) :Y	22(3.6) :Y	17(3.2) :Y
Gross Beta			29(3.4) :Y	28(3.3) :Y	32(3.6) :Y	34(3.6) :Y	28(3.4) :Y	30(3.5) :Y	31(3.7) :Y	33(3.8) :Y	34(3.5) :Y
Plutonium-239/240			.059(.013) :Y	.11(.015) :Y	.03(.007) :Y	.088(.016) :Y	.035(.009) :Y	.033(.01) :Y	.038(.011) :Y	.047(.009) :Y	.037(.01) :Y
Uranium-233,-234			.84(.21) :Y	.64(.16) :Y	.89(.16) :Y	.85(.14) :Y	.86(.15) :Y	.96(.15) :Y	.85(.14) :Y	.92(.15) :Y	.76(.078) B:Y
Uranium-235			.066(.079) U:Y	.01(.021) U:Y	.055(.042) J:Y	.065(.036) J:Y	.036(.036) U:Y	.018(.023) U:Y	.022(.033) U:Y	.033(.039) U:Y	.038(.02) J:Y
Uranium-238			.87(.21) :Y	.78(.18) :Y	.91(.16) :Y	.86(.14) :Y	.96(.15) :Y	.98(.15) :Y	1(.15) :Y	.72(.14) :Y	.76(.078) :Y

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS			135										137
HPGe (In situ)													
Station													
Americium-241													
Plutonium-239													
Thallium-232													
Uranium-238													
Uranium-235													
VSP HPGe													
LOCATION													
HPGe 0-2" (pCi/g)													
Sample ID:													
TOTAL ACTIVITY													
Americium-241													
Plutonium-239													
Thallium-234													
Uranium-235													
Uranium-237													
HPGe 2-4" (pCi/g)													
Sample ID:													
TOTAL ACTIVITY													
Americium-241													
Plutonium-239													
Thallium-234													
Uranium-235													
Uranium-237													
HPGe 4-6" (pCi/g)													
Sample ID:													
TOTAL ACTIVITY													
Americium-241													
Plutonium-239													
Thallium-234													
Uranium-235													
Uranium-237													
SURFACE SOILS													
Sample Location:	SS800993		SS801093	SS801193	SS801293	SS801393	SS801493		SS801593	SS801693	SS801793	SS801893	SS801993
Sample ID:	SSG0009JE		SSG0010JE	SSG0011JE	SSG0012JE	SSG0013JE	SSG0014JE		SSG0015JE	SSG0016JE	SSG0017JE	SSG0018JE	SSG0019JE
Date Sampled:	1-Dec-94		2-Nov-94	2-Nov-94	2-Nov-94	2-Nov-94	2-Nov-94		27-Oct-94	27-Oct-94	27-Oct-94	27-Oct-94	27-Oct-94
Units: pCi/g													
Americium-241	.002(.008) U:Y		.024(.018) :V	.12(.027) :V	.1(.025) :V	.045(.015) :V	.025(.012) :V		.21(.036) :V	.14(.038) :V	.14(.038) :V	.33(.057) :V	.71(.093) :V
Gross Alpha	20(4) :Y		10(2.4) :A	9.7(2.3) :A	15(2.7) :A	8.5(2.4) :A	9.4(2.3) :A		22(2.2) :A	16(1.9) :A	17(1.8) :A	33(4.3) :A	26(3.9) :A
Gross Beta	31(3.6) :Y		29(3.3) :A	27(3.5) :A	24(3.5) :A	25(3.2) :A	22(3.2) :A		27(2.2) :A	24(2) :A	19(1.9) :A	33(3.8) :A	30(3.4) :A
Plutonium-239/240	.004(.005) U:Y		.05(.016) :V	.14(.025) :V	.74(.068) :V	.054(.015) :V	.012(.008) J:V		.25(.036) B:V	.3(.038) B:V	.39(.047) B:V	.51(.052) B:V	1.1(.08) B:V
Uranium-233,-234	1.2(.11) B:Y		160(190) U:A	200(310) U:A	100(180) U:A	26(150) U:A	49(140) U:A		1.8(.33) B:V	1.5(.28) B:V	1(.22) B:V	6.1(.5) B:V	3.1(.43) B:V
Uranium-235	.045(.025) J:Y		.76(.22) :V	.54(.14) :V	.71(.17) :V	.75(.19) :V	.52(.15) :V		(.027) U:V	.11(.075) J:V	.066(.044) U:V	.29(.076) J:V	.17(.088) J:V
Uranium-238	1.1(.11) :Y		.25(.13) J:V	.009(.018) U:V	.028(.038) U:V	.059(.047) U:V	.033(.044) U:V		1.7(.33) B:V	1.2(.25) B:V	.95(.2) B:V	5.1(.44) B:V	3(.42) B:V
			.78(.22) :V	.48(.12) :V	.73(.17) :V	.63(.17) :V	.67(.17) :V						

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS												138
HPGe (In situ)												
Station					7U			7T				
Americium-241					2.8			3.0				
Plutonium-239					0.0			0.0				
Thallium-232					1.39			1.36				
Uranium-238					1.8			1.8				
Uranium-235					0.08			0.09				
VSP HPGe												
LOCATION								VP41194				
HPGe 0-2" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
HPGe 2-4" (pCi/g)								2-4"				
Sample ID:								VPG439				
TOTAL ACTIVITY								37.87				
Americium-241								2.5776				
Plutonium-239								<113000				
Thallium-234								<0.911				
Uranium-235								<0.203				
Uranium-237								<0.0953				
HPGe 4-6" (pCi/g)								4-6"				
Sample ID:								VPG440				
TOTAL ACTIVITY								48.09				
Americium-241								2.5221				
Plutonium-239								<142000				
Thallium-234								<2.66				
Uranium-235								<0.193				
Uranium-237								<0.117				
SURFACE SOILS												
Sample Location:	SS802093	SS802093	SS802193		SS802293	SS802393	SS802493	SS802593	SS802693	SS802693	SS802793	SS802893
Sample ID:	SSG0020JE	SSG0120JE	SSG0021JE		SSG0022JE	SSG0023JE	SSG0024JE	SSG0025JE	SSG0026JE	SSG0122JE	SSG0027JE	SSG0028JE
Date Sampled:	27-Oct-94	27-Oct-94	27-Oct-94		31-Oct-94	31-Oct-94	31-Oct-94	31-Oct-94	31-Oct-94	31-Oct-94	31-Oct-94	31-Oct-94
Units: pCi/g												
Americium-241	.22(.044) :V	.24(.046) :V	.23(.066) :V		4.9(.5) :V	.73(.12) :V	3.1(.26) :V	3.1(.43) :V	6.3(.73) :V	6.4(.64) :V	3.6(.53) :V	2.2(.31) :V
Gross Alpha	26(4) :A	23(3.7) :A	19(2.1) :A		25(2) :A	14(1.5) :A	28(3.6) :A	37(4.4) :A	19(3.4) :A	30(4) :A	31(4.1) :A	21(3.8) :A
Gross Beta	27(3.6) :A	24(3.3) :A	25(2.2) :A		32(1.6) :A	25(1.5) :A	20(2.8) :A	25(3.4) :A	30(3.5) :A	24(3.5) :A	32(3.5) :A	26(3.3) :A
Plutonium-239/240	.64(.058) B:V	.63(.057) B:V	.37(.042) B:V		2.4(.11) :V	.62(.046) :V	18(.5) :V	23(.59) :V	5.2(.14) B:V	5.6(.19) :V	15(.36) :V	7.1(.21) :V
Uranium-233,-234	5(.58) B:V	2.9(.48) B:V	1.8(.29) B:V		1.7(.29) :V	1.2(.17) :V	1.1(.27) :V	.94(.16) :V	.87(.19) :V	.95(.18) :V	.77(.2) :V	.53(.18) :V
Uranium-235	.42(.14) :V	.11(.086) J:V	.072(.062) U:V		.13(.066) J:V	.013(.025) U:V	.059(.059) U:V	.032(.038) U:V	.029(.039) U:V	.018(.037) U:V	.063(.051) U:V	.038(.051) U:V
Uranium-238	4.6(.55) B:V	2.6(.44) B:V	1.4(.25) B:V		1.7(.29) :V	1.1(.17) :V	.82(.21) :V	.64(.12) :V	.93(.19) :V	.83(.16) :V	.71(.18) :V	.65(.18) :V

TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS			139.1N		139.1S			139.2			
HPGe (In situ)											
Station			7M	7N							
Americium-241			0.2	0.3							
Plutonium-239			0.0	0.0							
Thallium-232			1.42	1.47							
Uranium-238			1.4	1.7							
Uranium-235			0.08	0.06							
VSP HPGe											
LOCATION											
HPGe 0-2" (pCi/g)											
Sample ID:											
TOTAL ACTIVITY											
Americium-241											
Plutonium-239											
Thallium-234											
Uranium-235											
Uranium-237											
HPGe 2-4" (pCi/g)											
Sample ID:											
TOTAL ACTIVITY											
Americium-241											
Plutonium-239											
Thallium-234											
Uranium-235											
Uranium-237											
HPGe 4-6" (pCi/g)											
Sample ID:											
TOTAL ACTIVITY											
Americium-241											
Plutonium-239											
Thallium-234											
Uranium-235											
Uranium-237											
SURFACE SOILS											
Sample Location:	SS802993	SS803093			SS803993	SS804093	SS804193	SS804293	SS804393	SS804393	SS804493
Sample ID:	SSG0029JE	SSG0030JE			SSG0033JE	SSG0034JE	SSG0035JE	SSG0036JE	SSG0037JE	SSG0140JE	SSG0038JE
Date Sampled:	31-Oct-94	31-Oct-94			21-Nov-94	21-Nov-94	21-Nov-94	21-Nov-94	21-Nov-94	21-Nov-94	21-Nov-94
Units: pCi/g											
Americium-241	.79(.068) :V	.71(.1) :V			.016(.009) J:Y	.048(.01) :Y	.076(.013) :Y	.05(.018) :Y	.025(.01) :Y	.016(.011) U:Y	.021(.009) :Y
Gross Alpha	17(1.4) :A	18(1.4) :A			18(3.5) :A	18(3.5) :A	11(2.6) :A	15(3.2) :A	18(3.5) :A	15(3) :A	15(3.2) :A
Gross Beta	27(1.6) :A	25(1.4) :A			35(3.8) :A	27(3.4) :A	28(3.6) :A	25(3.4) :A	34(3.5) :A	31(3.5) :A	38(3.8) :A
Plutonium-239/240	1.4(.079) :V	3.5(.1) B:V			.051(.01) :Y	.28(.025) :Y	.2(.021) :Y	.1(.013) :Y	.061(.013) :Y	.042(.011) :Y	.074(.014) :Y
Uranium-233,-234	.67(.16) :V	.84(.18) :V			.78(.22) :Y	.74(.24) :Y	.4(.18) :Y	.63(.25) :Y	.62(.21) :Y	.68(.23) :Y	.57(.24) :Y
Uranium-235	.029(.039) U:V	.009(.018) U:V			.053(.071) U:Y	.057(.077) U:Y	.021(.084) U:Y	(.057) U:Y	.035(.035) U:Y	.022(.044) U:Y	.091(.092) U:Y
Uranium-238	.59(.15) :V	.86(.18) :V			.51(.18) :Y	.91(.27) :Y	.61(.22) :Y	.68(.25) :Y	.64(.21) :Y	.64(.23) :Y	.43(.2) :Y

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS	144N											
HPGe (In situ)												
Station												
Americium-241												
Plutonium-239												
Thallium-232												
Uranium-238												
Uranium-235												
VSP HPGe												
LOCATION	VP41094											
HPGe 0-2" (pCi/g)	0-2"											
Sample ID:	VPG434											
TOTAL ACTIVITY	184413.02											
Americium-241	0.15											
Plutonium-239	184,360.00											
Thallium-234	2.29											
Uranium-235												
Uranium-237	0.19											
HPGe 2-4" (pCi/g)	2-4"											
Sample ID:	VPG435											
TOTAL ACTIVITY	49.27											
Americium-241	0.1604											
Plutonium-239	<114000											
Thallium-234	1.6198											
Uranium-235	<0.2											
Uranium-237	<0.0966											
HPGe 4-6" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
SURFACE SOILS												
Sample Location:	SS804593	SS804693	SS804793	SS804893	SS804993	SS805093	SS805193	SS805293		SS805393	SS805493	SS805593
Sample ID:	SSG0039JE	SSG0040JE	SSG0041JE	SSG0042JE	SSG0043JE	SSG0044JE	SSG0045JE	SSG0046JE		SSG0047JE	SSG0048JE	SSG0049JE
Date Sampled:	26-Oct-94	26-Oct-94	26-Oct-94	26-Oct-94	26-Oct-94	26-Oct-94	26-Oct-94	26-Oct-94		10-Nov-94	10-Nov-94	10-Nov-94
Units: pCi/g												
Americium-241	.24(.044) :V	.084(.028) :V	.23(.038) :V	3.9(.34) :V	1.5(.15) :V	.17(.034) :V	.024(.014) :V	.16(.04) :V		.018(.011) U:V	.013(.008) J:V	.021(.014) :V
Gross Alpha	13(2.8) :A	13(2.7) :A	17(3.3) :A	27(3.8) :A	99(7.1) :A	14(2.7) :A	13(3) :A	12(2.6) :A		9.2(2.4) :A	7.7(2.3) :A	6.8(2.3) :A
Gross Beta	21(3.1) :A	22(3.4) :A	23(3.3) :A	25(3.6) :A	17(3.2) :A	20(3.1) :A	24(3.2) :A	25(3.5) :A		26(3.2) :A	32(3.7) :A	22(3.2) :A
Plutonium-239/240	.94(.071) B:V	.27(.036) B:V	1.1(.077) B:V	22(.67) B:V	6.3(.23) B:V	1.1(.075) B:V	.16(.016) :V	1.1(.072) B:V		.035(.013) :V	.055(.015) :V	.098(.02) :V
Uranium-233,-234	.41(.14) B:V	.73(.18) B:V	.94(.26) B:V	.82(.17) B:V	.61(.17) B:V	.6(.18) B:V	.61(.22) B:V	.49(.15) B:V		.64(.16) :V	.63(.16) :V	.61(.15) :V
Uranium-235	.04(.054) U:V	.089(.067) J:V	.11(.073) J:V	.063(.054) U:V	.084(.073) U:V	.053(.053) U:V	.036(.036) U:V	.097(.073) J:V		.035(.047) U:V	.052(.042) U:V	.019(.019) U:V
Uranium-238	.42(.14) B:A	.73(.18) B:V	.81(.23) B:V	.85(.18) B:V	.79(.19) B:V	.52(.16) B:A	.28(.12) BJ:A	.55(.17) B:A		.63(.16) :V	.61(.16) :V	.59(.15) :V

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS	144S											150.1
HPGe (In situ)												
Station									7H		7G	
Americium-241									0.5		0.0	
Plutonium-239									2.7		0.0	
Thallium-232									1.50		1.65	
Uranium-238									1.5		2.3	
Uranium-235									0.06		0.06	
VSP HPGe												
LOCATION												
HPGe 0-2" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
HPGe 2-4" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
HPGe 4-6" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
SURFACE SOILS												
Sample Location:	SS805593	SS805693	SS805793	SS805893	SS805993		SS806093	SS806193	SS806293	SS806393	SS806493	SS806593
Sample ID:	SSG0132JE	SSG0050JE	SSG0051JE	SSG0052JE	SSG0053JE		SSG0054JE	SSG0055JE	SSG0056JE	SSG0057JE	SSG0058JE	SSG0059JE
Date Sampled:	10-Nov-94	10-Nov-94	10-Nov-94	10-Nov-94	10-Nov-94		16-Nov-94	16-Nov-94	16-Nov-94	16-Nov-94	16-Nov-94	16-Nov-94
Units: pCi/g												
Americium-241	.006(.012) U:V	.026(.017) :V	.007(.012) U:V	.018(.008) J:V	.012(.011) U:V		.051(.015) :Y	.16(.021) :Y	.068(.019) :Y	.015(.009) J:Y	.052(.012) :Y	.26(.033) :Y
Gross Alpha	13(2.7) :A	16(3.1) :A	7.8(2.1) :A	13(2.9) :A	8.6(2.5) :A		19(4) :A	12(2.8) :A	37(6.4) :A	17(3.5) :A	19(3.7) :A	19(3.7) :A
Gross Beta	26(3.4) :A	30(3.4) :A	24(3.2) :A	29(3.3) :A	32(3.7) :A		41(3.8) :A	35(3.5) :A	39(4.1) :A	35(3.7) :A	41(3.8) :A	26(3.4) :A
Plutonium-239/240	.013(.007) J:V	.065(.017) :V	.037(.013) :V	.13(.021) :V	.01(.012) U:V		.27(.023) :Y	.18(.021) :Y	.26(.024) :Y	.028(.009) J:Y	.004(.004) U:Y	.085(.014) :Y
Uranium-233,-234	.69(.2) :V	.67(.16) :V	.56(.16) :V	.55(.17) :V	.52(.16) :V		.92(.15) :Y	.59(.11) :Y	.92(.15) :Y	.79(.18) :Y	.83(.18) :Y	.83(.19) :Y
Uranium-235	.066(.066) U:V	.028(.037) U:V	.053(.053) U:V	.12(.073) J:V	(.026) U:V		.054(.033) J:Y	.064(.047) J:Y	.065(.036) J:Y	.062(.062) U:Y	.046(.037) U:Y	.043(.044) U:Y
Uranium-238	.68(.2) :V	.51(.13) :V	.53(.16) :V	.55(.17) :V	.57(.16) :V		.91(.14) :Y	.58(.11) :Y	.94(.15) :Y	.74(.18) :Y	.84(.18) :Y	.88(.19) :Y

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS							150.2						
HPGe (In situ)													
Station	7F	7FB		7E			7P			7Q		7R	
Americium-241	0.0	0.0		0.0			0.0			0.0		0.8	
Plutonium-239	0.0	0.0		0.0			0.0			0.0		11.4	
Thallium-232	1.66	1.55		1.52			1.09			1.25		1.14	
Uranium-238	2.4	1.7		2.4			2.0			2.2		2.0	
Uranium-235	0.10	0.07		0.07			0.06			0.08		0.10	
VSP HPGe													
LOCATION							VP40394	VP40494	VP40594	VP41494		VP41794	VP41994
HPGe 0-2" (pCi/g)							0-2"	0-2"	0-2"	0-2" (DUP)			0-2"
Sample ID:							VPG407	VPG410	VPG413	VPG450			VPG465
TOTAL ACTIVITY							36.96	33.28	5.45	45.21			35.44
Americium-241							<0.113	<0.151	<0.283	<0.618			<0.136
Plutonium-239							<101000	<71500	<62300	<101000			<60800
Thallium-234							2.0275	2.7462	<1.98	<3.62			<1.03
Uranium-235							<0.152	<0.199	<0.135	<0.187			<0.207
Uranium-237							<0.088	<0.123	<0.103	<0.132			<0.103
HPGe 2-4" (pCi/g)							2-4"	2-4"	2-4"	2-4"		2-4"	2-4"
Sample ID:							VPG408	VPG411	VPG414	VPG448		VPG459	VPG466
TOTAL ACTIVITY							37.16	281427.46	27.51	36.46		20.60	26.38
Americium-241							<0.391	<0.197	<0.105	<0.317		<0.392	<0.303
Plutonium-239							<124000	281400.0000	<96300	<130000		<122000	<119000
Thallium-234							3.7632	<2.73	1.2945	<2.71		<2.24	3.5431
Uranium-235							<0.169	<0.174	<0.179	<0.182		<0.168	<0.164
Uranium-237							<0.136	<0.108	<0.0846	<0.0776		<0.113	<0.128
HPGe 4-6" (pCi/g)									4-6"			4-6"	4-6"
Sample ID:									VPG415			VPG460	VPG467
TOTAL ACTIVITY									33.81			25.91	22.20
Americium-241									<0.27			<0.39	<0.332
Plutonium-239									<140000			<128000	<120000
Thallium-234									3.6671			<2.45	<2.12
Uranium-235									<0.171			<0.163	<0.132
Uranium-237									<0.127			<0.11	<0.0581
SURFACE SOILS													
Sample Location:	SS806693	SS806793	SS806793	SS806893	SS806993							SS807493	SS807593	SS807693
Sample ID:	SSG0060JE	SSG0061JE	SSG0134JE	SSG0062JE	SSG0063JE							SSG0068JE	SSG0069JE	SSG0070JE
Date Sampled:	16-Nov-94	15-Nov-94	15-Nov-94	16-Nov-94	16-Nov-94							12-Dec-94	12-Dec-94	12-Dec-94
Units: pCi/g														
Americium-241	.023(.014) :Y	.027(.016) :Y	.031(.013) :Y	(.01) U:Y	.006(.01) U:Y							.052(.011) :V	.028(.01) :V	.29(.029) :V
Gross Alpha	33(4.9) :A	17(3.6) :A	18(3.5) :A	14(3.1) :A	16(3.8) :A							10(2.6) :A	13(2.8) :A	14(2.8) :A
Gross Beta	43(3.9) :A	36(3.6) :A	39(3.8) :A	38(3.6) :A	34(3.8) :A							22(3.2) :A	21(3) :A	23(3.4) :A
Plutonium-239/240	.036(.008) :Y	.055(.018) :Y	.081(.019) :Y	.002(.003) U:Y	.004(.004) U:Y							.097(.016) B:V	.11(.017) B:V	1.3(.054) B:V
Uranium-233,-234	.74(.17) :Y	.68(.2) :Y	.65(.18) :Y	1(.21) :Y	1.1(.25) :Y							1(.18) B:V	.81(.15) B:V	.96(.33) B:V
Uranium-235	.054(.044) U:Y	.044(.058) U:Y	.059(.06) U:Y	.057(.039) U:Y	.1(.076) J:Y							.073(.049) J:V	.028(.042) U:V	.12(.12) U:V
Uranium-238	.72(.17) :Y	.8(.21) :Y	.59(.18) :Y	.83(.17) :Y	1.2(.25) :Y							.88(.17) :V	.96(.16) :V	.73(.27) :V

TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS	150.3						150.4					
HPGe (In situ)												
Station	7S										8E	
Americium-241	1.5										0.2	
Plutonium-239	13.7										0.5	
Thallium-232	1.22										0.79	
Uranium-238	1.8										1.6	
Uranium-235	0.09										0.05	
VSP HPGe												
LOCATION	VP41894											
HPGe 0-2" (pCi/g)	0-2" (DUP)											
Sample ID:	VPG462											
TOTAL ACTIVITY	41.75											
Americium-241	0.2206											
Plutonium-239	<92600											
Thallium-234	<1.1											
Uranium-235	0.1934											
Uranium-237	<0.112											
HPGe 2-4" (pCi/g)	2-4"											
Sample ID:	VPG463											
TOTAL ACTIVITY	35.64											
Americium-241	<0.446											
Plutonium-239	<123000											
Thallium-234	<3.01											
Uranium-235	<0.203											
Uranium-237	<0.148											
HPGe 4-6" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
SURFACE SOILS												
Sample Location:	SS807793	SS807893	SS807893	SS807993	SS808093		SS808193	SS808293	SS808393	SS808393	SS808493	SS808593
Sample ID:	SSG0071JE	SSG0072JE	SSG0153JE	SSG0073JE	SSG0074JE		SSG0075JE	SSG0076JE	SSG0077JE	SSG0137JE	SSG0078JE	SSG0079JE
Date Sampled:	12-Dec-94	12-Dec-94	12-Dec-94	12-Dec-94	12-Dec-94		18-Nov-94	18-Nov-94	18-Nov-94	18-Nov-94	18-Nov-94	18-Nov-94
Units: pCi/g												
Americium-241	.12(.018) :V	.42(.037) :V	.31(.03) :V	2.7(.15) :V	1.8(.095) :V		.004(.009) U:Y	.001(.006) U:Y	.006(.01) U:Y	.005(.011) U:Y	.007(.007) U:Y	.004(.005) U:Y
Gross Alpha	14(3.1) :A	15(3) :A	16(3.1) :A	20(3.4) :A	23(3.7) :A		38(5.1) :A	19(3.6) :A	25(4.1) :A	30(4.4) :A	20(3.9) :A	18(3.7) :A
Gross Beta	23(3.3) :A	25(3.2) :A	22(3.5) :A	25(3.4) :A	28(3.6) :A		52(4.2) :A	37(3.6) :A	37(3.7) :A	34(3.8) :A	34(3.6) :A	41(3.7) :A
Plutonium-239/240	.095(.016) B:V	.45(.034) B:V	.36(.03) B:V	1.9(.074) B:V	1.2(.058) B:V		.027(.008) J:Y	-.002(.003) U:Y	.026(.008) J:Y	.019(.008) J:Y	.053(.011) :Y	.006(.005) J:Y
Uranium-233,-234	.68(.14) B:V	.75(.16) B:V	.73(.13) B:V	.66(.13) B:V	.88(.16) B:V		3.3(.44) :Y	.68(.18) :Y	.74(.17) :Y	.91(.19) :Y	.71(.17) :Y	1(.21) :Y
Uranium-235	.015(.015) U:V	.062(.054) U:V	.038(.038) U:V	.051(.038) J:V	.037(.03) U:V		.15(.088) J:Y	.056(.045) U:Y	.031(.042) U:Y	.065(.044) U:Y	.067(.057) U:Y	.031(.042) U:Y
Uranium-238	.8(.16) :V	.74(.16) :V	.77(.14) :V	.64(.12) :V	.91(.16) :V		3.5(.46) :Y	.69(.18) :Y	.95(.19) :Y	1(.21) :Y	.79(.17) :Y	1(.21) :Y

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS					150.6						
HPGe (In situ)											
Station					7Z	8A		8B			
Americium-241					0.8	2.0		0.0			
Plutonium-239					0.0	0.0		0.0			
Thallium-232					1.61	1.48		1.55			
Uranium-238					2.3	2.0		2.1			
Uranium-235					0.08	0.10		0.09			
VSP HPGe											
LOCATION				VP41594	VP41394						
HPGe 0-2" (pCi/g)				0-2"							
Sample ID:				VPG451							
TOTAL ACTIVITY				32.94							
Americium-241				<0.369							
Plutonium-239				<78300							
Thallium-234				<2.07							
Uranium-235				<0.0958							
Uranium-237				<0.069							
HPGe 2-4" (pCi/g)				2-4"	2-4"						
Sample ID:				VPG452	VPG445						
TOTAL ACTIVITY				29.08	43.16						
Americium-241				<0.389	<0.277						
Plutonium-239				<62700	<72500						
Thallium-234				<2.24	<2.17						
Uranium-235				<0.11	<0.144						
Uranium-237				<0.0801	<0.122						
HPGe 4-6" (pCi/g)				4-6"	4-6"						
Sample ID:				VPG453	VPG446						
TOTAL ACTIVITY				35.37	42.88						
Americium-241				<0.431	<0.487						
Plutonium-239				<84400	<62100						
Thallium-234				3.6440	<2.75						
Uranium-235				<0.142	<0.168						
Uranium-237				<0.0961	<0.104						
SURFACE SOILS											
Sample Location:	SS808693	SS808793	SS808893	SS808993	SS809093	SS809193	SS809293	SS809393	SS809393	SS809493	SS809593
Sample ID:	SSG0080JE	SSG0081JE	SSG0082JE	SSG0083JE	SSG0084JE	SSG0085JE	SSG0086JE	SSG0087JE	SSG0130JE	SSG0088JE	SSG0089JE
Date Sampled:	9-Nov-94	21-Nov-94	9-Nov-94	9-Nov-94	8-Nov-94	21-Nov-94	21-Nov-94	9-Nov-94	9-Nov-94	21-Nov-94	9-Nov-94
Units: pCi/g											
Americium-241	.014(.009) J:V	.2(.029) :Y	.4(.05) :V	.012(.014) U:V	.003(.006) U:V	.003(.009) U:Y	.25(.035) :Y	.008(.012) U:V	.005(.005) U:V	.006(.011) U:Y	.057(.019) :V
Gross Alpha	8.2(2.2) :A	16(3.7) :A	23(3.8) :A	12(2.7) :A	6.9(2.2) :A	20(3.8) :A	13(2.9) :A	25(4.1) :A	24(3.8) :A	23(4.1) :A	25(4) :A
Gross Beta	28(3.4) :A	34(3.7) :A	29(3.5) :A	30(3.4) :A	15(3.2) :A	36(3.6) :A	29(3.5) :A	37(3.8) :A	34(3.7) :A	35(3.7) :A	33(3.6) :A
Plutonium-239/240	.023(.01) J:V	1.3(.062) :Y	2.6(.12) :V	.031(.012) :V	.006(.006) U:V	.004(.004) U:Y	1.7(.077) :Y	.007(.006) J:V	.014(.008) J:V	.013(.005) J:Y	.28(.033) :V
Uranium-233,-234	.61(.16) :V	.87(.2) :Y	.64(.16) :V	.49(.13) :V	.35(.12) :V	.81(.2) :Y	.6(.15) :Y	.89(.19) :V	.92(.19) :V	.92(.2) :Y	.93(.19) :V
Uranium-235	.074(.063) U:V	.066(.044) U:Y	.038(.038) U:V	.052(.052) U:V	.049(.04) U:V	.022(.045) U:Y	.033(.044) U:Y	.039(.039) U:V	.029(.039) U:V	.052(.042) U:Y	.075(.065) U:V
Uranium-238	.61(.15) :V	.93(.2) :Y	.71(.17) :V	.68(.15) :V	.3(.1) :V	.6(.16) :Y	.55(.15) :Y	1(.2) :V	.81(.17) :V	1.1(.21) :Y	.92(.19) :V

TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS	150.7					163.1						
HPGe (In situ)												
Station	8F	8G										
Americium-241	1.1	0.4										
Plutonium-239	6.4	0.8										
Thallium-232	1.70	1.59										
Uranium-238	1.9	2.0										
Uranium-235	0.07	0.08										
VSP HPGe												
LOCATION			VP40194/VP40194	VP40294				VP42094				
HPGe 0-2" (pCi/g)			0-2"/0-2"(DUP)	0-2"				0-2"				
Sample ID:			VPG401/VPG417	VPG404				VPG469				
TOTAL ACTIVITY			61.8948/52.5194	53.42				29.56				
Americium-241			0.1668/<0.132	0.8241				<0.383				
Plutonium-239			<143000/<131000	<199000				<37000				
Thallium-234			3.2156/1.8036	5.3709				<2.21				
Uranium-235			<0.216/0.2114	0.2417				<0.134				
Uranium-237			<0.114/<0.117	<0.164				<0.0848				
HPGe 2-4" (pCi/g)			2-4"	2-4"				2-4"				
Sample ID:			VPG402	VPG406				VPG470				
TOTAL ACTIVITY			53.35	50.81				40.90				
Americium-241			0.1781	<0.417				<0.28				
Plutonium-239			<63300	<109000				<95300				
Thallium-234			1.5723	<2.16				<1.92				
Uranium-235			0.2700	<0.177				0.1340				
Uranium-237			<0.103	<0.152				<0.0401				
HPGe 4-6" (pCi/g)			4-6"									
Sample ID:			VPG403									
TOTAL ACTIVITY			52.81									
Americium-241			0.2051									
Plutonium-239			<115000									
Thallium-234			1.7687									
Uranium-235			0.2935									
Uranium-237			<0.114									
SURFACE SOILS												
Sample Location:	SS809993	SS810093				SS810693	SS810793	SS810893	SS810993	SS811093	SS811193	SS811193
Sample ID:	SSG0093JE	SSG0094JE				SSG0100JE	SSG0101JE	SSG0102JE	SSG0103JE	SSG0104JE	SSG0105JE	SSG0148JE
Date Sampled:	30-Nov-94	30-Nov-94				2-Dec-94	2-Dec-94	2-Dec-94	5-Dec-94	5-Dec-94	2-Dec-94	2-Dec-94
Units: pCi/g												
Americium-241	-.001(.005) U:Y	.026(.012) :Y				.61(.081) :Y	.43(.051) :Y	.25(.029) :Y	.009(.005) J:V	.015(.006) J:V	.15(.028) :Y	.12(.02) :Y
Gross Alpha	22(3.7) :A	20(3.6) :A				16(3.1) :Y	23(3.6) :Y	8.8(2.6) :Y	17(3.4) :A	17(3.4) :A	15(2.9) :Y	8.5(2.4) :Y
Gross Beta	38(3.8) :A	38(3.7) :A				28(3.4) :Y	29(3.6) :Y	28(3.2) :Y	28(3.7) :A	36(3.6) :A	31(3.4) :Y	32(3.5) :Y
Plutonium-239/240	-.003(.006) U:Y	.022(.009) J:Y				.58(.035) :Y	.38(.029) :Y	.36(.031) :Y	.02(.008) BJ:V	.015(.006) BJ:V	.13(.015) :Y	.13(.015) :Y
Uranium-233,-234	.79(.28) :Y	.85(.17) :Y				.79(.074) B:Y	.79(.14) :Y	.45(.14) :Y	.69(.28) B:V	1(.33) B:V	.51(.16) :Y	.53(.16) :Y
Uranium-235	.023(.091) U:Y	.05(.043) U:Y				.052(.022) J:Y	.042(.036) U:Y	.036(.048) U:Y	.081(.11) U:V	(.046) U:V	.064(.052) U:Y	(.024) U:Y
Uranium-238	.73(.24) :Y	.77(.15) :Y				.83(.077) :Y	.88(.14) :Y	.61(.17) :Y	.87(.29) :V	.99(.29) :V	.31(.13) :Y	.52(.15) :Y

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS				172																				
HPGe (In situ)																								
Station				3I	3J	3K	3M	3N	3O	4M	4N	4O	4P	4Q	4R	4S	4T	4U	4V	6X	6Y	6Z	7A	7B
Americium-241				3.4	1.4	0.3	0.3	0.2	0.1	0.0	0.0	19.1	10.6	5.1	0.8	0.0	0.0	0	0.1	0	0	0.0	0.0	0.0
Plutonium-239				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thallium-232				0.91	0.86	1.20	0.99	0.99	0.86	0.97	1.51	1.54	2.15	1.35	1.3	1.33	1.21	1.06	1	1.05	1.28	1.46	124.00	1.35
Uranium-238				1.6	1.5	2.4	4.7	9.5	7.1	3.0	2.4	3.3	2.7	2.0	2.1	2.0	1.7	1.8	2.1	2.3	2.2	2.3	2.4	1.9
Uranium-235				0.05	0.05	0.05	0.07	0.09	0.07	0.06	0.05	0.08	0.08	0.05	0.06	0.09	0.05	0.04	0.07	0.09	0.08	0.09	0.09	0.08
VSP HPGe																								
LOCATION			VP42194																	VP41694				
HPGe 0-2" (pCi/g)			0-2"																	0-2"				
Sample ID:			VPG472																	VPG454				
TOTAL ACTIVITY			12.16																	6.43				
Americium-241			<0.294																	<0.0971				
Plutonium-239			<52500																	<87700				
Thallium-234			<1.41																	1.3149				
Uranium-235			<0.11																	<0.131				
Uranium-237			<0.0985																	<0.0679				
HPGe 2-4" (pCi/g)			2-4" (DUP)																	2-4"				
Sample ID:			VPG475																	VPG455				
TOTAL ACTIVITY			25.75																	66.70				
Americium-241			<0.416																	<0.174				
Plutonium-239			<71000																	<105000				
Thallium-234			<2.5																	<1.97				
Uranium-235			<0.136																	0.1130				
Uranium-237			<0.105																	<0.0787				
HPGe 4-6" (pCi/g)			4-6"																	4-6"				
Sample ID:			VPG474																	VPG456				
TOTAL ACTIVITY			32.43																	31.94				
Americium-241			0.2973																	<0.0898				
Plutonium-239			<53400																	<49600				
Thallium-234			<1.53																	0.9461				
Uranium-235			<0.13																	0.1706				
Uranium-237			<0.0989																	<0.0698				
SURFACE SOILS																								
Sample Location:	SS811293	SS811393	SS811493																					
Sample ID:	SSG0106JE	SSG0107JE	SSG0108JE																					
Date Sampled:	5-Dec-94	5-Dec-94	2-Dec-94																					
Units: pCi/g																								
Americium-241	.95(.054) :V	.017(.006) J:V	.98(.16) :Y																					
Gross Alpha	23(3.9) :A	20(3.5) :A	18(3.3) :Y																					
Gross Beta	27(3.3) :A	39(3.8) :A	67(4.5) :Y																					
Plutonium-239/240	.55(.04) B:V	.015(.007) BJ:V	1.9(.077) :Y																					
Uranium-233,-234	.65(.25) B:V	.88(.26) B:V	.81(.21) :Y																					
Uranium-235	.1(.082) U:V	.037(.037) U:V	.067(.054) U:Y																					
Uranium-238	.72(.25) :V	.6(.19) :V	.65(.19) :Y																					

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TABLE 2-2
Summary of Comparison of In Situ HPGe, Lab HPGe, and Laboratory Radiochemistry

IHSS					173			184	NO IHSS SPECIFIED			
HPGe (In situ)												
Station	7C	7D	7I	9L				8C	4W	4X	4Y	4Z
Americium-241	0.0	0.0	1.2	0.0				0.0	0.0	0.0	0.0	0.0
Plutonium-239	0.0	0.0	8.8	0.0				0.0	0.0	0.0	0.0	0.0
Thallium-232	1.44	1.35	1.64	1.45				1.53	1.35	1.81	1.84	1.91
Uranium-238	2.6	2.2	1.8	1.8				1.7	5.8	2.6	3.2	3.3
Uranium-235	0.10	0.08	0.06	0.08				0.09	0.07	0.06	0.06	0.07
VSP HPGe												
LOCATION								VP42294				
HPGe 0-2" (pCi/g)												
Sample ID:												
TOTAL ACTIVITY												
Americium-241												
Plutonium-239												
Thallium-234												
Uranium-235												
Uranium-237												
HPGe 2-4" (pCi/g)								2-4"				
Sample ID:								VPG478				
TOTAL ACTIVITY								23.53				
Americium-241								<0.0898				
Plutonium-239								<49600				
Thallium-234								0.9461				
Uranium-235								0.1706				
Uranium-237								<0.0698				
HPGe 4-6" (pCi/g)								4-6" (DUP)				
Sample ID:								VPG480				
TOTAL ACTIVITY								2.48				
Americium-241								<0.168				
Plutonium-239								<59300				
Thallium-234								<1.49				
Uranium-235								<0.11				
Uranium-237								<0.0719				
SURFACE SOILS												
Sample Location:			SS811593		SS811893	SS811993	SS812093		12-Dec-94	12-Dec-94		
Sample ID:			SSG0109JE		SSG0110JE	SSG0111JE	SSG0112JE					
Date Sampled:			13-Dec-94		6-Dec-94	6-Dec-94	20-Dec-94		.18(.023) :V	1.1(.07) :V		
Units: pCi/g									14(3) :A	17(3.2) :A		
Americium-241			.046(.011) :V		.003(.003) U:V	.007(.005) J:V	.002(.003) U:V		26(3.4) :A	24(3.3) :A		
Gross Alpha			8(2.1) :A		26(4) :A	21(3.7) :A	14(2.8) :A		.17(.024) B:V	2(.074) B:V		
Gross Beta			18(2.9) :A		40(3.7) :A	39(3.7) :A	32(3.7) :A		.85(.25) B:V	.94(.16) B:V		
Plutonium-239/240			.088(.012) :V		.006(.006) U:V	.002(.002) U:V	.002(.002) U:V		.017(.034) U:V	.056(.038) J:V		
Uranium-233,-234			.61(.14) :V		1.3(.32) B:V	1.1(.28) B:V	.83(.22) :V		.68(.21) :V	.93(.16) :V		
Uranium-235			.046(.046) U:V		.037(.038) U:V	.046(.061) U:V	.028(.028) U:V					
Uranium-238			.5(.12) :V		1.1(.31) :V	.85(.22) :V	.73(.2) :V					

Notes:

A = laboratory qualifier considered acceptable
B = detected in blank
HPGe = high purity germanium
IHSS = individual hazardous substance site
J = estimated value
pCi/g = picocuries per gram
U = undetected
V = valid data
VSP = vertical soil profile
Y = data in process of being validated

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TABLE 2-3
Analytes for Laboratory HPGe/Vertical Soil Profile Samples from OU8 IHSSs
Rocky Flats Environmental Technology Site

ANALYTE

AG-110M	NP-237
AM-241	NP-239
AM-243	PB-210
BA-133	PB-212
BA-140	PB-214
BE-7	PU-239
BI-207	PU-242
BI-214	RA-224
CD-109	RA-226
CE-139	RH-101
CE-144	RH-102
CO-57	RH-102M
CO-60	RU-103
CR-51	SB-124
CS-134	SB-125
CS-136	SN-113
CS-137	SR-85
EU-152	TE-132
EU-154	TH-228
EU-155	TH-234
FE-59	U-235
HG-203	U-237
K-40	XE-133
MN-54	XE-133M
MO-99	Y-88
NA-22	ZN-65
NB-95	ZR-95
ND-147	

Notes:
HPGe = high purity germanium
IHSS = individual hazardous substance site
OU8 = Operable Unit 8

Metastable radioisotopes are designated with the suffix "M."

TABLE 2-4
Target Analytes for Asphalt Samples from OU8 IHSSs Rocky Flats Environmental Technology Site

AMERICIUM-241
CESIUM-134
CESIUM-137
PLUTONIUM-239,240
PLUTONIUM-238
STRONTIUM-89
STRONTIUM-90
URANIUM-238
URANIUM-235
URANIUM-234

TABLE 2-5
Analytes of EPA Method 524.2 and Target Detection Limit for Soil-Gas Sampling Activities at OU8 Rocky Flats Environmental Technology Site

Compound	Detection Quantification Limit
Dichlorodifluoromethane	1.0 µg/L
Chloromethane	1.0 µg/L
Vinyl Chloride	1.0 µg/L
Bromomethane	1.0 µg/L
Chloroethane	1.0 µg/L
Trichlorofluoromethane	1.0 µg/L
Acetone*	1.0 µg/L
1,1-Dichloroethene	1.0 µg/L
Methylene Chloride*	1.0 µg/L
trans-1,2-Dichloroethene	1.0 µg/L
Carbon Disulfide*	1.0 µg/L
1,1-Dichloroethane*	1.0 µg/L
2-Butanone*	1.0 µg/L
cis-1,2-Dichloroethene	1.0 µg/L
2,2-Dichloropropane	1.0 µg/L
Bromochloromethane	1.0 µg/L
Chloroform*	1.0 µg/L
1,1,1-Trichloroethane*	1.0 µg/L
1,1-Dichloropropene	1.0 µg/L
Carbon Tetrachloride*	1.0 µg/L
1,2-Dichloroethane*	1.0 µg/L
Benzene*	1.0 µg/L
Trichloroethene*	1.0 µg/L
1,2-Dichloropropane	1.0 µg/L
Debromomethane	1.0 µg/L
Bromodichloromethane	1.0 µg/L
trans-1,3-Dichloropropene	1.0 µg/L
Toluene*	1.0 µg/L
cis-1,3-Dichloropropene	1.0 µg/L
1,2-Dibromoethane	1.0 µg/L
1,3-Dichloropropane	1.0 µg/L
Tetrachloroethene*	1.0 µg/L
Dibromochloromethane	1.0 µg/L
Chlorobenzene	1.0 µg/L
1,1,1,2-Tetrachloroethane	1.0 µg/L
Ethylbenzene*	1.0 µg/L
m & p-Xylenes*	1.0 µg/L
o-Xylene*	1.0 µg/L
Styrene	1.0 µg/L
Bromoform	1.0 µg/L
Isopropylbenzene	1.0 µg/L
1,1,2,2-Tetrachloroethane	1.0 µg/L
Bromobenzene	1.0 µg/L
1,2,3-Trichloropropane	1.0 µg/L
n-Propylbenzene	1.0 µg/L

TABLE 2-5
Analytes of EPA Method 524.2 and Target Detection Limit for Soil-Gas Sampling Activities at OU8 Rocky Flats Environmental Technology Site

Compound	Detection Quantification Limit
2-Chlorotoluene	1.0 µg/L
1,3,5-Trimethylbenzene	1.0 µg/L
4-Chlorotoluene	1.0 µg/L
t-Butylbenzene	1.0 µg/L
1,2,4-Trimethylbenzene	1.0 µg/L
s-Butylbenzene	1.0 µg/L
1,3-Dichlorobenzene	1.0 µg/L
p-Isopropyltoluene	1.0 µg/L
1,4-Dichlorobenzene	1.0 µg/L
n-Butylbenzene	1.0 µg/L
1,2-Dichlorobenzene	1.0 µg/L
1,2-Dibromo-3-chloropropane	1.0 µg/L
1,2,4-Trichlorobenzene	1.0 µg/L
Hexachlorobutadiene	1.0 µg/L
Napthalene	1.0 µg/L
1,2,3-Trichlorobenzene	1.0 µg/L

Notes:

OU8 = Operable Unit 8
µg/L = *micrograms per liter*
* Indicates the compound was listed as a Target Analyte in the OU8 RFI/RI Work Plan (DOE 1994a).

TABLE 2-6
Analytical Parameter and Detection/Quantitation Limits for Surface-Soil Sampling Activities from the OU8 RFI/RI Work Plan (DOE 1994a)

Target Compound List Volatiles

	Soil Limits (µg/kg)
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-Dichoropropane	5
2-Butanone	10
2-Hexanone	10
4-Methyl-2-pentanone	10
Acetone	10
Benzene	5
Bromodichloromethane	5
Bromoform	5
Bromomethane	10
Carbon Disulfide	5
Carbon Tetrachloride	5
Chlorobenzene	5
Chloroethane	10
Chloroform	5
Chloromethane	10
cis-1,3-Dichloropropene	5
Dibromochloromethane	5
Ethyl Benzene	5
Methylene Chloride	5
Styrene	5
Tetracholoroethene	5
Toluene	5
trans-1,2-Dichloropropene	5
Trichloroethene	5
Vinyl Acetate	10
Vinyl Chloride	10
Xylenes (total)	5

Target Compound List Semivolatiles

	Soil Limits (µg/kg)
1-2-Dichlorobenzene	330
1-3-Dichlorobenzene	330
1-4-Dichlorobenzene	330
2-Chlorophenol	330
Benzyl Alcohol	330
bis(2-Chloroethyl)ether	330
Phenol	330

TABLE 2-6
Analytical Parameter and Detection/Quantitation Limits for Surface-Soil Sampling Activities from the OU8 RFI/RI Work Plan (DOE 1994a)

Target Compound List Semivolatiles (cont'd.)	Soil Limits (µg/kg)
1,2,4-Trichlorobenzene	330
2,4,5-Trichlorophenol	1600
2,4,6-Trichlorophenol	330
2,4-Dichlorophenol	330
2,4-Dimethylphenol	330
2,4-Dinitrophenol	1600
2,4-Dinitrotoluene	330
2,6-Dinitrotoluene	330
2-Chloronaphthalene	330
2-Methylnaphthalene	330
2-Methylphenol	330
2-Nitroaniline	1600
2-Nitrophenol	330
3-Nitrophenol	1600
4,6-Dinitro-2-methylphenol	1600
4-Bromophenyl-Phenyl ether	330
4-Chloro-3-methylphenol	330
4-Chloroaniline	330
4-Chlorophenol Phenyl ether	330
4-Methylphenol	330
4-Nitroaniline	1600
4-Nitrophenol	1600
Acenaphthene	330
Acenaphthylene	330
Anthracene	330
Benzoic Acid	1600
bis(2-Chloroethoxy)methane	330
bis(2-Chloroisopropyl)ether	330
Di-n-butylphtalate	330
Dibenzofuran	330
Diethylphtalate	330
Dimethylphtalate	330
Flouranthene	330
Fluorene	330
Hexachlorobutadiene	330
Hexachlorocyclopentadiene	330
Hexachloroethane	330
Isophorone	330
N-Nitroso-Dipropylamine	330
N-nitrosodiphenylamine(1)	330
Naphthalene	330
Nitrobenzene	330
Phenanthrene	330

TABLE 2-6
Analytical Parameter and Detection/Quantitation Limits for Surface-Soil Sampling Activities from the OU8 RFI/RI Work Plan (DOE 1994a)

Target Compound List Semivolatiles (cont'd.)	Soil Limits (µg/kg)
3,3'-Dichlorobenzidine	660
Benzo(a)anthracene	330
Benzo(a)pyrene	330
Benzo(b)flouranthene	330
Benzo(g,h,i)perylene	330
Benzo(k)flouranthene	330
bis-(2-ethylhexyl)phthalate	330
Butyl Benzlyphthalate	330
Chrysene	330
Di-n-octyl Phthalate	330
Dibenz(a,h)anthracene	330
Ideno(1,2,3-cd)pyrene	330
Pyrene	330

Target Analyte List Metals	Soil Limits (mg/kg)
Aluminum	40.0
Antimony	12.0
Arsenic	2.0
Barium	40.0
Beryllium	1.0
Cadmium	1.0
Calcium	2000.0
Chromium	2.0
Cobalt	10.0
Copper	5.0
Cyanide	10.0
Iron	20.0
Lead	1.0
Lithium	20.0
Magnesium	2000.0
Manganese	3.0
Mercury	0.2
Nickel	8.0
Potassium	2000.0
Selenium	1.0
Silver	2.0
Sodium	2.0
Thallium	2.0
Vanadium	10.0
Zinc	4.0

Notes:

Detection limits are identified in the *Quality Assurance Project Plan*. EPA Contract Laboratory Method for Target Compound List volatiles was used unless noted otherwise.

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

TABLE 2-7

Summary Statistics for BSCP* Group 1 Analytes: Metals and Naturally Occurring Radionuclides

Analyte	Distribution	Count	% Non-Detect	Min	Max	Mean	Standard Deviation	Tolerance Factor	99/99 UTL[a]	Units
Aluminum	Normal	20	0	4050	17100	10244	3329	3.8316	22999	mg/kg
Antimony	X	20	96	.19U	0.47	X	X	3.8316	X	mg/kg
Arsenic	Normal	20	0	2.3	9.6	6.09	2	3.8316	13.75	mg/kg
Barium	Normal	20	0	45.7	134	102.4	19.43	3.8316	176	mg/kg
Beryllium	Normal	20	0	0.24	0.9	0.66	0.153	3.8316	1.25	mg/kg
Cadmium	Nonparam	20	39	.295U	2.3	0.714	0.449	3.8316	2.335	mg/kg
Calcium	Normal	20	0	1450	4550	2969	749	3.8316	5839	mg/kg
Cesium	X	20	100	6.05U	7U	X	X	3.8316	X	mg/kg
Chromium	Normal	20	0	5.5	16.9	11.29	2.85	3.8316	22.21	mg/kg
Cobalt	Normal	20	0	3.4	11.2	7.29	1.81	3.8316	14.22	mg/kg
Copper	Nonparam	20	0	5.2	15.85	12.94	2.56	3.8316	22.75	mg/kg
Iron	Normal	20	0	7390	18100	12549	2744	3.8316	23063	mg/kg
Lead	Normal	20	0	8.6	53.3	33.6	10.51	3.8316	73.87	mg/kg
Lithium	Lognormal	20	0	4.8	11.6	7.69	1.93	3.8316	15.08	mg/kg
Magnesium	Lognormal	20	0	1310	2800	1913.1	468.1	3.8316	3707	mg/kg
Manganese	Normal	20	0	129	357	237.3	63.89	3.8316	482.1	mg/kg
Mercury	Lognormal	20	65	0.4U	0.12	0.72	0.031	3.8316	0.191	mg/kg
Molybdenum	X	20	91	.29U	0.9U	X	X	3.8316	X	mg/kg
Nickel	Normal	20	0	3.8	14	9.63	2.64	3.8316	19.74	mg/kg
Potassium	Normal	20	0	1110	2380	2061.2	453	3.8316	3797	mg/kg
Selenium	Nonparam	20	39	.29U	1 .4	0.634	0.295	3.8316	1.76	mg/kg
Silicon	Normal	20	0	934	1650	1383.5	179	3.8316	2069	mg/kg
Silver	X	20	100	.19U	.22U	X	X	3.8316	X	mg/kg
Sodium	Lognormal	20	0	43.8	105	62.16	14.84	3.8316	119.02	mg/kg
Strontium	Lognormal	20	0	9.6	45.2	28.44	10.25	3.8316	67.92	mg/kg
Thallium	X	14**	100	.385U	.445U	X	X	4.2224	X	mg/kg
Tin	X	20	91	1.35U	2.9	X	X	3.8316	X	mg/kg
Vanadium	Normal	20	0	10.8	45.8	27.85	8.87	3.8316	61.84	mg/kg
Zinc	Normal	20	0	21.1	75.90	49.56	12.1	3.8316	95.92	mg/kg
Radium-226	Lognormal	20	0	0.1	0.805	0.619	0.153	3.8316	1.20	pCi/g
Radium-228	Normal	20	0	0.2	2.3	1.35	0.48	3.8316	3.189	pCi/g
Uranium-233/234	Lognormal	20	0	0.6	3.1	1.097	0.578	3.8316	3.31	pCi/g
Uranium-235	Lognormal	20	0	0.11	0.34	0.0539	0.02	3.8316	0.13	pCi/g
Uranium-238	Lognormal	20	0	0.74	2.6	1.09	0.455	3.8316	2.830	pCi/g

Notes:

a = All UTLs calculated assuming a normal distribution.
BSCP = Background Soils Characterization Program
mg/kg = milligrams per kilogram
Min and Max values = lowest/highest detected value or, if no detected values, 1/2 instrument detection level followed by U.
NC = not calculated
pCi/g = picocuries per gram
UTL = upper tolerance limit
X = Not applicable because more than 80% were non-detects.
% Non-detects are calculated from all accepted valid data except equipment rinsates.
Uranium-238 had 2 outliers removed for calculation
* Data taken from Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (EG&G 1995a).
** Six thallium samples were rejected during the validation process.

TABLE 2-8
Summary Statistics for BSCP* Group 1 Analytes: Supporting Data Types

Analyte	Distribution	Count	% Non-Detect	Min	Max	99/99 UTL	Mean	Standard Deviation	Units
Ammonia	Normal**	20	39	0.5U	7	NC	2.0333	1.8977	mg/kg
Carbonate	Normal**	20	100	5U	5.5U	NC	X	X	mg/kg
Nitrate/Nitrite	Normal**	20	0	2	7	NC	4	1.6859	mg/kg
Oil & Grease	Normal**	20	0	52	130	NC	94.575	19.325	mg/kg
pH	Normal**	20	NA	6	6.8	NC	6.3575	0.2424	pH
Specific Cond.	Normal**	20	NA	0.1	0.53	NC	0.2083	0.0896	mmhos/cm
TOC	Normal**	20	0	4920	17600	NC	16133	2696.9	mg/kg
% Clay	Normal**	20	0	7	36	NC	20.45	8.62	%
% Sand	Normal**	20	0	22	76	NC	43.93	15.27	%
% Silt	Normal**	20	0	18	45.5	NC	35.76	7.52	%
Bulk Density	Normal**	20	0	0.9	1.2	NC	0.923	0.07	g/cm^3

Notes:

BSCP = Background Soils Characterization Program
g/cm^3 = grams per cubic centimeter
mg/kg = milligrams per kilogram
Min and Max values = lowest/highest detected value or, if no detected values, 1/2 instrument detection level followed by U.
mmhos/cm = micromhos per centimeter
NA = not applicable
Normal** = Distribution assumed to be normal for summary statistics of supporting data
TOC = Total Organic Carbon
UTL = upper tolerance limit
X = Not applicable because more than 80% were non-detects.
* Data taken from Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995a).

TABLE 2-9
Summary Statistics for BSCP* Group 2 Analytes: Fallout Radionuclides and Supporting Data

Analyte	Distribution	Count	% Non-Detect	Min	Max	Tolerance Factor	99/99 UTL	Mean	S.D.	Units
Fallout Radionuclides										
Americium-241	Nonparam	50	0	0 .001	0.25	3.1369	0.037	0.0107	0.006	pCi/g
Cesium-134	Nonparam	50	0	0.05	0.3	3.1369	0.369	0.2	0.056	pCi/g
Cesium-137	Lognormal	50	0	0.3	1.7	3.1369	2.25	0.941	0.372	pCi/g
Plutonium-239/240	Lognormal	50	0	0.017	0.072	3.1369	0.084	0.038	0.014	pCi/g
Strontium-89/90	Lognormal	50	0	0.065	0.64	3.1369	0.708	0.254	0.128	pCi/g
Supporting Data										
% Clay	Normal**	50	0	1	34	X	X	11.58	6.37	%
% Sand	Normal**	50	0	24	78	X	X	53.29	11.97	%
% Silt	Normal**	50	0	20	51	X	X	35.21	7.49	%
Soil density	Normal**	50	0	0.8	1.2	X	X	0.944	0.78	g/cm^3
Total Organic Carbon	Normal**	50	0	1.4	6.05	X	X	3.66	1.24	%

Notes:

BSCP = Background Soils Characterization Program
g/cm^3 = grams per cubic centimeter
Min and Max values = lowest/highest detected value or, if no detected values, 1/2 instrument detection level followed by U.
Normal** = Distribution assumed to be normal for summary statistics of supporting data
pCi/g = picocuries per gram
S.D. = standard deviation
UTL = upper tolerance limit
X = Not calculated or not applicable
* Data taken from Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995a).

TABLE 2-10
Programmatic Risk-Based Preliminary
Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
Acenaphthene #	1.65E+04
Acenaphthylene #	--
Acetone #	2.74E+04
Aldrin	3.77E-02
Aluminum	7.96E+05
Anthracene #	8.23E+04
Antimony	1.10E+02
Aroclor 1016	1.92E+01
Aroclor 1221	8.32E-02
Aroclor 1232	8.32E-02
Aroclor 1242	8.32E-02
Aroclor 1248	8.32E-02
Aroclor 1254	8.32E-02
Aroclor 1260	8.32E-02
Arsenic	3.66E-01
Barium	1.91E+04
Benzene #	2.21E+01
alpha-BHC	1.02E-01
beta-BHC	3.56E-01
delta-BHC	--
gamma-BHC (Lindane)	4.93E-01
Benzo(a)anthracene	8.77E-01
Benzo(a)pyrene	8.77E-02
Benzo(b)fluoranthene	8.77E-01
Benzo(g,h,i)perylene	--
Benzo(k)fluoranthene	8.77E+00
Benzoic Acid	10^5 *
Benzyl Alcohol	8.23E+04
Beryllium	1.49E-01
bis(2-Chloroethoxy)methane #	--
bis(2-Chloroethyl)ether #	5.82E-01
bis(2-Chloroisopropyl)ether #	9.15E+00
bis(2-Ethylhexyl)phthalate	4.57E+01
Bromodichloromethane #	1.03E+01
Bromoform #	8.11E+01
Bromomethane #	3.84E+02
4-Bromophenyl phenyl ether	--

TABLE 2-10
Programmatic Risk-Based Preliminary Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
2-Butanone #	1.65E+05
Butylbenzylphthalate	5.49E+04
Cadmium	1.37E+02
Calcium	--
Carbon disulfide #	2.74E+04
Carbon tetrachloride #	4.93E+00
Cesium	--
alpha-Chlordane	4.93E-01
beta-Chlordane	4.93E-01
gamma-Chlordane	4.93E-01
4-Chloroaniline	1.10E+03
Chlorobenzene #	5.49E+03
Chloroethane #	--
Chloroform #	1.05E+02
Chloromethane #	4.93E+01
4-Chloro-3-methylphenol	--
2-Chloronaphthalene #	2.20E+04
2-Chlorophenol #	1.37E+03
4-Chlorophenyl phenyl ether	--
Chromium III	2.74E+05
Chromium VI	9.39E+02
Chyrsene	8.77E+01
Cobalt	1.65E+04
Copper	1.10E+04
Cyanide	5.49E+03
4,4-DDD	2.67E+00
4,4-DDE	1.88E+00
4,4-DDT	1.88E+00
Dibenz(a,h)anthracene	8.77E-02
Dibenzofuran	--
Dibromochloromethane	7.62E+00
Di-n-butylphthalate	2.74E+04
1,2-Dichlorobenzene #	2.47E+04
1,3-Dichlorobenzene #	--
1,4-Dichlorobenzene #	2.67E+01
3,3-Dichlorobenzidine	1.42E+00
Lithium	5.49E+03

TABLE 2-10
Programmatic Risk-Based Preliminary Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
Magnesium	--
Manganese	1.36E+03
Mercury	8.23E+01
Methoxychlor	1.37E+03
Methylene chloride #	8.54E+01
2-Methylnaphthalene #	--
4-Methyl-2-pentanone #	2.20E+04
2-Methylphenol	1.37E+04
4-Methylphenol	--
Molybdenum	1.37E+03
Naphthalene #	1.10E+04
Nickel	5.49E+03
2-Nitroaniline	--
3-Nitroaniline	--
4-Nitroaniline	--
Nitrobenzene #	1.37E+02
2-Nitrophenol	--
4-Nitrophenol #	--
n-Nitrosodiphenylamine #	1.31E+02
n-Nitrosodipropylamine	9.15E-02
Pentachlorophenol	5.34E+00
Phenanthrene #	--
Phenol	1.65E+05
Potassium	--
Pyrene	8.23E+03
Selenium	1.37E+03
Silver	1.37E+03
Sodium	--
Strontium	1.65E+05
Styrene #	5.49E+04
1,1,2,2-Tetrachloroethane #	3.20E+00
Tetrachloroethene #	1.23E+01
Thallium	--
Tin	1.65E+05
Toluene #	5.49E+04
Toxaphene	5.82E-01
1,2,4-Trichlorobenzene #	2.74E+03

TABLE 2-10
Programmatic Risk-Based Preliminary Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
1,1,1-Trichloroethane #	--
1,1,2-Trichloroethane #	1.12E+01
Trichloroethene #	5.82E+01
2,4,5-Trichlorophenol	2.74E+04
2,4,6-Trichlorophenol	5.82E+01
Vanadium	1.92E+03
Vinyl acetate	2.74E+05
Vinyl chloride #	3.37E-01
Xylene (total) #	5.49E+05
Zinc	8.23E+04
Nitrate	4.39E+05
Nitrite	2.74E+04
pH	--
Sulfide	--
Ammonium	--
Bicarbonate	--
Bromide	--
Carbonate	--
Chloride	--
Cyanide	--
Fluoride	1.65E+04
Orthophosphate	--
Silica (as Si and SiO_2)	--
Sulfate	--
Americium-241	2.37E+00 pCi/g
Cesium-137+D	2.08E-02 pCi/g
Plutonium-239	3.43E+00 pCi/g
Plutonium-240	3.42E+00 pCi/g
Radium-226+D	6.94E-03 pCi/g
Radium-228+D	1.43E-02 pCi/g
Strontium-89	6.64E+01 pCi/g
Strontium-90+D	2.20E+01 pCi/g
Tritium	1.47E+04 pCi/g
Uranium-233+D	4.47E+01 pCi/g

TABLE 2-10
Programmatic Risk-Based Preliminary Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
Uranium-234	4.53E+01 pCi/g
Uranium-235+D	1.73E-01 pCi/g
Uranium-238+D	8.00E+01 pCi/g
1,1-Dichloroethane #	2.74E+04
1,2-Dichloroethane #	7.04E+00
1,1-Dichloroethene #	1.07E+00
1,2-Dichloroethene (total) #	2.47E+03
2,4-Dichlorophenyl	8.23E+02
1,2-Dichloropropane #	9.42E+00
cis-1,3-Dichloropropane #	3.56E+00
trans-1,3-Dichloropropane #	3.56E+00
Dieldrin	4.00E-02
Diethylphthalate	2.20E+00
2,4-dimethylphenol #	5.49E+03
Dimethylphthalate	10^6 *
4,6-Dinitro-2-methylphenol #	--
2,4-Dinitrophenol	5.49E+02
2,4-Dinitrotoluene	5.49E+02
2,6-Dinitrotoluene	9.42E-01
Di-n-octylphthalate	4.57E+01
Endosulfan I	1.65E+03
Endosulfan II	1.65E+03
Endosulfan sulfate	1.65E+03
Endosulfan (technical)	1.65E+03
Endrin ketone	--
Endrin (technical)	8.23E+01
Ethylbenzene #	2.74E+04
Fluoranthene	1.10E+04
Fluorene #	1.10E+04
Heptachlor	1.42E-01
Heptachlor epoxide	7.04E-02
Hexachlorobenzene	4.00E-01
Hexachlorobutadiene	8.21E+00
Hexachlorocyclopentadiene	1.91E+03
Hexachloroethane	4.57E+01
2-Hexanone #	--

TABLE 2-10
Programmatic Risk-Based Preliminary Remediation Goals
Rocky Flats Environmental Technology Site
February 1995

Target Analyte List Chemical	Residential Soil (mg/kg)
Indeno(1,2,3-cd)pyrene	8.77E-01
Iron	--
Isophorone	6.74E+02
Lead	--

Notes:

Programmatic Preliminary Remediation Goals listed are the minimum of the noncarcinogenic (reference doses) and the carcinogenic (slope factor) Preliminary Remediation Goal.

mg/kg = milligrams per kilogram

pCi/g = picocuries per gram

chemicals listed are volatile

* Preliminary Remediation Goal value exceeds 10^6 parts per million. Consequently, value is set at 10^6.

TABLE 2-11
Analytical Parameters for Sediment
Samples from OU8 RFI/RI Work Plan (DOE 1994a)

Test Group:BNACLP
1,2,4-TRICHLOROBENZENE
1,2-DICHLOROBENZENE
1,3-DICHLOROBENZENE
1,4-DICHLOROBENZENE
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
2-CHLOROPHENOL
2-METHYLNAPHTHALENE
2-METHYLPHENOL
2-NITROANILINE
2-NITROPHENOL
3,3'-DICHLOROBENZIDINE
3-NITROANILINE
4,6-DINITRO-2-METHYLPHENOL
4-CHLORO-3-METHYLPHENOL
4-CHLOROANILINE
4-CHLOROPHENYL PHENYL ETHER
4-METHYLPHENOL
4-NITROANILINE
4-NITROPHENOL
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO(a)ANTHRACENE
BENZO(a)PYRENE
BENZO(b)FLUORANTHENE
BENZO(ghi)PERYLENE
BENZO(k)FLUORANTHENE
BENZOIC ACID
BENZYL ALCOHOL
BIS(2-CHLOROETHOXY)METHANE
BIS(2-CHLOROETHYL)ETHER
BIS(2-CHLOROISOPROPYL)ETHER
BIS(2-ETHYLHEXYL)PHTHALATE
BUTYL BENZYL PHTHALATE
CHRYSENE
DI-n-BUTYL PHTHALATE
DI-n-OCTYL PHTHALATE
DIBENZO(a,h)ANTHRACENE
DIBENZOFURAN
DIETHYL PHTHALATE
DIMETHYL PHTHALATE
FLUORANTHENE
FLUORENE

TABLE 2-11
Analytical Parameters for Sediment
Samples from OU8 RFI/RI Work Plan (DOE 1994a)

HEXACHLOROBENZENE
HEXACHLOROBUTADIENE
HEXACHLOROCYCLOPENTADIENE
HEXACHLOROETHANE
INDENO(1,2,3-cd)PYRENE
ISOPHORONE
N-NITROSO-DI-n-PROPYLAMINE
N-NITROSODIPHENYLAMINE
NAPHTHALENE
NITROBENZENE
PENTACHLOROPHENOL
PHENANTHRENE
PHENOL
PYRENE
p-BROMODIPHENYL ETHER
Test Group:METADD
CESIUM
LITHIUM
MOLYBDENUM
STRONTIUM
TIN
Test Group:SMETCLP
ALUMINUM
ANTIMONY
ARSENIC
BARIUM
BERYLLIUM
CADMIUM
CALCIUM
CHROMIUM
COBALT
COPPER
IRON
LEAD
MAGNESIUM
MANGANESE
MERCURY
NICKEL
POTASSIUM
SELENIUM
SILVER
SODIUM
THALLIUM
VANADIUM
ZINC

TABLE 2-11
Analytical Parameters for Sediment
Samples from OU8 RFI/RI Work Plan (DOE 1994a)

Test Group:TRADS
AMERICIUM-241
GROSS ALPHA
GROSS BETA
PLUTONIUM-239/240
URANIUM-233,-234
URANIUM-235
URANIUM-238

Test Group:VOACLP
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
1,2-DICHLOROPROPANE
2-BUTANONE
2-HEXANONE
4-METHYL-2-PENTANONE
ACETONE
BENZENE
BROMODICHLOROMETHANE
BROMOFORM
BROMOMETHANE
CARBON DISULFIDE
CARBON TETRACHLORIDE
CHLOROBENZENE
CHLOROETHANE
CHLOROFORM
CHLOROMETHANE
DIBROMOCHLOROMETHANE
ETHYLBENZENE
METHYLENE CHLORIDE
STYRENE
TETRACHLOROETHENE
TOLUENE
TOTAL XYLENES
TRICHLOROETHENE
VINYL ACETATE
VINYL CHLORIDE
cis-1,3-DICHLOROPROPENE
trans-1,3-DICHLOROPROPENE

Notes:
BNACLP = Base Neutral Acid Contract Lab Program
METADD = Metals Added
SMETCLP = Standard Metals Contract Lab Program
TRADS = Total Radionuclides
VOACLP = Volatile Organic Analysis Contract Lab Program

TABLE 2-12
Comparison of Work Proposed in OU8 RFI/RI Work Plan to Work Performed During Field Activities

	Proposed Field Activities OU8 Work Plan									Completed Field Activities OU8 Work Plan and Integrated FSP									
IHSS #	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Requested Surficial Soil Analytes	Soil Gas Target Analytes	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Actual Surficial Soil Analytes	Overlapping IHSS	Adjacent IHSS
118.1	0	0	0	0	7	0	0	N/A	CTET	1	0	0	0	7	0	0	N/A	OU8 IHSS 144(N)	OU14 IHSS 131 OU9 IHSS 132
118.2	0	0	0	0	7	0	0	N/A	CTET, MEK, TCA, Dichloromethane, Benzene	1	0	0	0	5	0	0	N/A	OU9 IHSS 121 OU8 IHSS 150.7	None
123.1	14	14	9	4	9	0	0	Metals, Nitrates, pH, Fluoride	Benzene, Toluene, Xylene, PCE, TCE	4	14	9	4	7	0	0	Rads, Metals, SVOC, pH, TPH, Nitrates, Fluoride	OU9 IHSS 121 OU16 IHSS 192	None
135	0	0	5	0	0	0	0	Tritium, Total Chrome	N/A	1	0	5	0	0	0	0	Rads, Metals, TPH, Tritium	None	OU10 IHSS 206 OU8 IHSS 151
137	0	0	7	0	0	0	0	Total Chrome	N/A	2	0	7	0	0	0	0	Rads, Metals, SVOC, pH	OU9 IHSS 121 (T-29)	OU8 IHSS 139.1(S)
138	4	4	9	2	0	0	0	Total Chrome	N/A	3	4	9	2	0	0	0	Rads, Metals, SVOC	OU9 IHSS 121	OU8 IHSS 150.6 / .8
139.1(N)	0	0	8	0	0	0	0	pH	N/A	2	0	2	0	0	5	0	Metals, pH, Nitrates, TPH, (VOA on Seds)	OU8 IHSS 172	OU8 IHSS 163.1
139.1(S)	0	0	3	0	0	0	0	pH	N/A	0	0	3	0	0	0	0	Rads, Metals, pH, SVOC, Nitrates	None	OU8 IHSS 132 OU8 IHSS 137 OU8 IHSS 139.2 OU8 IHSS 144(N)
139.2	0	0	3	0	0	0	0	pH, Nitrates	N/A	0	0	3	0	0	0	0	Rads, Metals, pH, SVOC, Nitrates	None	OU8 IHSS 137 OU8 IHSS 139.1(S) OU8 IHSS 144(N)
144(N)	1	1	8	1	5	2	0	Metals, SVOC	CTET, MEK, TCE, PCE, TCA, Benzene, Toluene, Xylene, Dichloromethane	2	1	8	1	5	2	0	Rads, Metals, pH, SVOC, Nitrates	OU8 IHSS 118.1 OU9 IHSS 132 (T-9,10)	OU8 IHSS 139.1(S) OU14 IHSS 131
144(S)	0	0	7	0	7	0	0	Metals, SVOC	CTET, MEK, TCE, PCE, TCA, Benzene, Toluene, Xylene, Dichloromethane	0	0	7	0	0	0	0	Rads, Metals, SVOC	OU9 IHSS 121	None

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TABLE 2-12
Comparison of Work Proposed in OU8 RFI/RI Work Plan to Work Performed During Field Activities

	Proposed Field Activities OU8 Work Plan									Completed Field Activities OU8 Work Plan and Integrated FSP									
IHSS #	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Requested Surficial Soil Analytes	Soil Gas Target Analytes	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Actual Surficial Soil Analytes	Overlapping IHSS	Adjacent IHSS
150.1	12	12	10	4	10	0	0	Metals, SVOC	1,1-DCA, CTET, PCE, TCE, Benzene, Toluene, Xylene	5	12	10	0	2	0	0	Rads, Metals, SVOC	OU8 IHSS 172 OU9 IHSS 126.1, 126.2	OU8 IHSS 150.2
150.2	10	10	0	4	0	0	0	Lab HPGe	N/A	6	8	0	4	0	0	0	Lab HPGe	OU8 IHSS 150.1 OU14 IHSS 162	OU14 IHSS 131
150.3	7	7	7	3	7	0	0	Metals, SVOC	CTET, PCE, TCE, Benzene, Toluene, Xylene	2	7	7	3	3	0	0	Rads, Metals, SVOC	OU9 IHSS 121	OU9 IHSS 146.1-146.6
150.4	1	1	5	2	5	0	0	Metals	1,1-DCE, CTET, Acetone	1	1	5	0	0	0	0	Rads, Metals, SVOC	OU9 IHSS 121	OU8 IHSS 150.7
150.6 / 150.8	9	9	10	4	10	0	0	Metals, SVOC	CTET, PCE, TCE, Benzene, Toluene, Xylene	3	9	10	2	2	0	3	Rads, Metals, SVOC	None	OU8 IHSS 138
150.7	26	26	0	5	0	0	0	Lab HPGe	N/A	2	26	2	2	0	0	0	Rads	OU8 IHSS 118.2 OU9 IHSS 121 OU14 IHSS 131	None
151	0	0	5	0	5	0	0	TPH-Diesel	Benzene, Toluene, ethylbenzene, Xylene	0	0	5	0	2	0	0	Tritium, Metals, TPH-Diesel	None	OU8 IHSS 135 OU10 IHSS 206
163.1	7	7	9	3	9	0	0	TPH, Metals, Nitrates	Benzene, Toluene, Xylene, PCE, TCE	1	7	9	2	5	0	0	Rads, Metals, pH, SVOC, TPH, Nitrates	None	OU8 IHSS 139.1(N) OU9 IHSS 124.1-124.3 OU9 IHSS 125 OU9 IHSS 149.1
163.2	0	0	0	0	0	0	0	N/A	N/A	1	0	0	0	0	0	0	N/A	None	OU8 IHSS 150.1 OU8 IHSS 172
172		460	0		0	0	0	N/A	N/A	25	460	1	1	0	0	3	Rads, Metals, SVOC, pH	OU8 IHSS 150.1, 150.2 OU9 IHSS 121, 126.1, 126.2 OU13 IHSS 117.3, 186 OU14 IHSS 162	OU8 IHSS 139.1(N) OU8 IHSS 163.2 OU13 IHSS 117.2, 158
173	1	1	3	2	3	0	0	Metals	CTET, PCE, TCE, Acetone	1	1	3	0	3	0	0	Rads, Metals, SVOC	OU8 IHSS 184	None
184	3	3	0	2	0	0	0	Lab HPGe	N/A	1	3	0	1	0	0	0	Lab HPGe	OU8 IHSS 173	None

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TABLE 2-12
Comparison of Work Proposed in OU8 RFI/RI Work Plan
to Work Performed During Field Activities

	Proposed Field Activities OU8 Work Plan									Completed Field Activities OU8 Work Plan and Integrated FSP									
IHSS #	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Requested Surficial Soil Analytes	Soil Gas Target Analytes	HPGe	NaI	Surf. Soil	Vert. Prof.	Soil Gas	Sediment	Asphalt	Actual Surficial Soil Analytes	Overlapping IHSS	Adjacent IHSS
188	0	0	5	0	0	0	0	Metals, pH, Nitrates	N/A	0	0	5	0	0	0	0	Metals, pH, Nitrates	None	None

Notes:

1,1-DCA = 1,1-dichloroethane
1,1-DCE = 1,1-dichlorothene
CTET = carbon tetrachloride
FSP = field sampling plan
HPGe = high purity germanium
IHSS = individual hazardous substance site
MEK = methyl ethyl ketone
NaI = sodium iodide
N/A = not applicable
OU = operable unit
PCE = tetrachloroethylene
Rads = radionuclides
RFI/RI = Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigation
Seds = sediments
Surf. Soil = surface soil
SVOC = semivolatile organic compound
TCA = trichloroethane
TCE = trichloroethene
TPH = total petroleum hydrocarbons
Vert. Prof. = vertical soil profile
VOA = volatile organic analysis

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FIGURE 2-1
Surface-Soil or Sediment Data Management Flow Chart

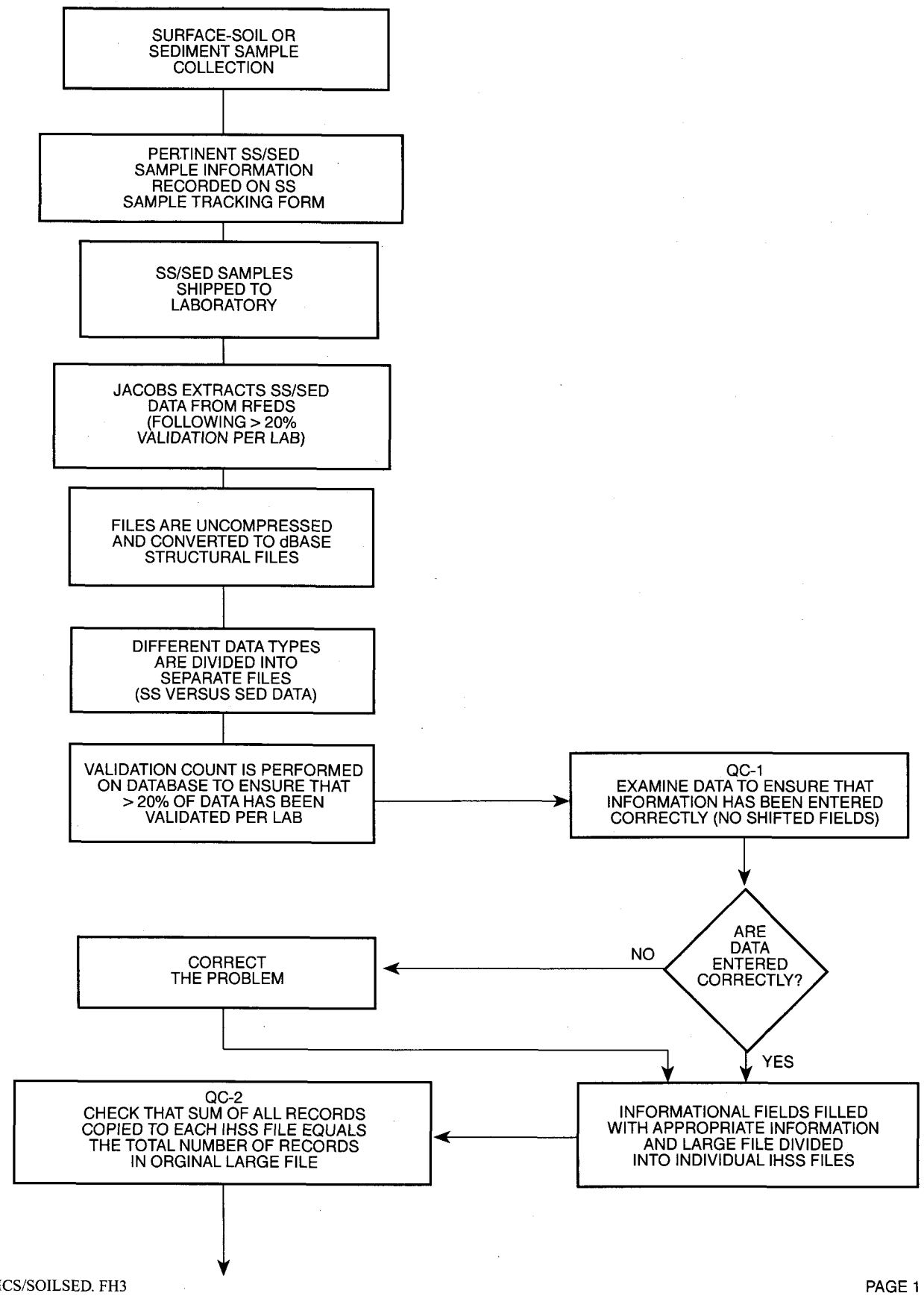
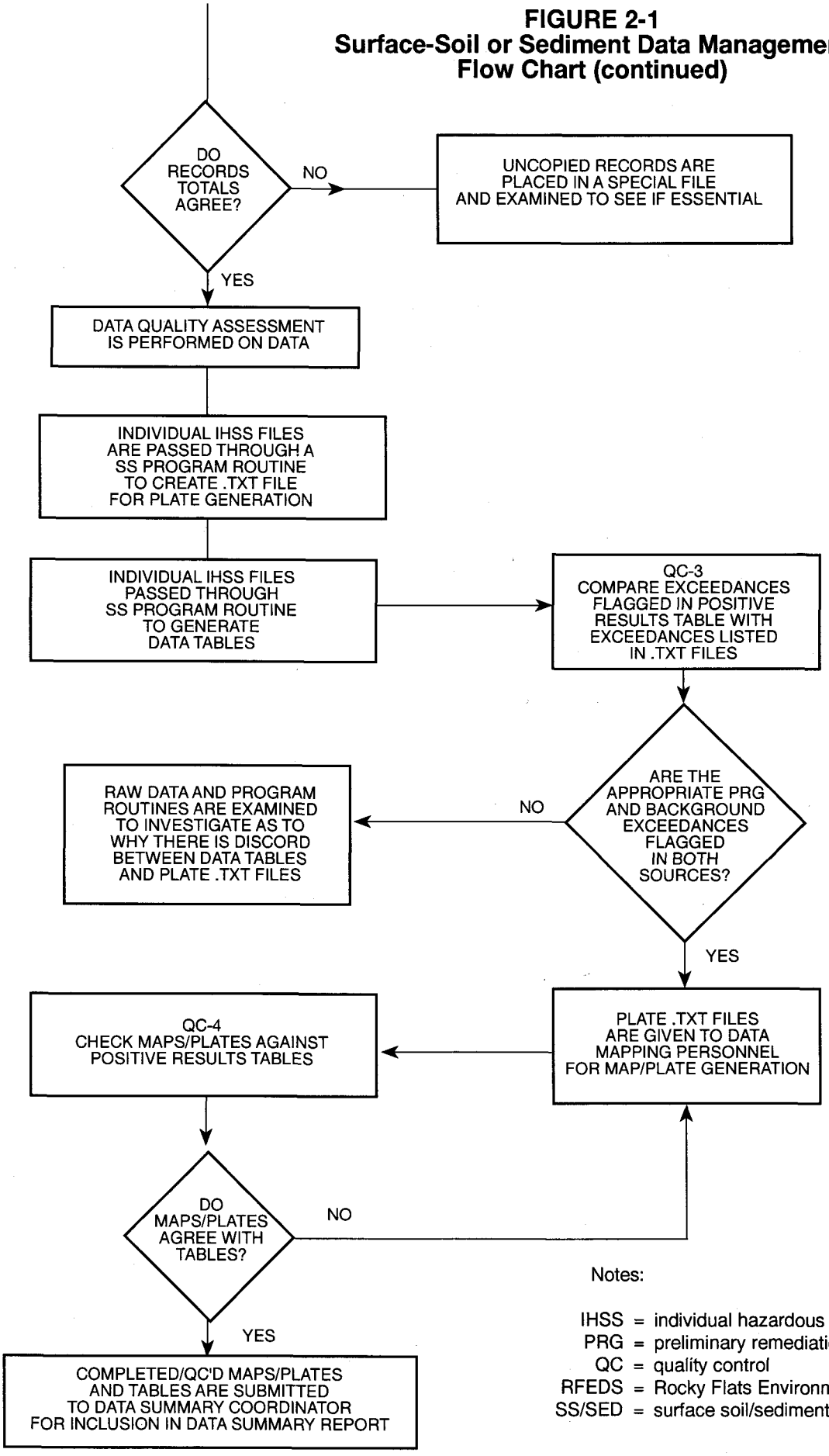


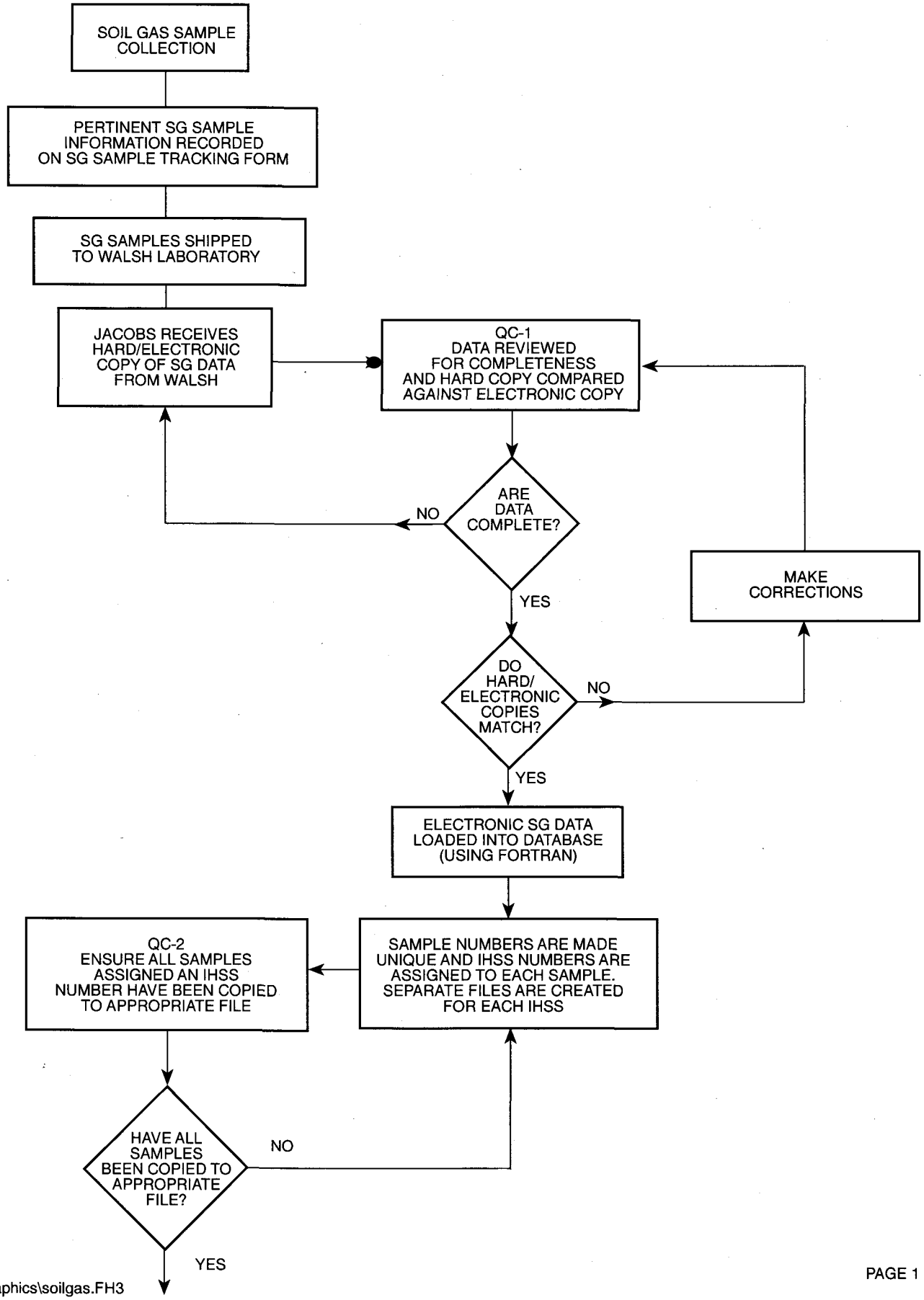
FIGURE 2-1
Surface-Soil or Sediment Data Management Flow Chart (continued)



Notes:

IHSS = individual hazardous substance site
PRG = preliminary remediation goal
QC = quality control
RFEDS = Rocky Flats Environmental Data System
SS/SED = surface soil/sediment

FIGURE 2-2
Soil-Gas Data Management Flow Chart



wp\flats\graphics\soilgas.FH3

FIGURE 2-2
Soil-Gas Data Management Flow Chart (continued)

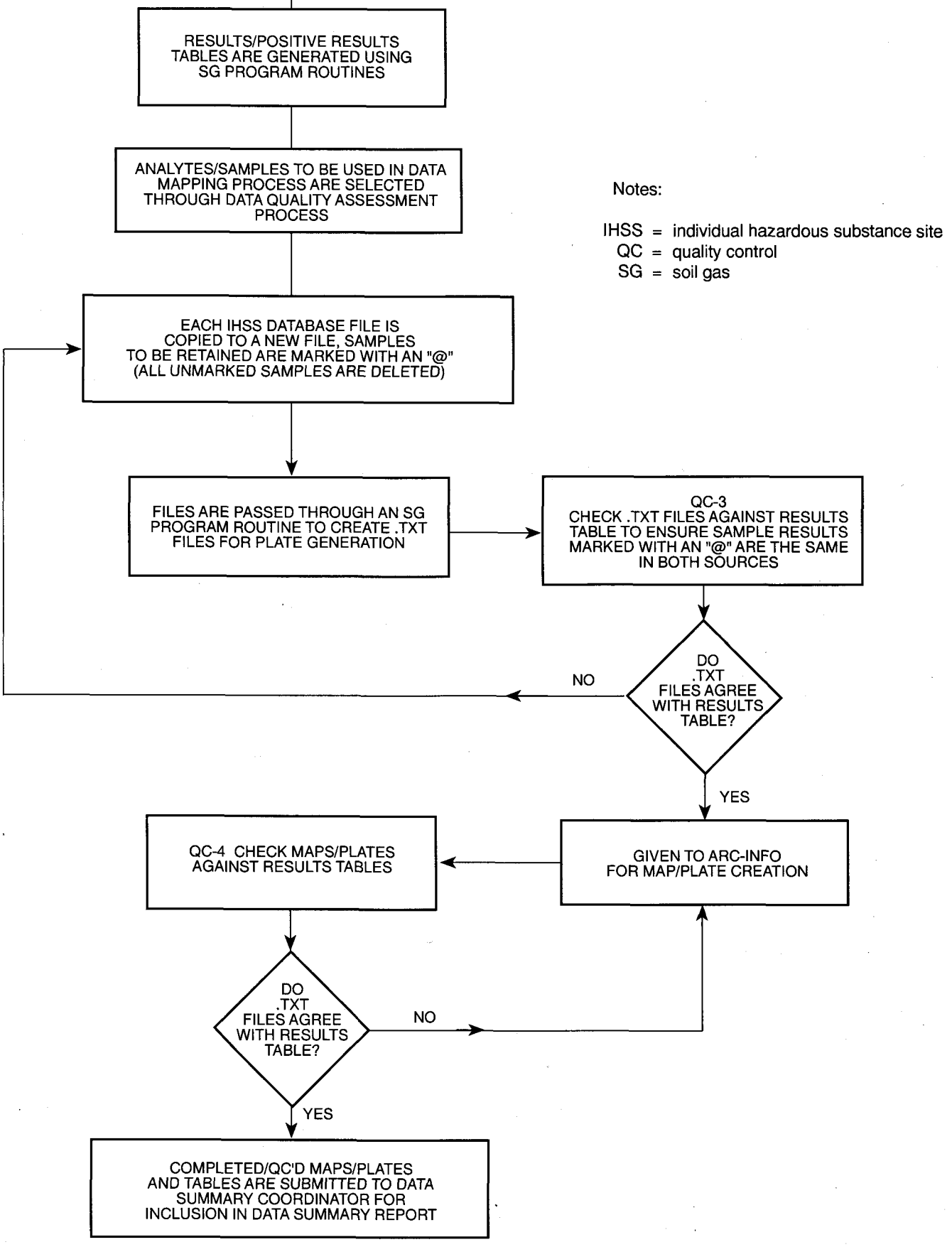
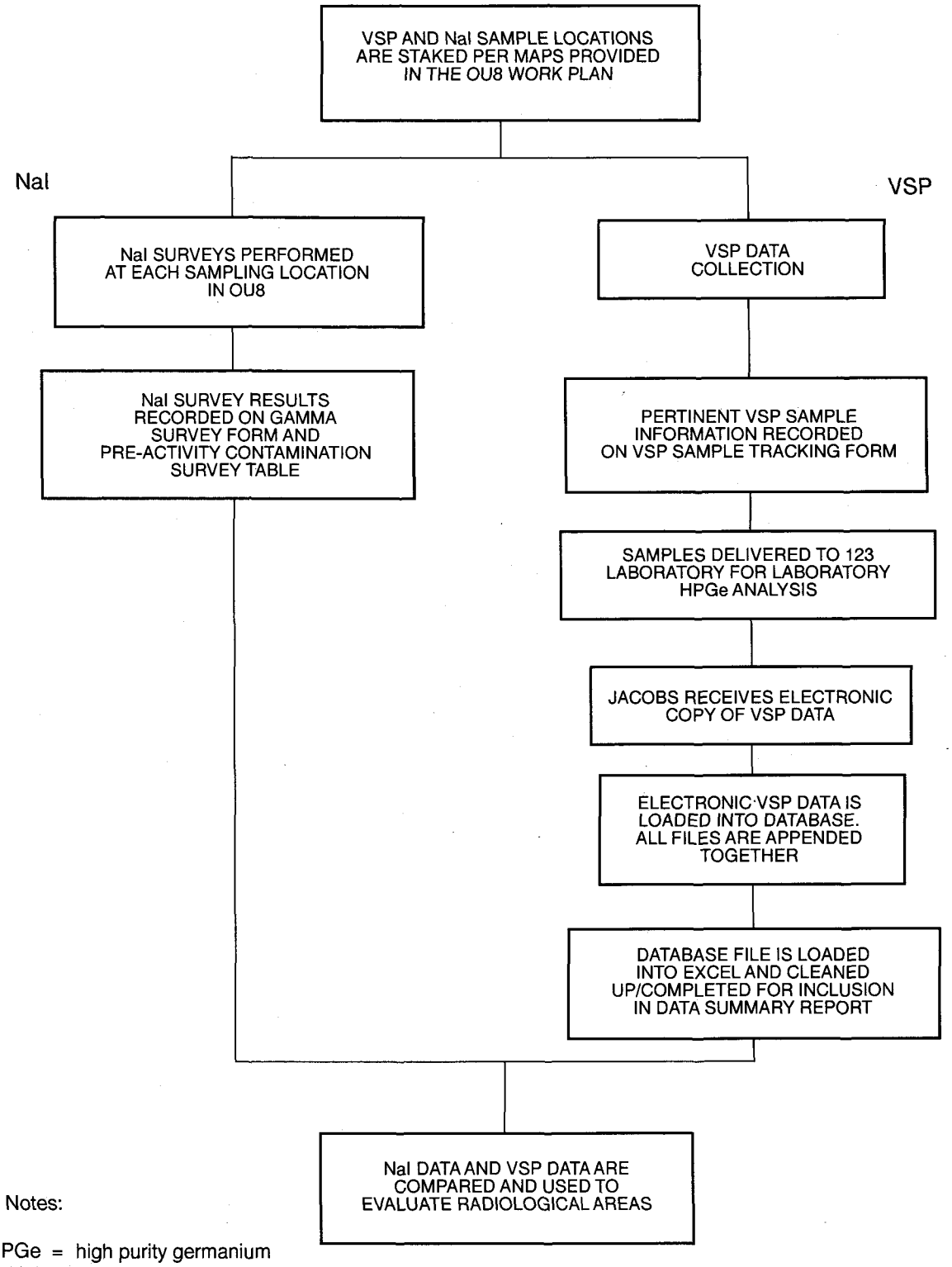


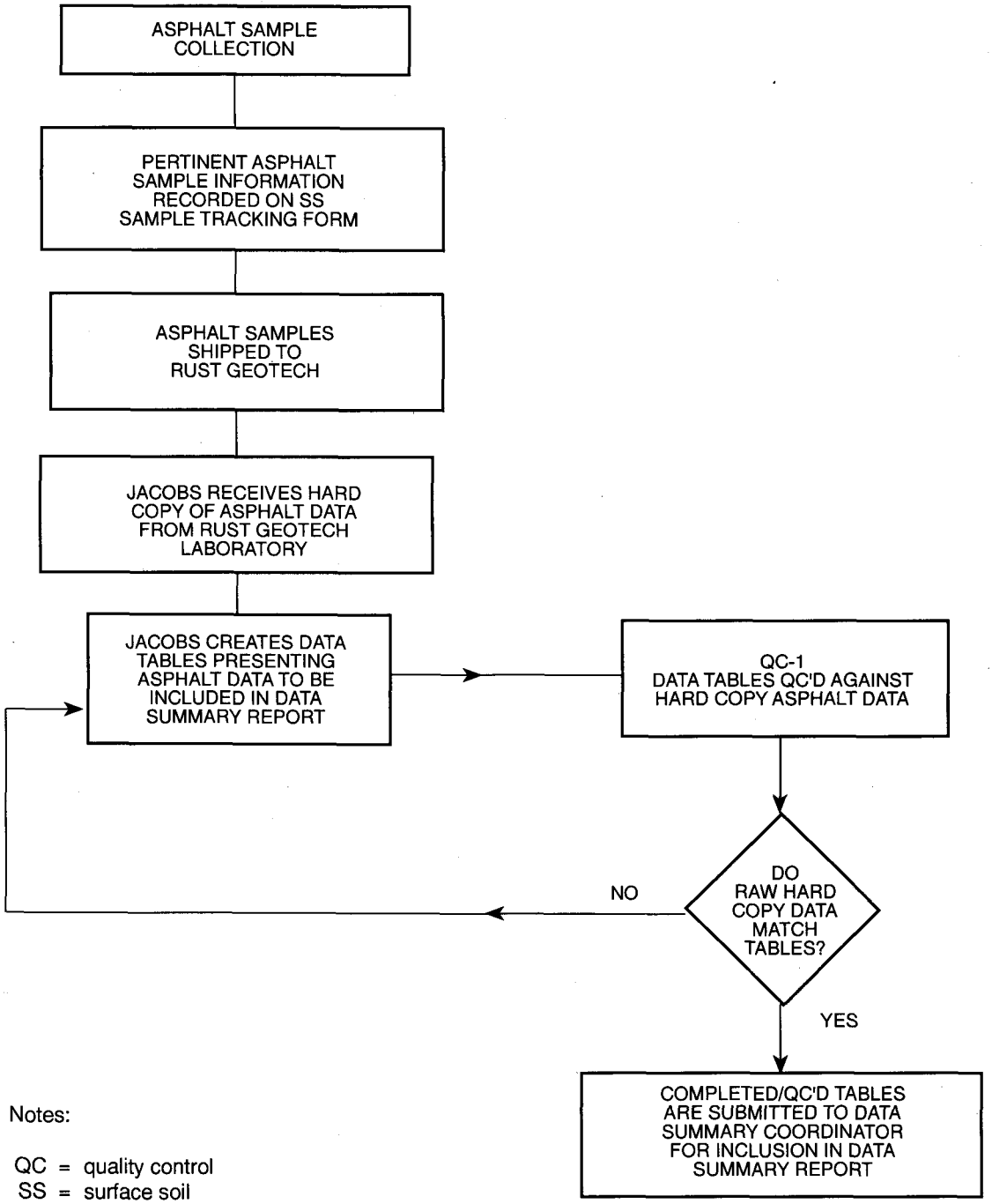
FIGURE 2-3
NaI and VSP/Laboratory HPGe Data Management Flow Chart



Notes:

HPGe = high purity germanium
NaI = sodium iodide
OU = operable unit
VSP = vertical soil profile

FIGURE 2-4
Asphalt Data Management Flow Chart



Notes:

QC = quality control
SS = surface soil

SECTION 3.0

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3-36 Surface Soil Positive Results Data Summary, OU8 - IHSS 139.1(S)

3-37 Population Distribution Summary of Surface-Soil Results for IHSS 139.1(S)

3-38 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 139.1(S)

3-39 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 139.1(S)

3-40 Surface Soil Positive Results, OU8 - IHSS 139.2

3-41 Surface Soil Positive Results Data Summary, OU8 - IHSS 139.2

3-42 Population Distribution Summary of Surface-Soil Results for IHSS 139.2

3-43 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 139.2

3-44 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 139.2

3-45 Laboratory HPGe Vertical Soil Profile Results for IHSS 144(N)

3-46 Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 144(N)

3-47 Surface Soil Positive Results, OU8 - IHSS 144(N)

3-48 Surface Soil Positive Results Data Summary, OU8 - IHSS 144(N)

3-49 Population Distribution Summary of Surface-Soil Results for IHSS 144(N)

3-50 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 144(N)

3-51 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 144(N)

3-52 Sediment Positive Results, OU8 - IHSS 144(N)

3-53 Sediment Positive Results Data Summary, OU8 - IHSS 144(N)

3-54 Surface Soil Positive Results, OU8 - IHSS 144(S)

3-55 Surface Soil Positive Results Data Summary, OU8 - IHSS 144(S)

3-56 Population Distribution Summary of Surface-Soil Results for IHSS 144(S)

3-57 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 144(S)

3-58 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 144(S)

3-59 Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 150.1

3-60 Surface Soil Positive Results, OU8 - IHSS 150.1

3-61 Surface Soil Positive Results Data Summary, OU8 - IHSS 150.1

3-62 Population Distribution Summary of Surface-Soil Results for IHSS 150.1

3-63 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.1

3-64 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.1

3-65 Laboratory HPGe Vertical Soil Profile Results for IHSS 150.2

3-66 Laboratory HPGe Vertical Soil Profile Results for IHSS 150.3

3-67 Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 150.3

3-68 Surface Soil Positive Results, OU8 - IHSS 150.3

3-69 Surface Soil Positive Results Data Summary, OU8 - IHSS 150.3

3-70 Population Distribution Summary of Surface-Soil Results for IHSS 150.3

3-71 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.3

3-72 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.3

3-73 Surface Soil Positive Results, OU8 - IHSS 150.4

3-74 Surface Soil Positive Results Data Summary, OU8 - IHSS 150.4

3-75 Population Distribution Summary of Surface-Soil Results for IHSS 150.4

3-76 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.4

3-77 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.4

3-78 Laboratory HPGe Vertical Soil Profile Results for IHSSs 150.6 and 150.8

3-79 Analytical Results for Asphalt Samples for IHSSs 150.6 and 150.8

3-80 Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSSs 150.6 and 150.8

3-81 Surface Soil Positive Results, OU8 - IHSSs 150.6 and 150.8

3-82 Surface Soil Positive Results Data Summary, OU8 - IHSSs 150.6 and 150.8

3-83 Population Distribution Summary of Surface-Soil Results for IHSSs 150.6 and 150.8

3-84 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSSs 150.6 and 150.8

3-85 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSSs 150.6 and 150.8

3-86 Laboratory HPGe Vertical Soil Profile Results for IHSSs 150.6 and 150.8

3-87 Surface Soil Positive Results, OU8 - IHSS 150.7

3-88 Surface Soil Positive Results Data Summary, OU8 - IHSS 150.7

3-89 Population Distribution Summary of Surface-Soil Results for IHSS 150.7

3-90 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.7

3-91 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.7

3-92 Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 151

3-93 Surface Soil Positive Results, OU8 - IHSS 151

3-94	Surface Soil Positive Results Data Summary, OU8 - IHSS 151
3-95	Population Distribution Summary of Surface-Soil Results for IHSS 151
3-96	Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 151
3-97	Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 151
3-98	Laboratory HPGe Vertical Soil Profile Results for IHSS 163.1
3-99	Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 163.1
3-100	Surface Soil Positive Results, OU8 - IHSS 163.1
3-101	Surface Soil Positive Results Data Summary, OU8 - IHSS 163.1
3-102	Population Distribution Summary of Surface-Soil Results for IHSS 163.1
3-103	Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 163.1
3-104	Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 163.1
3-105	Laboratory HPGe Vertical Soil Profile Results for IHSS 172
3-106	Analytical Results for Asphalt Samples for IHSS 172
3-107	Surface Soil Positive Results, OU8 - IHSS 172
3-108	Surface Soil Positive Results Data Summary, OU8 - IHSS 172
3-109	Population Distribution Summary of Surface-Soil Results for IHSS 172
3-110	Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 172
3-111	Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 172
3-112	Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter, OU8 - IHSS 173

3-113 Surface Soil Positive Results, OU8 - IHSS 173

3-114 Surface Soil Positive Results Data Summary, OU8 - IHSS 173

3-115 Population Distribution Summary of Surface-Soil Results for IHSS 173

3-116 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 173

3-117 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 173

3-118 Laboratory HPGe Vertical Soil Profile Results for IHSS 184

3-119 Surface Soil Positive Results, OU8 - IHSS 188

3-120 Surface Soil Positive Results Data Summary, OU8 - IHSS 188

3-121 Population Distribution Summary of Surface-Soil Results for IHSS 188

3-122 Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 188

3-123 Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 188

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Legend A

Notes:

IHSS = Individual Hazardous Substance Site
J = estimated value
NC = compound found in only one sample at site
OU = operable unit
µg/L = micrograms per liter
@ = indicates which one of multiple samples was used

Sample Identification Number suffixes:

* = 100 milliliter sample
** = 10 milliliter sample
R = indicates resample
D = duplicate

Shading indicates multiple samples from which one sample was selected.

Legend B

A = Validation qualifier; laboratory qualifier considered acceptable
B = Indicates compound was found in blank and sample
D = Compounds identified using Secondary Dilution Factor - Organic
I = Interference
J = Laboratory Qualifier: estimated value
R = Data are rejected
U = Analyzed; not detected at/above method detection limit
V = Validation qualifier: valid data
X = Result by calculation defined in GRRASP (EG&G 1991)
Y = Analytical results in validation process
* = Indicated compound exceeds PRG
** = All samples reported with positive results; no non-detects reported
- = No background or PRG for indicated compound
= Indicated compound exceeds background
< = Indicated compound is equal to or below instrument detection limit

BKGND = Background
BNACLP = Base Neutral Acid Contract Laboratory Program Method
E_TPH8015A = Extractable Total Petroleum Hydrocarbons Method 8015A
GRRASP = General Radiochemistry and Routine Analytical Services Protocol
IHSS = Individual Hazardous Substance Site
MDL = Method Detection Limit
METADD = Metals Added
mg/kg = milligrams per kilogram
OU = Operable Unit
pCi/g = picocuries per gram
pCi/L = picocuries per liter
pH = measure of acidity/alkalinity
PRG = Preliminary Remediation Goal
SED = Sediment
SMETCLP = Standard Metals Contract Laboratory Program
SQL = Sample Quantitation Limit
SS = Surface Soils
TPH8015A = Total Petroleum Hydrocarbons Method 8015A
TRADS = Total Radionuclides
V_TPH8015A = Volatile Total Petroleum Hydrocarbons Method 8015A
VOACLP = Contract Laboratory Program Volatile Organic Analyte Package
WQPL = Water Quality Parameter List
%REC = Percent Recovery
µg/kg = micrograms per kilogram
1 = PRGs from Programmatic Risk-Based Preliminary Remediation Goals (DOE 1995b)
2 = Background from Background Soils Characterization Program, May 1995 (DOE 1995a)

Legend C

A = Data acceptable
B = Indicates compound was found in blank and sample
D = Compounds identified using Secondary Dilution Factor - Organic
I = Interference
J = Estimated value
U = Analyzed; not detected at/above method detection limit
V = Valid data
X = Result by calculation defined in GRRASP (EG&G 1991)
Y = Results in validation process
* = The number of locations for maximum and minimum concentrations is shown in parentheses. When two or more locations are shown to have a maximum or minimum concentration, the sample ID of only one location is listed. The rest of the sample IDs are not shown. To identify the rest of the sample locations, please refer to the positive results table.
** = All samples reported with positive results; no non-detects reported

BNACLP = Base Neutral Acid Contract Laboratory Program Method
E_TPH8015A = Extractable Total Petroleum Hydrocarbons Method 8015A
GRRASP = General Radiochemistry and Routine Analytical Services Protocol
IHSS = Individual Hazardous Substance Site
MDL = Method Detection Limit
METADD = Metals Added
mg/kg = milligrams per kilogram
OU = Operable Unit
pCi/g = picocuries per gram
pCi/L = picocuries per liter
pH = measure of acidity/alkalinity
SED = Sediment
SMETCLP = Standard Metals Contract Laboratory Program
SQL = Sample Quantitation Limit
SS = Surface Soils
TPH8015A = Total Petroleum Hydrocarbons Method 8015A
TRADS = Total Radionuclides
V_TPH8015A = Volatile Total Petroleum Hydrocarbons Method 8015A
VOACLP = Contract Laboratory Program Volatile Organic Analyte Package
WQPL = Water Quality Parameter List
%REC = Percent Recovery
µg/g = micrograms per grams
µg/kg = micrograms per kilogram

Legend D

Notes:

Coef. of Var. = Coefficient of Variation
IHSS = Individual Hazardous Substance Site
MDL = method detection limit
METADD = metals added
mg/kg = milligrams per kilogram
ND = Not detected above quantification limit
pCi/g = picocuries per gram
PRG = preliminary remediation goal
SMETCLP = Standard Metals Contract Laboratory Program
TRADS = Total Radionuclides
WQPL = Water Quality Parameter List
µg/g = micrograms per gram
µg/kg = micrograms per kilogram

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-1
Air Sampling Tracking

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-2
Tank and Pipeline Compilation

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

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TABLE 3-3
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 118.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG000194 SGG0001JER 12/14/94	SG000194 SGG0001JE*R 12/14/94	SG000294 SGG0002JE 12/6/94	SG000394 SGG0003JE 12/7/94	SG000494 SGG0004JE 12/7/94	SG000494 SGG0004JE**R 12/14/94	SG000594 SGG0005JE 12/6/94
Test Group:GC/MS Units:µg/L									
1,1,1-Trichloroethane	7	2	5.8 J	8.6 @			0.06		0.04
1,1-Dichloroethane	3	0							
1,1-Dichloroethene	8	6	0.08				0.06		< .05
1,1-Dichloropropene	1	0							
1,2,4-Trimethylbenzene	2	0	0.01						0.01
Acetone	6	3		0.45	0.46				< .03
Benzene	6	0	0.09		0.13	0.04			0.08
Bromodichloromethane	2	0							
Carbon Tetrachloride	14	11	0.77	1.2 @	0.45	0.14	110 J	210 @	5 J
Chloroform	13	10	0.16		0.05	0.04	26 J	23 @	2.2 @
Chloromethane	4	2							
Dichlorodifluoromethane	4	2							
Ethylbenzene	3	0	0.01		0.02		0.01		
Tetrachloroethene	8	3					2 @	< 1.9	0.15
Toluene	2	0			0.2				0.14
Total Xylenes	1	0	0.05						
Trichloroethene	5	2					0.05		
Trichlorofluoromethane	9	9				3.6 @			2.9 @
cis-1,2-Dichloroethene	4	3							< .03
m & p-Xylenes	1	0	0.04						
o-Xylene	5	0	0.01		0.01	0.01			

Legend A

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TABLE 3-3
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 118.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	SG000594 SGG0005JE* 12/6/94	SG000594 SGG0005JE**R 12/14/94	SG000694 SGG0006JE 12/6/94	SG000694 SGG0006JE* 12/6/94	SG000794 SGG0007JE 12/6/94	SG000794 SGG0007JE* 12/6/94	SG000794 SGG0007JE**R 12/7/94
Test Group:GC/MS Units:µg/L							
1,1,1-Trichloroethane			0.04		0.2	0.36	
1,1-Dichloroethane	0.35				0.21	0.31	
1,1-Dichloroethene	1.3 NC	< 4.8			1 @	1.6	< 4.76
1,1-Dichloropropene					0.04		
1,2,4-Trimethylbenzene							
Acetone	2.1 NC	< 2.9	0.09				
Benzene	0.41					0.31	
Bromodichloromethane					0.07	0.38	
Carbon Tetrachloride	7.4 @	16	18 J	26 @	100 J	430 J	38 @
Chloroform	3.1	< 2.9	2.9 @	3.4	57 J	270 J	24 @
Chloromethane			0.84		0.12	1.2 @	< 2.86
Dichlorodifluoromethane			0.32		0.61	2 @	< 3.81
Ethylbenzene							
Tetrachloroethene	0.26		0.17	0.64	0.24	1.8	
Toluene							
Total Xylenes							
Trichloroethene			0.06		0.57	1.2 @	< 2.86
Trichlorofluoromethane	74 J	12	4.2 J	26 @	3.9 @	18	< 4.76
cis-1,2-Dichloroethene	1.1 NC	< 2.9			0.09		
m & p-Xylenes							
o-Xylene			0.01		0.02		

Legend A

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TABLE 3-4
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 118.2
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG001094 SGG0010JE 12/8/94	SG001094 SGG0010JE* 12/8/94	SG001194 SGG0011JE 12/8/94	SG001194 SGG0011JE* 12/8/94	SG001194 SGG0011JE** 12/8/94
Test Group:GC/MS Units:µg/L							
Acetone	2	0		0.34			
Benzene	7	1	0.05	0.34	0.15		
Carbon Disulfide	2	0			0.05		
Carbon Tetrachloride	10	10	5.3 J	6 @	31 J	74 J	98 @
Chloroform	9	6	0.3	0.35	7 J	9.4	11 @
Chloromethane	3	2		0.61			
Dichlorodifluoromethane	1	0	0.4				
Ethylbenzene	3	0	0.02		0.01		
Tetrachloroethene	9	4	1.2 @	1.6	0.46	2.5	2.7 @
Toluene	5	2	0.83	1.2 @	0.14		
Total Xylenes	1	0	0.06				
Trichloroethene	10	10	3 @	3.3	5.1 J	6.6 @	7.5
Trichlorofluoromethane	1	0					
cis-1,2-Dichloroethene	5	0	0.12		0.21		
m & p-Xylenes	2	0	0.05				
o-Xylene	1	0	0.01				

Legend A

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TABLE 3-4
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 118.2
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	SG001294 SGG0012JE 12/8/94	SG001294 SGG0012JE** 12/8/94	SG001394 SGG0013JE 12/8/94	SG001394 SGG0013JE* 12/8/94	SG001494 SGG0014JE 12/8/94
Test Group:GC/MS Units:µg/L					
Acetone				0.35	
Benzene	0.05	3.7	0.1		0.15
Carbon Disulfide			0.06		
Carbon Tetrachloride	79 J	1000 J @	10 J	10 @	3 @
Chloroform	16 J	28 @	2.3 @	2.3	0.42
Chloromethane	1.5 @	< 2.9			
Dichlorodifluoromethane					
Ethylbenzene					0.03
Tetrachloroethene	0.2		0.14	0.52	0.63
Toluene	0.11				2.7 @
Total Xylenes					
Trichloroethene	11 J	17 @	4.8 J	5.6 @	1.8 @
Trichlorofluoromethane					0.33
cis-1,2-Dichloroethene	0.31		0.11		0.09
m & p-Xylenes					0.05
o-Xylene					

Legend A

TABLE 3-5
Laboratory HPGe Vertical Soil Profile Results
for IHSS 123.1

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

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TABLE 3-6
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 123.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG001694 SGG0016JE 11/8/94	SG001794 SGG0151JER 2/21/95	SG001894 SGG0018JE 11/8/94	SG001994 SGG0019JE 11/8/94	SG002094 SGG0152JER 2/21/95	SG002194 SGG0153JER 3/21/95	SG002294 SGG0022JE 11/8/94
Test Group:GC/MS Units:µg/L									
1,1,1-Trichloroethane	1	0			0.08				
1,1-Dichloroethane	1	0		0.04					
1,2,4-Trimethylbenzene	4	0		0.03			0.02	0.02	0.01
1,3,5-Trimethylbenzene	1	0		0.01					
2-Butanone	3	0		0.11	0.05		0.05		
Acetone	5	0		0.34	0.12		0.13	0.21	0.17
Benzene	7	0	0.11	0.11	0.08	0.23	0.09	0.14	0.26
Carbon Disulfide	2	0				0.05			0.06
Carbon Tetrachloride	1	0						0.06	
Chloroform	1	0							0.04
Chloromethane	2	0		0.2			0.04		
Dichlorodifluoromethane	3	1		0.05				0.11	1.1 @
Ethylbenzene	6	0	0.09	0.02	0.02	0.02	0.02	0.02	
Isopropylbenzene	1	0	0.03						
Tetrachloroethene	3	0			0.82	0.17			0.02
Toluene	5	0		0.21		0.14	0.19	0.12	0.2
Total Xylenes	1	0						0.06	
Trichloroethene	1	0							0.06
cis-1,2-Dichloroethene	1	0		0.04					
m & p-Xylenes	1	0						0.04	
n-Propylbenzene	1	0	0.04						
o-Xylene	5	0	0.11	0.02		0.01	0.01	0.02	
s-Butylbenzene	1	0	0.02						

Legend A

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TABLE 3-7
Surface Soil Positive Results
OU8 - IHSS 123.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS800193 SSG0001JE 2-Dec-94	SS800293 SSG0002JE 2-Dec-94	SS800393 SSG0003JE 1-Dec-94	SS800493 SSG0004JE 1-Dec-94	SS800593 SSG0005JE 1-Dec-94	SS800693 SSG0006JE 1-Dec-94	SS800793 SSG0007JE 1-Dec-94	SS800793 SSG0145JE 1-Dec-94	SS800893 SSG0008JE 1-Dec-94	SS800993 SSG0009JE 1-Dec-94
Test Group:BNACLP Units:µg/kg												
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	54 J:A	94 J:A	56 J:A	78 J:A	39 J:A		55 J:A	38 J:A		
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	85 J:A	160 J:A*	67 J:A	93 J:A*	45 J:A	39 J:A	71 J:A	44 J:A	40 J:A	
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	120 J:A	230 J:A	96 J:A	120 J:A	64 J:A	63 J:A	100 J:A	59 J:A	62 J:A	
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	42 J:A-	79 J:A-		46 J:A-						
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	44 J:A	89 J:A		44 J:A			39 J:A			
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	93 J:A	120 J:A	110 J:A	49 J:A			80 J:A	93 J:A	67 J:A	
BUTYL BENZYL PHTHALATE	330	5.49E 7 / 0.00E 0			60 J:A	60 J:A		86 J:A	100 J:A	88 J:A		37 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	76 J:A	150 J:A	71 J:A	97 J:A	53 J:A	39 J:A	67 J:A	47 J:A	42 J:A	
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0						38 J:A	58 J:A			
FLUORANTHENE	330	1.10E 7 / 0.00E 0	130 J:A	220 J:A	130 J:A	160 J:A	80 J:A	72 J:A	130 J:A	81 J:A	78 J:A	
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	41 J:A	91 J:A		44 J:A						
PHENANTHRENE	330	0.00E 0 / 0.00E 0	66 J:A-	120 J:A-	58 J:A-	75 J:A-	41 J:A-		85 J:A-	47 J:A-		
PYRENE	330	8.23E 6 / 0.00E 0	120 J:A	200 J:A	110 J:A	150 J:A	71 J:A	65 J:A	120 J:A	74 J:A	63 J:A	
Test Group:METADD Units:mg/kg												
CESIUM	200	0.00E 0 / 7.00E 0	4.1 B:V	4 B:V								
LITHIUM	20	5.49E 3 / 15.08E 0	5.1 B:V	6.3 B:V	5.2 B:V	4.6 B:V	4.5 B:V	4.8 B:V	5.2 B:V	5.5 B:V	4.5 B:V	8.1 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	27.3 B:V	31.5 B:V	16.6 B:V	28.1 B:V	36.5 B:V	31.8 B:V	23.4 B:V	21.2 B:V	23.7 B:V	44.1 :V
Test Group:SMETCLP Units:mg/kg												
ALUMINUM	40	7.96E 5 / 22999.00E 0	5700 :V	7160 :V	4920 :V	4700 :V	4480 :V	4190 :V	4560 :V	4770 :V	4270 :V	8570 :V
ARSENIC	2	3.66E-1 / 13.75E 0	2.9 :V*	3.5 :V*	2.9 :V*	3 :V*	2.4 :JA*	2.4 :JA*	2.2 :JA*	2.7 :V*	2.6 :JA*	1.3 B:JA*
BARIUM	40	1.91E 4 / 176.00E 0	125 :V	102 :V	71.1 :V	80.5 :V	114 :V	75.3 :V	97.4 :V	92.7 :V	121 :V	34.3 B:V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.49 B:V*	.5 B:V*	.33 B:V*	.34 B:V*	.42 B:V*	.28 B:V*	.32 B:V*	.31 B:V*	.26 B:V*	.32 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	14200 :V#	13600 :V#	8790 :V#	15600 :V#	15500 :V#	13700 :V#	11400 :V#	9320 :V#	11800 :V#	8730 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	8 :V	9.4 :V	9.9 :V	13 :V	11.5 :V	13.6 :V	9.7 :V	13.8 :V	14.6 :V	9.5 :V
COBALT	10	1.65E 4 / 14.22E 0	4.9 B:V	4.6 B:V	4.3 B:V	4.2 B:V	4.3 B:V	3.9 B:V	4 B:V	5 B:V	4 B:V	11.1 :V
COPPER	5	1.10E 4 / 22.75E 0	17.3 :V	13.8 :V	10.3 :V	10.9 :V	11.8 :V	29.7 :V#	12.8 :V	12.7 :V	10.6 :V	61.4 :V#
IRON	20	0.00E 0 / 23063.00E 0	11400 :V	10900 :V	7310 :V	7440 :V	7120 :V	7040 :V	7030 :V	8110 :V	6690 :V	18500 :V
LEAD	1	0.00E 0 / 73.87E 0	17.4 :V	15.3 :V	10.8 :V	11.6 :V	12.7 :V	18 :V	9 :V	9.8 :V	9.7 :V	7.1 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2310 :V	2310 :V	1690 :V	1800 :V	1810 :V	1910 :V	2030 :V	1890 :V	1710 :V	7400 :V#
MANGANESE	3	1.36E 3 / 482.10E 0	198 :V	181 :V	149 :V	172 :V	189 :V	157 :V	141 :V	170 :V	127 :V	473 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.06 B:V									
NICKEL	8	5.49E 3 / 19.74E 0	7.7 B:V	8.6 :V	7.4 B:V	7.8 B:V	7.1 B:V	6.6 B:V	7.7 B:V	7.5 B:V	6.7 B:V	12.3 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1330 :V	1340 :V	1250 :V	1260 :V	1100 :V	1150 :V	1200 :V	1260 :V	1100 :V	1560 :V
SILVER	2	1.37E 3 / 0.22E 0	.59 B:JA#									
SODIUM	2000	0.00E 0 / 119.02E 0										1540 :V#
VANADIUM	10	1.92E 3 / 61.84E 0	16.8 :V	22.2 :V	17.7 :V	17.1 :V	16.7 :V	15.1 :V	17.3 :V	19.9 :V	16 :V	28.4 :V
ZINC	4	8.23E 4 / 95.92E 0	133 :V#	474 :V#	45.1 :V	56.6 :V	134 :V#	54.7 :V	72 :V	75.5 :V	118 :V#	37.5 :V
Test Group:TRADS Units:pCi/g												
AMERICIUM-241	0	2.37E 0 / 0.04E 0			.026(.018) :Y	.025(.012) :Y	.023(.014) :Y	.022(.012) :Y			.028(.014) :Y	
GROSS ALPHA	0	0.00E 0 / 44.56E 0	17(3.2) :Y	18(3.4) :Y	22(3.5) :Y	24(3.9) :Y	20(3.4) :Y	18(3.5) :Y	20(3.5) :Y	22(3.6) :Y	17(3.2) :Y	20(4) :Y
GROSS BETA	0	0.00E 0 / 55.35E 0	29(3.4) :Y	28(3.3) :Y	32(3.6) :Y	34(3.6) :Y	28(3.4) :Y	30(3.5) :Y	31(3.7) :Y	33(3.8) :Y	34(3.5) :Y	31(3.6) :Y
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.059(.013) :Y	.11(.015) :Y#	.03(.007) :Y	.088(.016) :Y#	.035(.009) :Y	.033(.01) :Y	.038(.011) :Y	.047(.009) :Y	.037(.01) :Y	
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.84(.21) :Y	.64(.16) :Y	.89(.16) :Y	.85(.14) :Y	.86(.15) :Y	.96(.15) :Y	.85(.14) :Y	.92(.15) :Y	.76(.078) B:Y	1.2(.11) B:Y
URANIUM-235	0	1.73E-1 / 0.13E 0			.055(.042) J:Y	.065(.036) J:Y					.038(.02) J:Y	.045(.025) J:Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.87(.21) :Y*	.78(.18) :Y	.91(.16) :Y*	.86(.14) :Y*	.96(.15) :Y*	.98(.15) :Y*	1(.15) :Y*	.72(.14) :Y	.76(.078) :Y	1.1(.11) :Y*
Test Group:WQPL Units:µg/g												
FLUORIDE	0	E 0 / E 0	2.18 :V-	2.26 :V-	2.36 :V-	1.87 :V-	3.61 :V-	2.52 :V-	2.33 :V-	2.97 :V-	2.58 :V-	2.06 :V-
NITRATE/NITRITE	0	E 0 / E 0	26.1 :V-	38.7 :V-	36.1 :JA-	32 :JA-	30.4 :JA-	32.8 :JA-	32.4 :JA-	24.7 :JA-	17.9 :JA-	29.7 :JA-

Legend B

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TABLE 3-8
Surface Soil Positive Results Data Summary
OU8 - IHSS 123.1
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BENZO(a)ANTHRACENE	330	360	SS800993 (1)	370	SS800693 (2)	39 J:A	SS800593 (1)
BENZO(a)PYRENE	330	360	SS800993 (1)	360	SS800993 (1)	39 J:A	SS800693 (1)
BENZO(b)FLUORANTHENE	330	360	SS800993 (1)	360	SS800993 (1)	62 J:A	SS800893 (1)
BENZO(ghi)PERYLENE	330	360	SS800793 (2)	370	SS800393 (4)	42 J:A	SS800193 (1)
BENZO(k)FLUORANTHENE	330	360	SS800993 (1)	370	SS800393 (4)	39 J:A	SS800793 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	360	SS800993 (1)	370	SS800593 (2)	49 J:A	SS800493 (1)
BUTYL BENZYL PHTHALATE	330	370	SS800193 (4)	370	SS800193 (4)	37 J:A	SS800993 (1)
CHRYSENE	330	360	SS800993 (1)	360	SS800993 (1)	39 J:A	SS800693 (1)
DI-n-OCTYL PHTHALATE	330	360	SS800993 (1)	370	SS800193 (6)	38 J:A	SS800693 (1)
FLUORANTHENE	330	360	SS800993 (1)	360	SS800993 (1)	72 J:A	SS800693 (1)
INDENO(1,2,3-cd)PYRENE	330	360	SS800793 (2)	370	SS800393 (4)	41 J:A	SS800193 (1)
PHENANTHRENE	330	360	SS800993 (1)	370	SS800693 (2)	41 J:A	SS800593 (1)
PYRENE	330	360	SS800993 (1)	360	SS800993 (1)	63 J:A	SS800893 (1)
Test Group:METADD Units:mg/kg							
CESIUM	1000	4.3	SS800393 (1)	6.5	SS800493 (2)	4 B:V	SS800293 (1)
LITHIUM	100	**	**	**	**	4.5 B:V	SS800593 (2)
STRONTIUM	200	**	**	**	**	16.6 B:V	SS800393 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	4190 :V	SS800693 (1)
ARSENIC	10	**	**	**	**	1.3 B:J	SS800993 (1)
BARIUM	200	**	**	**	**	34.3 B:V	SS800993 (1)
BERYLLIUM	5	**	**	**	**	.26 B:V	SS800893 (1)
CALCIUM	5000	**	**	**	**	8730 :V	SS800993 (1)
CHROMIUM	10	**	**	**	**	8 :V	SS800193 (1)
COBALT	50	**	**	**	**	3.9 B:V	SS800693 (1)
COPPER	25	**	**	**	**	10.3 :V	SS800393 (1)
IRON	100	**	**	**	**	6690 :V	SS800893 (1)
LEAD	3	**	**	**	**	7.1 :V	SS800993 (1)
MAGNESIUM	5000	**	**	**	**	1690 :V	SS800393 (1)
MANGANESE	15	**	**	**	**	127 :V	SS800893 (1)
MERCURY	0.2	0.05	SS800793 (2)	0.06	SS800493 (2)	.06 B:V	SS800193 (1)
NICKEL	40	**	**	**	**	6.6 B:V	SS800693 (1)
POTASSIUM	5000	**	**	**	**	1100 :V	SS800593 (2)
SILVER	10	0.49	SS800293 (2)	2.1	SS800993 (1)	.59 B:J	SS800193 (1)
SODIUM	5000	55.1	SS800493 (1)	122	SS800193 (1)	1540 :V	SS800993 (1)
VANADIUM	50	**	**	**	**	15.1 :V	SS800693 (1)
ZINC	20	**	**	**	**	37.5 :V	SS800993 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	.002(.008) U:Y	SS800993 (1)
GROSS ALPHA	3	**	**	**	**	17(3.2) :Y	SS800193 (2)
GROSS BETA	4	**	**	**	**	28(3.3) :Y	SS800293 (2)
PLUTONIUM-239/240	0.009	**	**	**	**	.004(.005) U:Y	SS800993 (1)
URANIUM-233,-234	0.03	**	**	**	**	.64(.16) :Y	SS800293 (1)
URANIUM-235	0.02	**	**	**	**	.01(.021) U:Y	SS800293 (1)
URANIUM-238	0.02	**	**	**	**	.72(.14) :Y	SS800793 (1)
Test Group:WQPL Units:µg/g							
FLUORIDE	1	**	**	**	**	1.87 :V	SS800493 (1)
NITRATE/NITRITE	0.5	**	**	**	**	17.9 :J	SS800893 (1)
pH Units: pH	0.01	**	**	**	**	7.96 :V	SS800393 (1)

Legend C

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TABLE 3-8
Surface Soil Positive Results Data Summary
OU8 - IHSS 123.1
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BENZO(a)ANTHRACENE	94 J:A	SS800293 (1)	6	9	102.8889
BENZO(a)PYRENE	160 J:A	SS800293 (1)	8	9	86.6667
BENZO(b)FLUORANTHENE	230 J:A	SS800293 (1)	8	9	115
BENZO(ghi)PERYLENE	79 J:A	SS800293 (1)	3	9	140.7778
BENZO(k)FLUORANTHENE	89 J:A	SS800293 (1)	4	9	126.2222
BIS(2-ETHYLHEXYL)PHTHALATE	120 J:A	SS800293 (1)	6	9	120.2222
BUTYL BENZYL PHTHALATE	100 J:A	SS800793 (1)	5	9	120.3333
CHRYSENE	150 J:A	SS800293 (1)	8	9	86.1111
DI-n-OCTYL PHTHALATE	58 J:A	SS800793 (1)	2	9	154
FLUORANTHENE	220 J:A	SS800293 (1)	8	9	131.1111
INDENO(1,2,3-cd)PYRENE	91 J:A	SS800293 (1)	3	9	141.7778
PHENANTHRENE	120 J:A	SS800293 (1)	6	9	110.5556
PYRENE	200 J:A	SS800293 (1)	8	9	119.8889
Test Group:METADD Units:mg/kg					
CESIUM	4.1 B:V	SS800193 (1)	2	9	3.1333
LITHIUM	8.1 B:V	SS800993 (1)	9	9	5.4
STRONTIUM	44.1 :V	SS800993 (1)	9	9	29.2222
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	8570 :V	SS800993 (1)	9	9	5417.778
ARSENIC	3.5 :V	SS800293 (1)	9	9	2.6333
BARIUM	125 :V	SS800193 (1)	9	9	91.1778
BERYLLIUM	.5 B:V	SS800293 (1)	9	9	0.3622
CALCIUM	15600 :V	SS800493 (1)	9	9	12591.11
CHROMIUM	14.6 :V	SS800893 (1)	9	9	11.4778
COBALT	11.1 :V	SS800993 (1)	9	9	5.1444
COPPER	61.4 :V	SS800993 (1)	9	9	19.8444
IRON	18500 :V	SS800993 (1)	9	9	9390
LEAD	18 :V	SS800693 (1)	9	9	12.4889
MAGNESIUM	7400 :V	SS800993 (1)	9	9	2552.222
MANGANESE	473 :V	SS800993 (1)	9	9	201.7778
MERCURY	.06 B:V	SS800193 (1)	1	9	0.0309
NICKEL	12.3 :V	SS800993 (1)	9	9	7.9889
POTASSIUM	1560 :V	SS800993 (1)	9	9	1261.111
SILVER	.59 B:J	SS800193 (1)	1	9	0.4178
SODIUM	1540 :V	SS800993 (1)	1	9	205.4111
VANADIUM	28.4 :V	SS800993 (1)	9	9	18.8778
ZINC	474 :V	SS800293 (1)	9	9	125.3778
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.028(.014) :Y	SS800893 (1)	10	10	0.0183
GROSS ALPHA	24(3.9) :Y	SS800493 (1)	10	10	19.8
GROSS BETA	34(3.6) :Y	SS800493 (2)	10	10	31
PLUTONIUM-239/240	.11(.015) :Y	SS800293 (1)	10	10	0.0481
URANIUM-233,-234	1.2(.11) B:Y	SS800993 (1)	10	10	0.877
URANIUM-235	.066(.079) U:Y	SS800193 (1)	10	10	0.0388
URANIUM-238	1.1(.11) :Y	SS800993 (1)	10	10	0.894
Test Group:WQPL Units:µg/g					
FLUORIDE	3.61 :V	SS800593 (1)	9	9	2.49
NITRATE/NITRITE	38.7 :V	SS800293 (1)	9	9	30.6778
pH Units: pH	8.8 :V	SS800993 (1)	9	9	8.3444

Legend C

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TABLE 3-9
Population Distribution Summary of Surface-Soil Results
for IHSS 123.1

Test Group: METADD	Distribution	Comments
Cesium	ND	Only two samples estimated below quantitation limit
Lithium	Lognormal	
Strontium	ND	One sample in excess of quantitation limit
Test Group: SMETCLP		
Aluminum	Normal	
Arsenic	Normal	
Barium	Normal	
Beryllium	ND	All samples estimated at below quantitation limit
Calcium	Normal	
Chromium	Normal	
Cobalt	ND	One sample in excess of quantitation limit
Copper	Lognormal	
Iron	Normal	
Lead	Normal	
Magnesium	Nonparametric	
Manganese	Nonparametric	
Mercury	ND	One sample analyzed
Nickel	ND	Two samples in excess of quantitation limit
Potassium	ND	All samples estimated at below quantitation limit
Silver	ND	No analyses
Sodium	ND	One sample analyzed
Vanadium	Lognormal	
Zinc	Lognormal	
Test Group:TRADS		
Americium-241	Nonparametric	
Gross Alpha	Normal	
Gross Beta	Normal	
Plutonium-239/240	Lognormal	
Uranium-233,-234	Normal	
Uranium-235	Nonparametric	
Uranium-238	Normal	
Test Group:WQPL		
Fluoride	Normal	
Nitrate/Nitrite	Normal	

Legend D

TABLE 3-10
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 123.1

	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power		
					d=0.2	d=0.3	d=0.5
Test Group: METADD							
Cesium	2	4.1	0.07	0.017	0.9999+	0.9999+	0.9999+
Lithium	10	5.4	1.10	0.205	0.89	0.998	0.9999
Strontium	10	28.4	7.98	0.281	0.66	0.93	0.9997
Test Group: SMETCLP							
Aluminum	10	3336.7	2531.91	0.759	0.19	0.33	0.62
Arsenic	10	2.6	0.59	0.226	0.82	0.986	0.9999
Barium	10	91.3	27.32	0.299	0.63	0.90	0.9992
Beryllium	10	0.4	0.08	0.235	0.80	0.975	0.9999
Calcium	10	8342.7	6998.50	0.839	0.175	0.28	0.55
Chromium	10	11.3	2.30	0.204	0.88	0.996	0.9999
Cobalt	10	5.0	2.17	0.430	0.39	0.61	0.97
Copper	10	18.2	16.70	0.916	0.16	0.22	0.42
Iron	10	5294.8	4454.85	0.841	0.17	0.27	0.51
Lead	10	12.1	3.67	0.302	0.63	0.89	0.9986
Magnesium	10	1228.7	981.29	0.799	0.19	0.29	0.57
Manganese	10	180.4	114.85	0.637	0.23	0.39	0.74
Mercury	1	0.1					
Nickel	10	7.9	1.64	0.206	0.88	0.995	0.9999
Potassium	10	773.5	605.95	0.783	0.19	0.32	0.57
Silver	1	0.6					
Sodium	1	154.0					
Vanadium	10	18.7	3.96	0.212	0.87	0.993	0.9999
Zinc	10	120.0	129.39	1.078	0.14	0.21	0.39
Test Group:TRADS							
Americium-241	5	0.1	0.11	1.523	0.09	0.12	0.19
Gross Alpha	10	16.2	7.84	0.484	0.32	0.55	0.91
Gross Beta	10	31.0	2.26	0.073	0.9999	0.9999	0.9999
Plutonium-239/240	9	0.2	0.18	1.016	0.14	0.21	0.39
Uranium-233,-234	10	0.9	0.14	0.164	0.95	0.9998	0.9999
Uranium-235	4	0.2	0.20	1.275	0.09	0.12	0.19
Uranium-238	10	0.9	0.12	0.134	0.995	0.9999	0.9999
Test Group:WQPL							
Fluoride	10	2.5	0.48	0.190	0.92	0.998	0.9999
Nitrate/Nitrite	10	30.1	5.97	0.198	0.90	0.997	0.9999

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-11
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 123.1

	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power		
					d=0.2	d=0.3	d=0.5
Test Group: METADD							
Cesium	2	4.1	0.07	0.017	0.9999+	0.9999+	0.9999+
Lithium	9	5.4	1.17	0.216	0.89	0.998	0.9999
Strontium	9	29.2	8.02	0.275	0.66	0.93	0.9997
Test Group: SMETCLP							
Aluminum	9	3656.8	2461.57	0.673	0.19	0.33	0.62
Arsenic	9	2.6	0.60	0.229	0.82	0.986	0.9999
Barium	9	91.2	28.97	0.318	0.63	0.90	0.9992
Beryllium	9	0.4	0.09	0.241	0.80	0.975	0.9999
Calcium	9	9257.0	6460.00	0.730	0.175	0.28	0.55
Chromium	9	11.5	2.37	0.206	0.88	0.996	0.9999
Cobalt	9	5.1	2.26	0.440	0.39	0.61	0.97
Copper	9	18.8	17.59	0.934	0.16	0.22	0.42
Iron	9	5875.0	4305.73	0.733	0.17	0.27	0.51
Lead	9	12.5	3.71	0.297	0.63	0.89	0.9986
Magnesium	9	1362.7	938.83	0.689	0.19	0.29	0.57
Manganese	9	198.6	105.50	0.531	0.23	0.39	0.74
Mercury	1	0.1					
Nickel	9	8.0	1.73	0.316	0.88	0.995	0.9999
Potassium	9	858.1	576.65	0.672	0.19	0.32	0.57
Silver	1	0.59					
Sodium	1	154.0					
Vanadium	9	18.9	4.17	0.221	0.87	0.993	0.9999
Zinc	9	125.4	136.06	1.085	0.14	0.21	0.39
Test Group:TRADS							
Americium-241	5	0.1	0.11	1.523	0.09	0.12	0.19
Gross Alpha	9	17.8	6.42	0.361	0.32	0.55	0.91
Gross Beta	9	31.0	2.40	0.077	0.9999	0.9999	0.9999
Plutonium-239/240	8	0.15	0.17	1.148	0.14	0.21	0.39
Uranium-233,-234	9	0.88	0.15	0.173	0.95	0.9998	0.9999
Uranium-235	4	0.16	0.20	1.275	0.09	0.12	0.19
Uranium-238	9	0.91	0.11	0.119	0.995	0.9999	0.9999
Test Group:WQPL							
Fluoride	9	2.55	0.50	0.197	0.92	0.998	0.9999
Nitrate/Nitrite	9	30.68	6.00	0.196	0.90	0.997	0.9999

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-12
Surface Soil Positive Results
OU8 - IHSS 135
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS801093 SSG0010JE 2-Nov-94	SS801193 SSG0011JE 2-Nov-94	SS801293 SSG0012JE 2-Nov-94	SS801393 SSG0013JE 2-Nov-94	SS801493 SSG0014JE 2-Nov-94
Test Group:METADD Units:mg/kg							
LITHIUM	20	5.49E 3 / 15.08E 0	2.2 B:V	2.7 B:V	2.9 B:V	4.6 B:V	2.6 B:V
MOLYBDENUM	40	1.37E 3 / 0.90E 0					4.8 B:V#
STRONTIUM	40	1.65E 5 / 67.92E 0	10.2 :V	10.7 B:V	18.1 B:V	18 B:V	12.6 B:V
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	40	7.96E 5 / 22999.00E 0	2460 :V	3180 :V	3870 :V	7440 :V	3150 :V
ANTIMONY	12	1.10E 2 / 0.47E 0		2.8 B:JA#			
ARSENIC	2	3.66E-1 / 13.75E 0	3.8 :V*	4.1 :V*	5.6 :V*	4.5 :V*	3.4 :V*
BARIUM	40	1.91E 4 / 176.00E 0	35.1 B:V	40.6 :V	108 :V	70.5 :V	96.8 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0				.68 B:V*	
CALCIUM	1000	0.00E 0 / 5839.00E 0	1500 I:JA	1460 I:JA	2620 I:JA	4570 I:JA	2760 I:JA
CHROMIUM	2	0.00E 0 / 22.21E 0	6.6 :V	6.1 :V	12 :V	9.2 :V	6.1 :V
COBALT	10	1.65E 4 / 14.22E 0	2.1 B:V	2.8 B:V	3.2 B:V	5.1 B:V	2.5 B:V
COPPER	5	1.10E 4 / 22.75E 0	15.8 :V	15.6 :V	65.2 :V#	14.1 :V	13.4 :V
IRON	20	0.00E 0 / 23063.00E 0	4820 :V	5870 :V	8690 :V	12000 :V	7040 :V
LEAD	1	0.00E 0 / 73.87E 0	6.8 :V	7.1 :V	9.1 :V	9.9 :V	6 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	772 B:V	945 B:V	1330 :V	2170 :V	1020 :V
MANGANESE	3	1.36E 3 / 482.10E 0	82 :V	90.3 :V	164 :V	204 :V	96.6 :V
MERCURY	0.2	8.23E 1 / 0.19E 0			.057 B:V		
NICKEL	8	5.49E 3 / 19.74E 0	4.3 B:V	4.8 B:V	6.3 B:V	9.1 :V	5.6 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	653 B:V	718 B:V	818 B:V	1300 :V	729 B:V
SODIUM	2000	0.00E 0 / 119.02E 0	63.7 B:V	107 B:V	151 B:V#	147 B:V#	92.9 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	10.4 :V	12.8 :V	13.7 :V	25.5 :V	11.8 :V
ZINC	4	8.23E 4 / 95.92E 0	47.5 :V	60.8 :V	146 :V#	52.9 :V	50.3 :V
Test Group:TPH8015A Units:%REC							
A,A,A-TFT	0	E 0 / E 0	71 :Y-	63 :Y-	65 :Y-	58 :Y-	65 :Y-
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.024(.018) :V	.12(.027) :V#	.1(.025) :V#	.045(.015) :V#	.025(.012) :V
GROSS ALPHA	0	0.00E 0 / 44.56E 0	10(2.4) :A	9.7(2.3) :A	15(2.7) :A	8.5(2.4) :A	9.4(2.3) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	29(3.3) :A	27(3.5) :A	24(3.5) :A	25(3.2) :A	22(3.2) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.05(.016) :V	.14(.025) :V#	.74(.068) :V#	.054(.015) :V	.012(.008) J:V
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.76(.22) :V	.54(.14) :V	.71(.17) :V	.75(.19) :V	.52(.15) :V
URANIUM-235	0	1.73E-1 / 0.13E 0	.25(.13) J:V*#				
URANIUM-238	0	8.00E-1 / 2.83E 0	.78(.22) :V	.48(.12) :V	.73(.17) :V	.63(.17) :V	.67(.17) :V

Legend B

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TABLE 3-13
Surface Soil Positive Results Data Summary
OU8 - IHSS 135
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	2.2 B:V	SS801093 (1)
MOLYBDENUM	200	0.7	SS801393 (1)	4.4	SS801293 (1)	4.8 B:V	SS801493 (1)
STRONTIUM	200	**	**	**	**	10.2 :V	SS801093 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	2460 :V	SS801093 (1)
ANTIMONY	60	2.2	SS801093 (2)	2.4	SS801293 (1)	2.8 B:J	SS801193 (1)
ARSENIC	10	**	**	**	**	3.4 :V	SS801493 (1)
BARIUM	200	**	**	**	**	35.1 B:V	SS801093 (1)
BERYLLIUM	5	0.2	SS801093 (1)	0.32	SS801193 (1)	.68 B:V	SS801393 (1)
CALCIUM	5000	**	**	**	**	1460 I:J	SS801193 (1)
CHROMIUM	10	**	**	**	**	6.1 :V	SS801193 (2)
COBALT	50	**	**	**	**	2.1 B:V	SS801093 (1)
COPPER	25	**	**	**	**	13.4 :V	SS801493 (1)
IRON	100	**	**	**	**	4820 :V	SS801093 (1)
LEAD	3	**	**	**	**	6 :V	SS801493 (1)
MAGNESIUM	5000	**	**	**	**	772 B:V	SS801093 (1)
MANGANESE	15	**	**	**	**	82 :V	SS801093 (1)
MERCURY	0.2	0.05	SS801093 (1)	0.05	SS801393 (1)	.057 B:V	SS801293 (1)
NICKEL	40	**	**	**	**	4.3 B:V	SS801093 (1)
POTASSIUM	5000	**	**	**	**	653 B:V	SS801093 (1)
SODIUM	5000	**	**	**	**	63.7 B:V	SS801093 (1)
VANADIUM	50	**	**	**	**	10.4 :V	SS801093 (1)
ZINC	20	**	**	**	**	47.5 :V	SS801093 (1)
Test Group:TPH8015A Units:%REC							
A,A,A-TFT	0	**	**	**	**	58 :Y	SS801393 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.009	**	**	**	**	.024(.018) :V	SS801093 (1)
GROSS ALPHA	2	**	**	**	**	8.5(2.4) :A	SS801393 (1)
GROSS BETA	4	**	**	**	**	22(3.2) :A	SS801493 (1)
PLUTONIUM-239/240	0.008	**	**	**	**	.012(.008) J:V	SS801493 (1)
TRITIUM	300	**	**	**	**	26(150) U:A	SS801393 (1)
URANIUM-233,-234	0.07	**	**	**	**	.52(.15) :V	SS801493 (1)
URANIUM-235	0.08	**	**	**	**	.009(.018) U:V	SS801193 (1)
URANIUM-238	0.07	**	**	**	**	.48(.12) :V	SS801193 (1)

Legend C

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TABLE 3-13
Surface Soil Positive Results Data Summary
OU8 - IHSS 135
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:METADD Units:mg/kg					
LITHIUM	4.6 B:V	SS801393 (1)	5	5	3
MOLYBDENUM	4.8 B:V	SS801493 (1)	1	5	1.636
STRONTIUM	18.1 B:V	SS801293 (1)	5	5	13.92
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	7440 :V	SS801393 (1)	5	5	4020
ANTIMONY	2.8 B:J	SS801193 (1)	1	5	1.47
ARSENIC	5.6 :V	SS801293 (1)	5	5	4.28
BARIUM	108 :V	SS801293 (1)	5	5	70.2
BERYLLIUM	.68 B:V	SS801393 (1)	1	5	0.239
CALCIUM	4570 I:J	SS801393 (1)	5	5	2582
CHROMIUM	12 :V	SS801293 (1)	5	5	8
COBALT	5.1 B:V	SS801393 (1)	5	5	3.14
COPPER	65.2 :V	SS801293 (1)	5	5	24.82
IRON	12000 :V	SS801393 (1)	5	5	7684
LEAD	9.9 :V	SS801393 (1)	5	5	7.78
MAGNESIUM	2170 :V	SS801393 (1)	5	5	1247.4
MANGANESE	204 :V	SS801393 (1)	5	5	127.38
MERCURY	.057 B:V	SS801293 (1)	1	5	0.0319
NICKEL	9.1 :V	SS801393 (1)	5	5	6.02
POTASSIUM	1300 :V	SS801393 (1)	5	5	843.6
SODIUM	151 B:V	SS801293 (1)	5	5	112.32
VANADIUM	25.5 :V	SS801393 (1)	5	5	14.84
ZINC	146 :V	SS801293 (1)	5	5	71.5
Test Group:TPH8015A Units:%REC					
A,A,A-TFT	71 :Y	SS801093 (1)	5	5	64.4
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.12(.027) :V	SS801193 (1)	5	5	0.0628
GROSS ALPHA	15(2.7) :A	SS801293 (1)	5	5	10.52
GROSS BETA	29(3.3) :A	SS801093 (1)	5	5	25.4
PLUTONIUM-239/240	.74(.068) :V	SS801293 (1)	5	5	0.1992
TRITIUM	200(310) U:A	SS801193 (1)	5	5	107
URANIUM-233,-234	.76(.22) :V	SS801093 (1)	5	5	0.656
URANIUM-235	.25(.13) J:V	SS801093 (1)	5	5	0.0758
URANIUM-238	.78(.22) :V	SS801093 (1)	5	5	0.658

Legend C

TABLE 3-14
Population Distribution Summary of Surface-Soil Results
for IHSS 135

Test Group: METADD	Distribution	Comments
Lithium	Normal	
Molybdenum	ND	One sample in excess of quantitation limit
Strontium	Normal	
Test Group: SMETCLP		
Aluminum	Normal	
Antimony	ND	Only one sample had a detectable concentration
Arsenic	Normal	
Barium	Normal	
Beryllium	ND	Only one sample had a detectable concentration
Calcium	Normal	
Chromium	Normal	
Cobalt	Normal	One sample in excess of quantitation limit
Copper	Nonparametric	
Iron	Normal	
Lead	Normal	
Magnesium	Normal	
Manganese	Normal	
Mercury	ND	Only one sample had a detectable concentration
Nickel	Lognormal	
Potassium	Normal	
Sodium	Normal	
Vanadium	Normal	
Zinc	Nonparametric	
Test Group:TRADS		
Americium-241	Normal	
Gross Alpha	Lognormal	
Gross Beta	Normal	
Plutonium-239/240	Lognormal	
Uranium-233,-234	Normal	
Uranium-235	Normal	
Uranium-238	Normal	

Legend D

TABLE 3-15
Test of Power of Differences of Sample Mean
of Surface-Soil Results
for IHSS 135

	Preliminary Remed. Goals	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	5490	5	3.0	0.93	0.310	0.300	0.540	0.900
MOLYBDENUM	1,370	1	4.8					
STRONTIUM	165,000	5	13.9	3.88	0.278	0.380	0.640	0.945
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796,000	5	4020.0	1975.79	0.491	0.290	0.300	0.580
ANTIMONY	110	1	2.8					
ARSENIC	0.366	5	4.3	0.84	0.196	0.580	0.870	0.998
BARIUM	19,100	5	70.2	32.58	0.464	0.630	0.340	0.640
BERYLLIUM	1,370	1	0.7					
CALCIUM	Not Determined	5	2582.0	1266.38	0.490	0.185	0.290	0.590
CHROMIUM	274,000	5	8.0	2.58	0.322	0.300	0.500	0.885
COBALT	16,500	5	3.1	1.17	0.372	0.250	0.440	0.790
COPPER	11,000	5	24.8	22.60	0.910	0.095	0.150	0.250
IRON	Not Determined	5	7684.0	2808.37	0.365	0.250	0.440	0.790
LEAD	Not Determined	5	7.8	1.65	0.211	0.540	0.835	0.994
MAGNESIUM	Not Determined	5	1247.4	553.89	0.444	0.200	0.340	0.670
MANGANESE	1,360	5	127.4	53.84	0.423	0.200	0.360	0.700
MERCURY	82.3	1	0.1					
NICKEL	5,490	5	6.0	1.88	0.313	0.300	0.540	0.895
POTASSIUM	Not Determined	5	843.6	261.82	0.310	0.300	0.540	0.900
SODIUM	Not Determined	5	112.3	36.97	0.329	0.300	0.500	0.860
VANADIUM	1,920	5	14.8	6.08	0.410	0.200	0.380	0.700
ZINC	82,300	5	71.5	41.94	0.587	0.150	0.225	0.470
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	2.37	5	0.1	0.05	0.782	0.125	0.175	0.300
GROSS ALPHA	Not Determined	5	10.5	2.57	0.244	0.440	0.730	0.980
GROSS BETA	Not Determined	5	25.4	2.70	0.106	0.960	0.999+	0.999+
PLUTONIUM-239/240	3.42	5	0.2	0.31	1.549	0.075	0.080	0.150
URANIUM-233,-234	44.7	5	0.7	0.12	0.178	0.670	0.925	0.999+
URANIUM-235	0.173	1	0.3					
URANIUM-238	0.80	5	0.7	0.11	0.174	0.670	0.930	0.999+

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-16
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 135

	Preliminary Remed. Goals	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
LITHIUM	5490	5	3.0	0.93	0.310	7	4	3	2	2	1
MOLYBDENUM	1,370	1	4.8								0
STRONTIUM	165,000	5	13.9	3.88	0.278	6	4	3	2	1	1
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796,000	5	4020.0	1975.79	0.491	17	10	8	5	3	2
ANTIMONY	110	1	2.8								0
ARSENIC	0.366	5	4.3	0.84	0.196	3	2	2	1	1	1
BARIUM	19,100	5	70.2	32.58	0.464	15	9	7	4	3	2
BERYLLIUM	1,370	1	0.7								0
CALCIUM	Not Determined	5	2582.0	1266.38	0.490	17	10	8	5	3	2
CHROMIUM	274,000	5	8.0	2.58	0.322	8	5	4	2	2	1
COBALT	16,500	5	3.1	1.17	0.372	10	6	5	3	2	1
COPPER	11,000	5	24.8	22.60	0.910	57	35	25	16	9	6
IRON	Not Determined	5	7684.0	2808.37	0.365	10	6	5	3	2	1
LEAD	Not Determined	5	7.8	1.65	0.211	4	2	2	1	1	1
MAGNESIUM	Not Determined	5	1247.4	553.89	0.444	14	9	6	4	3	2
MANGANESE	1,360	5	127.4	53.84	0.423	13	8	6	4	2	2
MERCURY	82.3	1	0.1								0
NICKEL	5,490	5	6.0	1.88	0.313	7	5	3	2	2	1
POTASSIUM	Not Determined	5	843.6	261.82	0.310	7	4	3	2	2	1
SODIUM	Not Determined	5	112.3	36.97	0.329	8	5	4	2	2	1
VANADIUM	1,920	5	14.8	6.08	0.410	12	7	6	4	2	2
ZINC	82,300	5	71.5	41.94	0.587	24	15	11	7	4	3
Test Group:TRADS Units: pCi/g											
AMERICIUM-241	2.37	5	0.1	0.05	0.782	42	26	19	12	7	5
GROSS ALPHA	Not Determined	5	10.5	2.57	0.244	5	3	2	2	1	1
GROSS BETA	Not Determined	5	25.4	2.70	0.106	1	1	1	1	1	1
PLUTONIUM-239/240	3.42	5	0.2	0.31	1.549	163	99	73	44	26	16
URANIUM-233,-234	44.7	5	0.7	0.12	0.178	3	2	1	1	1	1
URANIUM-235	0.173	1	0.3								
URANIUM-238	0.80	5	0.7	0.11	0.174	3	2	1	1	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-17
Surface Soil Positive Results
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]		SS801593 SSG0015JE 27-Oct-94	SS801693 SSG0016JE 27-Oct-94	SS801793 SSG0017JE 27-Oct-94	SS801893 SSG0018JE 27-Oct-94	SS801993 SSG0019JE 27-Oct-94	SS802093 SSG0020JE 27-Oct-94	SS802093 SSG0120JE 27-Oct-94	SS802193 SSG0021JE 27-Oct-94
Test Group:BNACLP Units: µg/kg											
2-METHYLNAPHTHALENE	330	0.00E 0 /	0.00E 0	37 J:A-	36 J:A-	94 J:A-			140 J:A-	170 J:A-	82 J:A-
ACENAPHTHENE	330	1.65E 7 /	0.00E 0	340 J:A	360 :V	840 :V	740 :V	470 J:A	810 :V	1000 :V	460 :V
ACENAPHTHYLENE	330	0.00E 0 /	0.00E 0							53 J:A-	
ANTHRACENE	330	8.23E 7 /	0.00E 0	420 :V	410 :V	800 :V	900 :V	530 J:A	930 :V	1100 :V	550 :V
BENZO(a)ANTHRACENE	330	8.77E 2 /	0.00E 0	930 :V*	880 :V*	2300 :V*	2600 :V*	1800 :V*	1700 :V*	1900 :V*	850 :V
BENZO(a)PYRENE	330	8.77E 1 /	0.00E 0	960 :V*	890 :V*	2000 :V*	2300 :V*	2000 :V*	1500 :V*	1500 :V*	890 :V*
BENZO(b)FLUORANTHENE	330	8.77E 2 /	0.00E 0	1200 :V*	1200 :V*	2800 :V*	3200 D:V*	3400 :V*	2100 :V*	2500 :V*	1100 :V*
BENZO(ghi)PERYLENE	330	0.00E 0 /	0.00E 0	640 :V-	530 :V-	1000 :V-	1000 :V-	1300 :V-	600 :V-	320 J:A-	400 :V-
BENZO(k)FLUORANTHENE	330	8.77E 3 /	0.00E 0	460 :JA	400 :JA	650 :JA	920 :V	950 :JA	660 :JA	630 :JA	450 :JA
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 /	0.00E 0	190 J:A	110 J:A	140 J:A	390 J:A	730 :V	280 J:A	200 J:A	140 J:A
CHRYSENE	330	8.77E 4 /	0.00E 0	870 :V	870 :V	2200 :V	2900 :V	2200 :V	1800 :V	2000 :V	910 :V
DI-n-BUTYL PHTHALATE	330	2.74E 7 /	0.00E 0	54 J:A	37 J:A	37 J:A	170 J:A	96 J:A		42 J:A	
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 /	0.00E 0	220 J:A*	200 J:A*	350 J:A*	300 J:A*	540 J:A*	360 J:A*	360 J:A*	190 J:A*
DIBENZOFURAN	330	0.00E 0 /	0.00E 0	110 J:A-	100 J:A-	260 J:A-	200 J:A-	140 J:A-	300 J:A-	360 J:A-	170 J:A-
DIMETHYL PHTHALATE	330	1.00E 9 /	0.00E 0	89 J:A							
FLUORANTHENE	330	1.10E 7 /	0.00E 0	2100 :V	1900 :V	7700 D:V	6500 D:V	3600 :V	6000 D:V	5800 D:V	2400 :V
FLUORENE	330	1.10E 7 /	0.00E 0	280 J:A	260 J:A	630 :V	570 :V	360 J:A	680 :V	810 :V	360 :V
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 /	0.00E 0	800 :V	670 :V	1300 :V*	1300 :V*	1700 :V*	1100 :V*	1100 :V*	600 :V
NAPHTHALENE	330	1.10E 7 /	0.00E 0	78 J:A	86 J:A	170 J:A		120 J:A	310 J:A	380 :V	190 J:A
PHENANTHRENE	330	0.00E 0 /	0.00E 0	1600 :V-	1500 :V-	5500 D:V-	4600 D:V-	2500 :V-	5100 D:V-	5000 D:V-	2000 :V-
PYRENE	330	8.23E 6 /	0.00E 0	1700 :V	1700 :V	6400 D:V	4500 D:V	2700 :V	4400 D:V	4200 D:V	1600 :V
Test Group:METADD Units: mg/kg											
LITHIUM	20	5.49E 3 /	15.08E 0	6.7 B:JA	6.5 B:V	8.8 B:V	10.3 B:V	13.6 B:V	9.6 B:V	8.7 B:V	9.8 B:V
MOLYBDENUM	40	1.37E 3 /	0.90E 0	9.7 B:JA#			7.9 B:JA#		7.8 B:JA#	10.1 B:JA#	5.2 B:V#
STRONTIUM	40	1.65E 5 /	67.92E 0	112 :JA#	37.6 B:V	37.6 B:JA	198 :JA#	241 :V#	99.5 :JA#	98.3 :JA#	18.8 B:V
TIN	40	1.65E 5 /	2.90E 0	12.2 B:JA#							
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	40	7.96E 5 /	22999.00E 0	8700 :V	8830 :V	13700 :V	16500 :V	19200 :V	19600 :V	17700 :V	13900 :V
ANTIMONY	12	1.10E 2 /	0.47E 0						3.1 B:JA#	2.8 B:JA#	3.5 B:JA#
ARSENIC	2	3.66E-1 /	13.75E 0	10.7 :V*	7.7 :V*	8 :V*	56.2 :V*#	201 :V*#	14.2 :V*#	15.4 :V*#	17 :V*#
BARIUM	40	1.91E 4 /	176.00E 0	116 :V	80.8 :V	127 :V	263 :V#	348 :V#	166 :V	168 :V	76.6 :V
BERYLLIUM	1	1.49E-1 /	1.25E 0		.51 B:V*	.95 B:V*			.64 B:V*	.59 B:V*	1.2 :V*
CADMIUM	1	1.37E 2 /	2.34E 0	.67 B:V		.72 B:V	10.6 :V#	5.1 :V#	3.8 :V#	3.9 :V#	6 :V#
CALCIUM	1000	0.00E 0 /	5839.00E 0	25800 :V#	6270 :V#	7540 :V#	22300 :V#	23100 :V#	12900 :V#	12400 :V#	2710 :V
CHROMIUM	2	0.00E 0 /	22.21E 0	42 :V#	22.6 :V#	25.5 :V#	193 :V#	309 :V#	50.4 :V#	54 :V#	35.9 :V#
COBALT	10	1.65E 4 /	14.22E 0	6.9 B:V	4.4 B:V	6.8 B:V	12.2 B:V	10.7 B:V	7 B:V	7.2 B:V	11.5 :V

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TABLE 3-17
Surface Soil Positive Results
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS801693 SSG0015JE 27-Oct-94	SS801693 SSG0016JE 27-Oct-94	SS801793 SSG0017JE 27-Oct-94	SS801893 SSG0018JE 27-Oct-94	SS801993 SSG0019JE 27-Oct-94	SS802093 SSG0020JE 27-Oct-94	SS802093 SSG0120JE 27-Oct-94	SS802193 SSG0021JE 27-Oct-94
COPPER	5	1.10E 4 / 22.75E 0	321 :V#	188 :V#	170 :V#	1340 :V#	2310 :V#	1860 :V#	550 :V#	77.2 :V#
IRON	20	0.00E 0 / 23063.00E 0	54900 :V#	16900 :V	24500 :V#	31400 :V#	32000 :V#	39600 :V#	47000 :V#	17300 :V
LEAD	1	0.00E 0 / 73.87E 0	45.6 :V	186 :V#	68 :V	283 :V#	124 :V#	98 :V#	103 :V#	50.9 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2080 :V	1570 :V	2250 :V	3580 :V	4740 :V#	2590 :V	2480 :V	1530 :V
MANGANESE	3	1.36E 3 / 482.10E 0	417 :V	185 :V	245 :V	553 :V#	832 :V#	309 :V	312 :V	137 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.066 B:V	.069 B:V	.091 B:V	.38 :V#	.41 :V#	.27 :V#	.15 :V	.13 :V
NICKEL	8	5.49E 3 / 19.74E 0	19.3 :V	9.2 :V	15.3 :V	20.4 :V#	20.2 :V#	16.8 :V	20 :V#	16.4 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1280 :V	1240 :V	2470 :V	2650 :V	3740 :V	2300 :V	2150 :V	1710 :V
SILVER	2	1.37E 3 / 0.22E 0	4.9 :JA#			4.6 :JA#	5.4 :V#	4.1 :JA#	5.1 :JA#	
SODIUM	2000	0.00E 0 / 119.02E 0	169 B:JA#	163 B:V#	78.5 B:JA	184 B:JA#	680 B:V#	208 B:JA#	205 B:JA#	334 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	19 :V	20.6 :V	32.2 :V	23.4 :V	247 :V#	26.6 :V	24 :V	57.5 :V
ZINC	4	8.23E 4 / 95.92E 0	165 :V#	135 :V#	230 :V#	1070 :V#	1090 :V#	1010 :V#	1170 :V#	421 :V#
Test Group:TRADS Units: pCi/g										
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.21(.036) :V#	.14(.038) :V#	.14(.038) :V#	.33(.057) :V#	.71(.093) :V#	.22(.044) :V#	.24(.046) :V#	.23(.066) :V#
GROSS ALpHA	0	0.00E 0 / 44.56E 0	22(2.2) :A	16(1.9) :A	17(1.8) :A	33(4.3) :A	26(3.9) :A	26(4) :A	23(3.7) :A	19(2.1) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	27(2.2) :A	24(2) :A	19(1.9) :A	33(3.8) :A	30(3.4) :A	27(3.6) :A	24(3.3) :A	25(2.2) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.25(.036) B:V#	.3(.038) B:V#	.39(.047) B:V#	.51(.052) B:V#	1.1(.08) B:V#	.64(.058) B:V#	.63(.057) B:V#	.37(.042) B:V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	1.8(.33) B:V	1.5(.28) B:V	1(.22) B:V	6.1(.5) B:V#	3.1(.43) B:V	5(.58) B:V#	2.9(.48) B:V	1.8(.29) B:V
URANIUM-235	0	1.73E-1 / 0.13E 0		.11(.075) J:V		.29(.076) J:V*#	.17(.088) J:V#	.42(.14) :V*#	.11(.086) J:V	
URANIUM-238	0	8.00E-1 / 2.83E 0	1.7(.33) B:V*	1.2(.25) B:V*	.95(.2) B:V*	5.1(.44) B:V*#	3(.42) B:V*#	4.6(.55) B:V*#	2.6(.44) B:V*	1.4(.25) B:V*

Legend B

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TABLE 3-18
Surface Soil Positive Results Data Summary
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
2-METHYLNAPHTHALENE	330	430	SS801893 (1)	700	SS801993 (1)	36 J:A	SS801693 (1)
ACENAPHTHENE	330	**	**	**	**	340 J:A	SS801593 (1)
ACENAPHTHYLENE	330	350	SS801593 (3)	700	SS801993 (1)	53 J:A	SS802093 (1)
ANTHRACENE	330	**	**	**	**	410 :V	SS801693 (1)
BENZO(a)ANTHRACENE	330	**	**	**	**	850 :V	SS802193 (1)
BENZO(a)PYRENE	330	**	**	**	**	890 :V	SS801693 (2)
BENZO(b)FLUORANTHENE	330	**	**	**	**	1100 :V	SS802193 (1)
BENZO(ghi)PERYLENE	330	**	**	**	**	400 :V	SS802193 (1)
BENZO(k)FLUORANTHENE	330	**	**	**	**	400 :J	SS801693 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	**	**	**	**	110 J:A	SS801693 (1)
CHRYSENE	330	**	**	**	**	870 :V	SS801593 (2)
DI-n-BUTYL PHTHALATE	330	350	SS802193 (1)	350	SS802193 (1)	37 J:A	SS801693 (2)
DIBENZO(a,h)ANTHRACENE	330	**	**	**	**	190 J:A	SS802193 (1)
DIBENZOFURAN	330	**	**	**	**	100 J:A	SS801693 (1)
DIMETHYL PHTHALATE	330	350	SS801693 (2)	700	SS801993 (1)	89 J:A	SS801593 (1)
FLUORANTHENE	330	**	**	**	**	1900 :V	SS801693 (1)
FLUORENE	330	**	**	**	**	260 J:A	SS801693 (1)
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	600 :V	SS802193 (1)
NAPHTHALENE	330	430	SS801893 (1)	430	SS801893 (1)	78 J:A	SS801593 (1)
PHENANTHRENE	330	**	**	**	**	1500 :V	SS801693 (1)
PYRENE	330	**	**	**	**	1600 :V	SS802193 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	6.5 B:V	SS801693 (1)
MOLYBDENUM	200	2.8	SS801693 (1)	6.8	SS801993 (1)	5.2 B:V	SS802193 (1)
STRONTIUM	200	**	**	**	**	18.8 B:V	SS802193 (1)
TIN	200	1.9	SS801693 (1)	11.8	SS801993 (1)	12.2 B:J	SS801593 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	8700 :V	SS801593 (1)
ANTIMONY	60	2.2	SS801693 (1)	4.1	SS801993 (1)	3.1 B:J	SS802093 (1)
ARSENIC	10	**	**	**	**	7.7 :V	SS801693 (1)
BARIUM	200	**	**	**	**	76.6 :V	SS802193 (1)
BERYLLIUM	5	0.43	SS801993 (1)	0.57	SS801893 (1)	.51 B:V	SS801693 (1)
CADMIUM	5	0.27	SS801693 (1)	0.27	SS801693 (1)	.67 B:V	SS801593 (1)
CALCIUM	5000	**	**	**	**	2710 :V	SS802193 (1)
CHROMIUM	10	**	**	**	**	22.6 :V	SS801693 (1)
COBALT	50	**	**	**	**	4.4 B:V	SS801693 (1)
COPPER	25	**	**	**	**	77.2 :V	SS802193 (1)
IRON	100	**	**	**	**	16900 :V	SS801693 (1)
LEAD	3	**	**	**	**	45.6 :V	SS801593 (1)

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TABLE 3-18
Surface Soil Positive Results Data Summary
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
MAGNESIUM	5000	**	**	**	**	1530 :V	SS802193 (1)
MANGANESE	15	**	**	**	**	137 :V	SS802193 (1)
MERCURY	0.2	**	**	**	**	.066 B:V	SS801593 (1)
NICKEL	40	**	**	**	**	9.2 :V	SS801693 (1)
POTASSIUM	5000	**	**	**	**	1240 :V	SS801693 (1)
SILVER	10	1.7	SS801693 (1)	2.5	SS801793 (1)	4.6 :J	SS801893 (1)
SODIUM	5000	**	**	**	**	78.5 B:J	SS801793 (1)
VANADIUM	50	**	**	**	**	19 :V	SS801593 (1)
ZINC	20	**	**	**	**	135 :V	SS801693 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.02	**	**	**	**	.14(.038) :V	SS801693 (2)
GROSS ALPHA	1	**	**	**	**	16(1.9) :A	SS801693 (1)
GROSS BETA	3	**	**	**	**	19(1.9) :A	SS801793 (1)
PLUTONIUM-239/240	0.008	**	**	**	**	.25(.036) B:V	SS801593 (1)
URANIUM-233,-234	0.08	**	**	**	**	1(.22) B:V	SS801793 (1)
URANIUM-235	0.08	**	**	**	**	(.027) U:V	SS801593 (1)
URANIUM-238	0.06	**	**	**	**	.95(.2) B:V	SS801793 (1)
Test Group:WQPL Units:pH							
pH	0.01	**	**	**	**	6.15 :V	SS802193 (1)

Legend C

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TABLE 3-18
Surface Soil Positive Results Data Summary
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
2-METHYLNAPHTHALENE	170 J:A	SS802093 (1)	5	7	140.5714
ACENAPHTHENE	1000 :V	SS802093 (1)	7	7	601.4286
ACENAPHTHYLENE	53 J:A	SS802093 (1)	1	7	189
ANTHRACENE	1100 :V	SS802093 (1)	7	7	672.8571
BENZO(a)ANTHRACENE	2600 :V	SS801893 (1)	7	7	1608.571
BENZO(a)PYRENE	2300 :V	SS801893 (1)	7	7	1505.714
BENZO(b)FLUORANTHENE	3400 :V	SS801993 (1)	7	7	2200
BENZO(ghi)PERYLENE	1300 :V	SS801993 (1)	7	7	781.4286
BENZO(k)FLUORANTHENE	950 :J	SS801993 (1)	7	7	641.4286
BIS(2-ETHYLHEXYL)PHTHALATE	730 :V	SS801993 (1)	7	7	282.8571
CHRYSENE	2900 :V	SS801893 (1)	7	7	1707.143
DI-n-BUTYL PHTHALATE	170 J:A	SS801893 (1)	6	7	87.2857
DIBENZO(a,h)ANTHRACENE	540 J:A	SS801993 (1)	7	7	308.5714
DIBENZOFURAN	360 J:A	SS802093 (1)	7	7	191.4286
DIMETHYL PHTHALATE	89 J:A	SS801593 (1)	1	7	195.5714
FLUORANTHENE	7700 D:V	SS801793 (1)	7	7	4314.286
FLUORENE	810 :V	SS802093 (1)	7	7	467.1429
INDENO(1,2,3-cd)PYRENE	1700 :V	SS801993 (1)	7	7	1067.143
NAPHTHALENE	380 :V	SS802093 (1)	6	7	177
PHENANTHRENE	5500 D:V	SS801793 (1)	7	7	3257.143
PYRENE	6400 D:V	SS801793 (1)	7	7	3285.714
Test Group:METADD Units:mg/kg					
LITHIUM	13.6 B:V	SS801993 (1)	7	7	9.3286
MOLYBDENUM	10.1 B:J	SS802093 (1)	4	7	5.6714
STRONTIUM	241 :V	SS801993 (1)	7	7	106.3571
TIN	12.2 B:J	SS801593 (1)	1	7	3.4143
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	19600 :V	SS802093 (1)	7	7	14347.14
ANTIMONY	3.5 B:J	SS802193 (1)	2	7	1.9357
ARSENIC	201 :V	SS801993 (1)	7	7	45.1429
BARIUM	348 :V	SS801993 (1)	7	7	168.4857
BERYLLIUM	1.2 :V	SS802193 (1)	4	7	0.5779
CADMIUM	10.6 :V	SS801893 (1)	6	7	3.875
CALCIUM	25800 :V	SS801593 (1)	7	7	14374.29
CHROMIUM	309 :V	SS801993 (1)	7	7	97.4286
COBALT	12.2 B:V	SS801893 (1)	7	7	8.5286
COPPER	2310 :V	SS801993 (1)	7	7	895.1714
IRON	54900 :V	SS801593 (1)	7	7	32000
LEAD	283 :V	SS801893 (1)	7	7	122.9286

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TABLE 3-18
Surface Soil Positive Results Data Summary
OU8 - IHSS 137
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
MAGNESIUM	4740 :V	SS801993 (1)	7	7	2620
MANGANESE	832 :V	SS801993 (1)	7	7	383
MERCURY	.41 :V	SS801993 (1)	7	7	0.2023
NICKEL	20.4 :V	SS801893 (1)	7	7	17.2571
POTASSIUM	3740 :V	SS801993 (1)	7	7	2198.572
SILVER	5.4 :V	SS801993 (1)	4	7	3.3071
SODIUM	680 B:V	SS801993 (1)	7	7	259.5
VANADIUM	247 :V	SS801993 (1)	7	7	60.9
ZINC	1170 :V	SS802093 (1)	7	7	611.5714
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.71(.093) :V	SS801993 (1)	8	8	0.2775
GROSS ALPHA	33(4.3) :A	SS801893 (1)	8	8	22.75
GROSS BETA	33(3.8) :A	SS801893 (1)	8	8	26.125
PLUTONIUM-239/240	1.1(.08) B:V	SS801993 (1)	8	8	0.5238
URANIUM-233,-234	6.1(.5) B:V	SS801893 (1)	8	8	2.9
URANIUM-235	.42(.14) :V	SS802093 (1)	8	8	0.1548
URANIUM-238	5.1(.44) B:V	SS801893 (1)	8	8	2.5687
Test Group:WQPL Units:pH					
pH	8.12 :V	SS801793 (1)	7	7	7.4843

Legend C

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TABLE 3-19
Population Distribution Summary of Surface-Soil Results
for IHSS 137

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-20
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 137

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-21
Required Number of Samples for Specified Confidence and
Difference in Means of Surface-Soil Results
for IHSS 137

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-22
Laboratory HPGe Vertical Soil Profile Results
for IHSS 138

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-23
Surface Soil Positive Results
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS802293 SSG0022JE 31-Oct-94	SS802393 SSG0023JE 31-Oct-94	SS802493 SSG0024JE 31-Oct-94	SS802593 SSG0025JE 31-Oct-94	SS802693 SSG0026JE 31-Oct-94	SS802693 SSG0122JE 31-Oct-94
Test Group:BNACLP Units:µg/kg								
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	65 J:A				38 J:A	43 J:A
ANTHRACENE	330	8.23E 7 / 0.00E 0	95 J:A	47 J:A				42 J:A
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	270 J:A	130 J:A	63 J:A	90 J:A	150 J:A	180 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	340 J:A*	150 J:A*	83 J:A	120 J:A*	210 J:A*	250 J:A*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	450 :JA	200 J:A	92 J:A	160 J:A	300 J:A	340 J:A
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	150 J:A-	55 J:A-	66 J:A-	77 J:A-	99 J:A-	110 J:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	130 J:A	77 J:A	36 J:A	46 J:A	110 J:A	130 J:A
BENZOIC ACID	1600	1.00E 9 / 0.00E 0						230 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	810 :V	95 J:A				
BUTYL BENZYL PHTHALATE	330	5.49E 7 / 0.00E 0	110 J:A	1300 :V		67 J:A	120 J:A	2600 :V
CHRYSENE	330	8.77E 4 / 0.00E 0	360 :V	150 J:A	76 J:A	110 J:A	230 J:A	260 J:A
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0	44 J:A				37 J:A	56 J:A
FLUORANTHENE	330	1.10E 7 / 0.00E 0	620 :V	330 J:A	140 J:A	230 J:A	440 :V	500 :V
FLUORENE	330	1.10E 7 / 0.00E 0	52 J:A					
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	140 J:A	55 J:A	42 J:A	60 J:A	91 J:A	110 J:A
PENTACHLOROPHENOL	1600	5.34E 3 / 0.00E 0					42 J:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0	470 :V-	250 J:A-	74 J:A-	140 J:A-	290 J:A-	320 J:A-
PYRENE	330	8.23E 6 / 0.00E 0	820 :V	320 J:A	130 J:A	230 J:A	370 :V	430 :V
Test Group:METADD Units:mg/kg								
LITHIUM	20	5.49E 3 / 15.08E 0	15.3 B:V#	16.9 B:V#	8.1 B:V	7.9 B:V	7.8 B:V	6.5 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	114 :JA#	88.2 :JA#	45 :V	33.1 B:V	22.6 B:V	20.2 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	15800 :V	13800 :V	9210 :V	8290 :V	7440 :V	6320 :V
ANTIMONY	12	1.10E 2 / 0.47E 0	3 B:JA#					3.2 B:JA#
ARSENIC	2	3.66E-1 / 13.75E 0	2.8 :V*	1.5 B:V*	6.1 :V*	5.3 :V*	2.9 :V*	2.9 :V*
BARIUM	40	1.91E 4 / 176.00E 0	151 :V	38.1 B:V	73.4 :V	73.3 :V	85.6 :V	68.4 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.69 B:V*	.5 B:V*	.82 B:V*	.64 B:V*	.94 B:V*	.84 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0	9.4 :V#		.32 B:V	.57 B:V	3.5 :V#	3.1 :V#
CALCIUM	1000	0.00E 0 / 5839.00E 0	15300 :V#	12900 :V#	24500 :V#	12500 :V#	9880 :V#	7640 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	244 :V#	11.3 :JA	12.1 :V	12.2 :V	13.4 :V	11.1 :V
COBALT	10	1.65E 4 / 14.22E 0	14.2 :V	12.8 :V	5.4 B:V	5.3 B:V	7.6 B:V	5.6 B:V
COPPER	5	1.10E 4 / 22.75E 0	85.6 :V#	56.9 :V#	15.1 :V	18.9 :V	25 :V#	21.6 :V
IRON	20	0.00E 0 / 23063.00E 0	30100 :V#	30100 :V#	11500 :V	11300 :V	16600 :V	12200 :V
LEAD	1	0.00E 0 / 73.87E 0	40.2 I:JA	15.6 I:JA	10.2 I:JA	12.3 I:JA	25.7 I:JA	16.4 I:JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	12800 :V#	16600 :V#	5420 :V#	2510 :V	4430 :V#	2750 :V
MANGANESE	3	1.36E 3 / 482.10E 0	755 :V#	771 :V#	189 :V	187 :V	343 :V	263 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.1 B:V		.07 B:V	.08 B:V	.06 B:V	.06 B:V
NICKEL	8	5.49E 3 / 19.74E 0	20.4 :V#	17.6 :V	10.7 :V	10.2 :V	8.9 :V	8.2 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	2400 :V	1660 :V	1850 :V	1990 :V	2340 :V	1710 :V
SILVER	2	1.37E 3 / 0.22E 0	2.1 B:V#	2.2 :V#	.59 B:V#	.99 B:V#	.84 B:V#	1.1 B:V#

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TABLE 3-23
Surface Soil Positive Results
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS802293 SSG0022JE 31-Oct-94	SS802393 SSG0023JE 31-Oct-94	SS802493 SSG0024JE 31-Oct-94	SS802593 SSG0025JE 31-Oct-94	SS802693 SSG0026JE 31-Oct-94	SS802693 SSG0122JE 31-Oct-94
SODIUM	2000	0.00E 0 / 119.02E 0	1810 :V#	2380 :V#	319 B:V#	106 B:V	137 B:V#	115 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	43.6 :V	41.7 :V	27.4 :V	26 :V	30.7 :V	22.5 :V
ZINC	4	8.23E 4 / 95.92E 0	2750 :V#	641 :V#	65.6 :V	79.2 :V	501 :V#	425 :V#
Test Group:TRADS Units:pCi/g								
AMERICIUM-241	0	2.37E 0 / 0.04E 0	4.9(.5) :V*#	.73(.12) :V#	3.1(.26) :V*#	3.1(.43) :V*#	6.3(.73) :V*#	6.4(.64) :V*#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	25(2) :A	14(1.5) :A	28(3.6) :A	37(4.4) :A	19(3.4) :A	30(4) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	32(1.6) :A	25(1.5) :A	20(2.8) :A	25(3.4) :A	30(3.5) :A	24(3.5) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	2.4(.11) :V#	.62(.046) :V#	18(.5) :V*#	23(.59) :V*#	5.2(.14) B:V*#	5.6(.19) :V*#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	1.7(.29) :V	1.2(.17) :V	1.1(.27) :V	.94(.16) :V	.87(.19) :V	.95(.18) :V
URANIUM-235	0	1.73E-1 / 0.13E 0	.13(.066) J:V#					
URANIUM-238	0	8.00E-1 / 2.83E 0	1.7(.29) :V*	1.1(.17) :V*	.82(.21) :V*	.64(.12) :V	.93(.19) :V*	.83(.16) :V*

Legend B

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TABLE 3-23
Surface Soil Positive Results
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS802793 SSG0027JE 31-Oct-94	SS802893 SSG0028JE 31-Oct-94	SS802993 SSG0029JE 31-Oct-94	SS803093 SSG0030JE 31-Oct-94
Test Group:BNACLP Units:µg/kg						
ACENAPHTHENE	330	1.65E 7 / 0.00E 0				
ANTHRACENE	330	8.23E 7 / 0.00E 0			46 J:A	
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	85 J:A		150 J:A	66 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	110 J:A*		190 J:A*	83 J:A
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	110 J:A		200 J:A	92 J:A
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	36 J:A-		64 J:A-	
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	44 J:A		87 J:A	35 J:A
BENZOIC ACID	1600	1.00E 9 / 0.00E 0				160 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	64 J:A		98 J:A	120 J:A
BUTYL BENZYL PHTHALATE	330	5.49E 7 / 0.00E 0	680 :V		1500 :V	2800 :V
CHRYSENE	330	8.77E 4 / 0.00E 0	120 J:A	1000 J:A	210 J:A	89 J:A
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0			39 J:A	
FLUORANTHENE	330	1.10E 7 / 0.00E 0	220 J:A	1300 J:A	390 :V	160 J:A
FLUORENE	330	1.10E 7 / 0.00E 0				
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	36 J:A		66 J:A	
PENTACHLOROPHENOL	1600	5.34E 3 / 0.00E 0		39000 :V*	200 J:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0	150 J:A-	1900 J:A-	280 J:A-	100 J:A-
PYRENE	330	8.23E 6 / 0.00E 0	210 J:A	1300 J:A	370 :V	160 J:A
Test Group:METADD Units:mg/kg						
LITHIUM	20	5.49E 3 / 15.08E 0	7.6 B:V	8.1 B:V	5 B:V	6.2 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	24.2 B:V	26.9 B:V	10.2 B:V	15.6 B:V
Test Group:SMETCLP Units:mg/kg						
ALUMINUM	40	7.96E 5 / 22999.00E 0	7390 :V	7230 :V	3940 :V	5610 :V
ANTIMONY	12	1.10E 2 / 0.47E 0				
ARSENIC	2	3.66E-1 / 13.75E 0	3.5 :V*	3.7 :V*	1.7 B:V*	2.2 :V*
BARIUM	40	1.91E 4 / 176.00E 0	61.9 :V	75 :V	43.2 :V	52.5 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.58 B:V*	.6 B:V*	.26 B:V*	.33 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0	.67 B:V	.8 B:V	.62 B:V	.54 B:V
CALCIUM	1000	0.00E 0 / 5839.00E 0	10300 :V#	10500 :V#	3040 :V	6930 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	11.5 :V	14.3 :V	7.6 :V	8.8 :V
COBALT	10	1.65E 4 / 14.22E 0	5.1 B:V	4.8 B:V	3.3 B:V	4.3 B:V
COPPER	5	1.10E 4 / 22.75E 0	21 :V	21.5 :V	17.5 :V	22.4 :V
IRON	20	0.00E 0 / 23063.00E 0	11600 :V	11600 :V	7330 :V	9660 :V
LEAD	1	0.00E 0 / 73.87E 0	14.2 I:JA	15.8 I:JA	17.4 I:JA	14.4 I:JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2660 :V	2700 :V	1490 :V	2000 :V
MANGANESE	3	1.36E 3 / 482.10E 0	203 :V	234 :V	137 :V	194 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.09 B:V	.06 B:V		
NICKEL	8	5.49E 3 / 19.74E 0	8.8 :V	8.9 :V	5.5 B:V	7.2 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1810 :V	1790 :V	1350 :V	1470 :V
SILVER	2	1.37E 3 / 0.22E 0	1.2 B:V#	.98 B:V#	.52 B:V#	1.2 B:V#

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TABLE 3-23
Surface Soil Positive Results
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS802793 SSG0027JE 31-Oct-94	SS802893 SSG0028JE 31-Oct-94	SS802993 SSG0029JE 31-Oct-94	SS803093 SSG0030JE 31-Oct-94
SODIUM	2000	0.00E 0 / 119.02E 0	141 B:V#	140 B:V#	83 B:V	71.1 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	20.3 :V	21.1 :V	11.7 :V	15.7 :V
ZINC	4	8.23E 4 / 95.92E 0	89.4 :V	109 :V#	79.5 :V	84.6 :V
Test Group:TRADS Units:pCi/g						
AMERICIUM-241	0	2.37E 0 / 0.04E 0	3.6(.53) :V*#	2.2(.31) :V#	.79(.068) :V#	.71(.1) :V#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	31(4.1) :A	21(3.8) :A	17(1.4) :A	18(1.4) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	32(3.5) :A	26(3.3) :A	27(1.6) :A	25(1.4) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	15(.36) :V*#	7.1(.21) :V*#	1.4(.079) :V#	3.5(.1) B:V*#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.77(.2) :V	.53(.18) :V	.67(.16) :V	.84(.18) :V
URANIUM-235	0	1.73E-1 / 0.13E 0				
URANIUM-238	0	8.00E-1 / 2.83E 0	.71(.18) :V	.65(.18) :V	.59(.15) :V	.86(.18) :V*

Legend B

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TABLE 3-24
Surface Soil Positive Results Data Summary
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

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	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
ACENAPHTHENE	330	330	SS802793 (1)	6900	SS802893 (1)	43 J:A	SS802693 (1)
ANTHRACENE	330	330	SS802793 (1)	6900	SS802893 (1)	42 J:A	SS802693 (1)
BENZO(a)ANTHRACENE	330	6900	SS802893 (1)	6900	SS802893 (1)	63 J:A	SS802493 (1)
BENZO(a)PYRENE	330	6900	SS802893 (1)	6900	SS802893 (1)	83 J:A	SS802493 (2)
BENZO(b)FLUORANTHENE	330	6900	SS802893 (1)	6900	SS802893 (1)	92 J:A	SS802493 (2)
BENZO(ghi)PERYLENE	330	340	SS803093 (1)	6900	SS802893 (1)	36 J:A	SS802793 (1)
BENZO(k)FLUORANTHENE	330	6900	SS802893 (1)	6900	SS802893 (1)	35 J:A	SS803093 (1)
BENZOIC ACID	1600	1600	SS802793 (2)	34000	SS802893 (1)	160 J:A	SS803093 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	340	SS802493 (2)	6900	SS802893 (1)	64 J:A	SS802793 (1)
BUTYL BENZYL PHTHALATE	330	340	SS802493 (1)	6900	SS802893 (1)	67 J:A	SS802593 (1)
CHRYSENE	330	**	**	**	**	76 J:A	SS802493 (1)
DI-n-BUTYL PHTHALATE	330	330	SS802793 (1)	6900	SS802893 (1)	39 J:A	SS802993 (1)
FLUORANTHENE	330	**	**	**	**	140 J:A	SS802493 (1)
FLUORENE	330	330	SS802793 (1)	6900	SS802893 (1)	52 J:A	SS802293 (1)
INDENO(1,2,3-cd)PYRENE	330	340	SS803093 (1)	6900	SS802893 (1)	36 J:A	SS802793 (1)
PENTACHLOROPHENOL	1600	1600	SS802793 (1)	1800	SS802393 (1)	42 J:A	SS802693 (1)
PHENANTHRENE	330	**	**	**	**	74 J:A	SS802493 (1)
PYRENE	330	**	**	**	**	130 J:A	SS802493 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	5 B:V	SS802993 (1)
STRONTIUM	200	**	**	**	**	10.2 B:V	SS802993 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	3940 :V	SS802993 (1)
ANTIMONY	60	2.2	SS802493 (5)	2.4	SS802393 (1)	3 B:J	SS802293 (1)
ARSENIC	10	**	**	**	**	1.5 B:V	SS802393 (1)
BARIUM	200	**	**	**	**	38.1 B:V	SS802393 (1)
BERYLLIUM	5	**	**	**	**	.26 B:V	SS802993 (1)
CADMIUM	5	0.3	SS802393 (1)	0.3	SS802393 (1)	.32 B:V	SS802493 (1)
CALCIUM	5000	**	**	**	**	3040 :V	SS802993 (1)
CHROMIUM	10	**	**	**	**	7.6 :V	SS802993 (1)
COBALT	50	**	**	**	**	3.3 B:V	SS802993 (1)
COPPER	25	**	**	**	**	15.1 :V	SS802493 (1)
IRON	100	**	**	**	**	7330 :V	SS802993 (1)
LEAD	3	**	**	**	**	10.2 I:J	SS802493 (1)
MAGNESIUM	5000	**	**	**	**	1490 :V	SS802993 (1)
MANGANESE	15	**	**	**	**	137 :V	SS802993 (1)
MERCURY	0.2	0.05	SS802393 (3)	0.05	SS802393 (3)	.06 B:V	SS802693 (2)
NICKEL	40	**	**	**	**	5.5 B:V	SS802993 (1)
POTASSIUM	5000	**	**	**	**	1350 :V	SS802993 (1)

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TABLE 3-24
Surface Soil Positive Results Data Summary
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
SILVER	10	**	**	**	**	.52 B:V	SS802993 (1)
SODIUM	5000	**	**	**	**	71.1 B:V	SS803093 (1)
VANADIUM	50	**	**	**	**	11.7 :V	SS802993 (1)
ZINC	20	**	**	**	**	65.6 :V	SS802493 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	.71(.1) :V	SS803093 (1)
GROSS ALPHA	0.9	**	**	**	**	14(1.5) :A	SS802393 (1)
GROSS BETA	2	**	**	**	**	20(2.8) :A	SS802493 (1)
PLUTONIUM-239/240	0.004	**	**	**	**	.62(.046) :V	SS802393 (1)
URANIUM-233,-234	0.09	**	**	**	**	.53(.18) :V	SS802893 (1)
URANIUM-235	0.07	**	**	**	**	.009(.018) U:V	SS803093 (1)
URANIUM-238	0.06	**	**	**	**	.59(.15) :V	SS802993 (1)

Legend C

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TABLE 3-24
Surface Soil Positive Results Data Summary
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
ACENAPHTHENE	65 J:A	SS802293 (1)	2	9	509.7778
ANTHRACENE	95 J:A	SS802293 (1)	4	9	484.4445
BENZO(a)ANTHRACENE	270 J:A	SS802293 (1)	8	9	498.2222
BENZO(a)PYRENE	340 J:A	SS802293 (1)	8	9	530.6667
BENZO(b)FLUORANTHENE	450 :J	SS802293 (1)	8	9	566
BENZO(ghi)PERYLENE	150 J:A	SS802293 (1)	7	9	464.2222
BENZO(k)FLUORANTHENE	130 J:A	SS802293 (2)	8	9	448.3333
BENZOIC ACID	230 J:A	SS802693 (1)	2	9	2493.333
BIS(2-ETHYLHEXYL)PHTHALATE	810 :V	SS802293 (1)	5	9	572.4445
BUTYL BENZYL PHTHALATE	2800 :V	SS803093 (1)	7	9	1408.556
CHRYSENE	1000 J:A	SS802893 (1)	9	9	263.8889
DI-n-BUTYL PHTHALATE	56 J:A	SS802693 (1)	3	9	494.3333
FLUORANTHENE	1300 J:A	SS802893 (1)	9	9	432.2222
FLUORENE	52 J:A	SS802293 (1)	1	9	522.4445
INDENO(1,2,3-cd)PYRENE	140 J:A	SS802293 (1)	7	9	458.7778
PENTACHLOROPHENOL	39000 :V	SS802893 (1)	3	9	4926.889
PHENANTHRENE	1900 J:A	SS802893 (1)	9	9	409.3333
PYRENE	1300 J:A	SS802893 (1)	9	9	441.1111
Test Group:METADD Units:mg/kg					
LITHIUM	16.9 B:V	SS802393 (1)	9	9	9.2111
STRONTIUM	114 :J	SS802293 (1)	9	9	42.2
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	15800 :V	SS802293 (1)	9	9	8745.556
ANTIMONY	3.2 B:J	SS802693 (1)	2	9	1.5611
ARSENIC	6.1 :V	SS802493 (1)	9	9	3.3
BARIUM	151 :V	SS802293 (1)	9	9	72.6667
BERYLLIUM	.94 B:V	SS802693 (1)	9	9	0.5956
CADMIUM	9.4 :V	SS802293 (1)	8	9	1.8411
CALCIUM	24500 :V	SS802493 (1)	9	9	11761.11
CHROMIUM	244 :V	SS802293 (1)	9	9	37.2444
COBALT	14.2 :V	SS802293 (1)	9	9	6.9778
COPPER	85.6 :V	SS802293 (1)	9	9	31.5444
IRON	30100 :V	SS802293 (2)	9	9	15532.22
LEAD	40.2 I:J	SS802293 (1)	9	9	18.4222
MAGNESIUM	16600 :V	SS802393 (1)	9	9	5623.333
MANGANESE	771 :V	SS802393 (1)	9	9	334.7778
MERCURY	.1 B:V	SS802293 (1)	6	9	0.0594
NICKEL	20.4 :V	SS802293 (1)	9	9	10.9111
POTASSIUM	2400 :V	SS802293 (1)	9	9	1851.111

Data Extraction: 6/19/95

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TABLE 3-24
Surface Soil Positive Results Data Summary
OU8 - IHSS 138
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
SILVER	2.2 :V	SS802393 (1)	9	9	1.2089
SODIUM	2380 :V	SS802393 (1)	9	9	576.3445
VANADIUM	43.6 :V	SS802293 (1)	9	9	26.4667
ZINC	2750 :V	SS802293 (1)	9	9	488.8112
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	6.4(.64) :V	SS802693 (1)	10	10	3.183
GROSS ALPHA	37(4.4) :A	SS802593 (1)	10	10	24
GROSS BETA	32(1.6) :A	SS802293 (2)	10	10	26.6
PLUTONIUM-239/240	23(.59) :V	SS802593 (1)	10	10	8.182
URANIUM-233,-234	1.7(.29) :V	SS802293 (1)	10	10	0.957
URANIUM-235	.13(.066) J:V	SS802293 (1)	10	10	0.042
URANIUM-238	1.7(.29) :V	SS802293 (1)	10	10	0.883

Legend C

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TABLE 3-25
Population Distribution Summary of Surface-Soil Results
for IHSS 138

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-26
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 138

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-27
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 138

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

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TABLE 3-28
Surface Soil Positive Results
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS803193 SSG0031JE 30-Nov-94	SS803193 SSG0143JE 30-Nov-94	SS803293 SSG0032JE 30-Nov-94
Test Group:METADD Units:mg/kg					
LITHIUM	20	5.49E 3 / 15.08E 0	6 B:V	5.6 B:V	6.7 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	10.6 B:V	8.4 B:V	36.1 B:V
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	40	7.96E 5 / 22999.00E 0	3380 :V	3030 :V	6660 :V
ARSENIC	2	3.66E-1 / 13.75E 0	1.6 B:JA*	1.1 B:JA*	2.3 B:JA*
BARIUM	40	1.91E 4 / 176.00E 0	41.2 B:V	33.7 B:V	101 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.15 B:V*	.12 B:V	.49 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	1510 :V	1550 :V	5820 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	14.9 :V	9.7 :V	16.9 :V
COBALT	10	1.65E 4 / 14.22E 0	9.6 B:V	7.3 B:V	6.3 B:V
COPPER	5	1.10E 4 / 22.75E 0	15.5 :V	12.7 :V	14.3 :V
IRON	20	0.00E 0 / 23063.00E 0	6960 :V	6470 :V	11500 :V
LEAD	1	0.00E 0 / 73.87E 0	6.4 :V	4.1 :V	13.2 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1830 :V	2040 :V	3250 :V
MANGANESE	3	1.36E 3 / 482.10E 0	89.5 :V	86.7 :V	207 :V
MERCURY	0.2	8.23E 1 / 0.19E 0			.14 :JA
NICKEL	8	5.49E 3 / 19.74E 0	9.1 :V	7.1 B:V	8 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1740 :V	1480 :V	1720 :V
SILVER	2	1.37E 3 / 0.22E 0	4.4 :V#		
SODIUM	2000	0.00E 0 / 119.02E 0	459 B:V#	427 B:V#	1210 :V#
VANADIUM	10	1.92E 3 / 61.84E 0	25.3 :V	21.8 :V	19.3 :V
ZINC	4	8.23E 4 / 95.92E 0	23.7 :V	23.1 :V	104 :V#
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	0	E 0 / E 0	24.8 :JA-	31.1 :JA-	5.99 :JA-

Legend B

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TABLE 3-29
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	6 B:V	SS803193 (1)
STRONTIUM	200	**	**	**	**	10.6 B:V	SS803193 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	3380 :V	SS803193 (1)
ARSENIC	10	**	**	**	**	1.6 B:J	SS803193 (1)
BARIUM	200	**	**	**	**	41.2 B:V	SS803193 (1)
BERYLLIUM	5	**	**	**	**	.15 B:V	SS803193 (1)
CALCIUM	5000	**	**	**	**	1550 :V	SS803193 (1)
CHROMIUM	10	**	**	**	**	14.9 :V	SS803193 (1)
COBALT	50	**	**	**	**	6.3 B:V	SS803293 (1)
COPPER	25	**	**	**	**	14.3 :V	SS803293 (1)
IRON	100	**	**	**	**	6960 :V	SS803193 (1)
LEAD	3	**	**	**	**	6.4 :V	SS803193 (1)
MAGNESIUM	5000	**	**	**	**	2040 :V	SS803193 (1)
MANGANESE	15	**	**	**	**	89.5 :V	SS803193 (1)
MERCURY	0.2	0.05	SS803193 (1)	0.05	SS803193 (1)	.14 :J	SS803293 (1)
NICKEL	40	**	**	**	**	8 B:V	SS803293 (1)
POTASSIUM	5000	**	**	**	**	1720 :V	SS803293 (1)
SILVER	10	1.1	SS803293 (1)	1.1	SS803293 (1)	4.4 :V	SS803193 (1)
SODIUM	5000	**	**	**	**	459 B:V	SS803193 (1)
VANADIUM	50	**	**	**	**	19.3 :V	SS803293 (1)
ZINC	20	**	**	**	**	23.7 :V	SS803193 (1)
Test Group:WQPL Units:µg/g							
NITRATE/NITRITE	0.5	**	**	**	**	5.99 :J	SS803293 (1)
pH **Units:pH**	0.01	**	**	**	**	9.31 :V	SS803193 (1)

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TABLE 3-29
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:METADD Units:mg/kg					
LITHIUM	6.7 B:V	SS803293 (1)	2	2	6.35
STRONTIUM	36.1 B:V	SS803293 (1)	2	2	23.35
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	6660 :V	SS803293 (1)	2	2	5020
ARSENIC	2.3 B:J	SS803293 (1)	2	2	1.95
BARIUM	101 :V	SS803293 (1)	2	2	71.1
BERYLLIUM	.49 B:V	SS803293 (1)	2	2	0.32
CALCIUM	5820 :V	SS803293 (1)	2	2	3685
CHROMIUM	16.9 :V	SS803293 (1)	2	2	15.9
COBALT	9.6 B:V	SS803193 (1)	2	2	7.95
COPPER	15.5 :V	SS803193 (1)	2	2	14.9
IRON	11500 :V	SS803293 (1)	2	2	9230
LEAD	13.2 :V	SS803293 (1)	2	2	9.8
MAGNESIUM	3250 :V	SS803293 (1)	2	2	2645
MANGANESE	207 :V	SS803293 (1)	2	2	148.25
MERCURY	.14 :J	SS803293 (1)	1	2	0.083
NICKEL	9.1 :V	SS803193 (1)	2	2	8.55
POTASSIUM	1740 :V	SS803193 (1)	2	2	1730
SILVER	4.4 :V	SS803193 (1)	1	2	2.475
SODIUM	1210 :V	SS803293 (1)	2	2	834.5
VANADIUM	25.3 :V	SS803193 (1)	2	2	22.3
ZINC	104 :V	SS803293 (1)	2	2	63.85
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	31.1 :J	SS803193 (1)	2	2	18.545
pH **Units:pH**	9.93 :V	SS803293 (1)	2	2	9.62

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TABLE 3-30
Population Distribution Summary of Surface-Soil Results
for IHSS 139.1(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-31
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 139.1(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-32
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 139.1(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-33
Sediment Positive Results
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SED80293 SDG0005JE 13-Dec-94	SED80393 SDG0006JE 13-Dec-94	SED80493 SDG0007JE 13-Dec-94	SED80593 SDG0008JE 13-Dec-94	SED80693 SDG0009JE 13-Dec-94
Test Group:METADD Units:mg/kg							
LITHIUM	20	5.49E 3 / 15.08E 0	8 B:V	9.7 B:V	4.7 B:V	13.6 B:V	5.5 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	63.8 :V	526 :V#	24.1 B:V	150 :V#	17.6 B:V
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	40	7.96E 5 / 22999.00E 0	10300 :V	9210 :V	5060 :V	13400 :V	4930 :V
ARSENIC	2	3.66E-1 / 13.75E 0	6.9 :V*		2.7 :V*	6.9 :V*	2.7 :V*
BARIUM	40	1.91E 4 / 176.00E 0	173 :V	193 :V#	60.5 :V	168 :V	48.9 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.71 B:V*	.44 B:V*	.29 B:V*	.72 B:V*	.31 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0		1.6 B:V		1.1 B:V	
CALCIUM	1000	0.00E 0 / 5839.00E 0	11500 :V#	140000 :V#	5140 :V	36500 :V#	4800 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	11.8 :V	22.5 :V#	7.6 :V	30.6 :V#	10 :V
COBALT	10	1.65E 4 / 14.22E 0	9 B:V	5 B:V	4 B:V	8.6 B:V	3.8 B:V
COPPER	5	1.10E 4 / 22.75E 0	20.9 :V	21.2 :V	21 :V	38.1 :V#	16.4 :V
IRON	20	0.00E 0 / 23063.00E 0	14700 :V	14700 :V	11000 :V	22600 :V	10100 :V
LEAD	1	0.00E 0 / 73.87E 0	19.5 :V	47.5 :V	11.2 :V	84.2 :V#	9.6 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2540 :V	5350 :V#	2280 :V	5380 :V#	2230 :V
MANGANESE	3	1.36E 3 / 482.10E 0	278 :V	425 :V	236 :V	439 :V	196 :V
MERCURY	0.2	8.23E 1 / 0.19E 0		.16 B:V		.45 :V#	.062 B:V
NICKEL	8	5.49E 3 / 19.74E 0	15.7 :V	8.6 B:JA	5.1 B:V	13.7 B:V	4.6 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1320 B:V	2170 B:V	1680 :V	3670 :V	1630 :V
SILVER	2	1.37E 3 / 0.22E 0		4.1 B:V#	1.2 B:V#	4.7 B:V#	1.9 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0	270 B:V#	936 B:V#	106 B:V	684 B:V#	148 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	30.9 :V	25.9 B:V	18.9 :V	39.7 :V	15.6 :V
ZINC	4	8.23E 4 / 95.92E 0	60.8 :V	704 :V#	74.6 :V	369 :V#	77.2 :V
Test Group:VOACLP Units:µg/kg							
1,1,2,2-TETRACHLOROETHANE	0	E 0 / E 0			2 J:A-		2 J:A-
ACETONE	10	2.74E 7 / 0.00E 0	310 B:JA				
TETRACHLOROETHENE	5	1.23E 4 / 0.00E 0		2 J:A			
TOLUENE	5	5.49E 7 / 0.00E 0	38 :V	6 :V	4 J:A		31 :V
TRICHLOROETHENE	0	5.82E 4 / 0.00E 0		3 J:A			

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TABLE 3-34
Sediment Positive Results Data Summary
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	4.7 B:V	SED80493 (1)
STRONTIUM	200	**	**	**	**	17.6 B:V	SED80693 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	4930 :V	SED80693 (1)
ARSENIC	10	4.8	SED80393 (1)	4.8	SED80393 (1)	2.7 :V	SED80493 (2)
BARIUM	200	**	**	**	**	48.9 :V	SED80693 (1)
BERYLLIUM	5	**	**	**	**	.29 B:V	SED80493 (1)
CADMIUM	5	0.31	SED80693 (1)	0.44	SED80293 (1)	1.1 B:V	SED80593 (1)
CALCIUM	5000	**	**	**	**	4800 :V	SED80693 (1)
CHROMIUM	10	**	**	**	**	7.6 :V	SED80493 (1)
COBALT	50	**	**	**	**	3.8 B:V	SED80693 (1)
COPPER	25	**	**	**	**	16.4 :V	SED80693 (1)
IRON	100	**	**	**	**	10100 :V	SED80693 (1)
LEAD	3	**	**	**	**	9.6 :V	SED80693 (1)
MAGNESIUM	5000	**	**	**	**	2230 :V	SED80693 (1)
MANGANESE	15	**	**	**	**	196 :V	SED80693 (1)
MERCURY	0.2	0.06	SED80493 (1)	0.08	SED80293 (1)	.062 B:V	SED80693 (1)
NICKEL	40	**	**	**	**	4.6 B:V	SED80693 (1)
POTASSIUM	5000	**	**	**	**	1320 B:V	SED80293 (1)
SILVER	10	0.76	SED80293 (1)	0.76	SED80293 (1)	1.2 B:V	SED80493 (1)
SODIUM	5000	**	**	**	**	106 B:V	SED80493 (1)
VANADIUM	50	**	**	**	**	15.6 :V	SED80693 (1)
ZINC	20	**	**	**	**	60.8 :V	SED80293 (1)
Test Group:VOACLP Units:µg/kg							
1,1,2,2-TETRACHLOROETHANE	5	6	SED80393 (1)	11	SED80593 (1)	2 J:A	SED80493 (2)
ACETONE	10	24	SED80393 (1)	75	SED80593 (1)	310 B:J	SED80293 (1)
TETRACHLOROETHENE	5	6	SED80493 (2)	11	SED80593 (1)	2 J:A	SED80393 (1)
TOLUENE	5	11	SED80593 (1)	11	SED80593 (1)	4 J:A	SED80493 (1)
TRICHLOROETHENE	5	6	SED80493 (2)	11	SED80593 (1)	3 J:A	SED80393 (1)
Test Group:WQPL							
pH Units: pH	0	**	**	**	**	7.3 :V	SED80393 (1)

Legend C

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TABLE 3-34
Sediment Positive Results Data Summary
OU8 - IHSS 139.1(N)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:METADD Units:mg/kg					
LITHIUM	13.6 B:V	SED80593 (1)	5	5	8.3
STRONTIUM	526 :V	SED80393 (1)	5	5	156.3
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	13400 :V	SED80593 (1)	5	5	8580
ARSENIC	6.9 :V	SED80293 (2)	4	5	4.32
BARIUM	193 :V	SED80393 (1)	5	5	128.68
BERYLLIUM	.72 B:V	SED80593 (1)	5	5	0.494
CADMIUM	1.6 B:V	SED80393 (1)	2	5	0.65
CALCIUM	140000 :V	SED80393 (1)	5	5	39588
CHROMIUM	30.6 :V	SED80593 (1)	5	5	16.5
COBALT	9 B:V	SED80293 (1)	5	5	6.08
COPPER	38.1 :V	SED80593 (1)	5	5	23.52
IRON	22600 :V	SED80593 (1)	5	5	14620
LEAD	84.2 :V	SED80593 (1)	5	5	34.4
MAGNESIUM	5380 :V	SED80593 (1)	5	5	3556
MANGANESE	439 :V	SED80593 (1)	5	5	314.8
MERCURY	.45 :V	SED80593 (1)	3	5	0.1479
NICKEL	15.7 :V	SED80293 (1)	5	5	9.54
POTASSIUM	3670 :V	SED80593 (1)	5	5	2094
SILVER	4.7 B:V	SED80593 (1)	4	5	2.456
SODIUM	936 B:V	SED80393 (1)	5	5	428.8
VANADIUM	39.7 :V	SED80593 (1)	5	5	26.2
ZINC	704 :V	SED80393 (1)	5	5	257.12
Test Group:VOACLP Units:µg/kg					
1,1,2,2-TETRACHLOROETHANE	2 J:A	SED80493 (2)	2	5	3.3
ACETONE	310 B:J	SED80293 (1)	1	5	77.6
TETRACHLOROETHENE	2 J:A	SED80393 (1)	1	5	3.5
TOLUENE	38 :V	SED80293 (1)	4	5	16.9
TRICHLOROETHENE	3 J:A	SED80393 (1)	1	5	3.7
Test Group:WQPL					
pH **Units: pH**	8.13 :V	SED80693 (1)	5	5	7.658

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TABLE 3-35
Surface Soil Positive Results
OU8 - IHSS 139.1(S)
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS803993 SSG0033JE 21-Nov-94	SS804093 SSG0034JE 21-Nov-94	SS804193 SSG0035JE 21-Nov-94
Test Group:BNACLP Units:µg/kg					
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	69 J:A	1500 DJ:A	670 DJ:A
ANTHRACENE	330	8.23E 7 / 0.00E 0	76 J:A	1800 DJ:A	830 DJ:A
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	240 J:A	4200 D:V*	2200 DJ:A*
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	270 J:A*	4300 D:JA*	2400 DJ:A*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	380 :V	4500 D:JA*	2800 DJ:A*
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	110 J:A-	1700 DJ:A-	1200 DJ:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	140 J:A	3400 DJ:A	1500 DJ:A
CHRYSENE	330	8.77E 4 / 0.00E 0	280 J:A	4900 D:V	2800 DJ:A
DIBENZOFURAN	330	0.00E 0 / 0.00E 0		470 DJ:A-	
FLUORANTHENE	330	1.10E 7 / 0.00E 0	650 :V	11000 D:V	5600 D:V
FLUORENE	330	1.10E 7 / 0.00E 0	47 J:A	1200 DJ:A	530 DJ:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	120 J:A	1500 DJ:A*	1100 DJ:A*
NAPHTHALENE	330	1.10E 7 / 0.00E 0		430 DJ:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0	470 :V-	8400 D:V-	4300 D:V-
PYRENE	330	8.23E 6 / 0.00E 0	730 :V	15000 D:V	5500 D:V
Test Group:METADD Units:mg/kg					
LITHIUM	20	5.49E 3 / 15.08E 0	6.1 B:V	7.3 B:V	3.7 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	10.8 B:V	23.7 B:V	14.4 B:V
TIN	40	1.65E 5 / 2.90E 0			6.7 B:V#
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	40	7.96E 5 / 22999.00E 0	4820 :V	11700 :V	4730 :V
ARSENIC	2	3.66E-1 / 13.75E 0	1.6 B:JA*	5.8 :V*	3 :V*
BARIUM	40	1.91E 4 / 176.00E 0	46 :V	72 :V	40.2 B:V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.19 B:JA*	.73 B:V*	.35 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0		.5 B:JA	
CALCIUM	1000	0.00E 0 / 5839.00E 0	4360 :V	7010 :V#	3720 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	26.8 :V#	14.3 :V	6.6 :V
COBALT	10	1.65E 4 / 14.22E 0	4.6 B:V	6 B:V	2.8 B:V
COPPER	5	1.10E 4 / 22.75E 0	20.3 :V	18.5 :V	13.1 :V
IRON	20	0.00E 0 / 23063.00E 0	11800 :JA	12200 :JA	7480 :JA
LEAD	1	0.00E 0 / 73.87E 0	8.5 :V	13.2 :V	10.8 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	3190 :V	1850 :V	1100 :V
MANGANESE	3	1.36E 3 / 482.10E 0	286 :JA	198 :JA	96.5 :JA
NICKEL	8	5.49E 3 / 19.74E 0	10.7 :V	16.4 :V	6.2 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	2480 :V	2530 :V	1530 :V
SILVER	2	1.37E 3 / 0.22E 0	.78 B:V#	1 B:V#	.72 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0	103 B:V		101 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	15.7 :V	27.3 :V	13.8 :V
ZINC	4	8.23E 4 / 95.92E 0	45.7 :JA	38.6 :JA	35.2 :JA
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.016(.009) J:Y	.048(.01) :Y#	.076(.013) :Y#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	18(3.5) :A	18(3.5) :A	11(2.6) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	35(3.8) :A	27(3.4) :A	28(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.051(.01) :Y	.28(.025) :Y#	.2(.021) :Y#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.78(.22) :Y	.74(.24) :Y	.4(.18) :Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.51(.18) :Y	.91(.27) :Y*	.61(.22) :Y
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	0	E 0 / E 0	33.7 :V-	23.6 :V-	33.2 :V-

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TABLE 3-36
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.1(S)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
ACENAPHTHENE	330	**	**	**	**	69 J:A	SS803993 (1)
ANTHRACENE	330	**	**	**	**	76 J:A	SS803993 (1)
BENZO(a)ANTHRACENE	330	**	**	**	**	240 J:A	SS803993 (1)
BENZO(a)PYRENE	330	**	**	**	**	270 J:A	SS803993 (1)
BENZO(b)FLUORANTHENE	330	**	**	**	**	380 :V	SS803993 (1)
BENZO(ghi)PERYLENE	330	**	**	**	**	110 J:A	SS803993 (1)
BENZO(k)FLUORANTHENE	330	**	**	**	**	140 J:A	SS803993 (1)
CHRYSENE	330	**	**	**	**	280 J:A	SS803993 (1)
DIBENZOFURAN	330	340	SS803993 (1)	3000	SS804193 (1)	470 DJ:A	SS804093 (1)
FLUORANTHENE	330	**	**	**	**	650 :V	SS803993 (1)
FLUORENE	330	**	**	**	**	47 J:A	SS803993 (1)
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	120 J:A	SS803993 (1)
NAPHTHALENE	330	340	SS803993 (1)	3000	SS804193 (1)	430 DJ:A	SS804093 (1)
PHENANTHRENE	330	**	**	**	**	470 :V	SS803993 (1)
PYRENE	330	**	**	**	**	730 :V	SS803993 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	3.7 B:V	SS804193 (1)
STRONTIUM	200	**	**	**	**	10.8 B:V	SS803993 (1)
TIN	200	2	SS803993 (1)	2.2	SS804093 (1)	6.7 B:V	SS804193 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	4730 :V	SS804193 (1)
ARSENIC	10	**	**	**	**	1.6 B:J	SS803993 (1)
BARIUM	200	**	**	**	**	40.2 B:V	SS804193 (1)
BERYLLIUM	5	**	**	**	**	.19 B:J	SS803993 (1)
CADMIUM	5	0.29	SS803993 (1)	0.3	SS804193 (1)	.5 B:J	SS804093 (1)
CALCIUM	5000	**	**	**	**	3720 :V	SS804193 (1)
CHROMIUM	10	**	**	**	**	6.6 :V	SS804193 (1)
COBALT	50	**	**	**	**	2.8 B:V	SS804193 (1)
COPPER	25	**	**	**	**	13.1 :V	SS804193 (1)
IRON	100	**	**	**	**	7480 :J	SS804193 (1)
LEAD	3	**	**	**	**	8.5 :V	SS803993 (1)
MAGNESIUM	5000	**	**	**	**	1100 :V	SS804193 (1)
MANGANESE	15	**	**	**	**	96.5 :J	SS804193 (1)
NICKEL	40	**	**	**	**	6.2 B:V	SS804193 (1)
POTASSIUM	5000	**	**	**	**	1530 :V	SS804193 (1)
SILVER	10	**	**	**	**	.72 B:V	SS804193 (1)
SODIUM	5000	69	SS804093 (1)	69	SS804093 (1)	101 B:V	SS804193 (1)
VANADIUM	50	**	**	**	**	13.8 :V	SS804193 (1)
ZINC	20	**	**	**	**	35.2 :J	SS804193 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	.016(.009) J:Y	SS803993 (1)
GROSS ALPHA	2	**	**	**	**	11(2.6) :A	SS804193 (1)
GROSS BETA	4	**	**	**	**	27(3.4) :A	SS804093 (1)
PLUTONIUM-239/240	0.009	**	**	**	**	.051(.01) :Y	SS803993 (1)
URANIUM-233,-234	0.2	**	**	**	**	.4(.18) :Y	SS804193 (1)
URANIUM-235	0.2	**	**	**	**	.021(.084) U:Y	SS804193 (1)
URANIUM-238	0.1	**	**	**	**	.51(.18) :Y	SS803993 (1)
Test Group:WQPL Units:µg/g							
NITRATE/NITRITE	0.5	**	**	**	**	23.6 :V	SS804093 (1)
pH Units: pH	0.01	**	**	**	**	8.96 :J	SS804093 (1)

Legend C

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TABLE 3-36
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.1(S)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
ACENAPHTHENE	1500 DJ:A	SS804093 (1)	3	3	746.3333
ANTHRACENE	1800 DJ:A	SS804093 (1)	3	3	902
BENZO(a)ANTHRACENE	4200 D:V	SS804093 (1)	3	3	2213.333
BENZO(a)PYRENE	4300 D:J	SS804093 (1)	3	3	2323.333
BENZO(b)FLUORANTHENE	4500 D:J	SS804093 (1)	3	3	2560
BENZO(ghi)PERYLENE	1700 DJ:A	SS804093 (1)	3	3	1003.333
BENZO(k)FLUORANTHENE	3400 DJ:A	SS804093 (1)	3	3	1680
CHRYSENE	4900 D:V	SS804093 (1)	3	3	2660
DIBENZOFURAN	470 DJ:A	SS804093 (1)	1	3	713.3333
FLUORANTHENE	11000 D:V	SS804093 (1)	3	3	5750
FLUORENE	1200 DJ:A	SS804093 (1)	3	3	592.3333
INDENO(1,2,3-cd)PYRENE	1500 DJ:A	SS804093 (1)	3	3	906.6667
NAPHTHALENE	430 DJ:A	SS804093 (1)	1	3	700
PHENANTHRENE	8400 D:V	SS804093 (1)	3	3	4390
PYRENE	15000 D:V	SS804093 (1)	3	3	7076.667
Test Group:METADD Units:mg/kg					
LITHIUM	7.3 B:V	SS804093 (1)	3	3	5.7
STRONTIUM	23.7 B:V	SS804093 (1)	3	3	16.3
TIN	6.7 B:V	SS804193 (1)	1	3	2.9333
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	11700 :V	SS804093 (1)	3	3	7083.333
ARSENIC	5.8 :V	SS804093 (1)	3	3	3.4667
BARIUM	72 :V	SS804093 (1)	3	3	52.7333
BERYLLIUM	.73 B:V	SS804093 (1)	3	3	0.4233
CADMIUM	.5 B:J	SS804093 (1)	1	3	0.265
CALCIUM	7010 :V	SS804093 (1)	3	3	5030
CHROMIUM	26.8 :V	SS803993 (1)	3	3	15.9
COBALT	6 B:V	SS804093 (1)	3	3	4.4667
COPPER	20.3 :V	SS803993 (1)	3	3	17.3
IRON	12200 :J	SS804093 (1)	3	3	10493.33
LEAD	13.2 :V	SS804093 (1)	3	3	10.8333
MAGNESIUM	3190 :V	SS803993 (1)	3	3	2046.667
MANGANESE	286 :J	SS803993 (1)	3	3	193.5
NICKEL	16.4 :V	SS804093 (1)	3	3	11.1
POTASSIUM	2530 :V	SS804093 (1)	3	3	2180
SILVER	1 B:VV	SS804093 (1)	3	3	0.8333
SODIUM	103 B:V	SS803993 (1)	2	3	79.5
VANADIUM	27.3 :V	SS804093 (1)	3	3	18.9333
ZINC	45.7 :J	SS803993 (1)	3	3	39.8333
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.076(.013) :Y	SS804193 (1)	3	3	0.0467
GROSS ALPHA	18(3.5) :A	SS803993 (2)	3	3	15.6667
GROSS BETA	35(3.8) :A	SS803993 (1)	3	3	30
PLUTONIUM-239/240	.28(.025) :Y	SS804093 (1)	3	3	0.177
URANIUM-233,-234	.78(.22) :Y	SS803993 (1)	3	3	0.64
URANIUM-235	.057(.077) U:Y	SS804093 (1)	3	3	0.0437
URANIUM-238	.91(.27) :Y	SS804093 (1)	3	3	0.6767
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	33.7 :V	SS803993 (1)	3	3	30.1667
pH Units: pH	9.32 :J	SS803993 (1)	3	3	9.15

Legend C

TABLE 3-37
Population Distribution Summary of Surface-Soil Results
for IHSS 139.1(S)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-38
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 139.1(S)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-39
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 139.1(S)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-40
Surface Soil Positive Results
OU8 - IHSS 139.2
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804293 SSG0036JE 21-Nov-94	SS804393 SSG0037JE 21-Nov-94	SS804393 SSG0140JE 21-Nov-94	SS804493 SSG0038JE 21-Nov-94
Test Group:BNACLP Units:µg/kg						
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0		2500 DJ:A-		
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	930 DJ:A	7100 D:V	2200 DJ:A	610 DJ:A
ANTHRACENE	330	8.23E 7 / 0.00E 0	1100 DJ:A	9000 D:V	2900 DJ:A	7300 DJ:A
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	2300 D:V*	13000 D:V*	6200 DJ:A*	1600 DJ:A*
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	2400 D:JA*	13000 D:JA*	6900 DJ:A*	1700 DJ:A*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	2900 D:JA*	13000 D:JA*	7600 D:JA*	1800 DJ:A*
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	1200 DJ:A-	6200 DJ:A-	4000 DJ:A-	1100 DJ:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	1100 DJ:A	9300 D:JA*	4400 DJ:A	1200 DJ:A
CHRYSENE	330	8.77E 4 / 0.00E 0	2700 D:V	16000 D:V	8100 D:V	1900 DJ:A
DIBENZOFURAN	330	0.00E 0 / 0.00E 0	320 DJ:A-	3800 DJ:A-	880 DJ:A-	
FLUORANTHENE	330	1.10E 7 / 0.00E 0	6300 D:V	34000 D:V	16000 D:V	4100 D:V
FLUORENE	330	1.10E 7 / 0.00E 0	720 DJ:A	6700 DJ:A	1800 DJ:A	440 DJ:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	1100 DJ:A*	5400 DJ:A*	3400 DJ:A*	850 DJ:A
NAPHTHALENE	330	1.10E 7 / 0.00E 0	330 DJ:A	7300 D:V	800 DJ:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0	5200 D:V-	36000 D:V-	14000 D:V-	3700 D:V-
PYRENE	330	8.23E 6 / 0.00E 0	6700 D:V	34000 D:V	15000 D:V	4100 D:V
Test Group:METADD Units:mg/kg						
LITHIUM	20	5.49E 3 / 15.08E 0	6.8 B:V	8.2 B:V	8.7 B:V	4.6 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	26.1 B:V	17.1 B:V	41.2 :V	16.9 B:V
Test Group:SMETCLP Units:mg/kg						
ALUMINUM	40	7.96E 5 / 22999.00E 0	9760 :V	8460 :V	13100 :V	5700 :V
ARSENIC	2	3.66E-1 / 13.75E 0	5.2 :V*	3.7 :V*	2.8 :V*	3.1 :V*
BARIUM	40	1.91E 4 / 176.00E 0	104 :V	78.1 :V	74.6 :V	49.5 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.72 B:V*	.5 B:V*	.65 B:V*	.36 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	5050 :V	3090 :V	4930 :V	3690 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	10.5 :V	12 :V	10 :V	19.8 :V
COBALT	10	1.65E 4 / 14.22E 0	9.6 B:V	23.8 :V#	4.4 B:V	5.2 B:V
COPPER	5	1.10E 4 / 22.75E 0	13.7 :V	58.2 :V#	14.9 :V	10.8 :V
IRON	20	0.00E 0 / 23063.00E 0	15400 :JA	12400 :JA	12500 :JA	8350 :JA
LEAD	1	0.00E 0 / 73.87E 0	16.8 :V	16 :V	10.5 :V	9.7 :V

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TABLE 3-40
Surface Soil Positive Results
OU8 - IHSS 139.2
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804293 SSG0036JE 21-Nov-94	SS804393 SSG0037JE 21-Nov-94	SS804393 SSG0140JE 21-Nov-94	SS804493 SSG0038JE 21-Nov-94
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1840 :V	2000 :V	1960 :V	1340 :V
MANGANESE	3	1.36E 3 / 482.10E 0	201 :JA	261 :JA	141 :JA	98.5 :JA
MERCURY	0.2	8.23E 1 / 0.19E 0	.091 B:V		.41 :V#	.29 :V#
NICKEL	8	5.49E 3 / 19.74E 0	13 :V	9.9 :V	9.3 :V	15.2 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	3200 :V	1400 :V	10600 :V#	1460 :V
SILVER	2	1.37E 3 / 0.22E 0	.92 B:V#	2.8 :V#	1 B:V#	.86 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0		111 B:V	84.7 B:V	
VANADIUM	10	1.92E 3 / 61.84E 0	26.5 :V	22.7 :V	18.9 :V	17.8 :V
ZINC	4	8.23E 4 / 95.92E 0	55.8 :JA	45.1 :JA	85.9 :JA	67 :JA
Test Group:TRADS Units:pCi/g						
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.05(.018) :Y#	.025(.01) :Y		.021(.009) :Y
GROSS ALPHA	0	0.00E 0 / 44.56E 0	15(3.2) :A	18(3.5) :A	15(3) :A	15(3.2) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	25(3.4) :A	34(3.5) :A	31(3.5) :A	38(3.8) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.1(.013) :Y#	.061(.013) :Y	.042(.011) :Y	.074(.014) :Y
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.63(.25) :Y	.62(.21) :Y	.68(.23) :Y	.57(.24) :Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.68(.25) :Y	.64(.21) :Y	.64(.23) :Y	.43(.2) :Y
Test Group:WQPL Units:µg/g						
NITRATE/NITRITE	0	E 0 / E 0	30.3 :V-	30.6 :V-	25.1 :V-	30.4 :V-

Legend B

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TABLE 3-41
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.2
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *	Maximum Concentration
Test Group:BNACLP Units:µg/kg								
2-METHYLNAPHTHALENE	330	1800	SS804293 (1)	3000	SS804493 (1)	2500 DJ:A	SS804393 (1)	2500 DJ:A
ACENAPHTHENE	330	**	**	**	**	610 DJ:A	SS804493 (1)	7100 D:V
ANTHRACENE	330	**	**	**	**	1100 DJ:A	SS804293 (1)	9000 D:V
BENZO(a)ANTHRACENE	330	**	**	**	**	1600 DJ:A	SS804493 (1)	13000 D:V
BENZO(a)PYRENE	330	**	**	**	**	1700 DJ:A	SS804493 (1)	13000 D:J
BENZO(b)FLUORANTHENE	330	**	**	**	**	1800 DJ:A	SS804493 (1)	13000 D:J
BENZO(ghi)PERYLENE	330	**	**	**	**	1100 DJ:A	SS804493 (1)	6200 DJ:A
BENZO(k)FLUORANTHENE	330	**	**	**	**	1100 DJ:A	SS804293 (1)	9300 D:J
CHRYSENE	330	**	**	**	**	1900 DJ:A	SS804493 (1)	16000 D:V
DIBENZOFURAN	330	3000	SS804493 (1)	3000	SS804493 (1)	320 DJ:A	SS804293 (1)	3800 DJ:A
FLUORANTHENE	330	**	**	**	**	4100 D:V	SS804493 (1)	34000 D:V
FLUORENE	330	**	**	**	**	440 DJ:A	SS804493 (1)	6700 DJ:A
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	850 DJ:A	SS804493 (1)	5400 DJ:A
NAPHTHALENE	330	3000	SS804493 (1)	3000	SS804493 (1)	330 DJ:A	SS804293 (1)	7300 D:V
PHENANTHRENE	330	**	**	**	**	3700 D:V	SS804493 (1)	36000 D:V
PYRENE	330	**	**	**	**	4100 D:V	SS804493 (1)	34000 D:V
Test Group:METADD Units:mg/kg								
LITHIUM	100	**	**	**	**	4.6 B:V	SS804493 (1)	8.7 B:V
STRONTIUM	200	**	**	**	**	16.9 B:V	SS804493 (1)	41.2 :V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	200	**	**	**	**	5700 :V	SS804493 (1)	13100 :V
ARSENIC	10	**	**	**	**	3.1 :V	SS804493 (1)	5.2 :V
BARIUM	200	**	**	**	**	49.5 :V	SS804493 (1)	104 :V
BERYLLIUM	5	**	**	**	**	.36 B:V	SS804493 (1)	.72 B:V
CALCIUM	5000	**	**	**	**	3690 :V	SS804493 (1)	5050 :V
CHROMIUM	10	**	**	**	**	10.5 :V	SS804293 (1)	19.8 :V
COBALT	50	**	**	**	**	5.2 B:V	SS804493 (1)	23.8 :V
COPPER	25	**	**	**	**	10.8 :V	SS804493 (1)	58.2 :V
IRON	100	**	**	**	**	8350 :J	SS804493 (1)	15400 :J
LEAD	3	**	**	**	**	9.7 :V	SS804493 (1)	16.8 :V
MAGNESIUM	5000	**	**	**	**	1340 :V	SS804493 (1)	2000 :V
MANGANESE	15	**	**	**	**	98.5 :J	SS804493 (1)	261 :J
MERCURY	0.2	**	**	**	**	.091 B:V	SS804293 (1)	.41 :V
NICKEL	40	**	**	**	**	9.9 :V	SS804393 (1)	15.2 :V
POTASSIUM	5000	**	**	**	**	1460 :V	SS804493 (1)	10600 :V
SILVER	10	**	**	**	**	.86 B:V	SS804493 (1)	2.8 :V
SODIUM	5000	54.9	SS804293 (1)	81.3	SS804493 (1)	111 B:V	SS804393 (1)	111 B:V
VANADIUM	50	**	**	**	**	17.8 :V	SS804493 (1)	26.5 :V
ZINC	20	**	**	**	**	55.8 :J	SS804293 (1)	85.9 :J
Test Group:TRADS Units:pCi/g								
AMERICIUM-241	0.01	**	**	**	**	.016(.011) U:Y	SS804393 (1)	.05(.018) :Y
GROSS ALPHA	2	**	**	**	**	15(3.2) :A	SS804293 (3)	18(3.5) :A
GROSS BETA	4	**	**	**	**	25(3.4) :A	SS804293 (1)	38(3.8) :A
PLUTONIUM-239/240	0.005	**	**	**	**	.042(.011) :Y	SS804393 (1)	.1(.013) :Y
URANIUM-233,-234	0.2	**	**	**	**	.57(.24) :Y	SS804493 (1)	.68(.23) :Y
URANIUM-235	0.2	**	**	**	**	(.057) U:Y	SS804293 (1)	.091(.092) U:Y
URANIUM-238	0.1	**	**	**	**	.43(.2) :Y	SS804493 (1)	.68(.25) :Y
Test Group:WQPL Units:µg/g								
NITRATE/NITRITE	0.5	**	**	**	**	30.3 :V	SS804293 (1)	30.6 :V
pH **Units: pH**	0.01	**	**	**	**	8.76 :J	SS804393 (1)	9.7 :J

Legend C

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TABLE 3-41
Surface Soil Positive Results Data Summary
OU8 - IHSS 139.2
Rocky Flats Environmental Technology Site

	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg				
2-METHYLNAPHTHALENE	SS804393 (1)	1	3	1633.333
ACENAPHTHENE	SS804393 (1)	3	3	2880
ANTHRACENE	SS804393 (1)	3	3	5800
BENZO(a)ANTHRACENE	SS804393 (1)	3	3	5633.333
BENZO(a)PYRENE	SS804393 (1)	3	3	5700
BENZO(b)FLUORANTHENE	SS804393 (1)	3	3	5900
BENZO(ghi)PERYLENE	SS804393 (1)	3	3	2833.333
BENZO(k)FLUORANTHENE	SS804393 (1)	3	3	3866.667
CHRYSENE	SS804393 (1)	3	3	6866.667
DIBENZOFURAN	SS804393 (1)	2	3	1873.333
FLUORANTHENE	SS804393 (1)	3	3	14800
FLUORENE	SS804393 (1)	3	3	2620
INDENO(1,2,3-cd)PYRENE	SS804393 (1)	3	3	2450
NAPHTHALENE	SS804393 (1)	2	3	3043.333
PHENANTHRENE	SS804393 (1)	3	3	14966.67
PYRENE	SS804393 (1)	3	3	14933.33
Test Group:METADD Units:mg/kg				
LITHIUM	SS804393 (1)	3	3	6.7
STRONTIUM	SS804393 (1)	3	3	28.0667
Test Group:SMETCLP Units:mg/kg				
ALUMINUM	SS804393 (1)	3	3	9520
ARSENIC	SS804293 (1)	3	3	4
BARIUM	SS804293 (1)	3	3	77.2
BERYLLIUM	SS804293 (1)	3	3	0.5767
CALCIUM	SS804293 (1)	3	3	4556.667
CHROMIUM	SS804493 (1)	3	3	14.1
COBALT	SS804393 (1)	3	3	12.8667
COPPER	SS804393 (1)	3	3	27.5667
IRON	SS804293 (1)	3	3	12083.33
LEAD	SS804293 (1)	3	3	14.1667
MAGNESIUM	SS804393 (1)	3	3	1726.667
MANGANESE	SS804393 (1)	3	3	186.8333
MERCURY	SS804393 (1)	3	3	0.2637
NICKEL	SS804493 (1)	3	3	12.7
POTASSIUM	SS804393 (1)	3	3	5086.667
SILVER	SS804393 (1)	3	3	1.5267
SODIUM	SS804393 (1)	1	3	59.7
VANADIUM	SS804293 (1)	3	3	22.3333
ZINC	SS804393 (1)	3	3	69.5667
Test Group:TRADS Units:pCi/g				
AMERICIUM-241	SS804293 (1)	4	4	0.028
GROSS ALPHA	SS804393 (1)	4	4	15.75
GROSS BETA	SS804493 (1)	4	4	32
PLUTONIUM-239/240	SS804293 (1)	4	4	0.0693
URANIUM-233,-234	SS804393 (1)	4	4	0.625
URANIUM-235	SS804493 (1)	4	4	0.037
URANIUM-238	SS804293 (1)	4	4	0.5975
Test Group:WQPL Units:µg/g				
NITRATE/NITRITE	SS804393 (1)	3	3	30.4333
pH Units: pH	SS804493 (1)	3	3	9.1167

Legend C

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TABLE 3-42
Population Distribution Summary of Surface-Soil Results
for IHSS 139.2

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-43
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 139.2

Spread Sheet was not completed because of
instructions to downsize the Data Summary
Report per DOE Termination Orders.

TABLE 3-44
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 139.2

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-45
Laboratory HPGe Vertical Soil Profile Results
for IHSS 144(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

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TABLE 3-46
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG002494 SGG0024JE 12/7/94	SG002594 SGG0025JE 12/7/94	SG002694 SGG0026JE 12/7/94	SG002794 SGG0027JE 12/7/94	SG002894 SGG0028JE 12/7/94
Test Group:GC/MS Units:µg/L							
1,2,4-Trimethylbenzene	3	0		0.01	0.01		0.01
Benzene	4	0	0.05	0.05	0.38		0.11
Carbon Disulfide	1	0					0.09
Carbon Tetrachloride	3	1	3.2 @	0.04		0.56	
Chloroform	2	0	0.54			0.23	
Chloromethane	2	0				0.08	0.05
Ethylbenzene	3	0		0.02	0.05		0.06
Toluene	1	0			0.24		
Total Xylenes	3	0		0.07	0.13		0.11
m & p-Xylenes	3	0		0.05	0.07		0.1
o-Xylene	3	0		0.02	0.06		0.01

Legend A

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TABLE 3-47
Surface Soil Positive Results
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

DRAFT

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804593 SSG0039JE 26-Oct-94	SS804693 SSG0040JE 26-Oct-94	SS804793 SSG0041JE 26-Oct-94	SS804893 SSG0042JE 26-Oct-94
Test Group:BNACLP Units:µg/kg						
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0		48 J:A-		
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	530 J:A	450 :V	80 J:A	380 :V
ANTHRACENE	330	8.23E 7 / 0.00E 0	550 J:A	340 :V	81 J:A	410 :V
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	1500 :JA*	1300 :V*	400 :V	1200 :V*
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	1800 :JA*	1200 :V*	450 :V*	1100 :JA*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	2200 :JA*	1900 :V*	610 :V	2500 :JA*
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	780 :JA-	430 :V-	170 J:A-	350 J:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	740 :JA	510 :V	240 J:A	570 :JA
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0		260 J:A	170 J:A	810 :V
CHRYSENE	330	8.77E 4 / 0.00E 0	1700 :JA	1400 :V	550 :V	1500 :V
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0		40 J:A		
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0	270 J:A*	390 :V*	89 J:A*	190 J:A*
DIBENZOFURAN	330	0.00E 0 / 0.00E 0	150 J:A-	120 J:A-		
FLUORANTHENE	330	1.10E 7 / 0.00E 0	3900 :JA	2400 :V	1300 :V	2700 D:V
FLUORENE	330	1.10E 7 / 0.00E 0	380 J:A	290 J:A		280 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	920 :JA*	970 :V*	330 J:A	650 :JA
NAPHTHALENE	330	1.10E 7 / 0.00E 0	100 J:A	110 J:A		140 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0	3200 :JA-	1800 :V-	770 :V-	2500 :V-
PYRENE	330	8.23E 6 / 0.00E 0	3600 :JA	2300 :V	930 :V	2400 :V
Test Group:METADD Units:mg/kg						
LITHIUM	20	5.49E 3 / 15.08E 0	4.3 B:V	5.1 B:V	5.9 B:V	6.4 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	16.4 B:V	18.5 B:V	20.8 B:V	21.1 B:V
Test Group:SMETCLP Units:mg/kg						
ALUMINUM	40	7.96E 5 / 22999.00E 0	5090 :V	6950 :V	8320 :V	7290 :V
ANTIMONY	12	1.10E 2 / 0.47E 0				
ARSENIC	2	3.66E-1 / 13.75E 0	3.9 :V*	4.4 :V*	5.9 :V*	4.2 :V*
BARIUM	40	1.91E 4 / 176.00E 0	62.9 :V	73.7 :V	78.7 :V	73.5 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.44 B:V*	.56 B:V*	.65 B:V*	.61 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0				.76 B:V
CALCIUM	1000	0.00E 0 / 5839.00E 0	3620 :V	4050 :V	4530 :V	4510 :V

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TABLE 3-47
Surface Soil Positive Results
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

DRAFT

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804593 SSG0039JE 26-Oct-94	SS804693 SSG0040JE 26-Oct-94	SS804793 SSG0041JE 26-Oct-94	SS804893 SSG0042JE 26-Oct-94
CHROMIUM	2	0.00E 0 / 22.21E 0	10.2 :V	14.7 :V	11.7 :V	18 :V
COBALT	10	1.65E 4 / 14.22E 0	4.7 :V	7.9 B:V	5.4 B:V	5.4 B:V
COPPER	5	1.10E 4 / 22.75E 0	14.9 :V	19.6 :V	15.4 :V	21.4 :V
IRON	20	0.00E 0 / 23063.00E 0	9260 :V	10900 :V	12100 :V	12100 :V
LEAD	1	0.00E 0 / 73.87E 0	23.6 :V	28.6 :V	75.4 :V#	64.9 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1670 :V	1870 :V	1960 :V	1790 :V
MANGANESE	3	1.36E 3 / 482.10E 0	156 :V	185 :V	182 :V	178 :V
MERCURY	0.2	8.23E 1 / 0.19E 0		.05 B:V	.06 B:V	.07 B:V
NICKEL	8	5.49E 3 / 19.74E 0	7.8 B:V	10.1 :V	9.9 :V	9.7 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1400 :V	1370 :V	1420 :V	1690 :V
SILVER	2	1.37E 3 / 0.22E 0	.83 B:V#	.71 B:V#	.94 B:V#	1.8 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0	60.4 B:V	97.8 B:V	71.1 B:V	66.3 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	18.2 :V	22.7 :V	26 :V	23.8 :V
ZINC	4	8.23E 4 / 95.92E 0	97 :V#	124 :V#	70.6 :V	212 :V#
Test Group:TRADS Units:pCi/g						
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.24(.044) :V#	.084(.028) :V#	.23(.038) :V#	3.9(.34) :V*#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	13(2.8) :A	13(2.7) :A	17(3.3) :A	27(3.8) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	21(3.1) :A	22(3.4) :A	23(3.3) :A	25(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.94(.071) B:V#	.27(.036) B:V#	1.1(.077) B:V#	22(.67) B:V*#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.41(.14) B:V	.73(.18) B:V	.94(.26) B:V	.82(.17) B:V
URANIUM-235	0	1.73E-1 / 0.13E 0		.089(.067) J:V	.11(.073) J:V	
URANIUM-238	0	8.00E-1 / 2.83E 0	.42(.14) B:A	.73(.18) B:V	.81(.23) B:V*	.85(.18) B:V*
Test Group:WQPL Units:µg/g						
NITRATE/NITRITE	0	E 0 / E 0	5.17 :V-	4.04 :V-	3.34 :V-	1.09 :V-

Legend B

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TABLE 3-47
Surface Soil Positive Results
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

DRAFT

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804993 SSG0043JE 26-Oct-94	SS805093 SSG0044JE 26-Oct-94	SS805193 SSG0045JE 26-Oct-94	SS805293 SSG0046JE 26-Oct-94
Test Group:BNACLP Units:µg/kg						
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0		140 J:A-	180 J:A-	
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	680 :V	840 :V	1100 :V	57 J:A
ANTHRACENE	330	8.23E 7 / 0.00E 0	610 :V	870 :V	1100 :V	60 J:A
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	2000 :V*	1700 :V*	2000 :V*	200 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	1800 :V*	1600 :V*	1700 :V*	350 :V*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	2800 :V*	2400 :V*	2600 :V*	360 :V
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	560 :V-	410 :V-	290 J:A-	140 J:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	610 :V	580 :JA	580 :JA	170 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	690 :V	420 :V	89 J:A	150 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	2300 :V	1800 :V	2200 :V	270 J:A
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0	42 J:A			64 J:A
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0	290 J:A*	310 J:A*	350 :V*	58 J:A
DIBENZOFURAN	330	0.00E 0 / 0.00E 0	170 J:A-	280 J:A-	410 :V-	
FLUORANTHENE	330	1.10E 7 / 0.00E 0	5900 D:V	5300 D:V	6800 D:V	680 :V
FLUORENE	330	1.10E 7 / 0.00E 0	470 :V	630 :V	860 :V	
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	1100 :V*	1000 :V*	1100 :V*	210 J:A
NAPHTHALENE	330	1.10E 7 / 0.00E 0	150 J:A	320 J:A	400 :V	
PHENANTHRENE	330	0.00E 0 / 0.00E 0	4300 D:V-	4400 D:V-	6000 D:V-	410 :V-
PYRENE	330	8.23E 6 / 0.00E 0	4700 D:V	4000 D:V	6100 D:V	510 :V
Test Group:METADD Units:mg/kg						
LITHIUM	20	5.49E 3 / 15.08E 0	7.9 B:V	5.4 B:V	3.6 :V	7 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	24 B:V	18.6 B:V	22.6 B:V	23.6 B:V
Test Group:SMETCLP Units:mg/kg						
ALUMINUM	40	7.96E 5 / 22999.00E 0	10100 :V	6550 :V	4850 :V	7130 :V
ANTIMONY	12	1.10E 2 / 0.47E 0			2.3 B:JA#	
ARSENIC	2	3.66E-1 / 13.75E 0	5.7 :V*	4 :V*	3.8 :V*	2.9 :V*
BARIUM	40	1.91E 4 / 176.00E 0	101 :V	74.8 :V	53.2 :V	81.6 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.73 B:V*	.53 B:V*	.36 B:V*	
CADMIUM	1	1.37E 2 / 2.34E 0	.84 B:V	.97 B:V		
CALCIUM	1000	0.00E 0 / 5839.00E 0	4580 :V	3690 :V	6290 :V#	8750 :V#

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TABLE 3-47
Surface Soil Positive Results
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS804993 SSG0043JE 26-Oct-94	SS805093 SSG0044JE 26-Oct-94	SS805193 SSG0045JE 26-Oct-94	SS805293 SSG0046JE 26-Oct-94
CHROMIUM	2	0.00E 0 / 22.21E 0	30.8 :V#	24.6 :V#	12.5 :V	13.8 :V
COBALT	10	1.65E 4 / 14.22E 0	8.2 B:V	6.1 B:V	4.1 B:V	7.2 B:V
COPPER	5	1.10E 4 / 22.75E 0	26.3 :V#	22.8 :V#	14.2 :V	30.2 :V#
IRON	20	0.00E 0 / 23063.00E 0	14300 :V	12600 :V	8120 :V	17200 :V
LEAD	1	0.00E 0 / 73.87E 0	161 :V#	56.8 :V	33.1 :V	35.8 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2130 :V	1730 :V	1300 :V	4030 :V#
MANGANESE	3	1.36E 3 / 482.10E 0	246 :V	216 :V	151 :V	379 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.18 :V	.1 :V		
NICKEL	8	5.49E 3 / 19.74E 0	12.3 :V	13.7 :V	8 B:V	8.2 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1960 :V	1730 :V	1540 :V	2540 :V
SILVER	2	1.37E 3 / 0.22E 0	1.9 :V#	1 B:V#	1 B:V#	
SODIUM	2000	0.00E 0 / 119.02E 0	63.4 :V	87.5 B:V	243 B:V#	257 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	30.5 :V	21.8 :V	17.3 :V	27.2 :V
ZINC	4	8.23E 4 / 95.92E 0	199 :V#	535 :V#	109 :V#	122 :V#
Test Group:TRADS Units:pCi/g						
AMERICIUM-241	0	2.37E 0 / 0.04E 0	1.5(.15) :V#	.17(.034) :V#	.024(.014) :V	.16(.04) :V#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	99(7.1) :A#	14(2.7) :A	13(3) :A	12(2.6) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	17(3.2) :A	20(3.1) :A	24(3.2) :A	25(3.5) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	6.3(.23) B:V*#	1.1(.075) B:V#	.16(.016) :V#	1.1(.072) B:V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.61(.17) B:V	.6(.18) B:V	.61(.22) B:V	.49(.15) B:V
URANIUM-235	0	1.73E-1 / 0.13E 0				.097(.073) J:V
URANIUM-238	0	8.00E-1 / 2.83E 0	.79(.19) B:V	.52(.16) B:A	.28(.12) BJ:A	.55(.17) B:A
Test Group:WQPL Units:µg/g						
NITRATE/NITRITE	0	E 0 / E 0	1.24 :V-	7.81 :V-	12.1 :V-	44.4 :V-

Legend B

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TABLE 3-48
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

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	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
2-METHYLNAPHTHALENE	330	340	SS805293 (1)	380	SS804993 (1)	48 J:A	SS804693 (1)
ACENAPHTHENE	330	**	**	**	**	57 J:A	SS805293 (1)
ANTHRACENE	330	**	**	**	**	60 J:A	SS805293 (1)
BENZO(a)ANTHRACENE	330	**	**	**	**	200 J:A	SS805293 (1)
BENZO(a)PYRENE	330	**	**	**	**	350 :V	SS805293 (1)
BENZO(b)FLUORANTHENE	330	**	**	**	**	360 :V	SS805293 (1)
BENZO(ghi)PERYLENE	330	**	**	**	**	140 J:A	SS805293 (1)
BENZO(k)FLUORANTHENE	330	**	**	**	**	170 J:A	SS805293 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	**	**	**	**	89 J:A	SS805193 (1)
CHRYSENE	330	**	**	**	**	270 J:A	SS805293 (1)
DI-n-BUTYL PHTHALATE	330	350	SS804793 (3)	370	SS805093 (1)	40 J:A	SS804693 (1)
DIBENZO(a,h)ANTHRACENE	330	**	**	**	**	58 J:A	SS805293 (1)
DIBENZOFURAN	330	340	SS805293 (1)	350	SS804793 (2)	120 J:A	SS804693 (1)
FLUORANTHENE	330	**	**	**	**	680 :V	SS805293 (1)
FLUORENE	330	340	SS805293 (1)	350	SS804793 (1)	280 J:A	SS804893 (1)
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	210 J:A	SS805293 (1)
NAPHTHALENE	330	340	SS805293 (1)	350	SS804793 (1)	100 J:A	SS804593 (1)
PHENANTHRENE	330	**	**	**	**	410 :V	SS805293 (1)
PYRENE	330	**	**	**	**	510 :V	SS805293 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	3.6 :V	SS805193 (1)
STRONTIUM	200	**	**	**	**	16.4 B:V	SS804593 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	4850 :V	SS805193 (1)
ANTIMONY	60	2.2	SS804693 (3)	2.6	SS804993 (1)	2.3 B:J	SS805193 (1)
ARSENIC	10	**	**	**	**	2.9 :V	SS805293 (1)
BARIUM	200	**	**	**	**	53.2 :V	SS805193 (1)
BERYLLIUM	5	0.47	SS805293 (1)	0.47	SS805293 (1)	.36 B:V	SS805193 (1)
CADMIUM	5	0.27	SS804793 (1)	0.28	SS804593 (4)	.76 B:V	SS804893 (1)
CALCIUM	5000	**	**	**	**	3620 :V	SS804593 (1)
CHROMIUM	10	**	**	**	**	10.2 :V	SS804593 (1)
COBALT	50	**	**	**	**	4.1 B:V	SS805193 (1)
COPPER	25	**	**	**	**	14.2 :V	SS805193 (1)
IRON	100	**	**	**	**	8120 :V	SS805193 (1)
LEAD	3	**	**	**	**	23.6 :V	SS804593 (1)
MAGNESIUM	5000	**	**	**	**	1300 :V	SS805193 (1)
MANGANESE	15	**	**	**	**	151 :V	SS805193 (1)

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TABLE 3-48
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
MERCURY	0.2	0.05	SS805293 (1)	0.05	SS804593 (2)	.05 B:V	SS804693 (1)
NICKEL	40	**	**	**	**	7.8 B:V	SS804593 (1)
POTASSIUM	5000	**	**	**	**	1370 :V	SS804693 (1)
SILVER	10	1.5	SS805293 (1)	1.5	SS805293 (1)	.71 B:V	SS804693 (1)
SODIUM	5000	**	**	**	**	60.4 B:V	SS804593 (1)
VANADIUM	50	**	**	**	**	17.3 :V	SS805193 (1)
ZINC	20	**	**	**	**	70.6 :V	SS804793 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	.024(.014) :V	SS805193 (1)
GROSS ALPHA	2	**	**	**	**	12(2.6) :A	SS805293 (1)
GROSS BETA	4	**	**	**	**	17(3.2) :A	SS804993 (1)
PLUTONIUM-239/240	0.008	**	**	**	**	.16(.016) :V	SS805193 (1)
URANIUM-233,-234	0.1	**	**	**	**	.41(.14) B:V	SS804593 (1)
URANIUM-235	0.09	**	**	**	**	.036(.036) U:V	SS805193 (1)
URANIUM-238	0.08	**	**	**	**	.28(.12) BJ:A	SS805193 (1)
Test Group:WQPL Units:µg/g							
NITRATE/NITRITE	0.5	**	**	**	**	1.09 :V	SS804893 (1)
pH **Units: pH**	0.01	**	**	**	**	7.62 :J	SS805293 (1)

Legend C

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TABLE 3-48
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
2-METHYLNAPHTHALENE	180 J:A	SS805193 (1)	3	7	154
ACENAPHTHENE	1100 :V	SS805193 (1)	8	8	514.625
ANTHRACENE	1100 :V	SS805193 (1)	8	8	502.625
BENZO(a)ANTHRACENE	2000 :V	SS804993 (2)	8	8	1287.5
BENZO(a)PYRENE	1800 :J	SS804593 (2)	8	8	1250
BENZO(b)FLUORANTHENE	2800 :V	SS804993 (1)	8	8	1921.25
BENZO(ghi)PERYLENE	780 :J	SS804593 (1)	8	8	391.25
BENZO(k)FLUORANTHENE	740 :J	SS804593 (1)	8	8	500
BIS(2-ETHYLHEXYL)PHTHALATE	810 :V	SS804893 (1)	7	7	369.8571
CHRYSENE	2300 :V	SS804993 (1)	8	8	1465
DI-n-BUTYL PHTHALATE	64 J:A	SS805293 (1)	3	7	122.2857
DIBENZO(a,h)ANTHRACENE	390 :V	SS804693 (1)	8	8	243.375
DIBENZOFURAN	410 :V	SS805193 (1)	5	8	206.25
FLUORANTHENE	6800 D:V	SS805193 (1)	8	8	3622.5
FLUORENE	860 :V	SS805193 (1)	6	8	406.875
INDENO(1,2,3-cd)PYRENE	1100 :V	SS804993 (2)	8	8	785
NAPHTHALENE	400 :V	SS805193 (1)	6	8	195.625
PHENANTHRENE	6000 D:V	SS805193 (1)	8	8	2922.5
PYRENE	6100 D:V	SS805193 (1)	8	8	3067.5
Test Group:METADD Units:mg/kg					
LITHIUM	7.9 B:V	SS804993 (1)	8	8	5.7
STRONTIUM	24 B:V	SS804993 (1)	8	8	20.7
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	10100 :V	SS804993 (1)	8	8	7035
ANTIMONY	2.3 B:J	SS805193 (1)	1	8	1.3063
ARSENIC	5.9 :V	SS804793 (1)	8	8	4.35
BARIUM	101 :V	SS804993 (1)	8	8	74.925
BERYLLIUM	.73 B:V	SS804993 (1)	7	8	0.5144
CADMIUM	.97 B:V	SS805093 (1)	3	8	0.4081
CALCIUM	8750 :V	SS805293 (1)	8	8	5002.5
CHROMIUM	30.8 :V	SS804993 (1)	8	8	17.0375
COBALT	8.2 B:V	SS804993 (1)	8	8	6.125
COPPER	30.2 :V	SS805293 (1)	8	8	20.6
IRON	17200 :V	SS805293 (1)	8	8	12072.5
LEAD	161 :V	SS804993 (1)	8	8	59.9
MAGNESIUM	4030 :V	SS805293 (1)	8	8	2060
MANGANESE	379 :V	SS805293 (1)	8	8	211.625

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TABLE 3-48
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
MERCURY	.18 :V	SS804993 (1)	5	8	0.0668
NICKEL	13.7 :V	SS805093 (1)	8	8	9.9625
POTASSIUM	2540 :V	SS805293 (1)	8	8	1706.25
SILVER	1.9 :V	SS804993 (1)	7	8	1.1163
SODIUM	257 B:V	SS805293 (1)	8	8	118.3125
VANADIUM	30.5 :V	SS804993 (1)	8	8	23.4375
ZINC	535 :V	SS805093 (1)	8	8	183.575
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	3.9(.34) :V	SS804893 (1)	8	8	0.7885
GROSS ALPHA	99(7.1) :A	SS804993 (1)	8	8	26
GROSS BETA	25(3.6) :A	SS804893 (2)	8	8	22.125
PLUTONIUM-239/240	22(.67) B:VV	SS804893 (1)	8	8	4.1213
URANIUM-233,-234	.94(.26) B:V	SS804793 (1)	8	8	0.6513
URANIUM-235	.11(.073) J:V	SS804793 (1)	8	8	0.0715
URANIUM-238	.85(.18) B:V	SS804893 (1)	8	8	0.6188
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	44.4 :V	SS805293 (1)	8	8	9.8988
pH **Units: pH**	9.02 :J	SS805193 (1)	8	8	8.365

Legend C

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TABLE 3-49
Population Distribution Summary of Surface-Soil Results
for IHSS 144(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-50
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 144(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-51
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 144(N)

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

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TABLE 3-52
Sediment Positive Results
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SED80093 SDG0002JE 12-Dec-94	SED80193 SDG0003JE 12-Dec-94
Test Group:BNACLP Units:µg/kg				
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0		94 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0		100 J:A*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0		140 J:A
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0		79 J:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0		50 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	91 J:A	140 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0		110 J:A
FLUORANTHENE	330	1.10E 7 / 0.00E 0		200 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0		83 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0		85 J:A-
PYRENE	330	8.23E 6 / 0.00E 0		190 J:A
Test Group:METADD Units:mg/kg				
LITHIUM	20	5.49E 3 / 15.08E 0	2.1 B:V	4.9 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	58.4 :V	38.1 B:V
TIN	40	1.65E 5 / 2.90E 0		5.6 B:V#
Test Group:SMETCLP Units:mg/kg				
ALUMINUM	40	7.96E 5 / 22999.00E 0	2560 :V	5440 :V
ARSENIC	2	3.66E-1 / 13.75E 0	2.2 :JA*	4.2 :JA*
BARIUM	40	1.91E 4 / 176.00E 0	60.8 :V	96.2 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.41 B:V*	.67 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	9180 I:JA#	11000 I:JA#
CHROMIUM	2	0.00E 0 / 22.21E 0	4 :JA	9.2 :JA
COBALT	10	1.65E 4 / 14.22E 0	2.7 B:V	6 B:V
IRON	20	0.00E 0 / 23063.00E 0	6110 :V	13700 :V
LEAD	1	0.00E 0 / 73.87E 0	8.2 :JA	18.9 :JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1080 :V	1720 B:V
MANGANESE	3	1.36E 3 / 482.10E 0	212 :V	256 :V
NICKEL	8	5.49E 3 / 19.74E 0	5.1 B:V	10.8 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	360 B:V	1080 B:V
SODIUM	2000	0.00E 0 / 119.02E 0	471 B:V#	212 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	9.5 B:V	25.7 :V
ZINC	4	8.23E 4 / 95.92E 0	216 :V#	218 :V#
Test Group:TRADS Units:pCi/g				
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.18(.023) :V#	1.1(.07) :V#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	14(3) :A	17(3.2) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	26(3.4) :A	24(3.3) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.17(.024) B:V#	2(.074) B:V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.85(.25) B:V	.94(.16) B:V
URANIUM-235	0	1.73E-1 / 0.13E 0		.056(.038) J:V
URANIUM-238	0	8.00E-1 / 2.83E 0	.68(.21) :V	.93(.16) :V*

Legend B

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TABLE 3-53
Sediment Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BENZO(a)ANTHRACENE	330	370	SED80093 (1)	370	SED80093 (1)	94 J:A	SED80193 (1)
BENZO(a)PYRENE	330	370	SED80093 (1)	370	SED80093 (1)	100 J:A	SED80193 (1)
BENZO(b)FLUORANTHENE	330	370	SED80093 (1)	370	SED80093 (1)	140 J:A	SED80193 (1)
BENZO(ghi)PERYLENE	330	370	SED80093 (1)	370	SED80093 (1)	79 J:A	SED80193 (1)
BENZO(k)FLUORANTHENE	330	370	SED80093 (1)	370	SED80093 (1)	50 J:A	SED80193 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	**	**	**	**	91 J:A	SED80093 (1)
CHRYSENE	330	370	SED80093 (1)	370	SED80093 (1)	110 J:A	SED80193 (1)
FLUORANTHENE	330	370	SED80093 (1)	370	SED80093 (1)	200 J:A	SED80193 (1)
INDENO(1,2,3-cd)PYRENE	330	370	SED80093 (1)	370	SED80093 (1)	83 J:A	SED80193 (1)
PHENANTHRENE	330	370	SED80093 (1)	370	SED80093 (1)	85 J:A	SED80193 (1)
PYRENE	330	370	SED80093 (1)	370	SED80093 (1)	190 J:A	SED80193 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	2.1 B:V	SED80093 (1)
STRONTIUM	200	**	**	**	**	38.1 B:V	SED80193 (1)
TIN	200	2.1	SED80093 (1)	2.1	SED80093 (1)	5.6 B:V	SED80193 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	2560 :V	SED80093 (1)
ARSENIC	10	**	**	**	**	2.2 :J	SED80093 (1)
BARIUM	200	**	**	**	**	60.8 :V	SED80093 (1)
BERYLLIUM	5	**	**	**	**	.41 B:V	SED80093 (1)
CALCIUM	5000	**	**	**	**	9180 I:J	SED80093 (1)
CHROMIUM	10	**	**	**	**	4 :J	SED80093 (1)
COBALT	50	**	**	**	**	2.7 B:V	SED80093 (1)
IRON	100	**	**	**	**	6110 :V	SED80093 (1)
LEAD	3	**	**	**	**	8.2 :J	SED80093 (1)
MAGNESIUM	5000	**	**	**	**	1080 :V	SED80093 (1)
MANGANESE	15	**	**	**	**	212 :V	SED80093 (1)
NICKEL	40	**	**	**	**	5.1 B:V	SED80093 (1)
POTASSIUM	5000	**	**	**	**	360 B:V	SED80093 (1)
SODIUM	5000	**	**	**	**	212 B:V	SED80193 (1)
VANADIUM	50	**	**	**	**	9.5 B:V	SED80093 (1)
ZINC	20	**	**	**	**	216 :V	SED80093 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.004	**	**	**	**	.18(.023) :V	SED80093 (1)
GROSS ALPHA	2	**	**	**	**	14(3) :A	SED80093 (1)
GROSS BETA	4	**	**	**	**	24(3.3) :A	SED80193 (1)
PLUTONIUM-239/240	0.006	**	**	**	**	.17(.024) B:V	SED80093 (1)
URANIUM-233,-234	0.05	**	**	**	**	.85(.25) B:V	SED80093 (1)
URANIUM-235	0.05	**	**	**	**	.017(.034) U:V	SED80093 (1)
URANIUM-238	0.04	**	**	**	**	.68(.21) :V	SED80093 (1)

Legend C

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TABLE 3-53
Sediment Positive Results Data Summary
OU8 - IHSS 144(N)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BENZO(a)ANTHRACENE	94 J:A	SED80193 (1)	1	2	139.5
BENZO(a)PYRENE	100 J:A	SED80193 (1)	1	2	142.5
BENZO(b)FLUORANTHENE	140 J:A	SED80193 (1)	1	2	162.5
BENZO(ghi)PERYLENE	79 J:A	SED80193 (1)	1	2	132
BENZO(k)FLUORANTHENE	50 J:A	SED80193 (1)	1	2	117.5
BIS(2-ETHYLHEXYL)PHTHALATE	140 J:A	SED80193 (1)	2	2	115.5
CHRYSENE	110 J:A	SED80193 (1)	1	2	147.5
FLUORANTHENE	200 J:A	SED80193 (1)	1	2	192.5
INDENO(1,2,3-cd)PYRENE	83 J:A	SED80193 (1)	1	2	134
PHENANTHRENE	85 J:A	SED80193 (1)	1	2	135
PYRENE	190 J:A	SED80193 (1)	1	2	187.5
Test Group:METADD Units:mg/kg					
LITHIUM	4.9 B:V	SED80193 (1)	2	2	3.5
STRONTIUM	58.4 :V	SED80093 (1)	2	2	48.25
TIN	5.6 B:V	SED80193 (1)	1	2	3.325
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	5440 :V	SED80193 (1)	2	2	4000
ARSENIC	4.2 :J	SED80193 (1)	2	2	3.2
BARIUM	96.2 :V	SED80193 (1)	2	2	78.5
BERYLLIUM	.67 B:V	SED80193 (1)	2	2	0.54
CALCIUM	11000 I:J	SED80193 (1)	2	2	10090
CHROMIUM	9.2 :J	SED80193 (1)	2	2	6.6
COBALT	6 B:V	SED80193 (1)	2	2	4.35
IRON	13700 :V	SED80193 (1)	2	2	9905
LEAD	18.9 :J	SED80193 (1)	2	2	13.55
MAGNESIUM	1720 B:V	SED80193 (1)	2	2	1400
MANGANESE	256 :V	SED80193 (1)	2	2	234
NICKEL	10.8 B:V	SED80193 (1)	2	2	7.95
POTASSIUM	1080 B:V	SED80193 (1)	2	2	720
SODIUM	471 B:V	SED80093 (1)	2	2	341.5
VANADIUM	25.7 :V	SED80193 (1)	2	2	17.6
ZINC	218 :V	SED80193 (1)	2	2	217
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	1.1(.07) :V	SED80193 (1)	2	2	0.64
GROSS ALPHA	17(3.2) :A	SED80193 (1)	2	2	15.5
GROSS BETA	26(3.4) :A	SED80093 (1)	2	2	25
PLUTONIUM-239/240	2(.074) B:VV	SED80193 (1)	2	2	1.085
URANIUM-233,-234	.94(.16) B:V	SED80193 (1)	2	2	0.895
URANIUM-235	.056(.038) J:V	SED80193 (1)	2	2	0.0365
URANIUM-238	.93(.16) :V	SED80193 (1)	2	2	0.805

Legend C

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TABLE 3-54
Surface Soil Positive Results
OU8 - IHSS 144(S)
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS805393 SSG0047JE 10-Nov-94	SS805493 SSG0048JE 10-Nov-94	SS805593 SSG0049JE 10-Nov-94	SS805593 SSG0132JE 10-Nov-94	SS805693 SSG0050JE 10-Nov-94	SS805793 SSG0051JE 10-Nov-94	SS805893 SSG0052JE 10-Nov-94	SS805993 SSG0053JE 10-Nov-94
Test Group:BNACLP Units:µg/kg										
4-NITROANILINE	1600	0.00E 0 / 0.00E 0					160 J:A-			
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0							44 J:A	
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0							39 J:A	
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0							67 J:A	
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0					44 J:A			
CHRYSENE	330	8.77E 4 / 0.00E 0							54 J:A	
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0					38 J:A			
FLUORANTHENE	330	1.10E 7 / 0.00E 0			45 J:A	61 J:A		71 J:A	100 J:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0				43 J:A-		87 J:A-	76 J:A-	
PYRENE	330	8.23E 6 / 0.00E 0			42 J:A	56 J:A		66 J:A	91 J:A	
Test Group:METADD Units:mg/kg										
LITHIUM	20	5.49E 3 / 15.08E 0	1.8 B:V	1.9 B:V	2.7 B:V	2.3 B:V	2.7 B:V	2.1 B:V	4.7 B:V	2 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	15 B:V	12.4 B:V	11.4 B:V	14 B:V	16.5 B:V	15.6 B:V	23.4 B:V	11.9 B:V
Test Group:SMETCLP Units:mg/kg										
ALUMINUM	40	7.96E 5 / 22999.00E 0	2090 :V	2210 :V	2320 :V	2410 :V	2580 :V	2310 :V	5060 :V	2280 :V
ARSENIC	2	3.66E-1 / 13.75E 0	5.4 :V*	4.9 :V*	4 :V*	4.5 :V*	4.8 :V*	4.5 :V*	3.5 :V*	5.5 :V*
BARIUM	40	1.91E 4 / 176.00E 0	40.8 B:V	42.9 :V	39.5 B:V	38.4 B:V	43.5 :V	40.6 B:V	66 :V	46.3 :V
CADMIUM	1	1.37E 2 / 2.34E 0		.32 B:V		.82 B:V			.44 B:V	
CALCIUM	1000	0.00E 0 / 5839.00E 0	2290 I:JA	1260 I:JA	1190 I:JA	2230 I:JA	3160 I:JA	2360 I:JA	5130 I:JA	1180 I:JA
CHROMIUM	2	0.00E 0 / 22.21E 0	4.5 :V	4.8 :V	4.8 :V	4.3 :V	5.3 :V	5.2 :V	7.8 :V	7.4 :V
COBALT	10	1.65E 4 / 14.22E 0	2.7 B:V	3.1 B:V	3.7 B:V	3.2 B:V	5.9 B:V	2.8 B:V	5.8 B:V	3.8 B:V
COPPER	5	1.10E 4 / 22.75E 0	12.7 :JA	15.5 :V	12.8 :JA	13.7 :JA	16.2 :V	13.7 :JA	16.8 :V	14.9 :JA
IRON	20	0.00E 0 / 23063.00E 0	3280 :V	3610 :V	4170 :V	4280 :V	4670 :V	3600 :V	7810 :V	4050 :V
LEAD	1	0.00E 0 / 73.87E 0	5 :V	4.5 :V	4.5 :V	8.1 :V	7.5 :V	5.6 :V	10.7 :V	5.1 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	576 B:V	572 B:V	845 B:V	783 B:V	859 B:V	662 B:V	1290 :V	601 B:V
MANGANESE	3	1.36E 3 / 482.10E 0	50.5 :V	47 :V	68.7 :V	78.2 :V	73.4 :V	57.2 :V	138 :V	61.7 :V
NICKEL	8	5.49E 3 / 19.74E 0	3.4 B:V	3.6 B:V	3.1 B:V	3.8 B:V	4.1 B:V	3.8 B:V	7 B:V	3.3 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	577 B:V	593 B:V	631 B:V	633 B:V	691 B:V	609 B:V	1040 B:V	581 B:V
SILVER	2	1.37E 3 / 0.22E 0							.56 B:V#	
SODIUM	2000	0.00E 0 / 119.02E 0				78 B:V			90 B:V	
VANADIUM	10	1.92E 3 / 61.84E 0	10.5 :V	11.1 :V	9.4 B:V	10.5 B:V	12.1 :V	10.7 B:V	16.1 :V	10.7 B:V
ZINC	4	8.23E 4 / 95.92E 0	18.4 :V	15.9 :V	17.3 :V	179 :V#	39.7 :V	28.3 :V	51.3 :V	16.1 :V
Test Group:TRADS Units:pCi/g										
AMERICIUM-241	0	2.37E 0 / 0.04E 0		.013(.008) J:V	.021(.014) :V		.026(.017) :V		.018(.008) J:V	
GROSS ALPHA	0	0.00E 0 / 44.56E 0	9.2(2.4) :A	7.7(2.3) :A	6.8(2.3) :A	13(2.7) :A	16(3.1) :A	7.8(2.1) :A	13(2.9) :A	8.6(2.5) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	26(3.2) :A	32(3.7) :A	22(3.2) :A	26(3.4) :A	30(3.4) :A	24(3.2) :A	29(3.3) :A	32(3.7) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.035(.013) :V	.055(.015) :V	.098(.02) :V#	.013(.007) J:V	.065(.017) :V	.037(.013) :V	.13(.021) :V#	
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.64(.16) :V	.63(.16) :V	.61(.15) :V	.69(.2) :V	.67(.16) :V	.56(.16) :V	.55(.17) :V	.52(.16) :V
URANIUM-235	0	1.73E-1 / 0.13E 0							.12(.073) J:V	
URANIUM-238	0	8.00E-1 / 2.83E 0	.63(.16) :V	.61(.16) :V	.59(.15) :V	.68(.2) :V	.51(.13) :V	.53(.16) :V	.55(.17) :V	.57(.16) :V

Legend B

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TABLE 3-55
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(S)
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
4-NITROANILINE	1600	1800	SS805393 (4)	1900	SS805593 (2)	160 J:A	SS805693 (1)
BENZO(a)ANTHRACENE	330	370	SS805393 (4)	400	SS805793 (1)	44 J:A	SS805893 (1)
BENZO(a)PYRENE	330	370	SS805393 (4)	400	SS805793 (1)	39 J:A	SS805893 (1)
BENZO(b)FLUORANTHENE	330	370	SS805393 (4)	400	SS805793 (1)	67 J:A	SS805893 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	370	SS805393 (4)	400	SS805793 (1)	44 J:A	SS805693 (1)
CHRYSENE	330	370	SS805393 (4)	400	SS805793 (1)	54 J:A	SS805893 (1)
DI-n-OCTYL PHTHALATE	330	370	SS805393 (4)	400	SS805793 (1)	38 J:A	SS805693 (1)
FLUORANTHENE	330	370	SS805393 (4)	370	SS805393 (4)	61 J:A	SS805593 (1)
PHENANTHRENE	330	370	SS805393 (4)	370	SS805393 (4)	43 J:A	SS805593 (1)
PYRENE	330	370	SS805393 (4)	370	SS805393 (4)	56 J:A	SS805593 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	1.8 B:V	SS805393 (1)
STRONTIUM	200	**	**	**	**	11.9 B:V	SS805993 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	2090 :V	SS805393 (1)
ARSENIC	10	**	**	**	**	3.5 :V	SS805893 (1)
BARIUM	200	**	**	**	**	39.5 B:V	SS805593 (1)
CADMIUM	5	0.28	SS805693 (1)	0.31	SS805793 (1)	.32 B:V	SS805493 (1)
CALCIUM	5000	**	**	**	**	1180 I:J	SS805993 (1)
CHROMIUM	10	**	**	**	**	4.5 :V	SS805393 (1)
COBALT	50	**	**	**	**	2.7 B:V	SS805393 (1)
COPPER	25	**	**	**	**	12.7 :J	SS805393 (1)
IRON	100	**	**	**	**	3280 :V	SS805393 (1)
LEAD	3	**	**	**	**	4.5 :V	SS805493 (1)
MAGNESIUM	5000	**	**	**	**	572 B:V	SS805493 (1)
MANGANESE	15	**	**	**	**	47 :V	SS805493 (1)
NICKEL	40	**	**	**	**	3.3 B:V	SS805993 (1)
POTASSIUM	5000	**	**	**	**	577 B:V	SS805393 (1)
SILVER	10	0.48	SS805693 (1)	0.54	SS805593 (1)	.56 B:V	SS805893 (1)
SODIUM	5000	30.1	SS805493 (1)	50.5	SS805993 (1)	78 B:V	SS805593 (1)
VANADIUM	50	**	**	**	**	10.5 :V	SS805393 (2)
ZINC	20	**	**	**	**	15.9 :V	SS805493 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.02	**	**	**	**	.006(.012) U:V	SS805593 (1)
GROSS ALPHA	3	**	**	**	**	6.8(2.3) :A	SS805593 (1)
GROSS BETA	5	**	**	**	**	22(3.2) :A	SS805593 (1)
PLUTONIUM-239/240	0.02	**	**	**	**	.01(.012) U:V	SS805993 (1)
URANIUM-233,-234	0.1	**	**	**	**	.52(.16) :V	SS805993 (1)
URANIUM-235	0.1	**	**	**	**	(.026) U:V:V	SS805993 (1)
URANIUM-238	0.08	**	**	**	**	.51(.13) :V	SS805693 (1)

Legend C

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TABLE 3-55
Surface Soil Positive Results Data Summary
OU8 - IHSS 144(S)
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
4-NITROANILINE	160 J:A	SS805693 (1)	1	7	808.5714
BENZO(a)ANTHRACENE	44 J:A	SS805893 (1)	1	7	168.4286
BENZO(a)PYRENE	39 J:A	SS805893 (1)	1	7	167.7143
BENZO(b)FLUORANTHENE	67 J:A	SS805893 (1)	1	7	171.7143
BIS(2-ETHYLHEXYL)PHTHALATE	44 J:A	SS805693 (1)	1	7	168.4286
CHRYSENE	54 J:A	SS805893 (1)	1	7	169.8571
DI-n-OCTYL PHTHALATE	38 J:A	SS805693 (1)	1	7	167.5714
FLUORANTHENE	100 J:A	SS805893 (1)	3	7	138.8571
PHENANTHRENE	87 J:A	SS805793 (1)	3	7	135.1429
PYRENE	91 J:A	SS805893 (1)	3	7	136.1429
Test Group:METADD Units:mg/kg					
LITHIUM	4.7 B:V	SS805893 (1)	7	7	2.5571
STRONTIUM	23.4 B:V	SS805893 (1)	7	7	15.5429
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	5060 :V	SS805893 (1)	7	7	2705.714
ARSENIC	5.5 :V	SS805993 (1)	7	7	4.7286
BARIUM	66 :V	SS805893 (1)	7	7	45.6571
CADMIUM	.82 B:V	SS805593 (1)	3	7	0.31
CALCIUM	5130 I:J	SS805893 (1)	7	7	2515.714
CHROMIUM	7.8 :V	SS805893 (1)	7	7	5.6857
COBALT	5.9 B:V	SS805693 (1)	7	7	3.9714
COPPER	16.8 :V	SS805893 (1)	7	7	14.7857
IRON	7810 :V	SS805893 (1)	7	7	4471.429
LEAD	10.7 :V	SS805893 (1)	7	7	6.6429
MAGNESIUM	1290 :V	SS805893 (1)	7	7	772.1429
MANGANESE	138 :V	SS805893 (1)	7	7	72.2857
NICKEL	7 B:V	SS805893 (1)	7	7	4.1429
POTASSIUM	1040 B:V	SS805893 (1)	7	7	674.8571
SILVER	.56 B:V	SS805893 (1)	1	7	0.2971
SODIUM	90 B:V	SS805893 (1)	2	7	37.9571
VANADIUM	16.1 :V	SS805893 (1)	7	7	11.6714
ZINC	179 :V	SS805593 (1)	7	7	49.8143
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.026(.017) :V	SS805693 (1)	8	8	0.0151
GROSS ALPHA	16(3.1) :A	SS805693 (1)	8	8	10.2625
GROSS BETA	32(3.7) :A	SS805493 (2)	8	8	27.625
PLUTONIUM-239/240	.13(.021) :V	SS805893 (1)	8	8	0.0554
URANIUM-233,-234	.69(.2) :V	SS805593 (1)	8	8	0.6087
URANIUM-235	.12(.073) J:V	SS805893 (1)	8	8	0.0466
URANIUM-238	.68(.2) :V	SS805593 (1)	8	8	0.5838

Legend C

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TABLE 3-56
Population Distribution Summary of Surface-Soil Results
for IHSS 144(S)

Test Group:METADD		
LITHIUM	Nonparametric	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Normal	
BARIUM	Nonparametric	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Normal	
CHROMIUM	Lognormal	
COBALT	Lognormal	
COPPER	Normal	
IRON	Nonparametric	
LEAD	Normal	
MAGNESIUM	Normal	
MANGANESE	Lognormal	
NICKEL	Nonparametric	
POTASSIUM	Nonparametric	
SILVER	ND	All results less than detection limit.
SODIUM	ND	All results less than detection limit.
VANADIUM	Nonparametric	
ZINC	Lognormal	
Test Group:TRADS		
GROSS ALPHA	Normal	
GROSS BETA	Normal	
PLUTONIUM-239,-240	Normal	
URANIUM-233,-234	Normal	
URANIUM-238	Normal	

Legend D

TABLE 3-57
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 144(S)

	PRGs	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power d=0.5	d=0.2	d=0.3	d=0.5
Test Group:METADD Units: mg/kg									
LITHIUM	5490	8	2.5	0.94	0.373	3.790	0.380	0.650	0.955
STRONTIUM	165000	8	15.0	3.85	0.256	5.526	0.610	0.900	0.999+
Test Group:SMETCLP Units: mg/kg									
ALUMINUM	796000	8	2657.5	981.16	0.369	3.830	0.380	0.660	0.960
ARSENIC	0.366	8	4.6	0.67	0.145	9.763	0.967	0.999+	0.999+
BARIUM	19100	8	44.8	8.94	0.200	7.078	0.800	0.980	0.999+
CADMIUM	6260	3	0.5	0.26	0.496	1.747	0.130	0.170	0.430
CALCIUM	None	8	2350.0	1325.85	0.564	2.507	0.230	0.380	0.720
CHROMIUM	274000	8	5.5	1.33	0.242	5.846	0.760	0.930	0.999+
COBALT	16500	8	3.9	1.28	0.330	4.288	0.450	0.740	0.986
COPPER	11000	8	14.5	1.55	0.106	13.295	0.999+	0.999+	0.999+
IRON	None	8	4433.8	1434.28	0.323	4.372	0.450	0.750	0.986
LEAD	None	8	6.4	2.21	0.346	4.085	0.400	0.680	0.970
MAGNESIUM	None	8	773.5	239.37	0.309	4.570	0.480	0.770	0.991
MANGANESE	1360	8	71.8	28.83	0.401	3.523	0.350	0.580	0.930
NICKEL	5490	8	4.0	1.25	0.311	4.546	0.480	0.770	0.991
POTASSIUM	None	8	669.4	154.20	0.230	6.139	0.700	0.950	0.999+
SILVER	1370	1	0.6	0.00	0.000	0.000	0.000	0.000	0.000
SODIUM	None	2	84.0	8.49	0.101	7.000	0.340	0.480	0.730
VANADIUM	1920	8	11.4	2.04	0.180	7.876	0.870	0.994	0.999+
ZINC	82300	8	45.8	55.36	1.210	1.169	0.120	0.160	0.280
Test Group:TRADS Units: pCi/g									
AMERICIUM-241	2.37	4	0.0	0.01	0.279	3.580	0.280	0.480	0.850
GROSS ALPHA	None	8	10.3	3.30	0.322	4.393	0.480	0.740	0.988
GROSS BETA	None	8	27.6	3.70	0.134	10.556	0.982	0.999+	0.999+
PLUTONIUM-239/240	3.43	7	0.1	0.04	0.651	2.032	0.180	0.270	0.540
URANIUM-233,-234	45.3	8	0.6	0.06	0.099	14.267	0.999+	0.999+	0.999+
URANIUM-235	0.173	1	0.1	0.00	0.000		0.000	0.000	0.000
URANIUM-238	0.8	8	0.6	0.06	0.096	14.797	0.999+	0.999+	0.999+

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-58
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 144(S)

	PRGs	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
LITHIUM	5490	7	2.5	0.94	0.373	10	6	5	3	2	1
STRONTIUM	165000	7	15.0	3.85	0.256	5	3	2	2	1	1
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	7	2657.5	981.16	0.369	10	6	5	3	2	1
ARSENIC	0.366	7	4.6	0.67	0.145	2	1	1	1	1	1
BARIUM	19100	7	44.8	8.94	0.200	3	2	2	1	1	1
CADMIUM	6260	3	0.5	0.26	0.496	17	11	8	5	3	2
CALCIUM	None	7	2350.0	1325.85	0.564	22	14	10	6	4	3
CHROMIUM	274000	7	5.5	1.33	0.242	4	3	2	2	1	1
COBALT	16500	7	3.9	1.28	0.330	8	5	4	2	2	1
COPPER	11000	7	14.5	1.55	0.106	1	1	1	1	1	1
IRON	None	7	4433.8	1434.28	0.323	8	5	4	2	2	1
LEAD	None	7	6.4	2.21	0.346	9	5	4	3	2	1
MAGNESIUM	None	7	773.5	239.37	0.309	7	4	3	2	2	1
MANGANESE	1360	7	71.8	28.83	0.401	11	7	5	3	2	2
NICKEL	5490	7	4.0	1.25	0.311	7	4	3	2	2	1
POTASSIUM	None	7	669.4	154.20	0.230	4	3	2	1	1	1
SILVER	1370	1	0.6								
SODIUM	None	2	84.0	8.49	0.101	1	1	1	1	1	1
VANADIUM	1920	7	11.4	2.04	0.180	3	2	1	1	1	1
ZINC	82300	7	45.8	55.36	1.210	100	61	45	27	16	10
Test Group:TRADS Units: pCi/g											
AMERICIUM-241	2.37	4	0.0	0.01	0.279	6	4	3	2	1	1
GROSS ALPHA	None	7	10.3	3.30	0.322	8	5	4	2	2	1
GROSS BETA	None	7	27.6	3.70	0.134	2	1	1	1	1	1
PLUTONIUM-239/240	3.43	7	0.1	0.04	0.651	29	18	13	8	5	3
URANIUM-233,-234	45.3	7	0.6	0.06	0.099	1	1	1	1	1	1
URANIUM-235	0.173	1	0.1	0.00							
URANIUM-238	0.8	7	0.6	0.06	0.096	1	1	1	1	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-59
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 150.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG003694 SGG0036JE 12/13/94	SG003694 SGG0036JE* 12/13/94	SG003694 SGG0097JE**-D 12/13/94	SG003694 SGG0036JE**R 2/16/95	SG004094 SGG0040JE 12/13/94
Test Group:GC/MS Units:µg/L					DUP AS REAL	NOT USED	
1,1,1-Trichloroethane	2	0	0.72	0.86			
1,1-Dichloroethane	3	3	33 J	66 J	120 @		
1,1-Dichloroethene	3	3	42 J	47 J	81 @		
1,2,4-Trimethylbenzene	3	1	0.05	< .1	2.5		0.04
1,3,5-Trimethylbenzene	2	0	0.02				0.01
2-Butanone	2	1	0.07	< .4	5.7		
Acetone	2	1	< .03	< .3	22 NC		0.05
Benzene	2	0	0.1				0.06
Bromomethane	1	0		0.4			
Chloroethane	2	2	2.4 @	2.6	< 7.6		
Chloromethane	2	2	< .03	3.9 NC	3.9		
Ethylbenzene	2	1	0.02	< .1	1.3		
Naphthalene	1	0	0.05				
Tetrachloroethene	3	1	0.27	0.47		55	
Total Xylenes	2	1	0.11	< .4	6		
Trichloroethene	3	1	0.7	0.85		57	
Trichlorofluoromethane	5	4	6 J	52 J	750 J @	330	0.73
Vinyl Chloride	3	3	12 J	12 @	8		
cis-1,2-dichloroethene	3	3	2 @	1.9	3.3		
m & p-Xylenes	2	1	0.08	< .4	4.4		
o-Xylene	3	1	0.03	< .1	1.6		0.01
trans-1,2-Dichloroethene	1	1	2.9 @	< .5	< 4.8		

Legend A

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TABLE 3-60
Surface Soil Positive Results
OU8 - IHSS 150.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS806093 SSG0054JE 16-Nov-94	SS806193 SSG0055JE 16-Nov-94	SS806293 SSG0056JE 16-Nov-94	SS806393 SSG0057JE 16-Nov-94	SS806493 SSG0058JE 16-Nov-94	SS806593 SSG0059JE 16-Nov-94	SS806693 SSG0060JE 16-Nov-94	SS806793 SSG0061JE 15-Nov-94
Test Group:BNACLP Units:µg/kg										
4-NITROANILINE	1600	0.00E 0 / 0.00E 0			790 J:A-					120 J:A-
ACENAPHTHENE	330	1.65E 7 / 0.00E 0		310 DJ:A						
ANTHRACENE	330	8.23E 7 / 0.00E 0		1100 DJ:A						
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	110 J:A	3800 D:V*	61 J:A				37 J:A	51 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0		2600 BJ:A*	330 BJ:A*					140 J:A*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	250 J:A	6000 D:V*	170 J:A				39 J:A	110 J:A
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	77 J:A-		71 J:A-					
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	90 J:A	1800 DJ:A	47 J:A					38 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	93 J:A	430 DJ:A	130 J:A	44 J:A	42 J:A			
CHRYSENE	330	8.77E 4 / 0.00E 0	140 J:A	4600 D:V	97 J:A				36 J:A	68 J:A
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0		360 DJ:A*						
FLUORANTHENE	330	1.10E 7 / 0.00E 0	230 J:A	7900 D:V	120 J:A				67 J:A	130 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	75 J:A	1000 DJ:A*						48 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0	81 J:A-	5500 D:V-	68 J:A-				39 J:A-	78 J:A-
PYRENE	330	8.23E 6 / 0.00E 0		6800 BD:V	420 B:V					220 J:A
Test Group:METADD Units:mg/kg										
LITHIUM	20	5.49E 3 / 15.08E 0	7.2 B:V	2.6 B:V	6.1 B:V	4.6 B:V	6.8 B:V	5.4 B:V	5.7 B:V	5.9 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	24.5 B:V	29 B:V	31.4 B:V	23.8 B:V	9.3 B:V	30.8 B:V	31.5 B:V	7.7 B:V
TIN	40	1.65E 5 / 2.90E 0								
Test Group:SMETCLP Units:mg/kg										
ALUMINUM	40	7.96E 5 / 22999.00E 0	6890 :V	3450 :V	5790 :V	5260 :V	5360 :V	7070 :V	7120 :V	4640 :V
ANTIMONY	12	1.10E 2 / 0.47E 0	3.2 B:JA#							
ARSENIC	2	3.66E-1 / 13.75E 0	2.9 :V*	1.7 B:V*	1.6 B:V*	2.9 :V*	1.6 B:V*	3.5 :V*	3.5 :V*	1.9 B:V*
BARIUM	40	1.91E 4 / 176.00E 0	94.8 :V	59.5 :V	67.7 :V	64.5 :V	53.2 :V	80.2 :V	92.4 :V	47.2 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.29 B:V*	.15 B:V*	.26 B:V*	.35 B:V*	.2 B:V*	.79 B:V*	.41 B:V*	.21 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0		.53 B:V						
CALCIUM	1000	0.00E 0 / 5839.00E 0	13800 :V#	10000 :V#	12800 :V#	2910 :V	1370 :V	4630 :V	5720 :V	1170 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	9.8 :V	7.7 :V	7.5 :V	8.2 :V	8.6 :V	8.1 :V	9.5 :V	8.5 :V
COBALT	10	1.65E 4 / 14.22E 0	4.9 B:V	2.8 B:V	5.4 B:V	7.3 B:V	10.9 :V	10.4 B:V	5.3 B:V	5 B:V
COPPER	5	1.10E 4 / 22.75E 0	13.1 :JA	13.8 :JA	24.7 :JA#	14.5 :JA	27 :JA#	29.1 :JA#	14.6 :JA	17.6 :JA
IRON	20	0.00E 0 / 23063.00E 0	10400 :V	8330 :V	9480 :V	8250 :V	8890 :V	9920 :V	10900 :V	8520 :V
LEAD	1	0.00E 0 / 73.87E 0	11.4 :V	17.5 :V	10.4 :V	14.9 :V	7.6 :V	15.3 :V	13.9 :V	10.9 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2320 :V	1120 :V	2300 :V	1770 :V	2080 :V	2250 :V	1880 :V	1740 :V
MANGANESE	3	1.36E 3 / 482.10E 0	191 :V	133 :V	172 :V	125 :V	156 :V	249 :V	474 :V	172 :V
NICKEL	8	5.49E 3 / 19.74E 0	7.7 B:V	6.5 B:V	6.3 B:V	7.6 B:V	5.4 B:V	8.3 B:V	7.3 B:V	5.7 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1950 :V	952 B:V	1680 :V	1160 :V	1730 :V	1040 B:V	1270 :V	1490 :V
SILVER	2	1.37E 3 / 0.22E 0								
SODIUM	2000	0.00E 0 / 119.02E 0	180 B:V#	110 B:V	481 B:V#	231 B:V#	79.6 B:V	233 B:V#	192 B:V#	93.5 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	19 :V	10.5 :V	15.3 :V	14.9 :V	14.4 :V	15.7 :V	20.2 :V	13.6 :V
ZINC	4	8.23E 4 / 95.92E 0	34.6 :V	84.2 :V	37.9 :V	37 :V	24.1 :V	36 :V	32.9 :V	26.1 :V
Test Group:TRADS Units:pCi/g										
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.051(.015) :Y#	.16(.021) :Y#	.068(.019) :Y#	.015(.009) J:Y	.052(.012) :Y#	.26(.033) :Y#	.023(.014) :Y	.027(.016) :Y
GROSS ALPHA	0	0.00E 0 / 44.56E 0	19(4) :A	12(2.8) :A	37(6.4) :A	17(3.5) :A	19(3.7) :A	19(3.7) :A	33(4.9) :A	17(3.6) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	41(3.8) :A	35(3.5) :A	39(4.1) :A	35(3.7) :A	41(3.8) :A	26(3.4) :A	43(3.9) :A	36(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.27(.023) :Y#	.18(.021) :Y#	.26(.024) :Y#	.028(.009) J:Y		.085(.014) :Y#	.036(.008) :Y	.055(.018) :Y
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.92(.15) :Y	.59(.11) :Y	.92(.15) :Y	.79(.18) :Y	.83(.18) :Y	.83(.19) :Y	.74(.17) :Y	.68(.2) :Y
URANIUM-235	0	1.73E-1 / 0.13E 0	.054(.033) J:Y	.064(.047) J:Y	.065(.036) J:Y					
URANIUM-238	0	8.00E-1 / 2.83E 0	.91(.14) :Y*	.58(.11) :Y	.94(.15) :Y*	.74(.18) :Y	.84(.18) :Y*	.88(.19) :Y*	.72(.17) :Y	.8(.21) :Y*

Legend B

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TABLE 3-60
Surface Soil Positive Results
OU8 - IHSS 150.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS806793 SSG0134JE 15-Nov-94	SS806893 SSG0062JE 16-Nov-94	SS806993 SSG0063JE 16-Nov-94
Test Group:BNACLP Units:µg/kg					
4-NITROANILINE	1600	0.00E 0 / 0.00E 0	97 J:A-		
ACENAPHTHENE	330	1.65E 7 / 0.00E 0			
ANTHRACENE	330	8.23E 7 / 0.00E 0			
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0			99 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0			
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	53 J:A		150 J:A
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0			
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0			53 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	46 J:A	57 J:A	38 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	37 J:A		110 J:A
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0			
FLUORANTHENE	330	1.10E 7 / 0.00E 0	60 J:A		95 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0			49 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0			
PYRENE	330	8.23E 6 / 0.00E 0	49 J:A		
Test Group:METADD Units:mg/kg					
LITHIUM	20	5.49E 3 / 15.08E 0	5.6 B:V	3.4 B:V	13.4 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	8.2 B:V	5.7 B:V	72.3 :JA#
TIN	40	1.65E 5 / 2.90E 0			2.6 B:JA
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	40	7.96E 5 / 22999.00E 0	4800 :V	2100 :V	12800 :V
ANTIMONY	12	1.10E 2 / 0.47E 0			
ARSENIC	2	3.66E-1 / 13.75E 0	1.2 B:V*	.56 B:V*	1.7 B:V*
BARIUM	40	1.91E 4 / 176.00E 0	51.8 :V	20 B:V	35.2 B:V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.19 B:V*	.12 B:V	.33 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0			
CALCIUM	1000	0.00E 0 / 5839.00E 0	1340 :V	833 B:V	11900 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	7.9 :V	3.6 :V	8.9 :JA
COBALT	10	1.65E 4 / 14.22E 0	4.5 B:V	2.6 B:V	19.7 :V#
COPPER	5	1.10E 4 / 22.75E 0	13.4 :JA		79.9 :JA#
IRON	20	0.00E 0 / 23063.00E 0	8470 :V	4800 :V	29800 :V#
LEAD	1	0.00E 0 / 73.87E 0	8.7 :V	3.3 :V	11 :JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1810 :V	981 B:V	12800 :V#
MANGANESE	3	1.36E 3 / 482.10E 0	168 :V	59.3 :V	787 :V#
NICKEL	8	5.49E 3 / 19.74E 0	6.1 B:V	3 B:V	11.5 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1580 :V	575 B:V	1550 :V
SILVER	2	1.37E 3 / 0.22E 0			5.6 :JA#
SODIUM	2000	0.00E 0 / 119.02E 0	101 B:V	147 B:V#	1900 :V#
VANADIUM	10	1.92E 3 / 61.84E 0	13.3 :V	6.8 B:V	49.5 :V
ZINC	4	8.23E 4 / 95.92E 0	27.5 :V	11.8 :V	48.5 :JA
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.031(.013) :Y		
GROSS ALPHA	0	0.00E 0 / 44.56E 0	18(3.5) :A	14(3.1) :A	16(3.8) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	39(3.8) :A	38(3.6) :A	34(3.8) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.081(.019) :Y#		
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.65(.18) :Y	1(.21) :Y	1.1(.25) :Y
URANIUM-235	0	1.73E-1 / 0.13E 0			.1(.076) J:Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.59(.18) :Y	.83(.17) :Y*	1.2(.25) :Y*

Legend B

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TABLE 3-61
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.1
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
4-NITROANILINE	1600	1700	SS806393 (4)	14000	SS806193 (1)	120 J:A	SS806793 (1)
ACENAPHTHENE	330	350	SS806393 (5)	390	SS806893 (1)	310 DJ:A	SS806193 (1)
ANTHRACENE	330	350	SS806393 (5)	390	SS806893 (1)	1100 DJ:A	SS806193 (1)
BENZO(a)ANTHRACENE	330	350	SS806393 (3)	390	SS806893 (1)	37 J:A	SS806693 (1)
BENZO(a)PYRENE	330	350	SS806393 (4)	390	SS806893 (1)	140 J:A	SS806793 (1)
BENZO(b)FLUORANTHENE	330	350	SS806393 (3)	390	SS806893 (1)	39 J:A	SS806693 (1)
BENZO(ghi)PERYLENE	330	350	SS806393 (5)	2900	SS806193 (1)	71 J:A	SS806293 (1)
BENZO(k)FLUORANTHENE	330	350	SS806393 (4)	390	SS806893 (1)	38 J:A	SS806793 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	350	SS806593 (2)	350	SS806593 (2)	38 J:A	SS806993 (1)
CHRYSENE	330	350	SS806393 (3)	390	SS806893 (1)	36 J:A	SS806693 (1)
DIBENZO(a,h)ANTHRACENE	330	350	SS806393 (5)	390	SS806893 (1)	360 DJ:A	SS806193 (1)
FLUORANTHENE	330	350	SS806393 (3)	390	SS806893 (1)	67 J:A	SS806693 (1)
INDENO(1,2,3-cd)PYRENE	330	350	SS806393 (4)	390	SS806893 (1)	48 J:A	SS806793 (1)
PHENANTHRENE	330	350	SS806393 (3)	390	SS806893 (1)	39 J:A	SS806693 (1)
PYRENE	330	350	SS806393 (4)	390	SS806893 (1)	220 J:A	SS806793 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	2.6 B:V	SS806193 (1)
STRONTIUM	200	**	**	**	**	5.7 B:V	SS806893 (1)
TIN	200	2	SS806193 (5)	2.3	SS806593 (1)	2.6 B:J	SS806993 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	2100 :V	SS806893 (1)
ANTIMONY	60	**	**	**	**	3.2 B:J	SS806093 (1)
ARSENIC	10	**	**	**	**	.56 B:V	SS806893 (1)
BARIUM	200	**	**	**	**	20 B:V	SS806893 (1)
BERYLLIUM	5	**	**	**	**	.12 B:V	SS806893 (1)
CADMIUM	5	0.28	SS806293 (2)	0.32	SS806593 (1)	.53 B:V	SS806193 (1)
CALCIUM	5000	**	**	**	**	833 B:V	SS806893 (1)
CHROMIUM	10	**	**	**	**	3.6 :V	SS806893 (1)
COBALT	50	**	**	**	**	2.6 B:V	SS806893 (1)
COPPER	25	5.7	SS806893 (1)	5.7	SS806893 (1)	13.1 :J	SS806093 (1)
IRON	100	**	**	**	**	4800 :V	SS806893 (1)
LEAD	3	**	**	**	**	3.3 :V	SS806893 (1)
MAGNESIUM	5000	**	**	**	**	981 B:V	SS806893 (1)
MANGANESE	15	**	**	**	**	59.3 :V	SS806893 (1)
NICKEL	40	**	**	**	**	3 B:V	SS806893 (1)
POTASSIUM	5000	**	**	**	**	575 B:V	SS806893 (1)
SILVER	10	0.48	SS806293 (1)	1.3	SS806593 (1)	5.6 :J	SS806993 (1)
SODIUM	5000	**	**	**	**	79.6 B:V	SS806493 (1)
VANADIUM	50	**	**	**	**	6.8 B:V	SS806893 (1)
ZINC	20	**	**	**	**	11.8 :V	SS806893 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.02	**	**	**	**	(.01) U:Y:Y	SS806893 (1)
GROSS ALPHA	3	**	**	**	**	12(2.8) :A	SS806193 (1)
GROSS BETA	5	**	**	**	**	26(3.4) :A	SS806593 (1)
PLUTONIUM-239/240	0.007	**	**	**	**	.002(.003) U:Y	SS806893 (1)
URANIUM-233,-234	0.1	**	**	**	**	.59(.11) :Y	SS806193 (1)
URANIUM-235	0.1	**	**	**	**	.043(.044) U:Y	SS806593 (1)
URANIUM-238	0.08	**	**	**	**	.58(.11) :Y	SS806193 (1)

Legend C

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TABLE 3-61
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.1
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
4-NITROANILINE	790 J:A	SS806293 (1)	2	10	1406
ACENAPHTHENE	310 DJ:A	SS806193 (1)	1	10	193
ANTHRACENE	1100 DJ:A	SS806193 (1)	1	10	272
BENZO(a)ANTHRACENE	3800 D:V	SS806193 (1)	6	10	487.8
BENZO(a)PYRENE	2600 BJ:A	SS806193 (1)	3	10	433.5
BENZO(b)FLUORANTHENE	6000 D:V	SS806193 (1)	6	10	743.9
BENZO(ghi)PERYLENE	77 J:A	SS806093 (1)	2	10	285.3
BENZO(k)FLUORANTHENE	1800 DJ:A	SS806193 (1)	5	10	292.3
BIS(2-ETHYLHEXYL)PHTHALATE	430 DJ:A	SS806193 (1)	8	10	123
CHRYSENE	4600 D:V	SS806193 (1)	6	10	577.1
DIBENZO(a,h)ANTHRACENE	360 DJ:A	SS806193 (1)	1	10	198
FLUORANTHENE	7900 D:V	SS806193 (1)	6	10	926.2
INDENO(1,2,3-cd)PYRENE	1000 DJ:A	SS806193 (1)	4	10	224.7
PHENANTHRENE	5500 D:V	SS806193 (1)	5	10	667.1
PYRENE	6800 BD:V	SS806193 (1)	3	10	870.5
Test Group:METADD Units:mg/kg					
LITHIUM	13.4 B:V	SS806993 (1)	10	10	6.11
STRONTIUM	72.3 :J	SS806993 (1)	10	10	26.65
TIN	2.6 B:J	SS806993 (1)	1	10	1.2
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	12800 :V	SS806993 (1)	10	10	6064
ANTIMONY	3.2 B:J	SS806093 (1)	1	1	3.2
ARSENIC	3.5 :V	SS806593 (2)	10	10	2.186
BARIUM	94.8 :V	SS806093 (1)	10	10	61.93
BERYLLIUM	.79 B:V	SS806593 (1)	10	10	0.311
CADMIUM	.53 B:V	SS806193 (1)	1	10	0.187
CALCIUM	13800 :V	SS806093 (1)	10	10	6530.3
CHROMIUM	9.8 :V	SS806093 (1)	10	10	8.04
COBALT	19.7 :V	SS806993 (1)	10	10	7.43
COPPER	79.9 :J	SS806993 (1)	9	10	23.715
IRON	29800 :V	SS806993 (1)	10	10	10929
LEAD	17.5 :V	SS806193 (1)	10	10	11.62
MAGNESIUM	12800 :V	SS806993 (1)	10	10	2931.1
MANGANESE	787 :V	SS806993 (1)	10	10	251.83
NICKEL	11.5 :V	SS806993 (1)	10	10	6.97
POTASSIUM	1950 :V	SS806093 (1)	10	10	1348.7
SILVER	5.6 :J	SS806993 (1)	1	10	0.8525
SODIUM	1900 :V	SS806993 (1)	10	10	365.46
VANADIUM	49.5 :V	SS806993 (1)	10	10	17.99
ZINC	84.2 :V	SS806193 (1)	10	10	37.45
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.26(.033) :Y	SS806593 (1)	11	11	0.063
GROSS ALPHA	37(6.4) :A	SS806293 (1)	11	11	20.0909
GROSS BETA	43(3.9) :A	SS806693 (1)	11	11	37
PLUTONIUM-239/240	.27(.023) :Y	SS806093 (1)	11	11	0.0914
URANIUM-233,-234	1.1(.25) :Y	SS806993 (1)	11	11	0.8227
URANIUM-235	.1(.076) J:Y	SS806993 (1)	11	11	0.0589
URANIUM-238	1.2(.25) :Y	SS806993 (1)	11	11	0.8209

Legend C

TABLE 3-65
Laboratory HPGe Vertical Soil Profile Results
for IHSS 150.2

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-62
Population Distribution Summary of Surface-Soil Results
for IHSS 150.1

Test Group:METADD mg/kg	Distribution	Comments
LITHIUM	Lognormal	
STRONTIUM	Lognormal	
TIN	ND	One sample analyzed
Test Group:SMETCLP mg/kg		
ALUMINUM	Normal	
ANTIMONY	ND	One sample analyzed
ARSENIC	Normal	
BARIUM	Normal	
BERYLLIUM	ND	All sample concentrations less than detection limit
CADMIUM	ND	One sample analyzed
CALCIUM	Normal	
CHROMIUM	Nonparametric	
COBALT	Lognormal	
COPPER	Nonparametric	
IRON	Nonparametric	
LEAD	Normal	
MAGNESIUM	Nonparametric	
MANGANESE	Lognormal	
NICKEL	Normal	
POTASSIUM	Normal	
SILVER	ND	One sample analyzed
SODIUM	ND	All sample concentrations less than detection limit
VANADIUM	Lognormal	
ZINC	Lognormal	
Test Group:TRADS pCi/g		
AMERICIUM-241	Lognormal	
GROSS ALPHA	Lognormal	
GROSS BETA	Normal	
PLUTONIUM-239/240	Normal	
URANIUM-233,-234	Normal	
URANIUM-235		
URANIUM-238	Normal	

Legend D

TABLE 3-63
Test of Power of Difference of Sample Mean and Population Mean
of Surface-Soil Results for IHSS 150.1

Sample Identification Number: Date Sampled:	Detect (C>MDL)	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	0	10	6.1	2.93	0.480	0.32	0.56	0.918
STRONTIUM	1	10	26.7	18.99	0.713	0.195	0.32	0.65
TIN	0	1	2.6	0.00	0.000			
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	10	10	6064.0	2858.60	0.471	0.32	0.56	0.921
ANTIMONY	0	1	3.2	0.00	0.000			
ARSENIC	4	10	2.2	0.96	0.441	0.39	0.62	0.952
BARIUM	8	10	61.9	23.66	0.382	0.45	0.75	0.986
BERYLLIUM	0	10	0.3	0.19	0.615	0.22	0.4	0.78
CADMIUM	0	1	0.5	0.00	0.000			
CALCIUM	9	10	6530.3	5125.44	0.785	0.188	0.3	0.58
CHROMIUM	10	10	8.0	1.72	0.214	0.87	0.992	0.9999+
COBALT	3	10	7.4	5.13	0.691	0.21	0.33	0.68
COPPER	9	9	26.0	21.11	0.811	0.18	0.28	0.53
IRON	10	10	10929.0	6839.19	0.626	0.24	0.39	0.75
LEAD	10	10	11.6	4.11	0.354	0.50	0.79	0.993
MAGNESIUM	9	10	2931.1	3498.38	1.194	0.13	0.19	0.32
MANGANESE	10	10	251.8	218.25	0.867	0.17	0.27	0.51
NICKEL	2	10	7.0	2.19	0.314	0.57	0.87	0.998
POTASSIUM	0	10	1348.7	422.14	0.313	0.57	0.87	0.998
SILVER	1	1	5.6	0.00	0.000			
SODIUM	0	10	365.5	551.05	1.508	0.104	0.148	0.25
VANADIUM	9	10	18.0	11.71	0.651	0.24	0.38	0.74
ZINC	10	10	37.5	19.07	0.509	0.32	0.51	0.88
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	8	8	0.1	0.08	1.028	0.14	0.195	0.36
GROSS ALPHA	10	10	20.4	8.09	0.396	0.42	0.70	0.976
GROSS BETA	10	10	37.1	4.89	0.132	0.996	0.9999+	0.9999+
PLUTONIUM-239/240	7	7	0.1	0.10	0.760	0.15	0.216	0.45
URANIUM-233,-234	10	10	0.8	0.15	0.180	0.94	0.987	0.9999+
URANIUM-235	4	4	0.1	0.02	0.284	0.28	0.48	0.84
URANIUM-238	10	10	0.8	0.16	0.193	0.904	0.997	0.999+

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-64
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.1

Sample Identification Number: Date Sampled:	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, *d*)					
					(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg										
LITHIUM	10	6.1	2.93	0.480	16	10	7	5	3	2
STRONTIUM	10	26.7	18.99	0.713	35	21	16	10	6	4
TIN	1	2.6	0.00	0.000						
Test Group:SMETCLP Units: mg/kg										
ALUMINUM	10	6064.0	2858.60	0.471	16	10	7	5	3	2
ANTIMONY	1	3.2	0.00	0.000						
ARSENIC	10	2.2	0.96	0.441	14	8	6	4	3	2
BARIUM	10	61.9	23.66	0.382	10	6	5	3	2	1
BERYLLIUM	10	0.3	0.19	0.615	26	16	12	7	5	3
CADMIUM	1	0.5	0.00	0.000						
CALCIUM	10	6530.3	5125.44	0.785	42	26	19	12	7	5
CHROMIUM	10	8.0	1.72	0.214	4	2	2	1	1	1
COBALT	10	7.4	5.13	0.691	33	20	15	9	6	4
COPPER	9	26.0	21.11	0.811	45	28	20	13	8	5
IRON	10	10929.0	6839.19	0.626	27	17	12	8	5	3
LEAD	10	11.6	4.11	0.354	9	6	4	3	2	1
MAGNESIUM	10	2931.1	3498.38	1.194	97	59	43	27	16	10
MANGANESE	10	251.8	218.25	0.867	51	31	23	14	9	5
NICKEL	10	7.0	2.19	0.314	7	5	3	2	2	1
POTASSIUM	10	1348.7	422.14	0.313	7	5	3	2	2	1
SILVER	1	5.6	0.00	0.000						
SODIUM	10	365.5	551.05	1.508	154	94	69	42	25	15
VANADIUM	10	18.0	11.71	0.651	29	18	13	8	5	3
ZINC	10	37.5	19.07	0.509	18	11	8	5	3	2
Test Group:TRADS Units: pCi/g										
AMERICIUM-241	8	0.1	0.08	1.028	72	44	32	20	12	7
GROSS ALPHA	10	20.4	8.09	0.396	11	7	5	3	2	2
GROSS BETA	10	37.1	4.89	0.132	2	1	1	1	1	1
PLUTONIUM-239/240	7	0.1	0.10	0.760	40	24	18	11	7	4
URANIUM-233,-234	10	0.8	0.15	0.180	3	2	1	1	1	1
URANIUM-235	4	0.1	0.02	0.284	6	4	3	2	1	1
URANIUM-238	10	0.8	0.16	0.193	3	2	2	1	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-65
Laboratory HPGe Vertical Soil Profile Results
for IHSS 150.2

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-66
Laboratory HPGe Vertical Soil Profile Results
for IHSS 150.3

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

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TABLE 3-67
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 150.3
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG005094 SGG0050JE 2/21/95	SG005194 SGG0051JE 2/21/95	SG005294 SGG0052JER 3/21/95
Test Group:GC/MS Units:µg/L					
1,2,4-Trimethylbenzene	1	0		0.05	
1,3,5-Trimethylbenzene	1	0		0.02	
Acetone	2	0		0.2	0.09
Benzene	1	0		0.15	
Chloromethane	2	0		0.03	0.03
Ethylbenzene	1	0		0.02	
Toluene	1	0		0.2	
Trichlorofluoromethane	2	0	0.29		0.06
o-Xylene	1	0		0.01	

Legend A

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TABLE 3-68
Surface Soil Positive Result
OU8 - IHSS 150.3
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS807493 SSG0068JE 12-Dec-94	SS807593 SSG0069JE 12-Dec-94	SS807693 SSG0070JE 12-Dec-94	SS807793 SSG0071JE 12-Dec-94	SS807893 SSG0072JE 12-Dec-94	SS807893 SSG0153JE 12-Dec-94	SS807993 SSG0073JE 12-Dec-94	SS808093 SSG0074JE 12-Dec-94
Test Group:BNACLP Units:µg/kg										
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0	76 J:A-			210 J:A-	360 J:A-	500 :V-	75 J:A-	110 J:A-
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	240 J:A	170 J:A	150 J:A	830 :V	2600 :V	3000 DJ:V	480 :V	700 :V
ACENAPHTHYLENE	330	0.00E 0 / 0.00E 0					58 J:A-			
ANTHRACENE	330	8.23E 7 / 0.00E 0	280 J:A	200 J:A	170 J:A	1300 :V	3000 :V	4000 D:V	740 :V	900 :V
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	340 J:A	300 J:A	290 J:A	3100 DJ:A*	5700 D:V*	9200 D:V*	1400 :V*	1900 :V*
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	340 J:A*	290 J:A*	270 J:A*	3600 D:V*	6300 D:V*	9400 D:V*	1400 :V*	1900 :V*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	380 J:A	330 J:A	310 J:A	4500 D:V*	7600 D:V*	12000 D:V*	1600 :V*	2200 :V*
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	250 J:A-	210 J:A-	150 J:A-	1200 :V-	1900 :V-	2500 :V-	630 :V-	980 :V-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	140 J:A	100 J:A	120 J:A	1400 :V	1800 :V	2400 :V	540 :V	700 :V
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0		43 J:A		85 J:A	98 J:A		51 J:A	100 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	360 J:A	340 J:A	330 J:A	3700 D:V	6400 D:V	11000 D:V	1700 :V	2200 :V
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0	68 J:A	55 J:A	51 J:A	390 J:A*			200 J:A*	320 J:A*
DIBENZOFURAN	330	0.00E 0 / 0.00E 0	92 J:A-	67 J:A-	62 J:A-	430 :V-	930 :V-	1200 :V-	190 J:A-	280 J:A-
FLUORANTHENE	330	1.10E 7 / 0.00E 0	990 :V	860 :V	870 :V	7300 D:V	12000 D:V	24000 D:V	3700 D:V	5100 D:V
FLUORENE	330	1.10E 7 / 0.00E 0	210 J:A	140 J:A	130 J:A	760 :V	2100 :V	2800 :V	410 :V	620 :V
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	270 J:A	220 J:A	180 J:A	1400 :V*	2100 :V*	2800 :V*	760 :V	1100 :V*
NAPHTHALENE	330	1.10E 7 / 0.00E 0	200 J:A	140 J:A	80 J:A	390 J:A	980 :V	1100 :V	180 J:A	310 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0	1100 :V-	890 :V-	900 :V-	6900 D:V-	13000 D:V-	22000 D:V-	3500 D:V-	4900 D:V-
PYRENE	330	8.23E 6 / 0.00E 0	910 :V	820 :V	790 :V	6100 D:V	11000 D:V	26000 D:V	3000 D:V	5700 D:V
Test Group:METADD Units:mg/kg										
LITHIUM	20	5.49E 3 / 15.08E 0	3.9 B:V	4 B:V	4.2 B:V	6.1 B:V	6.2 B:V	5.1 B:V	4.1 B:V	4.8 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	41.3 B:V	44.1 B:V	43.8 B:V	51.4 :V	45.2 :V	43.1 :V	22.3 B:V	33.4 B:V
TIN	40	1.65E 5 / 2.90E 0			2.8 B:V					2.1 B:V
Test Group:SMETCLP Units:mg/kg										
ALUMINUM	40	7.96E 5 / 22999.00E 0	5870 :V	6590 :V	6180 :V	8110 :V	6800 :V	6520 :V	5400 :V	6300 :V
ARSENIC	2	3.66E-1 / 13.75E 0	4.4 :V*	5.3 :V*	4.6 :V*	5.7 :V*	5.5 :V*	5 :V*	4.1 :V*	5.6 :V*
BARIUM	40	1.91E 4 / 176.00E 0	113 :V	123 :V	118 :V	141 :V	126 :V	140 :V	73.1 :V	87.1 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.72 B:V*	.67 B:V*	.68 B:V*	.8 B:V*	.7 B:V*	.65 B:V*	.52 B:V*	.62 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	11700 I:JA#	15900 I:JA#	14300 I:JA#	29600 I:JA#	22600 I:JA#	18600 I:JA#	11100 I:JA#	15600 I:JA#
CHROMIUM	2	0.00E 0 / 22.21E 0	6.6 :JA	7.2 :V	6.6 :JA	8.2 :V	8.7 :V	7.6 :V	6.3 :JA	9.1 :V
COBALT	10	1.65E 4 / 14.22E 0	5.3 B:V	4.7 B:V	6 B:V	5.2 B:V	8.1 B:V	5.4 B:V	4.8 B:V	20.9 :V#
COPPER	5	1.10E 4 / 22.75E 0	12.6 :JA	14.8 :JA	11.3 :JA		12.8 :JA	11.6 :JA		15.3 :JA
IRON	20	0.00E 0 / 23063.00E 0	9600 :V	11000 :V	9620 :V	9250 :V	11100 :V	9740 :V	7580 :V	11200 :V
LEAD	1	0.00E 0 / 73.87E 0	13.3 :JA	13.3 :JA	12.3 :JA	13.6 :JA	17.3 :JA	15.3 :JA	10.8 :JA	12.2 :JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1780 :V	1770 :V	1780 :V	1870 :V	1880 :V	1670 :V	1460 :V	1630 :V
MANGANESE	3	1.36E 3 / 482.10E 0	159 :V	117 :V	159 :V	133 :V	216 :V	172 :V	150 :V	193 :V
MERCURY	0.2	8.23E 1 / 0.19E 0	.07 B:V	.08 B:V	.07 B:V	.07 B:V	.05 B:V			
NICKEL	8	5.49E 3 / 19.74E 0	10.5 :V	9.7 :V	10.7 :V	10.6 :V	12.9 :V	9.9 :V	8.9 :V	11.3 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	880 B:V	839 B:V	889 B:V	1180 :V	1610 :V	1560 :V	1230 :V	1310 :V
SODIUM	2000	0.00E 0 / 119.02E 0								73.5 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	20.8 :V	22.4 :V	20.4 :V	24.2 :V	25 :V	22.3 :V	18.6 :V	21.4 :V
ZINC	4	8.23E 4 / 95.92E 0	70.5 :V	38.1 :V	64 :V	128 :V#	49.8 :V	49.3 :V	23.1 :V	49.8 :V
Test Group:TRADS Units:pCi/g										
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.052(.011) :V#	.028(.01) :V	.29(.029) :V#	.12(.018) :V#	.42(.037) :V#	.31(.03) :V#	2.7(.15) :V*#	1.8(.095) :V#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	10(2.6) :A	13(2.8) :A	14(2.8) :A	14(3.1) :A	15(3) :A	16(3.1) :A	20(3.4) :A	23(3.7) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	22(3.2) :A	21(3) :A	23(3.4) :A	23(3.3) :A	25(3.2) :A	22(3.5) :A	25(3.4) :A	28(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.097(.016) B:V#	.11(.017) B:V#	1.3(.054) B:V#	.095(.016) B:V#	.45(.034) B:V#	.36(.03) B:V#	1.9(.074) B:V#	1.2(.058) B:V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	1(.18) B:V	.81(.15) B:V	.96(.33) B:V	.68(.14) B:V	.75(.16) B:V	.73(.13) B:V	.66(.13) B:V	.88(.16) B:V
URANIUM-235	0	1.73E-1 / 0.13E 0	.073(.049) J:V						.051(.038) J:V	
URANIUM-238	0	8.00E-1 / 2.83E 0	.88(.17) :V*	.96(.16) :V*	.73(.27) :V	.8(.16) :V*	.74(.16) :V	.77(.14) :V	.64(.12) :V	.91(.16) :V*

Legend B

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TABLE 3-69
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.3
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *	Maximum Concentration
Test Group:BNACLP Units:µg/kg								
2-METHYLNAPHTHALENE	330	400	SS807593 (2)	400	SS807593 (2)	75 J:A	SS807993 (1)	500 :V
ACENAPHTHENE	330	**	**	**	**	150 J:A	SS807693 (1)	3000 DJ:V
ACENAPHTHYLENE	330	350	SS808093 (1)	400	SS807493 (4)	58 J:A	SS807893 (1)	58 J:A
ANTHRACENE	330	**	**	**	**	170 J:A	SS807693 (1)	4000 D:V
BENZO(a)ANTHRACENE	330	**	**	**	**	290 J:A	SS807693 (1)	9200 D:V
BENZO(a)PYRENE	330	**	**	**	**	270 J:A	SS807693 (1)	9400 D:V
BENZO(b)FLUORANTHENE	330	**	**	**	**	310 J:A	SS807693 (1)	12000 D:V
BENZO(ghi)PERYLENE	330	**	**	**	**	150 J:A	SS807693 (1)	2500 :V
BENZO(k)FLUORANTHENE	330	**	**	**	**	100 J:A	SS807593 (1)	2400 :V
BIS(2-ETHYLHEXYL)PHTHALATE	330	400	SS807493 (2)	400	SS807493 (2)	43 J:A	SS807593 (1)	100 J:A
CHRYSENE	330	**	**	**	**	330 J:A	SS807693 (1)	11000 D:V
DIBENZO(a,h)ANTHRACENE	330	370	SS807893 (1)	370	SS807893 (1)	51 J:A	SS807693 (1)	390 J:A
DIBENZOFURAN	330	**	**	**	**	62 J:A	SS807693 (1)	1200 :V
FLUORANTHENE	330	**	**	**	**	860 :V	SS807593 (1)	24000 D:V
FLUORENE	330	**	**	**	**	130 J:A	SS807693 (1)	2800 :V
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	180 J:A	SS807693 (1)	2800 :V
NAPHTHALENE	330	**	**	**	**	80 J:A	SS807693 (1)	1100 :V
PHENANTHRENE	330	**	**	**	**	890 :V	SS807593 (1)	22000 D:V
PYRENE	330	**	**	**	**	790 :V	SS807693 (1)	26000 D:V
Test Group:METADD Units:mg/kg								
LITHIUM	100	**	**	**	**	3.9 B:V	SS807493 (1)	6.2 B:V
STRONTIUM	200	**	**	**	**	22.3 B:V	SS807993 (1)	51.4 :V
TIN	200	2.1	SS807893 (2)	2.3	SS807593 (1)	2.1 B:V	SS808093 (1)	2.8 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	200	**	**	**	**	5400 :V	SS807993 (1)	8110 :V
ARSENIC	10	**	**	**	**	4.1 :V	SS807993 (1)	5.7 :V
BARIUM	200	**	**	**	**	73.1 :V	SS807993 (1)	141 :V
BERYLLIUM	5	**	**	**	**	.52 B:V	SS807993 (1)	.8 B:V
CALCIUM	5000	**	**	**	**	11100 I:J	SS807993 (1)	29600 I:J
CHROMIUM	10	**	**	**	**	6.3 :J	SS807993 (1)	9.1 :V
COBALT	50	**	**	**	**	4.7 B:V	SS807593 (1)	20.9 :V
COPPER	25	8.5	SS807993 (1)	11	SS807793 (1)	11.3 :J	SS807693 (1)	15.3 :J
IRON	100	**	**	**	**	7580 :V	SS807993 (1)	11200 :V
LEAD	3	**	**	**	**	10.8 :J	SS807993 (1)	17.3 :J
MAGNESIUM	5000	**	**	**	**	1460 :V	SS807993 (1)	1880 :V
MANGANESE	15	**	**	**	**	117 :V	SS807593 (1)	216 :V
MERCURY	0.2	0.05	SS807993 (2)	0.05	SS807993 (2)	.05 B:V	SS807893 (1)	.08 B:V
NICKEL	40	**	**	**	**	8.9 :V	SS807993 (1)	12.9 :V
POTASSIUM	5000	**	**	**	**	839 B:V	SS807593 (1)	1610 :V
SODIUM	5000	36.5	SS807493 (1)	62.9	SS807793 (1)	73.5 B:V	SS808093 (1)	73.5 B:V
VANADIUM	50	**	**	**	**	18.6 :V	SS807993 (1)	25 :V
ZINC	20	**	**	**	**	23.1 :V	SS807993 (1)	128 :V
Test Group:TRADS Units:pCi/g								
AMERICIUM-241	0.005	**	**	**	**	.028(.01) :V	SS807593 (1)	2.7(.15) :V
GROSS ALPHA	2	**	**	**	**	10(2.6) :A	SS807493 (1)	23(3.7) :A
GROSS BETA	4	**	**	**	**	21(3) :A	SS807593 (1)	28(3.6) :A
PLUTONIUM-239/240	0.005	**	**	**	**	.095(.016) B:V	SS807793 (1)	1.9(.074) B:V
URANIUM-233,-234	0.08	**	**	**	**	.66(.13) B:V	SS807993 (1)	1(.18) B:V
URANIUM-235	0.06	**	**	**	**	.015(.015) U:V	SS807793 (1)	.12(.12) U:V
URANIUM-238	0.05	**	**	**	**	.64(.12) :V	SS807993 (1)	.96(.16) :V

Legend C

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TABLE 3-69
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.3
Rocky Flats Environmental Technology Site

	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg				
2-METHYLNAPHTHALENE	SS807893 (1)	5	7	195.8571
ACENAPHTHENE	SS807893 (1)	7	7	795.7143
ACENAPHTHYLENE	SS807893 (1)	1	7	173.2857
ANTHRACENE	SS807893 (1)	7	7	1084.286
BENZO(a)ANTHRACENE	SS807893 (1)	7	7	2361.428
BENZO(a)PYRENE	SS807893 (1)	7	7	2457.143
BENZO(b)FLUORANTHENE	SS807893 (1)	7	7	3045.714
BENZO(ghi)PERYLENE	SS807893 (1)	7	7	845.7143
BENZO(k)FLUORANTHENE	SS807893 (1)	7	7	771.4286
BIS(2-ETHYLHEXYL)PHTHALATE	SS808093 (1)	5	7	111
CHRYSENE	SS807893 (1)	7	7	2804.286
DIBENZO(a,h)ANTHRACENE	SS807793 (1)	6	7	181.2857
DIBENZOFURAN	SS807893 (1)	7	7	331.5714
FLUORANTHENE	SS807893 (1)	7	7	6117.143
FLUORENE	SS807893 (1)	7	7	724.2857
INDENO(1,2,3-cd)PYRENE	SS807893 (1)	7	7	961.4286
NAPHTHALENE	SS807893 (1)	7	7	342.8571
PHENANTHRENE	SS807893 (1)	7	7	5741.429
PYRENE	SS807893 (1)	7	7	6188.571
Test Group:METADD Units:mg/kg				
LITHIUM	SS807893 (1)	7	7	4.7571
STRONTIUM	SS807793 (1)	7	7	40.2143
TIN	SS807693 (1)	2	7	1.4786
Test Group:SMETCLP Units:mg/kg				
ALUMINUM	SS807793 (1)	7	7	6464.286
ARSENIC	SS807793 (1)	7	7	5.0286
BARIUM	SS807793 (1)	7	7	113.6
BERYLLIUM	SS807793 (1)	7	7	0.6729
CALCIUM	SS807793 (1)	7	7	17257.14
CHROMIUM	SS808093 (1)	7	7	7.5286
COBALT	SS808093 (1)	7	7	7.8571
COPPER	SS808093 (1)	5	7	10.9357
IRON	SS808093 (1)	7	7	9907.143
LEAD	SS807893 (1)	7	7	13.2571
MAGNESIUM	SS807893 (1)	7	7	1738.571
MANGANESE	SS807893 (1)	7	7	161
MERCURY	SS807593 (1)	5	7	0.0557
NICKEL	SS807893 (1)	7	7	10.6571
POTASSIUM	SS807893 (1)	7	7	1134
SODIUM	SS808093 (1)	1	7	31.75
VANADIUM	SS807893 (1)	7	7	21.8286
ZINC	SS807793 (1)	7	7	60.4714
Test Group:TRADS Units:pCi/g				
AMERICIUM-241	SS807993 (1)	8	8	0.715
GROSS ALPHA	SS808093 (1)	8	8	15.625
GROSS BETA	SS808093 (1)	8	8	23.625
PLUTONIUM-239/240	SS807993 (1)	8	8	0.689
URANIUM-233,-234	SS807493 (1)	8	8	0.8087
URANIUM-235	SS807693 (1)	8	8	0.053
URANIUM-238	SS807593 (1)	8	8	0.8037

Legend C

TABLE 3-70
Population Distribution Summary of Surface-Soil Results for IHSS 150.3

Test Group: METADD	Distribution	Comments
Lithium	Lognormal	
Strontium	Normal	
Test Group: SMETCLP		
Aluminum	Normal	
Arsenic	Normal	
Barium	Normal	
Beryllium	ND	All samples estimated at below quantitation limit
Calcium	Normal	
Chromium	Normal	
Cobalt	Nonparametric	
Copper	Normal	
Iron	Normal	
Lead	Normal	
Magnesium	Normal	
Manganese	Normal	
Mercury	ND	All samples estimated at below quantitation limit
Nickel	Normal	
Potassium	Normal	
Silver	ND	No analyses
Sodium	ND	Only one sample analyzed
Vanadium	Normal	
Zinc	Normal	
Test Group:TRADS		
Americium-241	Lognormal	
Gross Alpha	Normal	
Gross Beta	Normal	
Plutonium-239/240	Normal	
Uranium-233,-234	Normal	
Uranium-235	ND	Only two samples analyzed
Uranium-238	Normal	
Test Group:WQPL		
Fluoride	Normal	
Nitrate/Nitrite	Normal	

Legend D

TABLE 3-71
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.3

	Preliminary Remed. Goals	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	5490	7	4.8	0.99	0.209	0.710	0.950	0.999+
STRONTIUM	165,000	7	40.2	9.54	0.237	0.610	0.890	0.999+
TIN	165,000	2	2.5	0.49	0.202	0.180	0.250	0.350
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796,000	7	6464.3	859.32	0.133	0.967	0.999+	0.999+
ARSENIC	0.366	7	5.0	0.65	0.129	0.972	0.999+	0.999+
BARIUM	19,100	7	113.6	25.49	0.224	0.670	0.925	0.999+
BERYLLIUM	1,370	7	0.7	0.09	0.129	0.972	0.999+	0.999+
CALCIUM	Not Determined	7	17257.1	6620.89	0.384	0.360	0.580	0.915
CHROMIUM	274,000	7	7.5	1.13	0.150	0.925	0.999	0.999+
COBALT	16,500	7	7.9	5.87	0.747	0.150	0.220	0.430
COPPER	11,000	5	13.4	1.66	0.124	0.900	0.996	0.999+
IRON	Not Determined	7	9907.1	1311.04	0.132	0.970	0.999+	0.999+
LEAD	Not Determined	7	13.3	2.02	0.153	0.925	0.997	0.999+
MAGNESIUM	Not Determined	7	1738.6	147.81	0.085	0.999+	0.999+	0.999+
MANGANESE	1,360	7	161.0	33.91	0.211	0.720	0.950	0.999+
MERCURY	82.3	5	0.1	0.01	0.161	0.720	0.960	0.999+
NICKEL	5,490	7	10.7	1.26	0.118	0.989	0.999+	0.999+
POTASSIUM	Not Determined	7	1134.0	282.98	0.250	0.580	0.880	0.998
SODIUM	Not Determined	1	73.5					
VANADIUM	1,920	7	21.8	2.23	0.102	0.998	0.999+	0.999+
ZINC	82,300	7	60.5	33.66	0.557	0.210	0.340	0.670
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	2.37	7	0.773	1.05	1.360	0.090	0.130	0.190
GROSS ALPHA	Not Determined	7	15.7	4.42	0.282	0.470	0.790	0.992
GROSS BETA	Not Determined	7	23.9	2.34	0.098	0.999	0.999+	0.999+
PLUTONIUM-239/240	3.42	7	0.736	0.73	0.989	0.115	0.170	0.330
URANIUM-233,-234	44.7	7	0.820	0.13	0.162	0.890	0.995	0.999+
URANIUM-235	0.173	2	0.062	0.02	0.251	0.140	0.200	0.330
URANIUM-238	0.80	6	0.797	0.11	0.141	0.890	0.996	0.999+

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-72
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 150.3

	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
					(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg										
LITHIUM	7	4.8	0.99	0.209	3	2	2	1	1	1
STRONTIUM	7	40.2	9.54	0.237	4	3	2	2	1	1
TIN	2	2.5	0.49	0.202	3	2	2	1	1	1
Test Group:SMETCLP Units: mg/kg										
ALUMINUM	7	6464.3	859.32	0.133	2	1	1	1	1	1
ARSENIC	7	5.0	0.65	0.129	2	1	1	1	1	1
BARIUM	7	113.6	25.49	0.224	4	3	2	1	1	1
BERYLLIUM	7	0.7	0.09	0.129	2	1	1	1	1	1
CALCIUM	7	17257.1	6620.89	0.384	10	7	5	3	2	1
CHROMIUM	7	7.5	1.13	0.150	2	1	1	1	1	1
COBALT	7	7.9	5.87	0.747	38	23	17	11	7	4
COPPER	5	13.4	1.66	0.124	2	1	1	1	1	1
IRON	7	9907.1	1311.04	0.132	2	1	1	1	1	1
LEAD	7	13.3	2.02	0.153	2	1	1	1	1	1
MAGNESIUM	7	1738.6	147.81	0.085	1	1	1	1	1	1
MANGANESE	7	161.0	33.91	0.211	4	2	2	1	1	1
MERCURY	5	0.1	0.01	0.161	2	2	1	1	1	1
NICKEL	7	10.7	1.26	0.118	1	1	1	1	1	1
POTASSIUM	7	1134.0	282.98	0.250	5	3	2	2	1	1
SODIUM	1	73.5	0.00	0.000	0	0	0	0	0	0
VANADIUM	7	21.8	2.23	0.102	1	1	1	1	1	1
ZINC	7	60.5	33.66	0.557	21	13	10	6	4	3
Test Group:TRADS Units: pCi/g										
AMERICIUM-241	7	0.8	1.05	1.360	126	76	56	34	21	13
GROSS ALPHA	7	15.7	4.42	0.282	6	4	3	2	1	1
GROSS BETA	7	23.9	2.34	0.098	1	1	1	1	1	1
PLUTONIUM-239/240	7	0.7	0.73	0.989	67	41	30	18	11	7
URANIUM-233,-234	7	0.8	0.13	0.162	2	2	1	1	1	1
URANIUM-235	2	0.1	0.02	0.251	5	3	2	2	1	1
URANIUM-238	6	0.8	0.11	0.141	2	1	1	1	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-73
Surface Soil Positive Results
OU8 - IHSS 150.4
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1] / BKGND[2]	SS808193 SSG0075JE 18-Nov-94	SS808293 SSG0076JE 18-Nov-94	SS808393 SSG0077JE 18-Nov-94	SS808393 SSG0137JE 18-Nov-94	SS808493 SSG0078JE 18-Nov-94	SS808593 SSG0079JE 18-Nov-94
Test Group:BNACLP Units:µg/kg								
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0			38 J:A		92 J:A	
BENZOIC ACID	1600	1.00E 9 / 0.00E 0						77 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	91 J:A		44 J:A	49 J:A	87 J:A	43 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0			41 J:A		110 J:A	
FLUORANTHENE	330	1.10E 7 / 0.00E 0			75 J:A		170 J:A	
PHENANTHRENE	330	0.00E 0 / 0.00E 0			58 J:A-		140 J:A-	
Test Group:METADD Units:mg/kg								
LITHIUM	20	5.49E 3 / 15.08E 0	5.2 B:V	7.2 B:V	6.4 B:V	6 B:V	6.5 B:V	6.1 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	2.4 B:V	4.9 B:V	10.7 B:V	10.3 B:V	12 B:V	7.8 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	3280 :V	4970 :V	6440 :V	5570 :V	7310 :V	4980 :V
ARSENIC	2	3.66E-1 / 13.75E 0	.68 B:V*	1.6 B:V*	2.5 :V*	1.6 B:V*	2.4 B:V*	1.4 B:V*
BARIUM	40	1.91E 4 / 176.00E 0	19.3 B:V	47.1 :V	50.9 :V	53.4 :V	52.8 :V	49.2 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.11 B:V	.19 B:V*	.3 B:V*	.24 B:V*	.33 B:V*	.2 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	685 B:V	1030 :V	4960 :V	3350 :V	3000 :V	1150 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	5.8 :V	8.1 :V	8.2 :V	8.1 :V	8.4 :V	7.9 :V
COBALT	10	1.65E 4 / 14.22E 0	4.7 B:V	4.6 B:V	4.1 B:V	4.3 B:V	5.6 B:V	5.7 B:V
COPPER	5	1.10E 4 / 22.75E 0	12.5 :JA	12.5 :JA	13.7 :JA	13.8 :JA	17.8 :JA	13.9 :JA
IRON	20	0.00E 0 / 23063.00E 0	6110 :V	8620 :V	9900 :V	9710 :V	10800 :V	8520 :V
LEAD	1	0.00E 0 / 73.87E 0	6.7 :V	9.8 :V	9 :V	8.5 :V	8.9 :V	7.6 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1570 :V	2020 :V	2100 :V	2090 :V	2340 :V	1980 :V
MANGANESE	3	1.36E 3 / 482.10E 0	112 :V	148 :V	159 :V	158 :V	176 :V	145 :V
NICKEL	8	5.49E 3 / 19.74E 0	4.7 B:V	5.8 B:V	7.1 B:V	5.8 B:V	7.1 B:V	5.4 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1630 :V	2020 :V	2950 :V	2650 :V	3100 :V	1670 :V
SODIUM	2000	0.00E 0 / 119.02E 0	231 B:V#	292 B:V#	718 B:V#	593 B:V#	872 B:V#	206 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	10.1 B:V	13.7 :V	17.7 :V	16.8 :V	22 :V	13.4 :V
ZINC	4	8.23E 4 / 95.92E 0	64.8 :V	26.9 :V	36.1 :V	43.4 :V	57 :V	24.7 :V
Test Group:TRADS Units:pCi/g								
GROSS ALPHA	0	0.00E 0 / 44.56E 0	38(5.1) :A	19(3.6) :A	25(4.1) :A	30(4.4) :A	20(3.9) :A	18(3.7) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	52(4.2) :A	37(3.6) :A	37(3.7) :A	34(3.8) :A	34(3.6) :A	41(3.7) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.027(.008) J:Y		.026(.008) J:Y	.019(.008) J:Y	.053(.011) :Y	.006(.005) J:Y
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	3.3(.44) :Y	.68(.18) :Y	.74(.17) :Y	.91(.19) :Y	.71(.17) :Y	1(.21) :Y
URANIUM-235	0	1.73E-1 / 0.13E 0	.15(.088) J:Y#					
URANIUM-238	0	8.00E-1 / 2.83E 0	3.5(.46) :Y*#	.69(.18) :Y	.95(.19) :Y*	1(.21) :Y*	.79(.17) :Y	1(.21) :Y*

Legend B

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TABLE 3-74
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.4
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BENZO(a)ANTHRACENE	330	350	SS808293 (2)	360	SS808193 (1)	38 J:A	SS808393 (1)
BENZOIC ACID	1600	1700	SS808193 (2)	2000	SS808493 (1)	77 J:A	SS808593 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	350	SS808293 (1)	350	SS808293 (1)	43 J:A	SS808593 (1)
CHRYSENE	330	350	SS808293 (2)	360	SS808193 (1)	41 J:A	SS808393 (1)
FLUORANTHENE	330	350	SS808293 (2)	360	SS808193 (1)	75 J:A	SS808393 (1)
PHENANTHRENE	330	350	SS808293 (2)	360	SS808193 (1)	58 J:A	SS808393 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	5.2 B:V	SS808193 (1)
STRONTIUM	200	**	**	**	**	2.4 B:V	SS808193 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	3280 :V	SS808193 (1)
ARSENIC	10	**	**	**	**	.68 B:V	SS808193 (1)
BARIUM	200	**	**	**	**	19.3 B:V	SS808193 (1)
BERYLLIUM	5	**	**	**	**	.11 B:V	SS808193 (1)
CALCIUM	5000	**	**	**	**	685 B:V	SS808193 (1)
CHROMIUM	10	**	**	**	**	5.8 :V	SS808193 (1)
COBALT	50	**	**	**	**	4.3 B:V	SS808393 (1)
COPPER	25	**	**	**	**	12.5 :J	SS808193 (2)
IRON	100	**	**	**	**	6110 :V	SS808193 (1)
LEAD	3	**	**	**	**	6.7 :V	SS808193 (1)
MAGNESIUM	5000	**	**	**	**	1570 :V	SS808193 (1)
MANGANESE	15	**	**	**	**	112 :V	SS808193 (1)
NICKEL	40	**	**	**	**	4.7 B:V	SS808193 (1)
POTASSIUM	5000	**	**	**	**	1630 :V	SS808193 (1)
SODIUM	5000	**	**	**	**	206 B:V	SS808593 (1)
VANADIUM	50	**	**	**	**	10.1 B:V	SS808193 (1)
ZINC	20	**	**	**	**	24.7 :V	SS808593 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.009	**	**	**	**	.001(.006) U:Y	SS808293 (1)
GROSS ALPHA	3	**	**	**	**	18(3.7) :A	SS808593 (1)
GROSS BETA	4	**	**	**	**	34(3.8) :A	SS808393 (2)
PLUTONIUM-239/240	0.006	**	**	**	**	-.002(.003) U:Y	SS808293 (1)
URANIUM-233,-234	0.07	**	**	**	**	.68(.18) :Y	SS808293 (1)
URANIUM-235	0.08	**	**	**	**	.031(.042) U:Y	SS808393 (2)
URANIUM-238	0.07	**	**	**	**	.69(.18) :Y	SS808293 (1)

Legend C

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TABLE 3-74
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.4
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BENZO(a)ANTHRACENE	92 J:A	SS808493 (1)	2	5	132
BENZOIC ACID	77 J:A	SS808593 (1)	1	5	735.4
BIS(2-ETHYLHEXYL)PHTHALATE	91 J:A	SS808193 (1)	4	5	89
CHRYSENE	110 J:A	SS808493 (1)	2	5	136.2
FLUORANTHENE	170 J:A	SS808493 (1)	2	5	155
PHENANTHRENE	140 J:A	SS808493 (1)	2	5	145.6
Test Group:METADD Units:mg/kg					
LITHIUM	7.2 B:V	SS808293 (1)	5	5	6.28
STRONTIUM	12 B:V	SS808493 (1)	5	5	7.56
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	7310 :V	SS808493 (1)	5	5	5396
ARSENIC	2.5 :V	SS808393 (1)	5	5	1.716
BARIUM	53.4 :V	SS808393 (1)	5	5	44.36
BERYLLIUM	.33 B:V	SS808493 (1)	5	5	0.226
CALCIUM	4960 :V	SS808393 (1)	5	5	2165
CHROMIUM	8.4 :V	SS808493 (1)	5	5	7.68
COBALT	5.7 B:V	SS808593 (1)	5	5	4.98
COPPER	17.8 :J	SS808493 (1)	5	5	14.1
IRON	10800 :V	SS808493 (1)	5	5	8790
LEAD	9.8 :V	SS808293 (1)	5	5	8.4
MAGNESIUM	2340 :V	SS808493 (1)	5	5	2002
MANGANESE	176 :V	SS808493 (1)	5	5	148
NICKEL	7.1 B:V	SS808393 (2)	5	5	6.02
POTASSIUM	3100 :V	SS808493 (1)	5	5	2274
SODIUM	872 B:V	SS808493 (1)	5	5	463.8
VANADIUM	22 :V	SS808493 (1)	5	5	15.38
ZINC	64.8 :V	SS808193 (1)	5	5	43.36
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.007(.007) U:Y	SS808493 (1)	6	6	0.0045
GROSS ALPHA	38(5.1) :A	SS808193 (1)	6	6	25
GROSS BETA	52(4.2) :A	SS808193 (1)	6	6	39.1667
PLUTONIUM-239/240	.053(.011) :Y	SS808493 (1)	6	6	0.0215
URANIUM-233,-234	3.3(.44) :Y	SS808193 (1)	6	6	1.2233
URANIUM-235	.15(.088) J:Y	SS808193 (1)	6	6	0.0667
URANIUM-238	3.5(.46) :Y	SS808193 (1)	6	6	1.3217

Legend C

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TABLE 3-75
Population Distribution Summary of Surface-Soil Results
for IHSS 150.4

Test Group:METADD		
LITHIUM	Normal	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Normal	
BARIUM	Nonparametric	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Normal	
CHROMIUM	Nonparametric	
COBALT	Normal	
COPPER	Normal	
IRON	Normal	
LEAD	Normal	
MAGNESIUM	Normal	
MANGANESE	Normal	
NICKEL	Normal	
POTASSIUM	Normal	
SODIUM	ND	All results less than detection limit.
VANADIUM	Normal	
ZINC	Normal	
Test Group:TRADS		
GROSS ALPHA	Normal	
GROSS BETA	Normal	
PLUTONIUM-239,-240	Normal	
URANIUM-233,-234	Lognormal	
URANIUM-238	Nonparametric	

Legend D

TABLE 3-76
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 150.4

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:BNACLP Units: µg/kg								
BENZO(a)ANTHRACENE	877	2	65.0	38.18	0.587	0.950	0.160	0.250
BENZOIC ACID	None	1	77.0	0.00	0.000	0.000	0.000	0.000
BIS(2-ETHYLHEXYL)PHTHALATE	45700	4	67.5	25.00	0.370	0.190	0.330	0.670
CHRYSENE	87700	2	75.5	48.79	0.646	0.750	0.100	0.135
FLUORANTHENE	11 E+06	2	122.5	67.18	0.548	0.850	0.110	0.160
PHENANTHRENE	None	2	99.0	57.98	0.586	0.800	0.105	0.150
Test Group:METADD Units: mg/kg								
LITHIUM	5490	5	6.3	0.73	0.116	0.925	0.998	0.999+
STRONTIUM	165000	5	7.6	3.98	0.526	0.175	0.270	0.540
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796000	5	5396.0	1548.01	0.287	0.380	0.590	0.935
ARSENIC	0.366	5	1.7	0.75	0.439	0.200	0.340	0.600
BARIUM	19100	5	44.4	14.25	0.321	0.310	0.530	0.865
BERYLLIUM	0.149	5	0.2	0.09	0.394	0.230	0.400	0.740
CALCIUM	None	5	2165.0	1804.03	0.833	0.105	0.160	0.280
CHROMIUM	274000	5	7.7	1.07	0.139	0.840	0.986	0.999+
COBALT	16500	5	5.0	0.63	0.127	0.890	0.995	0.999+
COPPER	11000	5	14.1	2.18	0.154	0.770	0.957	0.999+
IRON	None	5	8790.0	1771.75	0.202	0.560	0.850	0.997
LEAD	None	5	8.4	1.23	0.147	0.790	0.980	0.999+
MAGNESIUM	None	5	2002.0	278.96	0.139	0.840	0.984	0.999+
MANGANESE	1360	5	148.0	23.51	0.159	0.740	0.960	0.999+
NICKEL	5490	5	6.0	1.06	0.176	0.680	0.915	0.999+
POTASSIUM	None	5	2274.0	704.15	0.310	0.320	0.550	0.900
SODIUM	None	5	463.8	308.79	0.666	0.140	0.200	0.915
VANADIUM	1920	5	15.4	4.58	0.298	0.340	0.580	0.925
ZINC	82300	5	43.4	17.78	0.410	0.200	0.370	0.710
Test Group:TRADS Units: pCi/g								
GROSS ALPHA	None	5	25.0	8.72	0.349	0.270	0.460	0.840
GROSS BETA	None	5	40.2	7.05	0.175	0.680	0.915	0.999+
PLUTONIUM-239/240	3.43	4	0.0	0.02	0.688	0.120	0.150	0.280
URANIUM-233,-234	45.3	5	1.3	1.11	0.845	0.115	0.160	0.280
URANIUM-235	0.173	1	0.2	0.00	0.000	0.000	0.000	0.000
URANIUM-238	0.8	5	1.4	1.18	0.848	0.115	0.160	0.280

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-77
Required Number of Samples for Specified Confidence and Difference in Means for Surface-Soil Results for IHSS 150.4

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:BNACLP Units: µg/kg											
BENZO(a)ANTHRACENE	877	2	65.0	38.18	0.587	24	15	11	7	4	3
BENZOIC ACID	None	1	77.0	0.00	0.000	0	0	0	0	0	0
BIS(2-ETHYLHEXYL)PHTHALATE	45700	4	67.5	25.00	0.370	10	6	5	3	2	1
CHRYSENE	87700	2	75.5	48.79	0.646	29	18	13	8	5	3
FLUORANTHENE	11 E+06	2	122.5	67.18	0.548	21	13	10	6	4	2
PHENANTHRENE	None	2	99.0	57.98	0.586	24	15	11	7	4	3
Test Group:METADD Units: mg/kg											
LITHIUM	5490	5	6.3	0.73	0.116	1	1	1	1	1	1
STRONTIUM	165000	5	7.6	3.98	0.526	19	12	9	6	3	2
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	5	5396.0	1548.01	0.287	6	4	3	2	1	1
ARSENIC	0.366	5	1.7	0.75	0.439	14	8	6	4	3	2
BARIUM	19100	5	44.4	14.25	0.321	7	5	4	2	2	1
BERYLLIUM	0.149	5	0.2	0.09	0.394	11	7	5	3	2	2
CALCIUM	None	5	2165.0	1804.03	0.833	47	29	21	13	8	5
CHROMIUM	274000	5	7.7	1.07	0.139	2	1	1	1	1	1
COBALT	16500	5	5.0	0.63	0.127	2	1	1	1	1	1
COPPER	11000	5	14.1	2.18	0.154	2	1	1	1	1	1
IRON	None	5	8790.0	1771.75	0.202	3	2	2	1	1	1
LEAD	None	5	8.4	1.23	0.147	2	1	1	1	1	1
MAGNESIUM	None	5	2002.0	278.96	0.139	2	1	1	1	1	1
MANGANESE	1360	5	148.0	23.51	0.159	2	2	1	1	1	1
NICKEL	5490	5	6.0	1.06	0.176	3	2	1	1	1	1
POTASSIUM	None	5	2274.0	704.15	0.310	7	4	3	2	2	1
SODIUM	None	5	463.8	308.79	0.666	30	19	14	9	5	3
VANADIUM	1920	5	15.4	4.58	0.298	6	4	3	2	1	1
ZINC	82300	5	43.4	17.78	0.410	12	7	6	4	2	2
Test Group:TRADS Units: pCi/g											
GROSS ALPHA	None	5	25.0	8.72	0.349	9	5	4	3	2	1
GROSS BETA	None	5	40.2	7.05	0.175	3	2	1	1	1	1
PLUTONIUM-239/240	3.43	4	0.0	0.02	0.688	33	20	15	9	6	4
URANIUM-233,-234	45.3	5	1.3	1.11	0.845	49	30	22	14	8	5
URANIUM-235	0.173	1	0.2	0.00	0.000	0	0	0	0	0	0
URANIUM-238	0.8	5	1.4	1.18	0.848	49	30	22	14	8	5

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-78
Laboratory HPGe Vertical Soil Profile Results
for IHSSs 150.6 and 150.8

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-79
Analytical Results for Asphalt Samples for IHSS 150.6 and 150.8
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled: Date Received:			SS808793 ASG0161JE 21-Nov-94 29-Nov-94	SS809193 ASG0162JE 21-Nov-94 29-Nov-94	SS809493 ASG0163JE 21-Nov-94 29-Nov-94
Test Group:TRADS Units: pCi/g	MDL	PRG/ BKGND	IHSS 150.6/150.8	IHSS 150.6/150.8	IHSS 150.6/150.8
AMERICIUM-241	0	2.37E 0 / 0.04E 0	0.012 (0.009)	0.008 (0.007)	0.013 (0.009)
CESIUM-134	0	0.00E 0 / 0.00E 0	<0.06	<0.05	<0.05
CESIUM-137	0	2.83E 1 / 3.68E 0	<0.06	<0.05	<0.07
PLUTONIUM-239+240	0	3.43E 0 / 0.08E 0	0.010 (0.008)	0.007(0.007)	0.006 (0.006)
PLUTONIUM-238	0	0.00E 0 / 0.00E 0	0.008 (0.007)	0.005 (0.006)	0.005 (0.006)
STRONTIUM-89	0	6.64E 1 / 22.39E -1	0.46 (0.22)	0.28 (0.21)	0.14 (0.21)
STRONTIUM-90	0	2.20E 1 / 22.39E -1	0.05 (0.30)	-0.04 (0.32)	-0.03 (0.33)
URANIUM-238	0	8.00E-1 / 2.83E 0	1.01 (0.21)*	0.99 (0.21)*	1.13 (0.24)*
URANIUM-235	0	1.73E -1/ 19.83E -2	0.09 (0.05)	0.06 (0.04)	0.05 (0.04)
URANIUM-234	0	4.53E 1/ 0.00E 0	1.10 (0.22)	0.98 (0.21)	1.09 (1.09)

Legend B

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TABLE 3-80
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSSs 150.6 and 150.8
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG005894 SGG0058JE 12/13/94	SG005894 SGG0058JE* 12/13/94	SG005894 SGG0058JE** 12/13/94	SG006094 SGG0060JE 12/13/94	SG006094 SGG0060JE* 12/13/94	SG006094 SGG0060JE** 12/13/94
Test Group:GC/MS Units:µg/L								
1,1-Dichloroethane	4	0	0.35	0.54		0.21	0.39	
1,1-Dichloroethene	2	0	0.1			0.12		
1,2,4-Trimethylbenzene	3	0	0.01			0.1	0.31	
1,3,5-Trimethylbenzene	1	0				0.03		
Benzene	4	0	0.33	0.38		0.25	0.43	
Carbon Disulfide	1	0				0.05		
Carbon Tetrachloride	2	0	0.04				0.38	
Chloromethane	2	0	0.1			0.05		
Dichlorodifluoromethane	3	2	19 J @	< .4	< 3.8	0.53	2.1	< 3.8
Ethylbenzene	2	0				0.03	0.15	
Naphthalene	2	0	0.05			0.08		
Toluene	1	0				0.16		
Total Xylenes	2	0				0.13	0.67	
Trichloroethene	4	2	0.17	0.47		1.1 @	1.8	< 2.9
Trichlorofluoromethane	3	2	5 J @	< .5	< 4.8	0.83	80 J	< 4.8
Vinyl Chloride	4	4	2.4 @	4.4	< 6.7	3.6 @	8.7	< 6.7
cis-1,2-dichloroethene	5	3	0.54	0.8		4.3 J	7 @	4.7
m & p-Xylenes	2	0				0.09	0.49	
n-Propylbenzene	1	0				0.02		
o-Xylene	3	0	0.01			0.04	0.18	
trans-1,2-Dichloroethene	1	0				0.27		

Legend A

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TABLE 3-81
Surface Soil Positive Results
OU8 - IHSSs 150.6 and 150.8
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS808693 SSG0080JE 9-Nov-94	SS808793 SSG0081JE 21-Nov-94	SS808893 SSG0082JE 9-Nov-94	SS808993 SSG0083JE 9-Nov-94	SS809093 SSG0084JE 8-Nov-94	SS809193 SSG0085JE 21-Nov-94
Test Group:BNACLP Units:µg/kg								
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0			62 J:A	120 J:A		
BUTYL BENZYL PHTHALATE	330	5.49E 7 / 0.00E 0						
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0						
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0						
FLUORANTHENE	330	1.10E 7 / 0.00E 0			39 J:A	38 J:A		
PHENANTHRENE	330	0.00E 0 / 0.00E 0						
PYRENE	330	8.23E 6 / 0.00E 0						
Test Group:METADD Units:mg/kg								
LITHIUM	20	5.49E 3 / 15.08E 0	1.8 B:V	5 B:V	9.4 B:V	2.1 B:V	8.7 B:V	6.2 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	10 B:V	17.8 B:V	50.7 :V	13.3 B:V	10.3 B:JA	18.6 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	1880 :V	4190 :V	6730 :V	2060 :V	8000 :V	4910 :V
ANTIMONY	12	1.10E 2 / 0.47E 0	2.8 B:JA#				2.6 B:JA#	
ARSENIC	2	3.66E-1 / 13.75E 0	5.1 :V*	2.4 :JA*	2.5 :V*	5.5 :V*	1.1 B:V*	.81 B:JA*
BARIUM	40	1.91E 4 / 176.00E 0	38.6 B:V	27.8 B:V	50.6 :V	40.1 B:V	73.8 :V	52 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0		.15 B:JA*				.19 B:JA*
CADMIUM	1	1.37E 2 / 2.34E 0			1.2 :V	.41 B:V		
CALCIUM	1000	0.00E 0 / 5839.00E 0	1020 B:JA	3750 :V	10300 I:JA#	1160 I:JA	6060 I:JA#	1940 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	4.6 :V	7.7 :V	11.3 :V	6.4 :V	6.6 :JA	10.7 :V
COBALT	10	1.65E 4 / 14.22E 0	1.6 B:V	5.5 B:V	5.7 B:V	1.9 B:V	9.6 B:V	9.8 B:V
COPPER	5	1.10E 4 / 22.75E 0	13.4 :JA	19.4 :V	106 :V#	18 :V	34.5 :V#	20.5 :V
IRON	20	0.00E 0 / 23063.00E 0	3230 :V	8680 :JA	16100 :V	4590 :V	20900 :V	10500 :JA
LEAD	1	0.00E 0 / 73.87E 0	5.1 :V	7.6 :V	42.2 :V	25.3 :V	6 :JA	5.1 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	532 B:V	2450 :V	5880 :V#	798 B:V	5330 :V#	2610 :V
MANGANESE	3	1.36E 3 / 482.10E 0	49.3 :V	169 :JA	296 :V	67.5 :V	468 :V	172 :JA
NICKEL	8	5.49E 3 / 19.74E 0	3 B:V	7.1 B:V	14.2 :V	4.7 B:V	3.2 B:JA	6.2 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	557 B:V	1010 B:V	1230 :V	714 B:V	3620 :V	1710 :V
SILVER	2	1.37E 3 / 0.22E 0		.69 B:V#	1.2 B:V#		1.9 B:V#	1.1 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0	129 B:V#	280 B:V#	1010 B:V#	255 B:V#	267 B:JA#	229 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	8.9 B:V	16.6 :V	22 :V	15.8 :V	23.3 :V	18.4 :V
ZINC	4	8.23E 4 / 95.92E 0	28.2 :V	59.1 :JA	58.4 :V	42.2 :V	77.6 :V	30.7 :JA
Test Group:TRADS Units:pCi/g								
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.014(.009) J:V	.2(.029) :Y#	.4(.05) :V#			
GROSS ALPHA	0	0.00E 0 / 44.56E 0	8.2(2.2) :A	16(3.7) :A	23(3.8) :A	12(2.7) :A	6.9(2.2) :A	20(3.8) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	28(3.4) :A	34(3.7) :A	29(3.5) :A	30(3.4) :A	15(3.2) :A	36(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.023(.01) J:V	1.3(.062) :Y#	2.6(.12) :V#	.031(.012) :V		
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.61(.16) :V	.87(.2) :Y	.64(.16) :V	.49(.13) :V	.35(.12) :V	.81(.2) :Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.61(.15) :V	.93(.2) :Y*	.71(.17) :V	.68(.15) :V	.3(.1) :V	.6(.16) :Y

Legend B

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TABLE 3-81
Surface Soil Positive Results
OU8 - IHSSs 150.6 and 150.8
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS809293 SSG0086JE 21-Nov-94	SS809393 SSG0087JE 9-Nov-94	SS809393 SSG0130JE 9-Nov-94	SS809493 SSG0088JE 21-Nov-94	SS809593 SSG0089JE 9-Nov-94
Test Group:BNACLP Units:µg/kg							
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0					76 J:A
BUTYL BENZYL PHTHALATE	330	5.49E 7 / 0.00E 0	760 B:V				
DI-n-BUTYL PHTHALATE	330	2.74E 7 / 0.00E 0					150 J:A
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0		44 J:A			
FLUORANTHENE	330	1.10E 7 / 0.00E 0					65 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0					45 J:A-
PYRENE	330	8.23E 6 / 0.00E 0					57 J:A
Test Group:METADD Units:mg/kg							
LITHIUM	20	5.49E 3 / 15.08E 0	5 B:V	5.8 B:V	6 B:V	6 B:V	6.8 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	33.9 B:V	12.1 B:V	10.8 B:V	13.7 B:V	9.8 B:V
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	40	7.96E 5 / 22999.00E 0	3270 :V	4640 :V	4320 :V	4020 :V	4180 :V
ANTIMONY	12	1.10E 2 / 0.47E 0					
ARSENIC	2	3.66E-1 / 13.75E 0	2.1 B:JA*	2.1 :V*	1.2 B:V*	1.4 B:JA*	1.1 B:V*
BARIUM	40	1.91E 4 / 176.00E 0	43.7 :V	55.9 :V	51 :V	45.4 :V	42.7 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.22 B:JA*			.15 B:JA*	
CADMIUM	1	1.37E 2 / 2.34E 0	2.9 :V#				
CALCIUM	1000	0.00E 0 / 5839.00E 0	11100 :V#	2250 I:JA	1780 I:JA	1820 :V	2040 I:JA
CHROMIUM	2	0.00E 0 / 22.21E 0	6.5 :V	11.2 :V	10.9 :V	9 :V	15.1 :V
COBALT	10	1.65E 4 / 14.22E 0	2.5 B:V	8 B:V	7 B:V	7.3 B:V	6.9 B:V
COPPER	5	1.10E 4 / 22.75E 0	11.1 :V	18.4 :V	18.1 :V	14.7 :V	17.6 :V
IRON	20	0.00E 0 / 23063.00E 0	7460 :JA	11600 :V	10900 :V	14100 :JA	9750 :V
LEAD	1	0.00E 0 / 73.87E 0	32.2 :V	6.2 :V	5.4 :V	5.4 :V	9.4 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2170 :V	2780 :V	2470 :V	2200 :V	2210 :V
MANGANESE	3	1.36E 3 / 482.10E 0	146 :JA	160 :V	141 :V	197 :JA	91.1 :V
NICKEL	8	5.49E 3 / 19.74E 0	5.6 B:V	6.4 B:V	7.1 B:V	13.6 :V	7.7 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	812 B:V	1660 :V	1460 :V	1270 :V	1360 :V
SILVER	2	1.37E 3 / 0.22E 0	.71 B:V#	1.4 B:V#	1.7 B:V#	1.1 B:V#	.96 B:V#
SODIUM	2000	0.00E 0 / 119.02E 0		94.5 B:V	81.4 B:V		83 B:V
VANADIUM	10	1.92E 3 / 61.84E 0	11.8 :V	21.2 :V	18.8 :V	19.1 :V	17.6 :V
ZINC	4	8.23E 4 / 95.92E 0	544 :JA#	25.7 :V	25.1 :V	33.8 :JA	42.5 :V
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.25(.035) :Y#				.057(.019) :V#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	13(2.9) :A	25(4.1) :A	24(3.8) :A	23(4.1) :A	25(4) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	29(3.5) :A	37(3.8) :A	34(3.7) :A	35(3.7) :A	33(3.6) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	1.7(.077) :Y#	.007(.006) J:V	.014(.008) J:V	.013(.005) J:Y	.28(.033) :V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.6(.15) :Y	.89(.19) :V	.92(.19) :V	.92(.2) :Y	.93(.19) :V
URANIUM-238	0	8.00E-1 / 2.83E 0	.55(.15) :Y	1(.2) :V*	.81(.17) :V*	1.1(.21) :Y*	.92(.19) :V*

Legend B

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TABLE 3-82
Surface Soil Positive Results Data Summary
OU8 - IHSSs 150.6 and 150.8
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BIS(2-ETHYLHEXYL)PHTHALATE	330	350	SS808793 (4)	370	SS809293 (1)	62 J:A	SS808893 (1)
BUTYL BENZYL PHTHALATE	330	350	SS808793 (5)	360	SS808693 (4)	760 B:V	SS809293 (1)
DI-n-BUTYL PHTHALATE	330	350	SS808793 (4)	370	SS809293 (1)	150 J:A	SS809593 (1)
DI-n-OCTYL PHTHALATE	330	350	SS808793 (4)	370	SS809293 (1)	44 J:A	SS809393 (1)
FLUORANTHENE	330	350	SS808793 (4)	370	SS809293 (1)	38 J:A	SS808993 (1)
PHENANTHRENE	330	350	SS808793 (4)	370	SS809293 (1)	45 J:A	SS809593 (1)
PYRENE	330	350	SS808793 (4)	370	SS809293 (1)	57 J:A	SS809593 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	1.8 B:V	SS808693 (1)
STRONTIUM	200	**	**	**	**	9.8 B:V	SS809593 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	1880 :V	SS808693 (1)
ANTIMONY	60	2.3	SS808793 (4)	2.4	SS808893 (4)	2.6 B:J	SS809093 (1)
ARSENIC	10	**	**	**	**	.81 B:J	SS809193 (1)
BARIUM	200	**	**	**	**	27.8 B:V	SS808793 (1)
BERYLLIUM	5	0.11	SS808693 (1)	0.34	SS809093 (1)	.15 B:J	SS808793 (2)
CADMIUM	5	0.28	SS809393 (2)	0.3	SS809093 (1)	.41 B:V	SS808993 (1)
CALCIUM	5000	**	**	**	**	1020 B:J	SS808693 (1)
CHROMIUM	10	**	**	**	**	4.6 :V	SS808693 (1)
COBALT	50	**	**	**	**	1.6 B:V	SS808693 (1)
COPPER	25	**	**	**	**	11.1 :V	SS809293 (1)
IRON	100	**	**	**	**	3230 :V	SS808693 (1)
LEAD	3	**	**	**	**	5.1 :V	SS808693 (2)
MAGNESIUM	5000	**	**	**	**	532 B:V	SS808693 (1)
MANGANESE	15	**	**	**	**	49.3 :V	SS808693 (1)
NICKEL	40	**	**	**	**	3 B:V	SS808693 (1)
POTASSIUM	5000	**	**	**	**	557 B:V	SS808693 (1)
SILVER	10	0.5	SS808693 (1)	0.51	SS808993 (1)	.69 B:V	SS808793 (1)
SODIUM	5000	74.1	SS809493 (1)	87.6	SS809293 (1)	83 B:V	SS809593 (1)
VANADIUM	50	**	**	**	**	8.9 B:V	SS808693 (1)
ZINC	20	**	**	**	**	25.7 :V	SS809393 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	.003(.006) U:V	SS809093 (2)
GROSS ALPHA	3	**	**	**	**	6.9(2.2) :A	SS809093 (1)
GROSS BETA	4	**	**	**	**	15(3.2) :A	SS809093 (1)
PLUTONIUM-239/240	0.007	**	**	**	**	.004(.004) U:Y	SS809193 (1)
URANIUM-233,-234	0.09	**	**	**	**	.35(.12) :V	SS809093 (1)
URANIUM-235	0.08	**	**	**	**	.022(.045) U:Y	SS809193 (1)
URANIUM-238	0.07	**	**	**	**	.3(.1) :V	SS809093 (1)

Legend C

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TABLE 3-82
Surface Soil Positive Results Data Summary
OU8 - IHSSs 150.6 and 150.8
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BIS(2-ETHYLHEXYL)PHTHALATE	120 J:A	SS808993 (1)	3	10	150.3
BUTYL BENZYL PHTHALATE	760 B:V	SS809293 (1)	1	10	235.5
DI-n-BUTYL PHTHALATE	150 J:A	SS809593 (1)	1	10	175.5
DI-n-OCTYL PHTHALATE	44 J:A	SS809393 (1)	1	10	164.9
FLUORANTHENE	65 J:A	SS809593 (1)	3	10	138.7
PHENANTHRENE	45 J:A	SS809593 (1)	1	10	165
PYRENE	57 J:A	SS809593 (1)	1	10	166.2
Test Group:METADD Units:mg/kg					
LITHIUM	9.4 B:V	SS808893 (1)	10	10	5.7
STRONTIUM	50.7 :V	SS808893 (1)	10	10	19.02
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	8000 :V	SS809093 (1)	10	10	4388
ANTIMONY	2.8 B:J	SS808693 (1)	2	10	1.48
ARSENIC	5.5 :V	SS808993 (1)	10	10	2.411
BARIUM	73.8 :V	SS809093 (1)	10	10	47.06
BERYLLIUM	.22 B:J	SS809293 (1)	4	10	0.138
CADMIUM	2.9 :V	SS809293 (1)	3	10	0.552
CALCIUM	11100 :V	SS809293 (1)	10	10	4144
CHROMIUM	15.1 :V	SS809593 (1)	10	10	8.91
COBALT	9.8 B:V	SS809193 (1)	10	10	5.88
COPPER	106 :V	SS808893 (1)	10	10	27.36
IRON	20900 :V	SS809093 (1)	10	10	10691
LEAD	42.2 :V	SS808893 (1)	10	10	14.45
MAGNESIUM	5880 :V	SS808893 (1)	10	10	2696
MANGANESE	468 :V	SS809093 (1)	10	10	181.59
NICKEL	14.2 :V	SS808893 (1)	10	10	7.24
POTASSIUM	3620 :V	SS809093 (1)	10	10	1394.3
SILVER	1.9 B:V	SS809093 (1)	8	10	0.9865
SODIUM	1010 B:V	SS808893 (1)	8	10	242.835
VANADIUM	23.3 :V	SS809093 (1)	10	10	17.47
ZINC	544 :J	SS809293 (1)	10	10	94.22
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.4(.05) :V	SS808893 (1)	11	11	0.0871
GROSS ALPHA	25(4.1) :A	SS809393 (2)	11	11	17.8273
GROSS BETA	37(3.8) :A	SS809393 (1)	11	11	30.9091
PLUTONIUM-239/240	2.6(.12) :V	SS808893 (1)	11	11	0.5435
URANIUM-233,-234	.93(.19) :V	SS809593 (1)	11	11	0.73
URANIUM-235	.075(.065) U:V	SS809593 (1)	11	11	0.0481
URANIUM-238	1.1(.21) :Y	SS809493 (1)	11	11	0.7464

Legend C

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TABLE 3-83
Population Distribution Summary of Surface-Soil Results
for IHSSs 150.6 and 150.8

Test Group:METADD		
LITHIUM	Normal	
STRONTIUM	Lognormal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Lognormal	
BARIUM	Normal	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Lognormal	
CHROMIUM	Normal	
COBALT	Normal	
COPPER	Nonparametric	
IRON	Normal	
LEAD	Nonparametric	
MAGNESIUM	Normal	
MANGANESE	Normal	
NICKEL	Normal	
POTASSIUM	Normal	
SILVER	ND	All results less than detection limit.
SODIUM	ND	All but one result less than detection limit.
VANADIUM	Normal	
ZINC	Nonparametric	
Test Group:TRADS		
GROSS ALPHA	Normal	
GROSS BETA	Nonparametric	
PLUTONIUM-239,-240	Normal	
URANIUM-233,-234	Normal	
URANIUM-238	Normal	

Legend D

TABLE 3-84
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSSs 150.6 and 150.8

	PRGs	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	5490	10	5.7	2.44	0.428	0.390	0.640	0.960
STRONTIUM	165000	10	19.0	13.24	0.696	0.200	0.340	0.630
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796000	10	4388.0	1886.94	0.430	0.390	0.640	0.957
ANTIMONY	None	2	2.7	0.14	0.052	0.940	0.998	0.999+
ARSENIC	0.366	10	2.4	1.63	0.677	0.200	0.350	0.670
BARIUM	19100	10	47.1	12.27	0.261	0.700	0.945	0.999+
BERYLLIUM	0.149	4	0.2	0.03	0.192	0.420	0.750	0.980
CADMIUM	6260	3	1.5	1.27	0.846	0.850	0.110	0.170
CALCIUM	None	10	4144.0	3757.14	0.907	0.160	0.240	0.460
CHROMIUM	274000	10	8.9	3.16	0.355	0.460	0.790	0.993
COBALT	16500	10	5.9	3.03	0.515	0.300	0.500	0.860
COPPER	11000	10	27.4	28.34	1.036	0.140	0.500	0.390
IRON	None	10	10691.0	5314.79	0.497	0.300	0.520	0.895
LEAD	None	10	14.5	13.63	0.943	0.150	0.240	0.450
MAGNESIUM	None	10	2696.0	1706.03	0.633	0.240	0.380	0.740
MANGANESE	1360	10	181.6	122.95	0.677	0.200	0.360	0.700
NICKEL	5490	10	7.2	3.85	0.532	0.280	0.460	0.860
POTASSIUM	None	10	1394.3	870.39	0.624	0.240	0.380	0.740
SILVER	1370	8	1.2	0.43	0.370	0.380	0.660	0.950
SODIUM	None	8	293.4	300.21	1.023	0.110	0.180	0.310
VANADIUM	1920	10	17.5	4.49	0.257	0.740	0.955	0.999+
ZINC	82300	10	94.2	158.89	1.686	0.095	0.120	0.200
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	2.37	5	0.2	0.16	0.842	0.110	0.160	0.310
GROSS ALPHA	None	10	17.2	6.91	0.402	0.420	0.670	0.970
GROSS BETA	None	10	30.6	6.35	0.207	0.860	0.994	0.999+
PLUTONIUM-239/240	3.43	8	0.7	1.00	1.340	0.100	0.130	0.230
URANIUM-233,-234	45.3	10	0.7	0.20	0.287	0.640	0.910	0.999+
URANIUM-238	0.8	10	0.7	0.24	0.330	0.520	0.810	0.997

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-85
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSSs 150.6 and 150.8

	PRGs	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, *d*)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
LITHIUM	5490	10	5.7	2.44	0.428	13	8	6	4	2	2
STRONTIUM	165000	10	19.0	13.24	0.696	33	20	15	9	6	4
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	10	4388.0	1886.94	0.430	13	8	6	4	3	2
ANTIMONY	None	2	2.7	0.14	0.052	1	1	1	1	1	1
ARSENIC	0.366	10	2.4	1.63	0.677	32	19	14	9	5	4
BARIUM	19100	10	47.1	12.27	0.261	5	3	3	2	1	1
BERYLLIUM	0.149	4	0.2	0.03	0.192	3	2	2	1	1	1
CADMIUM	6260	3	1.5	1.27	0.846	49	30	22	14	8	5
CALCIUM	None	10	4144.0	3757.14	0.907	56	34	25	16	9	6
CHROMIUM	274000	10	8.9	3.16	0.355	9	6	4	3	2	1
COBALT	16500	10	5.9	3.03	0.515	18	11	8	5	3	2
COPPER	11000	10	27.4	28.34	1.036	73	45	33	20	12	8
IRON	None	10	10691.0	5314.79	0.497	17	11	8	5	3	2
LEAD	None	10	14.5	13.63	0.943	61	37	27	17	10	6
MAGNESIUM	None	10	2696.0	1706.03	0.633	28	17	13	8	5	3
MANGANESE	1360	10	181.6	122.95	0.677	32	19	14	9	5	4
NICKEL	5490	10	7.2	3.85	0.532	20	12	9	6	4	2
POTASSIUM	None	10	1394.3	870.39	0.624	27	17	12	8	5	3
SILVER	1370	8	1.2	0.43	0.370	10	6	5	3	2	1
SODIUM	None	8	293.4	300.21	1.023	71	44	32	20	12	7
VANADIUM	1920	10	17.5	4.49	0.257	5	3	2	2	1	1
ZINC	82300	10	94.2	158.89	1.686	193	117	86	52	31	19
Test Group:TRADS Units: pCi/g											
AMERICIUM-241	2.37	5	0.2	0.16	0.842	49	30	22	13	8	5
GROSS ALPHA	None	10	17.2	6.91	0.402	11	7	5	3	2	2
GROSS BETA	None	10	30.6	6.35	0.207	3	2	2	1	1	1
PLUTONIUM-239/240	3.43	8	0.7	1.00	1.340	122	74	54	33	20	12
URANIUM-233,-234	45.3	10	0.7	0.20	0.287	6	4	3	2	1	1
URANIUM-238	0.8	10	0.7	0.24	0.330	8	5	4	2	2	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-86
Laboratory HPGe Vertical Soil Profile Results
for IHSSs 150.6 and 150.8

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

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TABLE 3-87
Surface Soil Positive Results
OU8 - IHSS 150.7
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS809993 SSG0093JE 30-Nov-94	SS810093 SSG0094JE 30-Nov-94
Test Group:TRADS Units:pCi/g				
AMERICIUM-241	0	2.37E 0 / 0.04E 0		.026(.012) :Y
GROSS ALPHA	0	0.00E 0 / 44.56E 0	22(3.7) :A	20(3.6) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	38(3.8) :A	38(3.7) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0		.022(.009) J:Y
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.79(.28) :Y	.85(.17) :Y
URANIUM-238	0	8.00E-1 / 2.83E 0	.73(.24) :Y	.77(.15) :Y

Legend B

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TABLE 3-88
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.7
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.01	**	**	**	**	-.001(.005) U:Y	SS809993 (1)
GROSS ALPHA	3	**	**	**	**	20(3.6) :A	SS810093 (1)
GROSS BETA	4	**	**	**	**	38(3.8) :A	SS809993 (2)
PLUTONIUM-239/240	0.008	**	**	**	**	-.003(.006) U:Y	SS809993 (1)
URANIUM-233,-234	0.1	**	**	**	**	.79(.28) :Y	SS809993 (1)
URANIUM-235	0.06	**	**	**	**	.023(.091) U:Y	SS809993 (1)
URANIUM-238	0.07	**	**	**	**	.73(.24) :Y	SS809993 (1)

Legend C

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TABLE 3-88
Surface Soil Positive Results Data Summary
OU8 - IHSS 150.7
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.026(.012) :Y	SS810093 (1)	2	2	0.0125
GROSS ALPHA	22(3.7) :A	SS809993 (1)	2	2	21
GROSS BETA	38(3.8) :A	SS809993 (2)	2	2	38
PLUTONIUM-239/240	.022(.009) J:Y	SS810093 (1)	2	2	0.0095
URANIUM-233,-234	.85(.17) :Y	SS810093 (1)	2	2	0.82
URANIUM-235	.05(.043) U:Y	SS810093 (1)	2	2	0.0365
URANIUM-238	.77(.15) :Y	SS810093 (1)	2	2	0.75

Legend C

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TABLE 3-89
Population Distribution Summary of Surface-Soil Results
for IHSS 150.7

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-90
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 150.7

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-91
Required Number of Samples for Specified Confidence and
Difference in Means of Surface-Soil Results
for IHSS 150.7

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

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TABLE 3-92
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 151
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG006894 SGG0068JE 12/6/94	SG006894 SGG0068JE* 12/6/94	SG006994 SGG0069JE 12/6/94
Test Group:GC/MS Units:µg/L					
1,2,4-Trimethylbenzene	2	0	0.02		0.03
1,3,5-Trimethylbenzene	1	0			0.01
Benzene	2	0	0.05		0.11
Ethylbenzene	2	0	0.01		0.03
Tetrachloroethene	1	0	0.13		
Total Xylenes	2	0	0.07		0.11
Trichlorofluoromethane	3	2	5.3 J	17 @	0.26
m & p-Xylenes	2	0	0.05		0.08
o-Xylene	2	0	0.02		0.03

Legend A

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TABLE 3-93
Surface Soil Positive Results
OU8 - IHSS 151
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS810193 SSG0095JE 1-Nov-94	SS810293 SSG0096JE 1-Nov-94	SS810293 SSG0124JE 1-Nov-94	SS810393 SSG0097JE 1-Nov-94	SS810493 SSG0098JE 1-Nov-94	SS810593 SSG0099JE 1-Nov-94
Test Group:METADD Units:mg/kg								
LITHIUM	20	5.49E 3 / 15.08E 0	5.7 B:V	5.6 B:V	5 B:V	6.2 B:V	7.1 B:V	5.2 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	25.4 B:V	26.8 B:V	24.3 B:V	28.9 B:V	34.3 B:V	23.8 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	9150 :V	8960 :V	8070 :V	7490 :V	8080 :V	5700 :V
ARSENIC	2	3.66E-1 / 13.75E 0	4.7 :V*	4.8 :V*	4.2 :V*	2.6 :V*	2.2 :V*	3 :V*
BARIUM	40	1.91E 4 / 176.00E 0	79.4 :V	82.1 :V	80.3 :V	50.4 :V	67 :V	42.2 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.72 B:V*	.74 B:V*	.7 B:V*		.42 B:V*	
CALCIUM	1000	0.00E 0 / 5839.00E 0	4000 I:JA	3980 I:JA	3930 I:JA	4620 I:JA	6050 I:JA#	3590 I:JA
CHROMIUM	2	0.00E 0 / 22.21E 0	9.6 :V	9.3 :V	8.6 :V	8 :V	7.4 :V	7.9 :V
COBALT	10	1.65E 4 / 14.22E 0	6.1 B:V	6 B:V	6.1 B:V	6.8 B:V	13.3 :V	4.5 B:V
COPPER	5	1.10E 4 / 22.75E 0	15.2 :V	17.9 :V	15.5 :V	32.9 :V#	31.9 :V#	22.4 :V
IRON	20	0.00E 0 / 23063.00E 0	13600 :V	13100 :V		13600 :V	14200 :V	10300 :V
LEAD	1	0.00E 0 / 73.87E 0	9.6 :V	9.8 :V	9.9 :V	10.7 :V	18.1 :V	8.9 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2640 :V	2590 :V	2520 :V	4180 :V#	4520 :V#	2910 :V
MANGANESE	3	1.36E 3 / 482.10E 0	214 :V	336 :V	206 :V	303 :V	540 :V#	214 :V
NICKEL	8	5.49E 3 / 19.74E 0	11.2 :V	11.2 :V	10.5 :V	10.1 :V	12.5 :V	7 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1300 :V	1290 :V	1290 :V	1290 :V	1350 :V	1060 :V
SODIUM	2000	0.00E 0 / 119.02E 0	259 B:V#	235 B:V#	247 B:V#	808 B:V#	1100 :V#	572 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	28.8 :V	27.3 :V	26.6 :V	23.9 :V	25.8 :V	19 :V
ZINC	4	8.23E 4 / 95.92E 0	30.6 :V	32.9 :V	33 :V	44.3 :V	45.7 :V	32 :V
Test Group:TPH8015A Units:%REC								
A,A,A-TFT	0	E 0 / E 0	69 :Y-	67 :Y-		66 :Y-	62 :Y-	
Test Group:V_TPH8015A Units:µg/kg								
GASOLINE	0	E 0 / E 0		2000 X:Y-				720 :Y-

Legend B

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TABLE 3-94
Surface Soil Positive Results Data Summary
OU8 - IHSS 151
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:METADD Units: mg/kg							
LITHIUM	100	**	**	**	**	5.2 B:V	SS810593 (1)
STRONTIUM	200	**	**	**	**	23.8 B:V	SS810593 (1)
Test Group:SMETCLP Units: mg/kg							
ALUMINUM	200	**	**	**	**	5700 :V	SS810593 (1)
ARSENIC	10	**	**	**	**	2.2 :V	SS810493 (1)
BARIUM	200	**	**	**	**	42.2 :V	SS810593 (1)
BERYLLIUM	5	0.31	SS810593 (1)	0.33	SS810393 (1)	.42 B:V	SS810493 (1)
CALCIUM	5000	**	**	**	**	3590 I:J	SS810593 (1)
CHROMIUM	10	**	**	**	**	7.4 :V	SS810493 (1)
COBALT	50	**	**	**	**	4.5 B:V	SS810593 (1)
COPPER	25	**	**	**	**	15.2 :V	SS810193 (1)
IRON	100	**	**	**	**	10300 :V	SS810593 (1)
LEAD	3	**	**	**	**	8.9 :V	SS810593 (1)
MAGNESIUM	5000	**	**	**	**	2590 :V	SS810293 (1)
MANGANESE	15	**	**	**	**	214 :V	SS810193 (2)
NICKEL	40	**	**	**	**	7 B:V	SS810593 (1)
POTASSIUM	5000	**	**	**	**	1060 :V	SS810593 (1)
SODIUM	5000	**	**	**	**	247 B:V	SS810293 (1)
VANADIUM	50	**	**	**	**	19 :V	SS810593 (1)
ZINC	20	**	**	**	**	30.6 :V	SS810193 (1)
Test Group:TPH8015A Units: %REC							
A,A,A-TFT	0	**	**	**	**	62 :Y	SS810493 (1)
Test Group:TRADS Units: pCi/L							
TRITIUM	300	**	**	**	**	-110(140) U:A	SS810293 (1)
Test Group:V_TPH8015A Units: µg/kg							
GASOLINE	100	520	SS810193 (6)	530	SS810293 (1)	720 :Y	SS810593 (1)

Legend C

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TABLE 3-94
Surface Soil Positive Results Data Summary
OU8 - IHSS 151
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:METADD Units: mg/kg					
LITHIUM	7.1 B:V	SS810493 (1)	5	5	5.96
STRONTIUM	34.3 B:V	SS810493 (1)	5	5	27.84
Test Group:SMETCLP Units: mg/kg					
ALUMINUM	9150 :V	SS810193 (1)	5	5	7876
ARSENIC	4.8 :V	SS810293 (1)	5	5	3.46
BARIUM	82.1 :V	SS810293 (1)	5	5	64.22
BERYLLIUM	.74 B:V	SS810293 (1)	3	5	0.44
CALCIUM	6050 I:J	SS810493 (1)	5	5	4448
CHROMIUM	9.6 :V	SS810193 (1)	5	5	8.44
COBALT	13.3 :V	SS810493 (1)	5	5	7.36
COPPER	32.9 :V	SS810393 (1)	5	5	24.06
IRON	14200 :V	SS810493 (1)	5	5	12960
LEAD	18.1 :V	SS810493 (1)	5	5	11.44
MAGNESIUM	4520 :V	SS810493 (1)	5	5	3368
MANGANESE	540 :V	SS810493 (1)	5	5	321.4
NICKEL	12.5 :V	SS810493 (1)	5	5	10.4
POTASSIUM	1350 :V	SS810493 (1)	5	5	1258
SODIUM	1100 :V	SS810493 (1)	5	5	597.2
VANADIUM	28.8 :V	SS810193 (1)	5	5	24.96
ZINC	45.7 :V	SS810493 (1)	5	5	37.12
Test Group:TPH8015A Units: %REC					
A,A,A-TFT	69 :Y	SS810193 (1)	5	5	65.4
Test Group:TRADS Units: pCi/L					
TRITIUM	37(150) U:A	SS810193 (2)	6	6	-38.1667
Test Group:V_TPH8015A Units: µg/kg					
GASOLINE	2000 X:Y	SS810293 (1)	2	9	505

Legend C

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TABLE 3-95
Population Distribution Summary of Surface-Soil Results
for IHSS 151

Test Group:METADD		
LITHIUM	Normal	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Normal	
BARIUM	Normal	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Normal	
CHROMIUM	Normal	
COBALT	Normal	
COPPER	Normal	
IRON	Normal	
LEAD	Lognormal	
MAGNESIUM	Normal	
MANGANESE	Normal	
NICKEL	Normal	
POTASSIUM	Nonparametric	
SODIUM	ND	All results less than detection limit.
VANADIUM	Normal	
ZINC	Normal	

Legend D

TABLE 3-96
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 151

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	5490	5	6.0	0.73	0.122	0.900	0.997	0.999+
STRONTIUM	165000	5	27.8	4.07	0.146	0.790	0.980	0.999+
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796000	5	7876.0	1389.58	0.176	0.660	0.925	0.999+
ARSENIC	0.366	5	3.5	1.21	0.350	0.260	0.470	0.830
BARIUM	19100	5	64.2	17.56	0.273	0.360	0.640	0.945
BERYLLIUM	0.149	3	0.6	0.18	0.286	0.240	0.400	0.790
CALCIUM	None	5	4448.0	968.49	0.218	0.500	0.810	0.993
CHROMIUM	274000	5	8.4	0.96	0.113	0.945	0.999	0.999+
COBALT	16500	5	7.4	3.43	0.465	0.190	0.320	0.640
COPPER	11000	5	24.1	8.04	0.334	0.310	0.500	0.850
IRON	None	5	12960.0	1537.21	0.119	0.915	0.998	0.999+
LEAD	None	5	11.4	3.78	0.330	0.280	0.500	0.870
MAGNESIUM	None	5	3368.0	912.62	0.271	0.390	0.660	0.950
MANGANESE	1360	5	321.4	133.61	0.416	0.200	0.370	0.710
NICKEL	5490	5	10.4	2.08	0.200	0.570	0.850	0.997
POTASSIUM	None	5	1258.0	113.45	0.090	0.991	0.999+	0.999+
SODIUM	None	5	597.2	365.68	0.612	0.140	0.200	0.440
VANADIUM	1920	5	25.0	3.79	0.152	0.780	0.972	0.999+
ZINC	82300	5	37.1	7.26	0.196	0.580	0.870	0.998
Test Group:V_TPH8015A Units: µg/kg								
GASOLINE	None	2	1360.0	905.10	0.666	0.900	0.130	0.200

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-97
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 151

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
LITHIUM	5490	5	6.0	0.73	0.122	2	1	1	1	1	1
STRONTIUM	165000	5	27.8	4.07	0.146	2	1	1	1	1	1
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	5	7876.0	1389.58	0.176	3	2	1	1	1	1
ARSENIC	0.366	5	3.5	1.21	0.350	9	6	4	3	2	1
BARIUM	19100	5	64.2	17.56	0.273	6	4	3	2	1	1
BERYLLIUM	0.149	3	0.6	0.18	0.286	6	4	3	2	1	1
CALCIUM	None	5	4448.0	968.49	0.218	4	2	2	1	1	1
CHROMIUM	274000	5	8.4	0.96	0.113	1	1	1	1	1	1
COBALT	16500	5	7.4	3.43	0.465	15	9	7	4	3	2
COPPER	11000	5	24.1	8.04	0.334	8	5	4	3	2	1
IRON	None	5	12960.0	1537.21	0.119	1	1	1	1	1	1
LEAD	None	5	11.4	3.78	0.330	8	5	4	2	2	1
MAGNESIUM	None	5	3368.0	912.62	0.271	5	4	3	2	1	1
MANGANESE	1360	5	321.4	133.61	0.416	12	8	6	4	2	2
NICKEL	5490	5	10.4	2.08	0.200	3	2	2	1	1	1
POTASSIUM	None	5	1258.0	113.45	0.090	1	1	1	1	1	1
SODIUM	None	5	597.2	365.68	0.612	26	16	12	7	5	3
VANADIUM	1920	5	25.0	3.79	0.152	2	1	1	1	1	1
ZINC	82300	5	37.1	7.26	0.196	3	2	2	1	1	1
Test Group:V_TPH8015A Units: µg/kg											
GASOLINE		2	1360.0	905.10	0.666	30	19	14	9	5	3

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-98
Laboratory HPGe Vertical Soil Profile Results
for IHSS 163.1

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

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TABLE 3-99
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG007594 SGG0075JE 11/9/94	SG007694 SGG0076JE 11/9/94	SG007794 SGG0077JE 11/9/94	SG007994 SGG0154JER 2/16/95	SG008194 SGG0081JE 11/9/94
Test Group:GC/MS Units: µg/L							
1,1-Dichloroethane	1	0			0.05		
1,1-Dichloroethene	1	0			0.17		
1,2,4-Trimethylbenzene	3	0		0.01		0.01	0.01
2-Butanone	2	0		0.06	0.05		
Acetone	2	0	0.12		0.21		
Benzene	4	0		0.22	0.12	0.47	0.12
Carbon Disulfide	1	0			0.06		
Chloromethane	1	0			0.39		
Ethylbenzene	4	0		0.02	0.01	0.11	0.02
Methylene Chloride	1	0					0.09
Tetrachloroethene	1	0				0.66	
Toluene	2	0		0.16		0.39	
Total Xylenes	2	0		0.06		0.67	
Trichloroethene	1	0				0.36	
Trichlorofluoromethane	1	0					0.07
m & p-Xylenes	2	0		0.04		0.6	
o-Xylene	3	0		0.02		0.07	0.01

Legend A

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TABLE 3-100
Surface Soil Positive Results
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS810693 SSG0100JE 2-Dec-94	SS810793 SSG0101JE 2-Dec-94	SS810893 SSG0102JE 2-Dec-94	SS810993 SSG0103JE 5-Dec-94	SS811093 SSG0104JE 5-Dec-94	SS811193 SSG0105JE 2-Dec-94
Test Group:BNACLP Units:µg/kg								
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0						
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	190 J:A	120 J:A				40 J:A
ANTHRACENE	330	8.23E 7 / 0.00E 0	280 J:A	170 J:A				100 J:A
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	700 :V	460 :V	170 J:A			430 :V
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	850 :V*	480 :V*	210 J:A*			510 :V*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	1100 :V*	610 :V	260 J:A			770 :V
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	350 J:A-	190 J:A-	130 J:A-			170 J:A-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	360 J:A	220 J:A	90 J:A			250 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	150 J:A	110 J:A	69 J:A			230 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	890 :V	550 :V	210 J:A			680 :V
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0	51 J:A	50 J:A	59 J:A			
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0	110 J:A*	62 J:A	38 J:A			58 J:A
DIBENZOFURAN	330	0.00E 0 / 0.00E 0	61 J:A-					
FLUORANTHENE	330	1.10E 7 / 0.00E 0	1800 :V	1100 :V	340 J:A			1100 :V
FLUORENE	330	1.10E 7 / 0.00E 0	150 J:A	110 J:A				39 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	390 :V	230 J:A	150 J:A			220 J:A
NAPHTHALENE	330	1.10E 7 / 0.00E 0	50 J:A					
PHENANTHRENE	330	0.00E 0 / 0.00E 0	1300 :V-	790 :V-	190 J:A-			700 :V-
PYRENE	330	8.23E 6 / 0.00E 0	1700 :V	1200 :V	350 :V	44 J:A		1000 :V
Test Group:METADD Units:mg/kg								
CESIUM	200	0.00E 0 / 7.00E 0	4.1 B:V	4.5 B:V				5.8 B:V
LITHIUM	20	5.49E 3 / 15.08E 0	7.6 B:V	5.5 B:V	3.2 B:V	7.7 B:V	6.9 B:V	
STRONTIUM	40	1.65E 5 / 67.92E 0	21.4 B:V	23.5 B:V	15.9 B:V	8.8 B:V	12 B:V	6.7 B:V
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	8590 :V	6330 :V	3690 :V	6140 :V	5380 :V	1450 :V
ARSENIC	2	3.66E-1 / 13.75E 0	4.1 :V*	3.2 :V*	2.4 :V*	1 B:V*	1.5 B:V*	1.3 B:JA*
BARIUM	40	1.91E 4 / 176.00E 0	84 :V	77.4 :V	38 B:V	62.6 :V	56.7 :V	20.1 B:V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.57 B:V*	.46 B:V*		.35 B:V*	.44 B:V*	
CADMIUM	1	1.37E 2 / 2.34E 0						
CALCIUM	1000	0.00E 0 / 5839.00E 0	4450 :V	6210 :V#	4450 :V	4240 :V	4920 :V	1980 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	10.9 :V	9.6 :V	5.4 :JA	7.1 :V	8.8 :V	15 :V
COBALT	10	1.65E 4 / 14.22E 0	5.6 B:V	4.6 B:V	3.2 B:V	7.8 B:V	8.2 B:V	1.5 B:V
COPPER	5	1.10E 4 / 22.75E 0	15.7 :V	16.3 :V	15.4 :V	24.3 :V#	18.8 :V	8 :V
IRON	20	0.00E 0 / 23063.00E 0	13700 :V	10900 :V	7910 :V	15400 :V	14300 :V	4790 :V
LEAD	1	0.00E 0 / 73.87E 0	23.1 :V	18.6 :V	8.1 :V	6.2 :V	6.2 :V	52.1 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2370 :V	2080 :V	1630 :V	3810 :V#	3730 :V#	628 B:V
MANGANESE	3	1.36E 3 / 482.10E 0	209 :V	201 :V	140 :V	324 :V	267 :V	68.4 :V
MERCURY	0.2	8.23E 1 / 0.19E 0		.062 B:V				

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TABLE 3-100
Surface Soil Positive Results
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]		SS810693 SSG0100JE 2-Dec-94	SS810793 SSG0101JE 2-Dec-94	SS810893 SSG0102JE 2-Dec-94	SS810993 SSG0103JE 5-Dec-94	SS811093 SSG0104JE 5-Dec-94	SS811193 SSG0105JE 2-Dec-94
NICKEL	8	5.49E 3 /	19.74E 0	10.8 :V	8.7 B:V	4.6 B:V	4.9 B:V	7 B:V	3 B:V
POTASSIUM	2000	0.00E 0 /	3797.00E 0	1890 :V	1440 :V	1060 :V	2390 :V	2170 :V	481 B:V
SILVER	2	1.37E 3 /	0.22E 0	21.1 :V#	.97 B:JA#	1.1 B:JA#			1.1 B:JA#
SODIUM	2000	0.00E 0 /	119.02E 0			255 B:V#		166 B:V#	
VANADIUM	10	1.92E 3 /	61.84E 0	24.8 :V	18.4 :V	14.7 :V	20.4 :V	23.7 :V	6.7 B:V
ZINC	4	8.23E 4 /	95.92E 0	217 :V#	57.3 :V	39.1 :V	60.2 :V	40.9 :V	40.5 :V
Test Group:TRADS Units:pCi/g									
AMERICIUM-241	0	2.37E 0 /	0.04E 0	.61(.081) :Y#	.43(.051) :Y#	.25(.029) :Y#	.009(.005) J:V	.015(.006) J:V	.15(.028) :Y#
GROSS ALPHA	0	0.00E 0 /	44.56E 0	16(3.1) :Y	23(3.6) :Y	8.8(2.6) :Y	17(3.4) :A	17(3.4) :A	15(2.9) :Y
GROSS BETA	0	0.00E 0 /	55.35E 0	28(3.4) :Y	29(3.6) :Y	28(3.2) :Y	28(3.7) :A	36(3.6) :A	31(3.4) :Y
PLUTONIUM-239/240	0	3.43E 0 /	0.08E 0	.58(.035) :Y#	.38(.029) :Y#	.36(.031) :Y#	.02(.008) BJ:V	.015(.006) BJ:V	.13(.015) :Y#
URANIUM-233,-234	0	4.53E 1 /	3.31E 0	.79(.074) B:Y	.79(.14) :Y	.45(.14) :Y	.69(.28) B:V	1(.33) B:V	.51(.16) :Y
URANIUM-235	0	1.73E-1 /	0.13E 0	.052(.022) J:Y					
URANIUM-238	0	8.00E-1 /	2.83E 0	.83(.077) :Y*	.88(.14) :Y*	.61(.17) :Y	.87(.29) :V*	.99(.29) :V*	.31(.13) :Y
Test Group:WQPL Units:µg/g									
NITRATE/NITRITE	0	E 0 /	E 0	26.3 :V-	30.8 :V-	49.7 :V-	29.2 :V-	30.2 :V-	21.1 :V-

Legend B

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TABLE 3-100
Surface Soil Positive Results
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS811193 SSG0148JE 2-Dec-94	SS811293 SSG0106JE 5-Dec-94	SS811393 SSG0107JE 5-Dec-94	SS811493 SSG0108JE 2-Dec-94
Test Group:BNACLP Units:µg/kg						
2-METHYLNAPHTHALENE	330	0.00E 0 / 0.00E 0				78 J:A-
ACENAPHTHENE	330	1.65E 7 / 0.00E 0	69 J:A			450 :V
ANTHRACENE	330	8.23E 7 / 0.00E 0	240 J:A		40 J:A	570 :V
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	720 :V		70 J:A	1100 :V*
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	780 :V*		78 J:A	1700 :V*
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	1200 :V*		110 J:A	2400 :V*
BENZO(ghi)PERYLENE	330	0.00E 0 / 0.00E 0	270 J:A-			680 :V-
BENZO(k)FLUORANTHENE	330	8.77E 3 / 0.00E 0	360 :V		42 J:A	780 :V
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	450 :JA			79 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	920 :V	48 J:A	81 J:A	1300 :V
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0				
DIBENZO(a,h)ANTHRACENE	330	8.77E 1 / 0.00E 0	86 J:A			210 J:A*
DIBENZOFURAN	330	0.00E 0 / 0.00E 0				180 J:A-
FLUORANTHENE	330	1.10E 7 / 0.00E 0	1600 :V	78 J:A	210 J:A	2900 :V
FLUORENE	330	1.10E 7 / 0.00E 0	72 J:A			380 :V
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	330 J:A			820 :V
NAPHTHALENE	330	1.10E 7 / 0.00E 0				190 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0	1000 :V-	61 J:A-	160 J:A-	2700 :V-
PYRENE	330	8.23E 6 / 0.00E 0	1500 :V	89 J:A	160 J:A	2800 :V
Test Group:METADD Units:mg/kg						
CESIUM	200	0.00E 0 / 7.00E 0				
LITHIUM	20	5.49E 3 / 15.08E 0	2.3 B:V	7.5 B:V	5.7 B:V	7.4 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	7.1 B:V	28.6 B:V	6.3 B:V	25.9 B:V
Test Group:SMETCLP Units:mg/kg						
ALUMINUM	40	7.96E 5 / 22999.00E 0	1900 :V	8890 :V	4490 :V	9210 :V
ARSENIC	2	3.66E-1 / 13.75E 0	1.1 B:JA*	5.1 :V*	1.1 B:V*	5.9 :V*
BARIUM	40	1.91E 4 / 176.00E 0	22.5 B:V	72.5 :V	45.8 :V	95.1 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0		1.1 B:V*	.18 B:V*	.83 B:V*
CADMIUM	1	1.37E 2 / 2.34E 0				.45 B:V
CALCIUM	1000	0.00E 0 / 5839.00E 0	1950 :V	5200 :V	1180 :V	11700 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	17.8 :V	11.1 :V	7.7 :V	10.4 :V
COBALT	10	1.65E 4 / 14.22E 0	1.7 B:V	10.6 B:V	3.8 B:V	5.7 B:V
COPPER	5	1.10E 4 / 22.75E 0	9.3 :V	22.2 :V	10.3 :V	16.5 :V
IRON	20	0.00E 0 / 23063.00E 0	5500 :V	12000 :V	7890 :V	13700 :V
LEAD	1	0.00E 0 / 73.87E 0	51.8 :V	14.2 :V	7.5 :V	20 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	759 B:V	1920 :V	1860 :V	2190 :V
MANGANESE	3	1.36E 3 / 482.10E 0	82.2 :V	227 :V	123 :V	230 :V
MERCURY	0.2	8.23E 1 / 0.19E 0			1.1 :JA#	

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TABLE 3-100
Surface Soil Positive Results
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS811193 SSG0148JE 2-Dec-94	SS811293 SSG0106JE 5-Dec-94	SS811393 SSG0107JE 5-Dec-94	SS811493 SSG0108JE 2-Dec-94
NICKEL	8	5.49E 3 / 19.74E 0	4.2 B:V	12.7 :V	5.3 B:V	11.3 :V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	577 B:V	1810 :V	1550 :V	2110 :V
SILVER	2	1.37E 3 / 0.22E 0	.53 B:JA#			1.3 B:JA#
SODIUM	2000	0.00E 0 / 119.02E 0		160 B:V#	110 B:V	
VANADIUM	10	1.92E 3 / 61.84E 0	9.1 B:V	25.9 :V	13.6 :V	28 :V
ZINC	4	8.23E 4 / 95.92E 0	43.1 :V	1130 :V#	23.2 :V	51.5 :V
Test Group:TRADS Units:pCi/g						
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.12(.02) :Y#	.95(.054) :V#	.017(.006) J:V	.98(.16) :Y#
GROSS ALPHA	0	0.00E 0 / 44.56E 0	8.5(2.4) :Y	23(3.9) :A	20(3.5) :A	18(3.3) :Y
GROSS BETA	0	0.00E 0 / 55.35E 0	32(3.5) :Y	27(3.3) :A	39(3.8) :A	67(4.5) :Y#
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.13(.015) :Y#	.55(.04) B:V#	.015(.007) BJ:V	1.9(.077) :Y#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.53(.16) :Y	.65(.25) B:V	.88(.26) B:V	.81(.21) :Y
URANIUM-235	0	1.73E-1 / 0.13E 0				
URANIUM-238	0	8.00E-1 / 2.83E 0	.52(.15) :Y	.72(.25) :V	.6(.19) :V	.65(.19) :Y
Test Group:WQPL Units:µg/g						
NITRATE/NITRITE	0	E 0 / E 0	30.3 :V-	36.5 :V-	22.3 :V-	37.9 :V-

Legend B

TABLE 3-101
Surface Soil Positive Results Data Summary
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

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	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
2-METHYLNAPHTHALENE	330	340	SS810893 (1)	390	SS811293 (1)	78 J:A	SS811493 (1)
ACENAPHTHENE	330	340	SS810893 (1)	390	SS811293 (1)	69 J:A	SS811193 (1)
ANTHRACENE	330	340	SS810893 (1)	390	SS811293 (1)	40 J:A	SS811393 (1)
BENZO(a)ANTHRACENE	330	360	SS810993 (2)	390	SS811293 (1)	70 J:A	SS811393 (1)
BENZO(a)PYRENE	330	360	SS810993 (2)	390	SS811293 (1)	78 J:A	SS811393 (1)
BENZO(b)FLUORANTHENE	330	360	SS810993 (2)	390	SS811293 (1)	110 J:A	SS811393 (1)
BENZO(ghi)PERYLENE	330	360	SS810993 (3)	390	SS811293 (1)	130 J:A	SS810893 (1)
BENZO(k)FLUORANTHENE	330	360	SS810993 (2)	390	SS811293 (1)	42 J:A	SS811393 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	330	360	SS810993 (3)	390	SS811293 (1)	69 J:A	SS810893 (1)
CHRYSENE	330	360	SS810993 (2)	360	SS810993 (2)	48 J:A	SS811293 (1)
DI-n-OCTYL PHTHALATE	330	350	SS811193 (1)	390	SS811293 (1)	50 J:A	SS810793 (1)
DIBENZO(a,h)ANTHRACENE	330	360	SS810993 (3)	390	SS811293 (1)	38 J:A	SS810893 (1)
DIBENZOFURAN	330	340	SS810893 (1)	390	SS811293 (1)	61 J:A	SS810693 (1)
FLUORANTHENE	330	360	SS810993 (2)	360	SS810993 (2)	78 J:A	SS811293 (1)
FLUORENE	330	340	SS810893 (1)	390	SS811293 (1)	72 J:A	SS811193 (1)
INDENO(1,2,3-cd)PYRENE	330	360	SS810993 (3)	390	SS811293 (1)	150 J:A	SS810893 (1)
NAPHTHALENE	330	340	SS810893 (1)	390	SS811293 (1)	50 J:A	SS810693 (1)
PHENANTHRENE	330	360	SS810993 (2)	360	SS810993 (2)	61 J:A	SS811293 (1)
PYRENE	330	360	SS811093 (1)	360	SS811093 (1)	44 J:A	SS810993 (1)
Test Group:METADD Units:mg/kg							
CESIUM	1000	2.5	SS810893 (1)	6	SS810993 (2)	4.1 B:V	SS810693 (1)
LITHIUM	100	**	**	**	**	2.3 B:V	SS811193 (1)
STRONTIUM	200	**	**	**	**	6.3 B:V	SS811393 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	1900 :V	SS811193 (1)
ARSENIC	10	**	**	**	**	1 B:V	SS810993 (1)
BARIUM	200	**	**	**	**	22.5 B:V	SS811193 (1)
BERYLLIUM	5	0.17	SS811193 (1)	0.26	SS810893 (1)	.18 B:V	SS811393 (1)
CADMIUM	5	0.27	SS810893 (2)	0.51	SS811293 (1)	.45 B:V	SS811493 (1)
CALCIUM	5000	**	**	**	**	1180 :V	SS811393 (1)
CHROMIUM	10	**	**	**	**	5.4 :J	SS810893 (1)
COBALT	50	**	**	**	**	1.7 B:V	SS811193 (1)
COPPER	25	**	**	**	**	9.3 :V	SS811193 (1)
IRON	100	**	**	**	**	5500 :V	SS811193 (1)
LEAD	3	**	**	**	**	6.2 :V	SS810993 (2)
MAGNESIUM	5000	**	**	**	**	759 B:V	SS811193 (1)
MANGANESE	15	**	**	**	**	82.2 :V	SS811193 (1)
MERCURY	0.2	0.05	SS811193 (1)	0.19	SS811293 (1)	.062 B:V	SS810793 (1)
NICKEL	40	**	**	**	**	4.2 B:V	SS811193 (1)
POTASSIUM	5000	**	**	**	**	577 B:V	SS811193 (1)

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TABLE 3-101
Surface Soil Positive Results Data Summary
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
SILVER	10	0.66	SS811393 (1)	1.7	SS811293 (1)	.97 B:J	SS810793 (1)
SODIUM	5000	83.2	SS810993 (1)	151	SS810793 (1)	110 B:V	SS811393 (1)
VANADIUM	50	**	**	**	**	9.1 B:V	SS811193 (1)
ZINC	20	**	**	**	**	23.2 :V	SS811393 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.06	**	**	**	**	.009(.005) J:V	SS810993 (1)
GROSS ALPHA	2	**	**	**	**	8.5(2.4) :Y	SS811193 (1)
GROSS BETA	4	**	**	**	**	27(3.3) :A	SS811293 (1)
PLUTONIUM-239/240	0.007	**	**	**	**	.015(.006) BJ:V	SS811093 (2)
URANIUM-233,-234	0.1	**	**	**	**	.45(.14) :Y	SS810893 (1)
URANIUM-235	0.1	**	**	**	**	(.046) U:V:Y	SS811093 (2)
URANIUM-238	0.1	**	**	**	**	.31(.13) :Y	SS811193 (1)
Test Group:WQPL Units:µg/g							
NITRATE/NITRITE	0.5	**	**	**	**	22.3 :V	SS811393 (1)
pH **Unit: pH**	0.01	**	**	**	**	7.74 :V	SS810693 (1)

Legend C

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TABLE 3-101
Surface Soil Positive Results Data Summary
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
2-METHYLNAPHTHALENE	78 J:A	SS811493 (1)	1	9	170.3333
ACENAPHTHENE	450 :V	SS811493 (1)	4	9	192.6667
ANTHRACENE	570 :V	SS811493 (1)	5	9	225
BENZO(a)ANTHRACENE	1100 :V	SS811493 (1)	6	9	419.4445
BENZO(a)PYRENE	1700 :V	SS811493 (1)	6	9	517
BENZO(b)FLUORANTHENE	2400 :V	SS811493 (1)	6	9	692.7778
BENZO(ghi)PERYLENE	680 :V	SS811493 (1)	5	9	261.6667
BENZO(k)FLUORANTHENE	780 :V	SS811493 (1)	6	9	267.4445
BIS(2-ETHYLHEXYL)PHTHALATE	450 :J	SS811193 (1)	5	9	177
CHRYSENE	1300 :V	SS811493 (1)	7	9	484.3333
DI-n-OCTYL PHTHALATE	59 J:A	SS810893 (1)	3	9	140
DIBENZO(a,h)ANTHRACENE	210 J:A	SS811493 (1)	5	9	137.8889
DIBENZOFURAN	180 J:A	SS811493 (1)	2	9	167.8889
FLUORANTHENE	2900 :V	SS811493 (1)	7	9	932
FLUORENE	380 :V	SS811493 (1)	4	9	179.6667
INDENO(1,2,3-cd)PYRENE	820 :V	SS811493 (1)	5	9	295
NAPHTHALENE	190 J:A	SS811493 (1)	2	9	167.7778
PHENANTHRENE	2700 :V	SS811493 (1)	7	9	729
PYRENE	2800 :V	SS811493 (1)	8	9	891.4445
Test Group:METADD Units:mg/kg					
CESIUM	5.8 B:V	SS811193 (1)	3	9	3.0333
LITHIUM	7.7 B:V	SS810993 (1)	9	9	5.9778
STRONTIUM	28.6 B:V	SS811293 (1)	9	9	16.6111
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	9210 :V	SS811493 (1)	9	9	6068.889
ARSENIC	5.9 :V	SS811493 (1)	9	9	2.8444
BARIUM	95.1 :V	SS811493 (1)	9	9	61.6222
BERYLLIUM	1.1 B:V	SS811293 (1)	7	9	0.4606
CADMIUM	.45 B:V	SS811493 (1)	1	9	0.1894
CALCIUM	11700 :V	SS811493 (1)	9	9	4925.556
CHROMIUM	17.8 :V	SS811193 (1)	9	9	9.8667
COBALT	10.6 B:V	SS811293 (1)	9	9	5.6889
COPPER	24.3 :V	SS810993 (1)	9	9	16.5333
IRON	15400 :V	SS810993 (1)	9	9	11255.56
LEAD	52.1 :V	SS811193 (1)	9	9	17.3333
MAGNESIUM	3810 :V	SS810993 (1)	9	9	2261
MANGANESE	324 :V	SS810993 (1)	9	9	200.3555
MERCURY	1.1 :J	SS811393 (1)	2	9	0.1633
NICKEL	12.7 :V	SS811293 (1)	9	9	7.7222
POTASSIUM	2390 :V	SS810993 (1)	9	9	1666.333

Data Extraction: 6/19/95

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TABLE 3-101
Surface Soil Positive Results Data Summary
OU8 - IHSS 163.1
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
SILVER	21.1 :V	SS810693 (1)	5	9	3.1167
SODIUM	255 B:V	SS810893 (1)	4	9	109.8111
VANADIUM	28 :V	SS811493 (1)	9	9	19.8444
ZINC	1130 :V	SS811293 (1)	9	9	184.7
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.98(.16) :Y	SS811493 (1)	10	10	0.3531
GROSS ALPHA	23(3.6) :Y	SS810793 (2)	10	10	16.63
GROSS BETA	67(4.5) :Y	SS811493 (1)	10	10	34.5
PLUTONIUM-239/240	1.9(.077) :Y	SS811493 (1)	10	10	0.408
URANIUM-233,-234	1(.33) B:V:Y	SS811093 (1)	10	10	0.71
URANIUM-235	.1(.082) U:V	SS811293 (1)	10	10	0.0479
URANIUM-238	.99(.29) :V	SS811093 (1)	10	10	0.698
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	49.7 :V	SS810893 (1)	9	9	32.5778
pH **Unit: pH**	8.58 :J	SS811093 (1)	9	9	8.2978

Legend C

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TABLE 3-102
Population Distribution Summary of Surface-Soil Results
for IHSS 163.1

Test Group:METADD		
LITHIUM	Nonparametric	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Normal	
BARIUM	Normal	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Normal	
CHROMIUM	Normal	
COBALT	Normal	
COPPER	Normal	
IRON	Normal	
LEAD	Lognormal	
MAGNESIUM	Normal	
MANGANESE	Normal	
NICKEL	Nonparametric	
POTASSIUM	Normal	
SILVER	ND	All results less than detection limit.
SODIUM	ND	All but one result less than detection limit.
VANADIUM	Normal	
ZINC	Nonparametric	
Test Group:TRADS		
AMERICIUM-241	Nonparametric	
GROSS ALPHA	Normal	
GROSS BETA	Nonparametric	
PLUTONIUM-239,-240	Nonparametric	
URANIUM-233,-234	Normal	
URANIUM-238	Normal	

Legend D

TABLE 3-103
Test of Power of Difference of Sample Mean and Population Mean of Surface-Soil Results for IHSS 163.1

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
CESIUM	None	3	4.8	0.89	0.185	0.350	0.570	0.850
LITHIUM	5490	9	6.0	2.01	0.336	0.450	0.750	0.992
STRONTIUM	165000	9	16.6	8.51	0.513	0.260	0.450	0.840
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796000	9	6068.9	2506.51	0.413	0.350	0.630	0.945
ARSENIC	0.366	9	2.8	1.84	0.645	0.200	0.360	0.660
BARIUM	19100	9	61.6	23.33	0.379	0.420	0.690	0.975
BERYLLIUM	0.149	7	0.6	0.31	0.553	0.220	0.340	0.680
CADMIUM	6260	1	0.5					
CALCIUM	None	9	4925.6	2984.25	0.606	0.230	0.350	0.730
CHROMIUM	274000	9	9.9	3.52	0.357	0.450	0.730	0.984
COBALT	16500	9	5.7	2.78	0.488	0.290	0.480	0.850
COPPER	11000	9	16.5	4.88	0.295	0.560	0.850	0.998
IRON	None	9	11255.6	3440.97	0.306	0.560	0.850	0.998
LEAD	None	9	17.3	14.54	0.839	0.160	0.230	0.480
MAGNESIUM	None	9	2261.0	970.71	0.429	0.350	0.560	0.940
MANGANESE	1360	9	200.4	74.98	0.374	0.400	0.690	0.975
MERCURY	82.3	2	0.6	0.73	1.263	0.650	0.700	0.900
NICKEL	5490	9	7.7	3.25	0.421	0.350	0.270	0.945
POTASSIUM	None	9	1666.3	577.05	0.346	0.450	0.750	0.987
SILVER	1370	5	5.1	8.94	1.748	0.070	0.085	0.130
SODIUM	None	4	172.8	60.31	0.349	0.200	0.360	0.680
VANADIUM	1920	9	19.8	6.38	0.322	0.500	0.810	0.996
ZINC	82300	9	184.7	359.19	1.945	0.080	0.110	0.155
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	2.37	9	0.4	0.39	1.027	0.140	0.195	0.380
GROSS ALPHA	None	9	17.5	4.35	0.248	0.690	0.945	0.999+
GROSS BETA	None	9	34.9	12.73	0.365	0.420	0.690	0.975
PLUTONIUM-239/240	3.43	9	0.4	0.59	1.350	0.110	0.150	0.260
URANIUM-233,-234	45.3	9	0.7	0.17	0.234	0.730	0.960	0.999+
URANIUM-235	0.173	1	0.1					
URANIUM-238	0.8	9	0.7	0.16	0.214	0.800	0.984	0.999+
Test Group:WQPL Units: µg/g								
NITRATE/NITRITE	439000	9	32.6	7.96	0.244	0.690	0.940	0.999+

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-104
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 163.1

	PRGs	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, *d*)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
CESIUM	None	3	4.8	0.89	0.185	3	2	2	1	1	1
LITHIUM	5490	9	6.0	2.01	0.336	8	5	4	3	2	1
STRONTIUM	165000	9	16.6	8.51	0.513	18	11	8	5	3	2
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	9	6068.9	2506.51	0.413	12	8	6	4	2	2
ARSENIC	0.366	9	2.8	1.84	0.645	29	18	13	8	5	3
BARIUM	19100	9	61.6	23.33	0.379	10	6	5	3	2	1
BERYLLIUM	0.149	7	0.6	0.31	0.553	21	13	10	6	4	3
CADMIUM	6260	1	0.5								
CALCIUM	None	9	4925.6	2984.25	0.606	25	16	12	7	4	3
CHROMIUM	274000	9	9.9	3.52	0.357	9	6	4	3	2	1
COBALT	16500	9	5.7	2.78	0.488	17	10	8	5	3	2
COPPER	11000	9	16.5	4.88	0.295	6	4	3	2	1	1
IRON	None	9	11255.6	3440.97	0.306	7	4	3	2	2	1
LEAD	None	9	17.3	14.54	0.839	48	29	22	13	8	5
MAGNESIUM	None	9	2261.0	970.71	0.429	13	8	6	4	2	2
MANGANESE	1360	9	200.4	74.98	0.374	10	6	5	3	2	1
MERCURY	82.3	2	0.6	0.73	1.263	108	66	48	30	18	11
NICKEL	5490	9	7.7	3.25	0.421	12	8	6	4	2	2
POTASSIUM	None	9	1666.3	577.05	0.346	9	5	4	3	2	1
SILVER	1370	5	5.1	8.94	1.748	207	126	92	56	34	21
SODIUM	None	4	172.8	60.31	0.349	9	6	4	3	2	1
VANADIUM	1920	9	19.8	6.38	0.322	7	5	4	2	2	1
ZINC	82300	9	184.7	359.19	1.945	256	156	114	70	41	25
Test Group:TRADS Units: pCi/g											
AMERICIUM-241	2.37	9	0.4	0.39	1.027	72	44	32	20	12	7
GROSS ALPHA	None	9	17.5	4.35	0.248	5	3	2	2	1	1
GROSS BETA	None	9	34.9	12.73	0.365	10	6	5	3	2	1
PLUTONIUM-239/240	3.43	9	0.4	0.59	1.350	124	75	55	34	20	12
URANIUM-233,-234	45.3	9	0.7	0.17	0.234	4	3	2	2	1	1
URANIUM-235	0.173	1	0.1								
URANIUM-238	0.8	9	0.7	0.16	0.214	4	2	2	1	1	1
Test Group:WQPL Units: µg/g											
NITRATE/NITRITE	439000	9	32.6	7.96	0.244	5	3	2	2	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-105
Laboratory HPGe Vertical Soil Profile Results
for IHSS 172

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-106
Analytical Results for Asphalt Samples for IHSS 172
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled: Date Received:			SS811693 ASG0164JE 9-Dec-94 19-Dec-95	SS811793 ASG0165JE 9-Dec-94 19-Dec-95	SS812693 ASG0166JE 9-Dec-94 19-Dec-95
Test Group:TRADS Units: pCi/g	MDL	PRG/ BKGND	IHSS 172	IHSS 172	IHSS 172
AMERICIUM-241	0	2.37E 0 / 0.04E 0	0.023 (0.012)	0.012 (0.009)	0.009 (0.008)
CESIUM-134	0	0.00E 0 / 0.00E 0	<0.06	<0.06	<0.05
CESIUM-137	0	2.83E 1 / 3.68E 0	<0.05	<0.07	<0.05
PLUTONIUM-239+240	0	3.43E 0 / 0.08E 0	0.009 (0.007)	0.058 (0.019)#	0.005 (0.006)
PLUTONIUM-238	0	0.00E 0 / 0.00E 0	0.005 (0.005)	0.007 (0.007)	0.003 (0.004)
STRONTIUM-89	0	6.64E 1 / 22.39E -1	0.44 (0.21)	0.16 (0.22)	0.16 (0.21)
STRONTIUM-90	0	2.20E 1 / 22.39E -1	-0.10 (0.29)	-0.13 (0.37)	-0.41 (0.34)
URANIUM-238	0	8.00E-1 / 2.83E 0	1.54 (0.26)*	0.83 (0.17)*	1.15 (0.20)*
URANIUM-235	0	1.73E -1/ 19.83E -2	0.09 (0.04)	0.03 (0.03)	0.06 (0.03)
URANIUM-234	0	4.53E 1/ 0.00E 0	1.64 (0.27)	1.00 (0.19)	1.19 (0.21)

Legend A

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TABLE 3-107
Surface Soil Positive Results
OU8 - IHSS 172
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS811593 SSG0109JE 13-Dec-94
Test Group:BNACLP Units:µg/kg			
BENZO(a)ANTHRACENE	330	8.77E 2 / 0.00E 0	62 J:A
BENZO(a)PYRENE	330	8.77E 1 / 0.00E 0	66 J:A
BENZO(b)FLUORANTHENE	330	8.77E 2 / 0.00E 0	83 J:A
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0	67 J:A
CHRYSENE	330	8.77E 4 / 0.00E 0	72 J:A
FLUORANTHENE	330	1.10E 7 / 0.00E 0	110 J:A
INDENO(1,2,3-cd)PYRENE	330	8.77E 2 / 0.00E 0	40 J:A
PHENANTHRENE	330	0.00E 0 / 0.00E 0	69 J:A-
PYRENE	330	8.23E 6 / 0.00E 0	120 J:A
Test Group:METADD Units:mg/kg			
LITHIUM	20	5.49E 3 / 15.08E 0	6.5 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	30.6 B:V
Test Group:SMETCLP Units:mg/kg			
ALUMINUM	40	7.96E 5 / 22999.00E 0	7480 :V
ARSENIC	2	3.66E-1 / 13.75E 0	5 :V*
BARIUM	40	1.91E 4 / 176.00E 0	72 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.44 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	5790 :V
CHROMIUM	2	0.00E 0 / 22.21E 0	9.4 :V
COBALT	10	1.65E 4 / 14.22E 0	7 B:V
COPPER	5	1.10E 4 / 22.75E 0	19.3 :V
IRON	20	0.00E 0 / 23063.00E 0	10500 :V
LEAD	1	0.00E 0 / 73.87E 0	9.9 :V
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	2160 :V
MANGANESE	3	1.36E 3 / 482.10E 0	156 :V
NICKEL	8	5.49E 3 / 19.74E 0	7.6 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1440 :V
SODIUM	2000	0.00E 0 / 119.02E 0	167 B:V#
VANADIUM	10	1.92E 3 / 61.84E 0	18.9 :V
ZINC	4	8.23E 4 / 95.92E 0	41 :V
Test Group:TRADS Units:pCi/g			
AMERICIUM-241	0	2.37E 0 / 0.04E 0	.046(.011) :V#
GROSS ALpHA	0	0.00E 0 / 44.56E 0	8(2.1) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	18(2.9) :A
PLUTONIUM-239/240	0	3.43E 0 / 0.08E 0	.088(.012) :V#
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	.61(.14) :V
URANIUM-238	0	8.00E-1 / 2.83E 0	.5(.12) :V

Legend B

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TABLE 3-108
Surface Soil Positive Results Data Summary
OU8 - IHSS 172
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BENZO(a)ANTHRACENE	330	**	**	**	**	62 J:A	SS811593 (1)
BENZO(a)PYRENE	330	**	**	**	**	66 J:A	SS811593 (1)
BENZO(b)FLUORANTHENE	330	**	**	**	**	83 J:A	SS811593 (1)
BIS(2-ETHYLHEXYL)pHTHALATE	330	**	**	**	**	67 J:A	SS811593 (1)
CHRYSENE	330	**	**	**	**	72 J:A	SS811593 (1)
FLUORANTHENE	330	**	**	**	**	110 J:A	SS811593 (1)
INDENO(1,2,3-cd)PYRENE	330	**	**	**	**	40 J:A	SS811593 (1)
pHENANTHRENE	330	**	**	**	**	69 J:A	SS811593 (1)
PYRENE	330	**	**	**	**	120 J:A	SS811593 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	6.5 B:V	SS811593 (1)
STRONTIUM	200	**	**	**	**	30.6 B:V	SS811593 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	7480 :V	SS811593 (1)
ARSENIC	10	**	**	**	**	5 :V	SS811593 (1)
BARIUM	200	**	**	**	**	72 :V	SS811593 (1)
BERYLLIUM	5	**	**	**	**	.44 B:V	SS811593 (1)
CALCIUM	5000	**	**	**	**	5790 :V	SS811593 (1)
CHROMIUM	10	**	**	**	**	9.4 :V	SS811593 (1)
COBALT	50	**	**	**	**	7 B:V	SS811593 (1)
COPPER	25	**	**	**	**	19.3 :V	SS811593 (1)
IRON	100	**	**	**	**	10500 :V	SS811593 (1)
LEAD	3	**	**	**	**	9.9 :V	SS811593 (1)
MAGNESIUM	5000	**	**	**	**	2160 :V	SS811593 (1)
MANGANESE	15	**	**	**	**	156 :V	SS811593 (1)
NICKEL	40	**	**	**	**	7.6 B:V	SS811593 (1)
POTASSIUM	5000	**	**	**	**	1440 :V	SS811593 (1)
SODIUM	5000	**	**	**	**	167 B:V	SS811593 (1)
VANADIUM	50	**	**	**	**	18.9 :V	SS811593 (1)
ZINC	20	**	**	**	**	41 :V	SS811593 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.006	**	**	**	**	.046(.011) :V	SS811593 (1)
GROSS ALpHA	2	**	**	**	**	8(2.1) :A	SS811593 (1)
GROSS BETA	4	**	**	**	**	18(2.9) :A	SS811593 (1)
PLUTONIUM-239/240	0.004	**	**	**	**	.088(.012) :V	SS811593 (1)
URANIUM-233,-234	0.08	**	**	**	**	.61(.14) :V	SS811593 (1)
URANIUM-235	0.06	**	**	**	**	.046(.046) U:V	SS811593 (1)
URANIUM-238	0.06	**	**	**	**	.5(.12) :V	SS811593 (1)
Test Group:WQPL							
pH Units:pH	0	**	**	**	**	8.67 :V	SS811593 (1)

Legend C

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TABLE 3-108
Surface Soil Positive Results Data Summary
OU8 - IHSS 172
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BENZO(a)ANTHRACENE	62 J:A	SS811593 (1)	1	1	62
BENZO(a)PYRENE	66 J:A	SS811593 (1)	1	1	66
BENZO(b)FLUORANTHENE	83 J:A	SS811593 (1)	1	1	83
BIS(2-ETHYLHEXYL)pHTHALATE	67 J:A	SS811593 (1)	1	1	67
CHRYSENE	72 J:A	SS811593 (1)	1	1	72
FLUORANTHENE	110 J:A	SS811593 (1)	1	1	110
INDENO(1,2,3-cd)PYRENE	40 J:A	SS811593 (1)	1	1	40
pHENANTHRENE	69 J:A	SS811593 (1)	1	1	69
PYRENE	120 J:A	SS811593 (1)	1	1	120
Test Group:METADD Units:mg/kg					
LITHIUM	6.5 B:V	SS811593 (1)	1	1	6.5
STRONTIUM	30.6 B:V	SS811593 (1)	1	1	30.6
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	7480 :V	SS811593 (1)	1	1	7480
ARSENIC	5 :V	SS811593 (1)	1	1	5
BARIUM	72 :V	SS811593 (1)	1	1	72
BERYLLIUM	.44 B:V	SS811593 (1)	1	1	0.44
CALCIUM	5790 :V	SS811593 (1)	1	1	5790
CHROMIUM	9.4 :V	SS811593 (1)	1	1	9.4
COBALT	7 B:V	SS811593 (1)	1	1	7
COPPER	19.3 :V	SS811593 (1)	1	1	19.3
IRON	10500 :V	SS811593 (1)	1	1	10500
LEAD	9.9 :V	SS811593 (1)	1	1	9.9
MAGNESIUM	2160 :V	SS811593 (1)	1	1	2160
MANGANESE	156 :V	SS811593 (1)	1	1	156
NICKEL	7.6 B:V	SS811593 (1)	1	1	7.6
POTASSIUM	1440 :V	SS811593 (1)	1	1	1440
SODIUM	167 B:V	SS811593 (1)	1	1	167
VANADIUM	18.9 :V	SS811593 (1)	1	1	18.9
ZINC	41 :V	SS811593 (1)	1	1	41
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.046(.011) :V	SS811593 (1)	1	1	0.046
GROSS ALpHA	8(2.1) :A	SS811593 (1)	1	1	8
GROSS BETA	18(2.9) :A	SS811593 (1)	1	1	18
PLUTONIUM-239/240	.088(.012) :V	SS811593 (1)	1	1	0.088
URANIUM-233,-234	.61(.14) :V	SS811593 (1)	1	1	0.61
URANIUM-235	.046(.046) U:V	SS811593 (1)	1	1	0.046
URANIUM-238	.5(.12) :V	SS811593 (1)	1	1	0.5
Test Group:WQPL					
pH **Units:pH**	8.67 :V	SS811593 (1)	1	1	8.67

Legend C

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TABLE 3-109
Population Distribution Summary of Surface-Soil Results
for IHSS 172

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-110
Test of Power of Differences of Sample Mean and
Population Mean of Surface-Soil Results
for IHSS 172

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

TABLE 3-111
Required Number of Samples for Specified Confidence and
Difference in Means of Surface-Soil Results
for IHSS 172

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

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TABLE 3-112
Analytical Results for Soil-Gas Samples Greater Than or Equal to 1.0 Micrograms Per Liter
OU8 - IHSS 173
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	Total Hits >0.00	Total Hits ≥ 1	SG008294 SGG0082JE** 2/16/95	SG008394 SGG0083JE 2/16/95	SG008494 SGG0084JER 3/21/95
Test Group:GC/MS Units:µg/L					
1,2,4-Trimethylbenzene	2	0		0.03	0.07
1,3,5-Trimethylbenzene	1	0			0.02
2-Butanone	2	0		0.06	0.06
Acetone	2	1	4.4 @		0.35
Benzene	3	1	4.3 @	0.39	0.06
Carbon Disulfide	1	0		0.06	
Chloromethane	1	0		0.03	
Ethylbenzene	2	0		0.03	0.06
Tetrachloroethene	3	1	280 @	0.21	0.08
Toluene	2	0		0.42	0.35
Total Xylenes	1	0			0.24
Trichloroethene	3	1	650 J @	0.35	0.39
Trichlorofluoromethane	1	0		0.12	
Vinyl Chloride	1	0		0.08	
cis-1,2-dichloroethene	3	2	7.1 @	1.8 @	0.04
m & p-Xylenes	1	0			0.17
n-Propylbenzene	1	0			0.02
o-Xylene	2	0		0.04	0.07

Legend A

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TABLE 3-113
Surface Soil Positive Results
OU8 - IHSS 173
Rocky Flats Environmental Technology Site

Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS811893 SSG0110JE 6-Dec-94	SS811993 SSG0111JE 6-Dec-94	SS812093 SSG0112JE 20-Dec-94
Test Group:BNACLP Units:µg/kg					
BIS(2-ETHYLHEXYL)PHTHALATE	330	4.57E 4 / 0.00E 0		52 J:A	
DI-n-OCTYL PHTHALATE	330	4.57E 4 / 0.00E 0			96 J:A
Test Group:METADD Units:mg/kg					
LITHIUM	20	5.49E 3 / 15.08E 0	6.2 B:V	4.6 B:V	5.3 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	7 B:V	5.7 B:V	9.7 B:V
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	40	7.96E 5 / 22999.00E 0	4540 :V	3170 :V	4770 :V
ARSENIC	2	3.66E-1 / 13.75E 0	1.5 B:JA*	1.5 B:JA*	2.3 :JA*
BARIUM	40	1.91E 4 / 176.00E 0	44.6 :V	34.8 B:V	46.1 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.16 B:V*	.14 B:V	.19 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	1090 I:JA	964 IB:JA	1130 I:JA
CHROMIUM	2	0.00E 0 / 22.21E 0	6.4 :V	6 :JA	7.3 :V
COBALT	10	1.65E 4 / 14.22E 0	8 B:V	5.5 B:V	6.3 B:V
COPPER	5	1.10E 4 / 22.75E 0	20 :JA	14.3 :JA	19.1 :V
IRON	20	0.00E 0 / 23063.00E 0	7290 :V	5530 :V	7180 :V
LEAD	1	0.00E 0 / 73.87E 0	6 :JA	6 :JA	6.1 :JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	1990 :V	1380 :V	1650 :V
MANGANESE	3	1.36E 3 / 482.10E 0	133 :V	113 :V	113 :V
NICKEL	8	5.49E 3 / 19.74E 0	4.7 B:V	5 B:V	5 B:V
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1740 :V	1300 :V	1550 :V
SILVER	2	1.37E 3 / 0.22E 0			1.1 B:JA#
SODIUM	2000	0.00E 0 / 119.02E 0	77.9 B:V		
VANADIUM	10	1.92E 3 / 61.84E 0	11.2 :V	9.1 B:V	12.7 :V
ZINC	4	8.23E 4 / 95.92E 0	23.5 :V	16.9 :V	21.1 :V
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	0	2.37E 0 / 0.04E 0		.007(.005) J:V	
GROSS ALpHA	0	0.00E 0 / 44.56E 0	26(4) :A	21(3.7) :A	14(2.8) :A
GROSS BETA	0	0.00E 0 / 55.35E 0	40(3.7) :A	39(3.7) :A	32(3.7) :A
URANIUM-233,-234	0	4.53E 1 / 3.31E 0	1.3(.32) B:V	1.1(.28) B:V	.83(.22) :V
URANIUM-238	0	8.00E-1 / 2.83E 0	1.1(.31) :V*	.85(.22) :V*	.73(.2) :V

Legend B

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TABLE 3-114
Surface Soil Positive Results Data Summary
OU8 - IHSS 173
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:BNACLP Units:µg/kg							
BIS(2-ETHYLHEXYL)PHTHALATE	330	350	SS812093 (1)	360	SS811893 (1)	52 J:A	SS811993 (1)
DI-n-OCTYL PHTHALATE	330	360	SS811893 (2)	360	SS811893 (2)	96 J:A	SS812093 (1)
Test Group:METADD Units:mg/kg							
LITHIUM	100	**	**	**	**	4.6 B:V	SS811993 (1)
STRONTIUM	200	**	**	**	**	5.7 B:V	SS811993 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	3170 :V	SS811993 (1)
ARSENIC	10	**	**	**	**	1.5 B:J	SS811893 (2)
BARIUM	200	**	**	**	**	34.8 B:V	SS811993 (1)
BERYLLIUM	5	**	**	**	**	.14 B:V	SS811993 (1)
CALCIUM	5000	**	**	**	**	964 IB:J	SS811993 (1)
CHROMIUM	10	**	**	**	**	6 :J	SS811993 (1)
COBALT	50	**	**	**	**	5.5 B:V	SS811993 (1)
COPPER	25	**	**	**	**	14.3 :J	SS811993 (1)
IRON	100	**	**	**	**	5530 :V	SS811993 (1)
LEAD	3	**	**	**	**	6 :J	SS811893 (2)
MAGNESIUM	5000	**	**	**	**	1380 :V	SS811993 (1)
MANGANESE	15	**	**	**	**	113 :V	SS811993 (2)
NICKEL	40	**	**	**	**	4.7 B:V	SS811893 (1)
POTASSIUM	5000	**	**	**	**	1300 :V	SS811993 (1)
SILVER	10	1.1	SS811993 (1)	1.4	SS811893 (1)	1.1 B:J	SS812093 (1)
SODIUM	5000	60.1	SS811993 (1)	91.2	SS812093 (1)	77.9 B:V	SS811893 (1)
VANADIUM	50	**	**	**	**	9.1 B:V	SS811993 (1)
ZINC	20	**	**	**	**	16.9 :V	SS811993 (1)
Test Group:TRADS Units:pCi/g							
AMERICIUM-241	0.004	**	**	**	**	.002(.003) U:V	SS812093 (1)
GROSS ALpHA	2	**	**	**	**	14(2.8) :A	SS812093 (1)
GROSS BETA	4	**	**	**	**	32(3.7) :A	SS812093 (1)
PLUTONIUM-239/240	0.003	**	**	**	**	.002(.002) U:V	SS811993 (2)
URANIUM-233,-234	0.09	**	**	**	**	.83(.22) :V	SS812093 (1)
URANIUM-235	0.1	**	**	**	**	.028(.028) U:V	SS812093 (1)
URANIUM-238	0.09	**	**	**	**	.73(.2) :V	SS812093 (1)

Legend C

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TABLE 3-114
Surface Soil Positive Results Data Summary
OU8 - IHSS 173
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:BNACLP Units:µg/kg					
BIS(2-ETHYLHEXYL)PHTHALATE	52 J:A	SS811993 (1)	1	3	135.6667
DI-n-OCTYL PHTHALATE	96 J:A	SS812093 (1)	1	3	152
Test Group:METADD Units:mg/kg					
LITHIUM	6.2 B:V	SS811893 (1)	3	3	5.3667
STRONTIUM	9.7 B:V	SS812093 (1)	3	3	7.4667
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	4770 :V	SS812093 (1)	3	3	4160
ARSENIC	2.3 :J	SS812093 (1)	3	3	1.7667
BARIUM	46.1 :V	SS812093 (1)	3	3	41.8333
BERYLLIUM	.19 B:V	SS812093 (1)	3	3	0.1633
CALCIUM	1130 I:J	SS812093 (1)	3	3	1061.333
CHROMIUM	7.3 :V	SS812093 (1)	3	3	6.5667
COBALT	8 B:V	SS811893 (1)	3	3	6.6
COPPER	20 :J	SS811893 (1)	3	3	17.8
IRON	7290 :V	SS811893 (1)	3	3	6666.667
LEAD	6.1 :J	SS812093 (1)	3	3	6.0333
MAGNESIUM	1990 :V	SS811893 (1)	3	3	1673.333
MANGANESE	133 :V	SS811893 (1)	3	3	119.6667
NICKEL	5 B:V	SS811993 (2)	3	3	4.9
POTASSIUM	1740 :V	SS811893 (1)	3	3	1530
SILVER	1.1 B:J	SS812093 (1)	1	3	0.7833
SODIUM	77.9 B:V	SS811893 (1)	1	3	51.1833
VANADIUM	12.7 :V	SS812093 (1)	3	3	11
ZINC	23.5 :V	SS811893 (1)	3	3	20.5
Test Group:TRADS Units:pCi/g					
AMERICIUM-241	.007(.005) J:V	SS811993 (1)	3	3	0.004
GROSS ALpHA	26(4) :A	SS811893 (1)	3	3	20.3333
GROSS BETA	40(3.7) :A	SS811893 (1)	3	3	37
PLUTONIUM-239/240	.006(.006) U:V	SS811893 (1)	3	3	0.0033
URANIUM-233,-234	1.3(.32) B:V	SS811893 (1)	3	3	1.0767
URANIUM-235	.046(.061) U:V	SS811993 (1)	3	3	0.037
URANIUM-238	1.1(.31) :V	SS811893 (1)	3	3	0.8933

Legend C

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TABLE 3-115
Population Distribution Summary of Surface-Soil Results
for IHSS 173

Test Group:METADD Units: mg/kg	Distribution	Comments
LITHIUM	Normal	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Nonparametric	
BARIUM	Normal	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Normal	
CHROMIUM	Normal	
COBALT	Normal	
COPPER	Normal	
IRON	Normal	
LEAD	Nonparametric	
MAGNESIUM	Normal	
MANGANESE	Nonparametric	
NICKEL	Nonparametric	
POTASSIUM	Normal	
SILVER	ND	One sample analyzed.
SODIUM	ND	One sample analyzed.
VANADIUM	Normal	
ZINC	Normal	
Test Group:TRADS		
AMERICIUM-241	ND	One sample analyzed.
GROSS ALPHA	Normal	
GROSS BETA	Normal	
URANIUM-233,-234	Normal	
URANIUM-238	Normal	

Legend D

TABLE 3-116
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 173

Sample Identification Number: Date Sampled:	Preliminary Remed. Goals	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
LITHIUM	5,490	3	5.4	0.80	0.149	0.440	0.700	0.962
STRONTIUM	165,000	3	7.5	2.04	0.273	0.210	0.370	0.650
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796,000	3	4160.0	865.04	0.208	0.280	0.500	0.820
ARSENIC	0.366	3	1.8	0.46	0.261	0.230	0.370	0.670
BARIUM	19,100	3	41.8	6.14	0.147	0.440	0.710	0.967
BERYLLIUM	1,370	3	0.2	0.03	0.154	0.420	0.690	0.950
CALCIUM	Not Determined	3	1061.3	86.63	0.082	0.825	0.980	.999+
CHROMIUM	274,000	3	6.6	0.67	0.101	0.690	0.920	0.991
COBALT	16,500	3	6.6	1.28	0.193	0.300	0.540	0.870
COPPER	11,000	3	17.8	3.06	0.172	0.380	0.610	0.915
IRON	Not Determined	3	6666.7	985.92	0.148	0.340	0.710	0.965
LEAD	Not Determined	3	6.0	0.06	0.010	.999+	.999+	.999+
MAGNESIUM	Not Determined	3	1673.3	305.67	0.183	0.350	0.570	0.885
MANGANESE	1,360	3	119.7	11.55	0.096	0.730	0.935	.999+
NICKEL	5,490	3	4.9	0.17	0.035	.999+	.999+	.999+
POTASSIUM	Not Determined	3	1530.0	220.68	0.144	0.450	0.730	0.971
SILVER	1,370	1	1.1	0.00	0.000	0.000	0.000	0.000
SODIUM	Not Determined	1	77.9	0.00	0.000	0.000	0.000	0.000
VANADIUM	1,920	3	11.0	1.81	0.164	0.400	0.620	0.935
ZINC	82,300	3	20.5	3.34	0.163	0.400	0.650	0.937
Test Group:TRADS Units: pCi/g								
AMERICIUM-241	2.37	1	0.0	0.00	0.000	0.000	0.000	0.000
GROSS ALPHA	Not Determined	3	20.3	6.03	0.296	0.190	0.300	0.580
GROSS BETA	Not Determined	3	37.0	4.36	0.118	0.580	0.850	0.994
URANIUM-233,-234	44.7	3	1.1	0.24	0.219	0.240	0.340	0.790
URANIUM-238	0.80	3	0.9	0.19	0.211	0.260	0.490	0.800

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-117
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 173

Sample Identification Number: Date Sampled:	No. of Samples	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, *d*)					
					(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg										
LITHIUM	3	5.4	0.80	0.149	2	1	1	1	1	1
STRONTIUM	3	7.5	2.04	0.273	6	4	3	2	1	1
Test Group:SMETCLP Units: mg/kg										
ALUMINUM	3	4160.0	865.04	0.208	3	2	2	1	1	1
ARSENIC	3	1.8	0.46	0.261	5	3	3	2	1	1
BARIUM	3	41.8	6.14	0.147	2	1	1	1	1	1
BERYLLIUM	3	0.2	0.03	0.154	2	1	1	1	1	1
CALCIUM	3	1061.3	86.63	0.082	1	1	1	1	1	1
CHROMIUM	3	6.6	0.67	0.101	1	1	1	1	1	1
COBALT	3	6.6	1.28	0.193	3	2	2	1	1	1
COPPER	3	17.8	3.06	0.172	3	2	1	1	1	1
IRON	3	6666.7	985.92	0.148	2	1	1	1	1	1
LEAD	3	6.0	0.06	0.010	1	1	1	1	1	1
MAGNESIUM	3	1673.3	305.67	0.183	3	2	2	1	1	1
MANGANESE	3	119.7	11.55	0.096	1	1	1	1	1	1
NICKEL	3	4.9	0.17	0.035	1	1	1	1	1	1
POTASSIUM	3	1530.0	220.68	0.144	2	1	1	1	1	1
SILVER	1	1.1	0.00	0.000	0	0	0	0	0	0
SODIUM	1	77.9	0.00	0.000	0	0	0	0	0	0
VANADIUM	3	11.0	1.81	0.164	2	2	1	1	1	1
ZINC	3	20.5	3.34	0.163	2	2	1	1	1	1
Test Group:TRADS Units: pCi/g										
AMERICIUM-241	1	0.0	0.00	0.000	0	0	0	0	0	0
GROSS ALPHA	3	20.3	6.03	0.296	6	4	3	2	1	1
GROSS BETA	3	37.0	4.36	0.118	1	1	1	1	1	1
URANIUM-233,-234	3	1.1	0.24	0.219	4	2	2	1	1	1
URANIUM-238	3	0.9	0.19	0.211	4	2	2	1	1	1

Legend D

Shading indicates that the value of the power is greater than 0.80.

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TABLE 3-118
Laboratory HPGe Vertical Soil Profile Results
for IHSS 184

Spread Sheet was not completed because of instructions to downsize the Data Summary Report per DOE Termination Orders.

All laboratory HPGe sample results collected for OU8 are presented in Appendix C.

TABLE 3-119
Surface Soil Positive Results
OU8 - IHSS 188
Rocky Flats Environmental Technology Site

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Sample Location: Sample Identification Number: Date Sampled:	MDL	PRG[1]/ BKGND[2]	SS812193 SSG0113JE 7-Nov-94	SS812193 SSG0127JE 7-Nov-94	SS812293 SSG0114JE 7-Nov-94	SS812393 SSG0115JE 7-Nov-94	SS812493 SSG0116JE 7-Nov-94	SS812593 SSG0117JE 7-Nov-94
Test Group:METADD Units:mg/kg								
CESIUM	200	0.00E 0 / 7.00E 0	8.5 B:V#	6 B:V	6.7 B:V	6.7 B:V	6.4 B:V	4.4 B:V
LITHIUM	20	5.49E 3 / 15.08E 0	7.3 B:V	7.1 B:V	6.6 B:V	6.3 B:V	8.1 B:V	12.2 B:V
STRONTIUM	40	1.65E 5 / 67.92E 0	41.9 B:V	44.5 :V	37.8 B:V	46.5 :V	56.4 :V	17.6 B:JA
Test Group:SMETCLP Units:mg/kg								
ALUMINUM	40	7.96E 5 / 22999.00E 0	7590 :V	7930 :V	6870 :V	7980 :V	9010 :V	10700 :V
ARSENIC	2	3.66E-1 / 13.75E 0	1.7 B:V*	1.7 B:V*	1.3 B:V*	.99 B:V*	1.4 B:V*	.57 B:V*
BARIUM	40	1.91E 4 / 176.00E 0	26.8 B:V	27.2 B:V	31.8 B:V	30.3 B:V	25.9 B:V	91.8 :V
BERYLLIUM	1	1.49E-1 / 1.25E 0	.32 B:V*	.34 B:V*	.33 B:V*	.34 B:V*	.2 B:V*	.32 B:V*
CALCIUM	1000	0.00E 0 / 5839.00E 0	6900 :V#	6850 :V#	6390 :V#	6970 :V#	7830 :V#	11700 :V#
CHROMIUM	2	0.00E 0 / 22.21E 0	7.4 :V	7.6 :V	11.8 :V	5.7 :V	7.1 :V	7.5 :JA
COBALT	10	1.65E 4 / 14.22E 0	19.1 :V#	14.9 :V#	21.1 :V#	36.2 :V#	36.5 :V#	11.8 :V
COPPER	5	1.10E 4 / 22.75E 0	79.9 :V#	74.5 :V#	84.1 :V#	115 :V#	122 :V#	50.2 :V#
IRON	20	0.00E 0 / 23063.00E 0	17100 :V	16800 :V	17300 :V	16400 :V	18800 :V	26600 :V#
LEAD	1	0.00E 0 / 73.87E 0	7.9 :V	8.1 :V	5.6 :V	6.4 :V	8.6 :V	9 :JA
MAGNESIUM	1000	0.00E 0 / 3707.00E 0	6440 :V#	6300 :V#	5610 :V#	5800 :V#	7350 :V#	6790 :V#
MANGANESE	3	1.36E 3 / 482.10E 0	434 :V	453 :V	333 :V	358 :V	467 :V	664 :V#
NICKEL	8	5.49E 3 / 19.74E 0	9.6 :V	10.4 :V	15.7 :V	8.6 B:V	10.7 :V	4.3 B:JA
POTASSIUM	2000	0.00E 0 / 3797.00E 0	1390 I:JA	1320 I:JA	1380 I:JA	1370 I:JA	1470 I:JA	3220 I:JA
SILVER	2	1.37E 3 / 0.22E 0	8.3 :JA#	6.1 :JA#	6.9 :JA#	9.7 :JA#	9.8 :JA#	
SODIUM	2000	0.00E 0 / 119.02E 0	1180 :V#	1520 :V#	1190 :V#	1800 :V#	1910 :V#	139 B:JA#
VANADIUM	10	1.92E 3 / 61.84E 0	27.4 :V	27.3 :V	28.7 :V	28.2 :V	31.4 :V	46.3 :V
ZINC	4	8.23E 4 / 95.92E 0	39.1 :V	36 :V	47.6 :V	36.9 :V	40.6 :V	85.6 :V
Test Group:WQPL Units:µg/g								
NITRATE/NITRITE	0	E 0 / E 0	1.56 :V-	1.39 :V-				

Legend B

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TABLE 3-120
Surface Soil Positive Results Data Summary
OU8 - IHSS 188
Rocky Flats Environmental Technology Site

	MDL	SQL Minimum Value	SQL Minimum Location *	SQL Maximum Value	SQL Maximum Location *	Minimum Concentration	Minimum Concentration Location *
Test Group:METADD Units:mg/kg							
CESIUM	1000	**	**	**	**	4.4 B:V	SS812593 (1)
LITHIUM	100	**	**	**	**	6.3 B:V	SS812393 (1)
STRONTIUM	200	**	**	**	**	17.6 B:J	SS812593 (1)
Test Group:SMETCLP Units:mg/kg							
ALUMINUM	200	**	**	**	**	6870 :V	SS812293 (1)
ARSENIC	10	**	**	**	**	.57 B:V	SS812593 (1)
BARIUM	200	**	**	**	**	25.9 B:V	SS812493 (1)
BERYLLIUM	5	**	**	**	**	.2 B:V	SS812493 (1)
CALCIUM	5000	**	**	**	**	6390 :V	SS812293 (1)
CHROMIUM	10	**	**	**	**	5.7 :V	SS812393 (1)
COBALT	50	**	**	**	**	11.8 :V	SS812593 (1)
COPPER	25	**	**	**	**	50.2 :V	SS812593 (1)
IRON	100	**	**	**	**	16400 :V	SS812393 (1)
LEAD	3	**	**	**	**	5.6 :V	SS812293 (1)
MAGNESIUM	5000	**	**	**	**	5610 :V	SS812293 (1)
MANGANESE	15	**	**	**	**	333 :V	SS812293 (1)
NICKEL	40	**	**	**	**	4.3 B:J	SS812593 (1)
POTASSIUM	5000	**	**	**	**	1370 I:J	SS812393 (1)
SILVER	10	1.8	SS812593 (1)	1.8	SS812593 (1)	6.9 :J	SS812293 (1)
SODIUM	5000	**	**	**	**	139 B:J	SS812593 (1)
VANADIUM	50	**	**	**	**	27.4 :V	SS812193 (1)
ZINC	20	**	**	**	**	36.9 :V	SS812393 (1)
Test Group:WQPL Units:µg/g							
NITRATE/NITRITE	0.5	0.54	SS812493 (1)	0.61	SS812293 (1)	1.56 :V	SS812193 (1)
pH **Units: pH**	0.01	**	**	**	**	8.14 :V	SS812293 (1)

Legend C

1/85

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TABLE 3-120
Surface Soil Positive Results Data Summary
OU8 - IHSS 188
Rocky Flats Environmental Technology Site

	Maximum Concentration	Maximum Concentration Location *	Number of Detects	Total Number of Samples	Average Concentration
Test Group:METADD Units:mg/kg					
CESIUM	8.5 B:V	SS812193 (1)	5	5	6.54
LITHIUM	12.2 B:V	SS812593 (1)	5	5	8.1
STRONTIUM	56.4 :V	SS812493 (1)	5	5	40.56
Test Group:SMETCLP Units:mg/kg					
ALUMINUM	10700 :V	SS812593 (1)	5	5	8498
ARSENIC	1.7 B:V	SS812193 (1)	5	5	1.192
BARIUM	91.8 :V	SS812593 (1)	5	5	41.4
BERYLLIUM	.34 B:V	SS812193 (2)	5	5	0.306
CALCIUM	11700 :V	SS812593 (1)	5	5	7958
CHROMIUM	11.8 :V	SS812293 (1)	5	5	7.94
COBALT	36.5 :V	SS812493 (1)	5	5	24.94
COPPER	122 :V	SS812493 (1)	5	5	90.24
IRON	26600 :V	SS812593 (1)	5	5	19240
LEAD	9 :J	SS812593 (1)	5	5	7.54
MAGNESIUM	7350 :V	SS812493 (1)	5	5	6398
MANGANESE	664 :V	SS812593 (1)	5	5	455
NICKEL	15.7 :V	SS812293 (1)	5	5	9.94
POTASSIUM	3220 I:J	SS812593 (1)	5	5	1766
SILVER	9.8 :J	SS812493 (1)	4	5	7.12
SODIUM	1910 :V	SS812493 (1)	5	5	1311.8
VANADIUM	46.3 :V	SS812593 (1)	5	5	32.4
ZINC	85.6 :V	SS812593 (1)	5	5	49.96
Test Group:WQPL Units:µg/g					
NITRATE/NITRITE	1.56 :V	SS812193 (1)	1	5	0.54
pH **Units: pH**	8.93 :V	SS812493 (1)	5	5	8.694

Legend C

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TABLE 3-121
Population Distribution Summary of Surface-Soil Results
for IHSS 188

Test Group:METADD		
LITHIUM	Normal	
STRONTIUM	Normal	
Test Group:SMETCLP		
ALUMINUM	Normal	
ARSENIC	Normal	
BARIUM	Nonparametric	
BERYLLIUM	ND	All results less than detection limit.
CALCIUM	Lognormal	
CHROMIUM	Normal	
COBALT	Normal	
COPPER	Normal	
IRON	Lognormal	
LEAD	Normal	
MAGNESIUM	Normal	
MANGANESE	Normal	
NICKEL	Normal	
POTASSIUM	Nonparametric	
SILVER	Normal	
SODIUM	ND	All results less than detection limit.
VANADIUM	Nonparametric	
ZINC	Lognormal	

Legend D

TABLE 3-122
Test of Power of Differences of Sample Mean and Population Mean of Surface-Soil Results for IHSS 188

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Power d=0.2	Power d=0.3	Power d=0.5
Test Group:METADD Units: mg/kg								
CESIUM	None	5	6.5	0.00	0.000	0.000	0.000	0.000
LITHIUM	5490	5	8.1	2.39	1.785	0.065	0.090	0.120
STRONTIUM	165000	5	40.6	14.46	0.000	0.000	0.000	0.000
Test Group:SMETCLP Units: mg/kg								
ALUMINUM	796000	5	8498.0	1445.02	0.170	0.690	0.935	.999+
ARSENIC	0.366	5	1.2	0.43	0.361	0.250	0.435	0.790
BARIUM	19100	5	41.4	28.27	0.683	0.120	0.160	0.380
BERYLLIUM	0.149	5	0.3	0.06	0.196	0.560	0.870	0.998
CALCIUM	None	5	7958.0	2154.82	0.271	0.390	0.670	0.995
CHROMIUM	274000	5	7.9	2.29	0.288	0.360	0.600	0.930
COBALT	16500	5	24.9	10.98	0.440	0.200	0.360	0.660
COPPER	11000	5	90.2	29.02	0.322	0.320	0.500	0.895
IRON	None	5	19240.0	4206.30	0.219	0.500	0.815	0.998
LEAD	None	5	7.5	1.47	0.195	0.590	0.870	0.998
MAGNESIUM	None	5	6398.0	714.19	0.112	0.945	0.999	.999+
MANGANESE	1360	5	455.0	130.50	0.287	0.340	0.600	0.930
NICKEL	5490	5	9.9	4.11	0.413	0.200	0.390	0.710
POTASSIUM	None	5	1766.0	813.78	0.461	0.160	0.340	0.630
SILVER	1370	4	8.7	1.37	0.158	0.660	0.915	0.998
SODIUM	None	5	1311.8	712.36	0.543	0.160	0.240	0.500
VANADIUM	1920	5	32.4	7.91	0.244	0.430	0.700	0.977
ZINC	82300	5	50.0	20.32	0.407	0.200	0.380	0.730
Test Group:WQPL Units: µg/g								
NITRATE/NITRITE	439000	1	1.6	0.00	0.000	0.000	0.000	0.000

Legend D

Shading indicates that the value of the power is greater than 0.80.

TABLE 3-123
Required Number of Samples for Specified Confidence and Difference in Means of Surface-Soil Results for IHSS 188

	PRGs	No. of Samples (n)	Mean	Standard Deviation	Coef. of Var.	Required Number of Samples (α, d)					
						(0.05,0.2)	(0.10,0.2)	(0.05,0.3)	(0.10,0.3)	(0.05,0.5)	(0.10,0.5)
Test Group:METADD Units: mg/kg											
CESIUM	None	5	6.5	0.00	0.000	0	0	0	0	0	0
LITHIUM	5490	5	8.1	2.39	0.296	6	4	3	2	1	1
STRONTIUM	165000	5	40.6	14.46	0.357	9	6	4	3	2	1
Test Group:SMETCLP Units: mg/kg											
ALUMINUM	796000	5	8498.0	1445.02	0.170	2	2	1	1	1	1
ARSENIC	0.366	5	1.2	0.43	0.361	9	6	4	3	2	1
BARIUM	19100	5	41.4	28.27	0.683	32	20	15	9	6	4
BERYLLIUM	0.149	5	0.3	0.06	0.196	3	2	2	1	1	1
CALCIUM	None	5	7958.0	2154.82	0.271	5	4	3	2	1	1
CHROMIUM	274000	5	7.9	2.29	0.288	6	4	3	2	1	1
COBALT	16500	5	24.9	10.98	0.440	14	8	6	4	3	2
COPPER	11000	5	90.2	29.02	0.322	7	5	4	2	2	1
IRON	None	5	19240.0	4206.30	0.219	4	2	2	1	1	1
LEAD	None	5	7.5	1.47	0.195	3	2	2	1	1	1
MAGNESIUM	None	5	6398.0	714.19	0.112	1	1	1	1	1	1
MANGANESE	1360	5	455.0	130.50	0.287	6	4	3	2	1	1
NICKEL	5490	5	9.9	4.11	0.413	12	8	6	4	2	2
POTASSIUM	None	5	1766.0	813.78	0.461	15	9	7	4	3	2
SILVER	1370	4	8.7	1.37	0.158	2	2	1	1	1	1
SODIUM	None	5	1311.8	712.36	0.543	20	13	9	6	4	2
VANADIUM	1920	5	32.4	7.91	0.244	5	3	2	2	1	1
ZINC	82300	5	50.0	20.32	0.407	12	7	5	4	2	2
Test Group:WQPL Units: µg/g											
NITRATE/NITRITE	439000	1	1.6	0.00	0.000	0	0	0	0	0	0

Legend D

Shading indicates that the value of the power is greater than 0.80.

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THIS TARGET SHEET REPRESENTS AN OVER-SIZED MAP / PLATE FOR THIS DOCUMENT

Data Summary 2 IHSS 129
Operable Unit No. 8
700 Area, Volume I
September 1995

Plate 2:

IHSS 129 Analytical Results For Surface Soil Samples

Map ID: OU10

February 10, 1995

CERCLA Administrative Record document, IA - A - 000567

U.S. DEPARTEMENT OF ENERGY
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

490 | 490

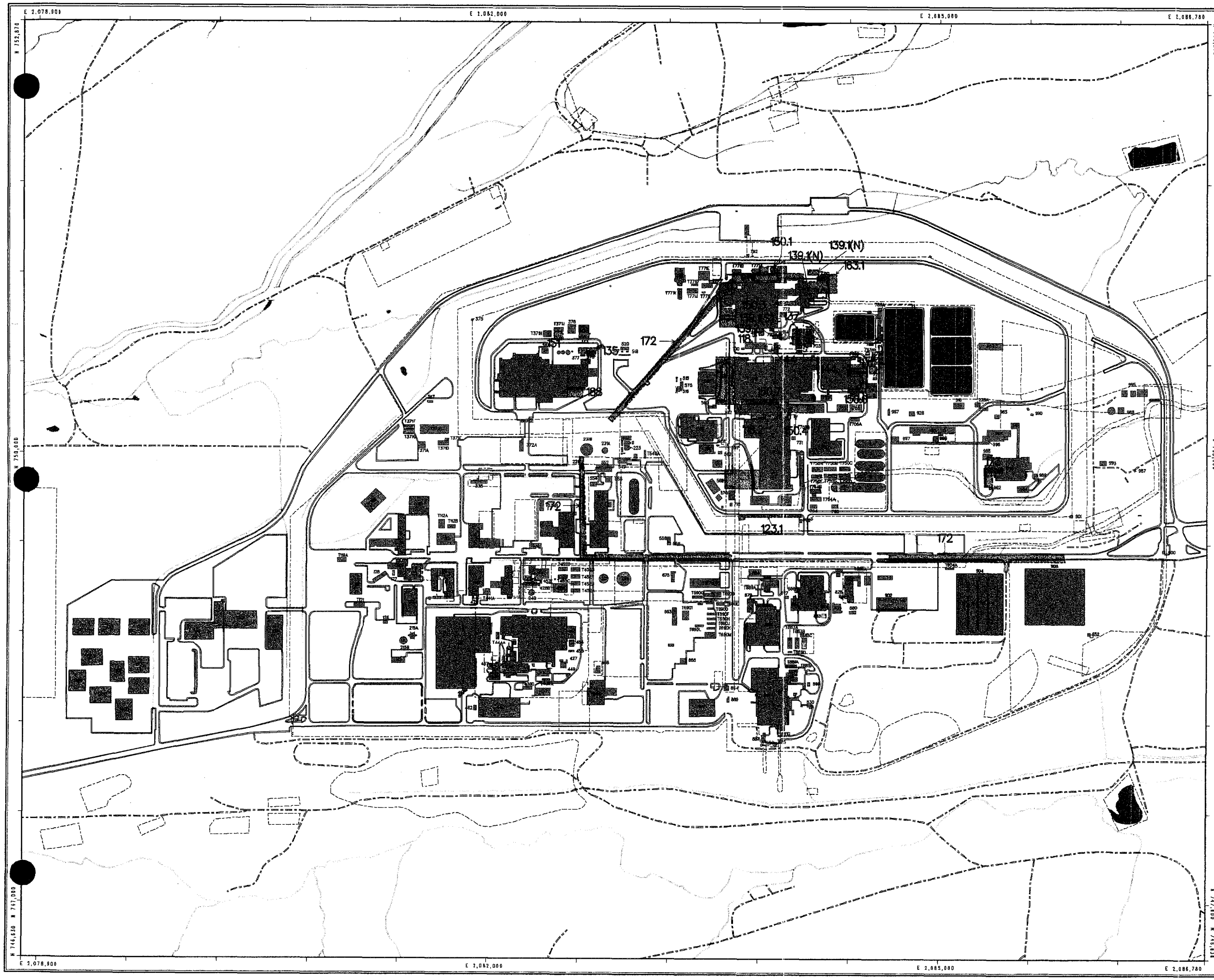

FIGURE 1-2

Operable Unit 8
Individual Hazardous Substance Sites

EXPLANATION

- OU 8 IHSS
- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

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Scale – 1 : 8050
1 inch represents approximately 670.83 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

RMRS

Rocky Mountain Remediation Services
A Limited Liability Company

7100 East Belleview Avenue, Suite 300
Englewood, Colorado 80110

MAP ID: OU8

August 29, 1995

/users/gis/data/ou8/amis/ou8fig1_2.aml

223

FIGURE 1-1
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

EXPLANATION

- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Building footprint (where overlaps IHSS)
- Fences
- Contours (20' Intervals)
- Rocky Flats boundary
- Paved roads
- Dirt roads

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- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Building footprint (where overlaps IHSS)
- Fences
- Contours (20' Intervals)
- Rocky Flats boundary
- Paved roads
- Dirt roads

Scale = 1 : 5460
1 inch represents 455 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

Rocky Mountain Remediation Services
A Limited Liability Company
7100 East Belleview Avenue, Suite 300
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MAP ID: Location 222 August 29, 1995

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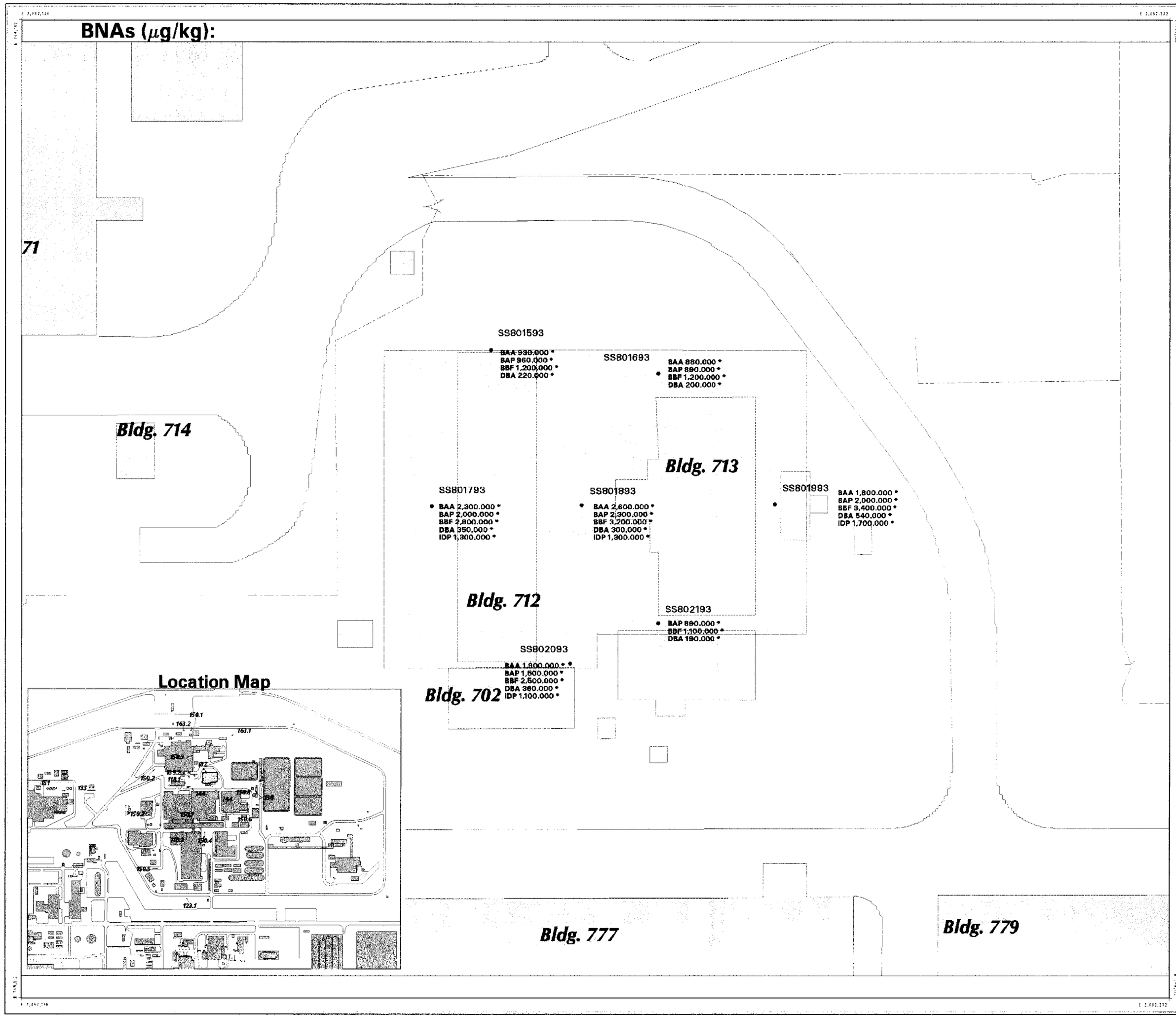

FIGURE 3-9

OU8-IHSS 137

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
DBA = Dibenzo(a,h)antracene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

Rocky Mountain Remediation Services
A Limited Liability Company
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Englewood, Colorado 80110

MAP ID: ou-8

232

August 23, 1995

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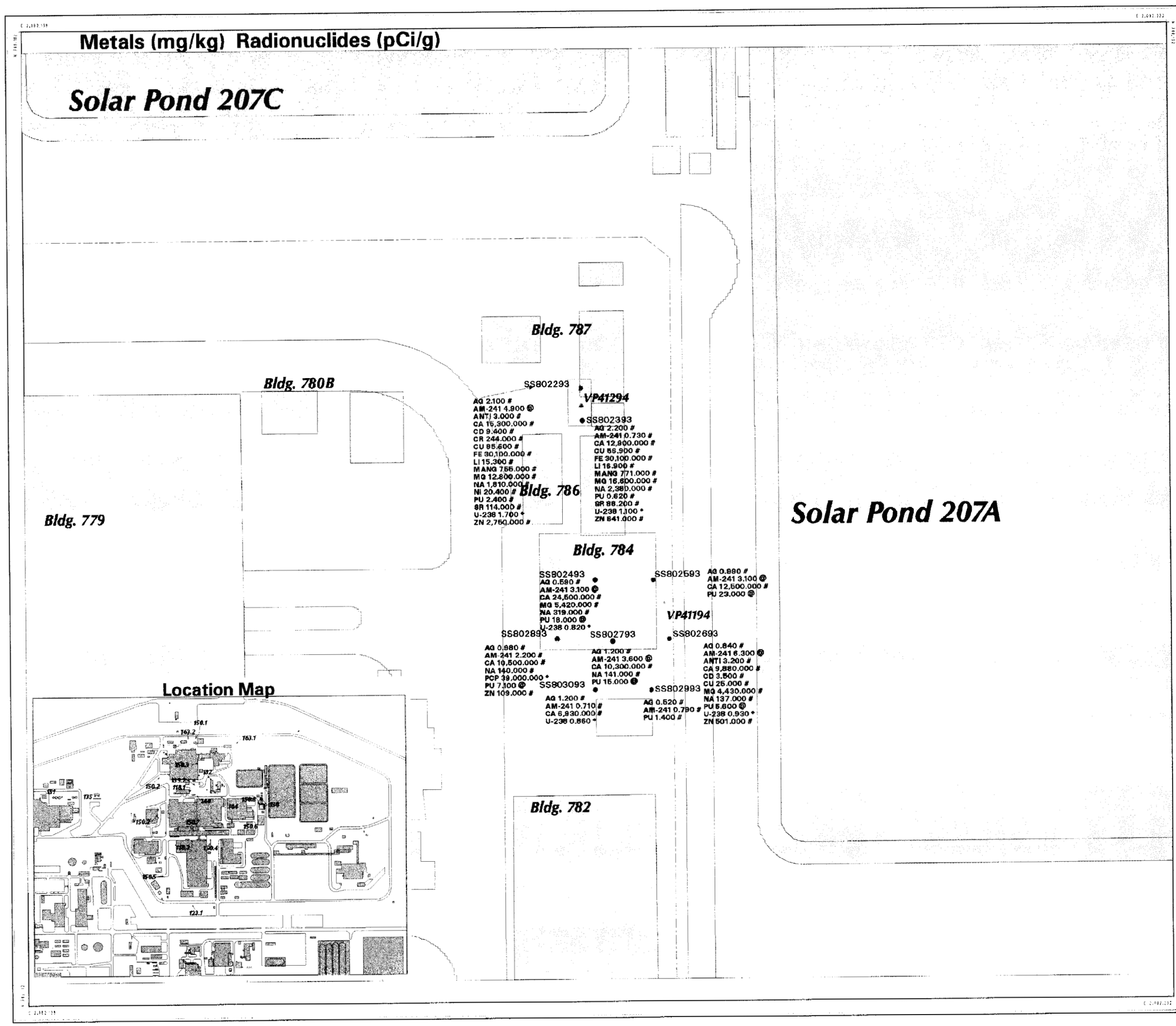

FIGURE 3-10

OU8-IHSS 138

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
CA = Calcium
CD = Cadmium
CR = Chromium
CU = Copper
FE = Iron
LI = Lithium
MANG = Manganese
MG = Magnesium
NA = Sodium
NI = Nickel
PCP = Pentachlorophenol
PU = Plutonium-239/240
SR = Strontium
U-235 = Uranium-235
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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MAP ID: ou-8

233

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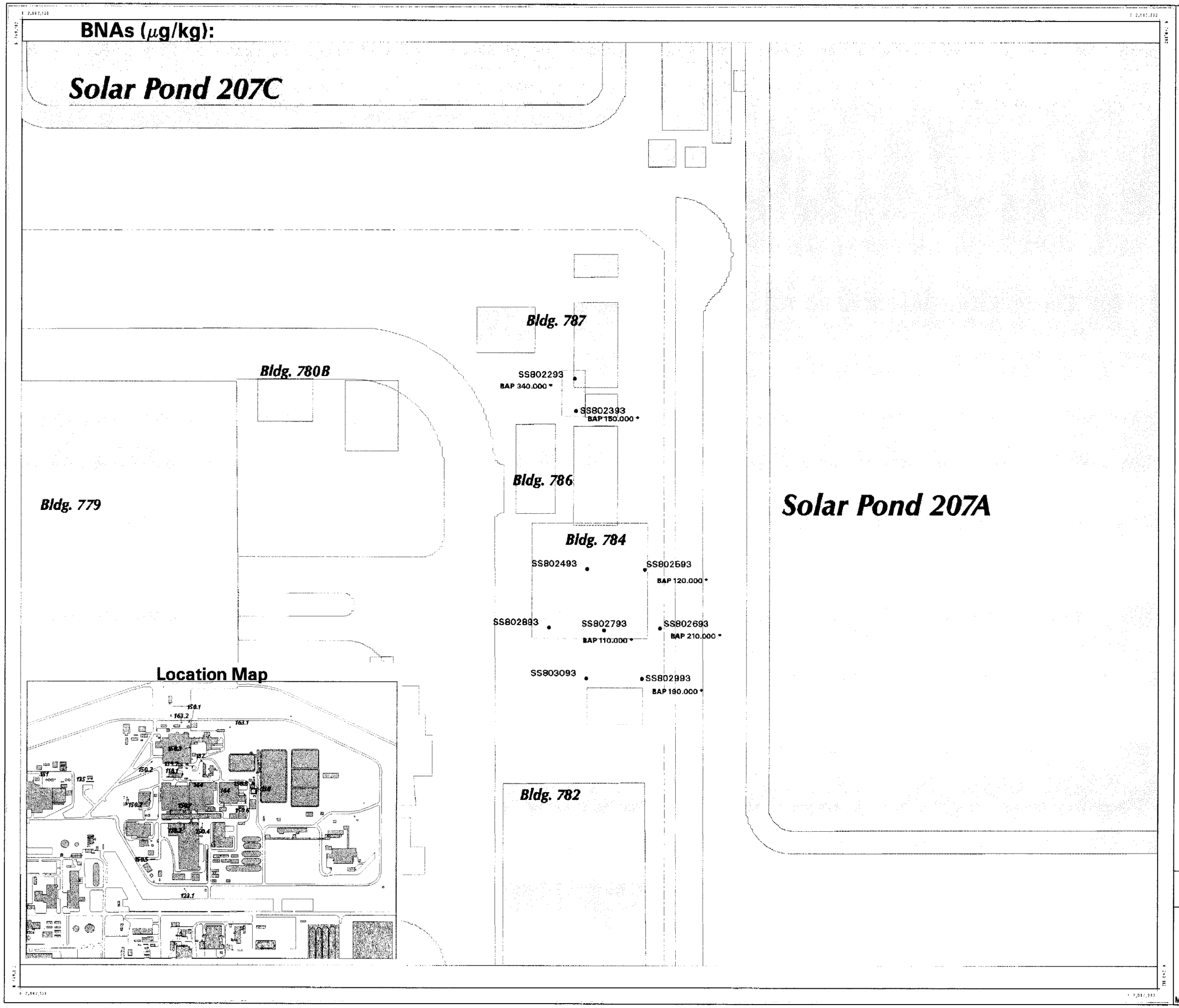

FIGURE 3-11

OU8-IHSS 138

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAP = Benso(a)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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Rocky Flats Environmental Technology Site

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MAP ID: ou-8

234

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/users/vkjera/s521905/projects/iou/ou8/sogplates/sso138.aml

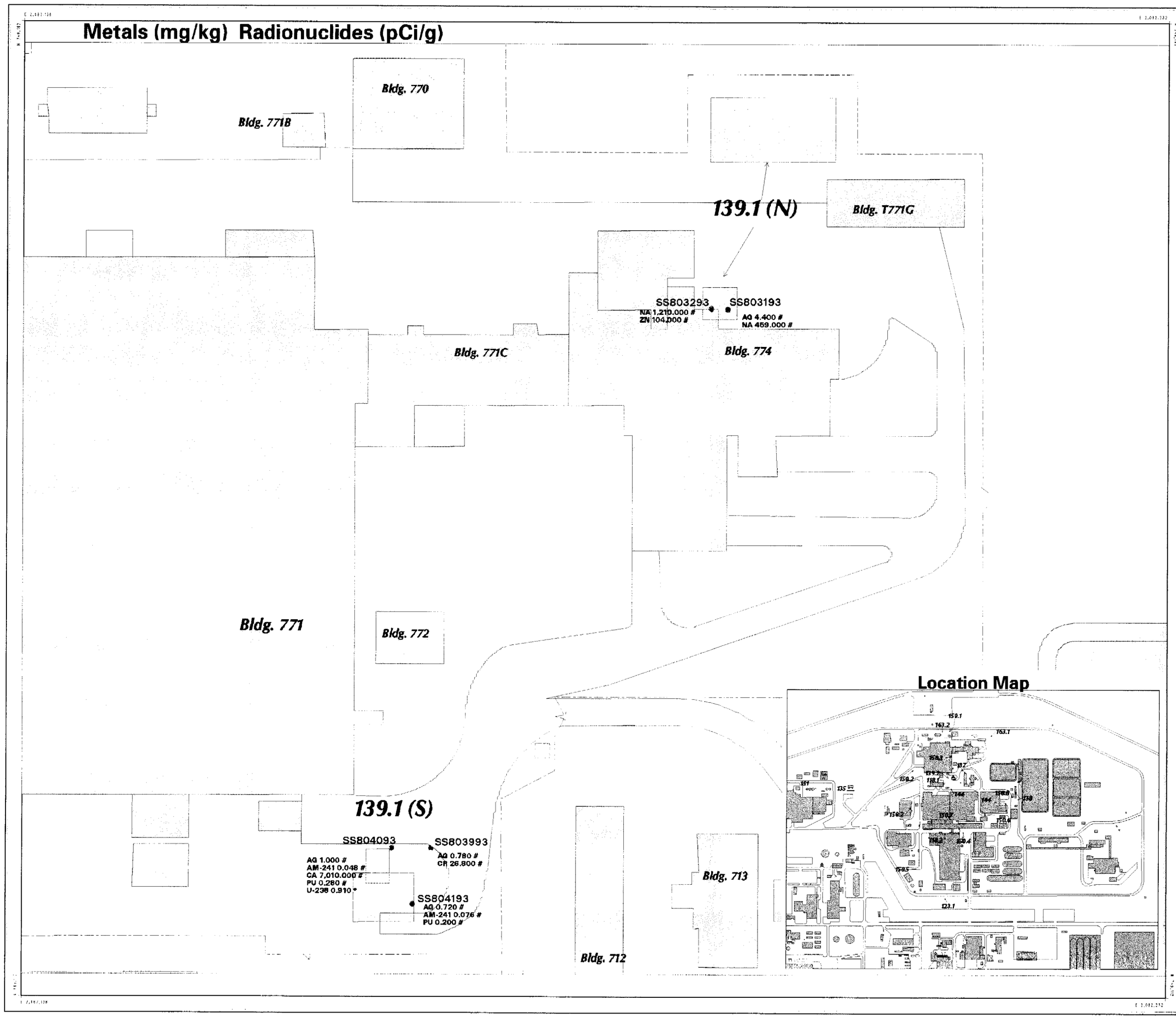

FIGURE 3-12

OU8-IHSS 139.1

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
CA = Calcium
CR = Chromium
NA = Sodium
PU = Plutonium-239/240
TIN = Tin
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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Rocky Flats Environmental Technology Site

Prepared by:

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A Limited Liability Company
7100 East Belleview Avenue, Suite 300
Englewood, Colorado 80110

MAP ID: ou-8

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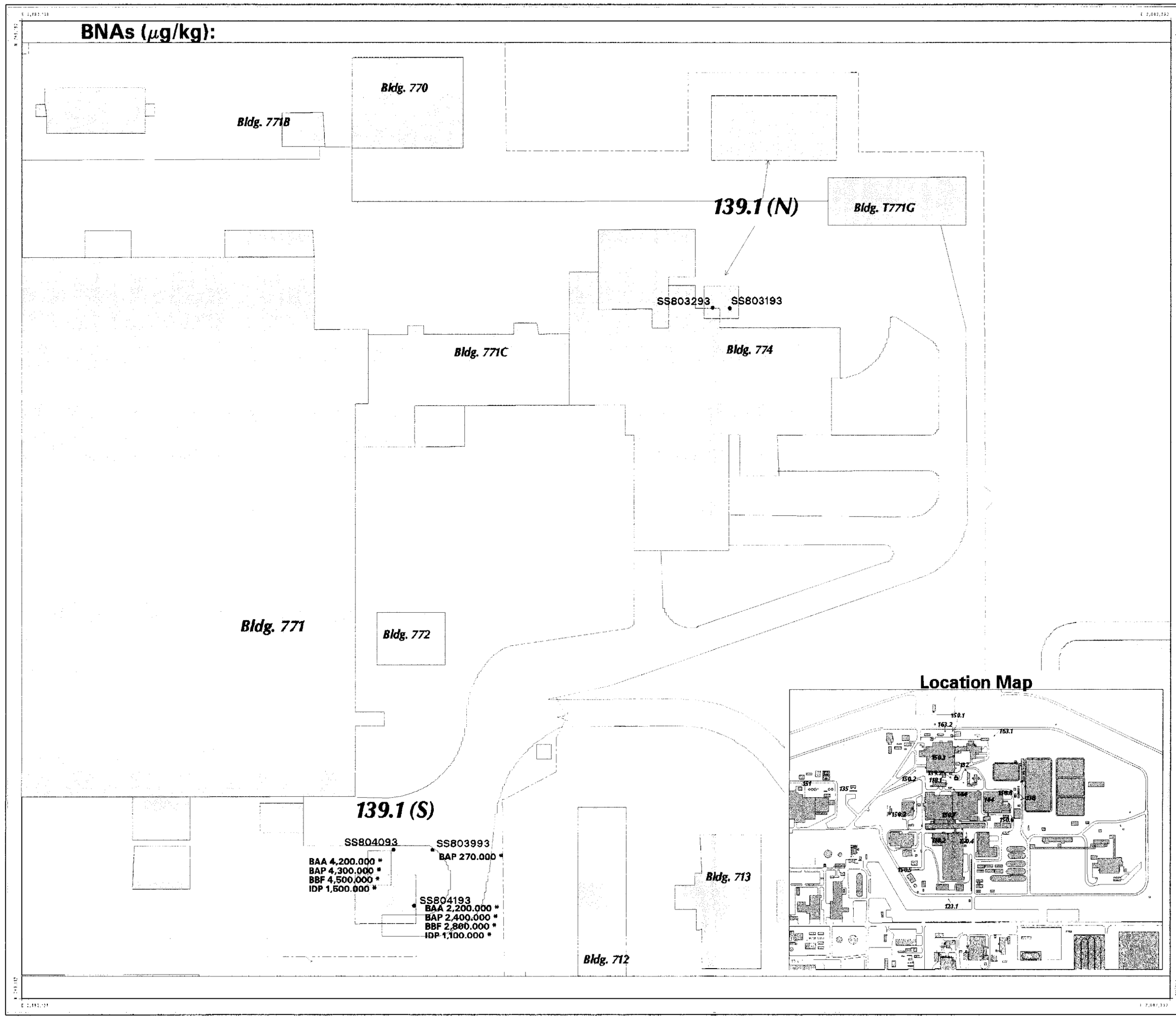

FIGURE 3-13

OU8-IHSS 139.1

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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Rocky Flats Environmental Technology Site

Prepared by:

Rocky Mountain Remediation Services
A Limited Liability Company
7100 East Belleview Avenue, Suite 300
Englewood, Colorado 80110

MAP ID: ou-8 236 August 23, 1995

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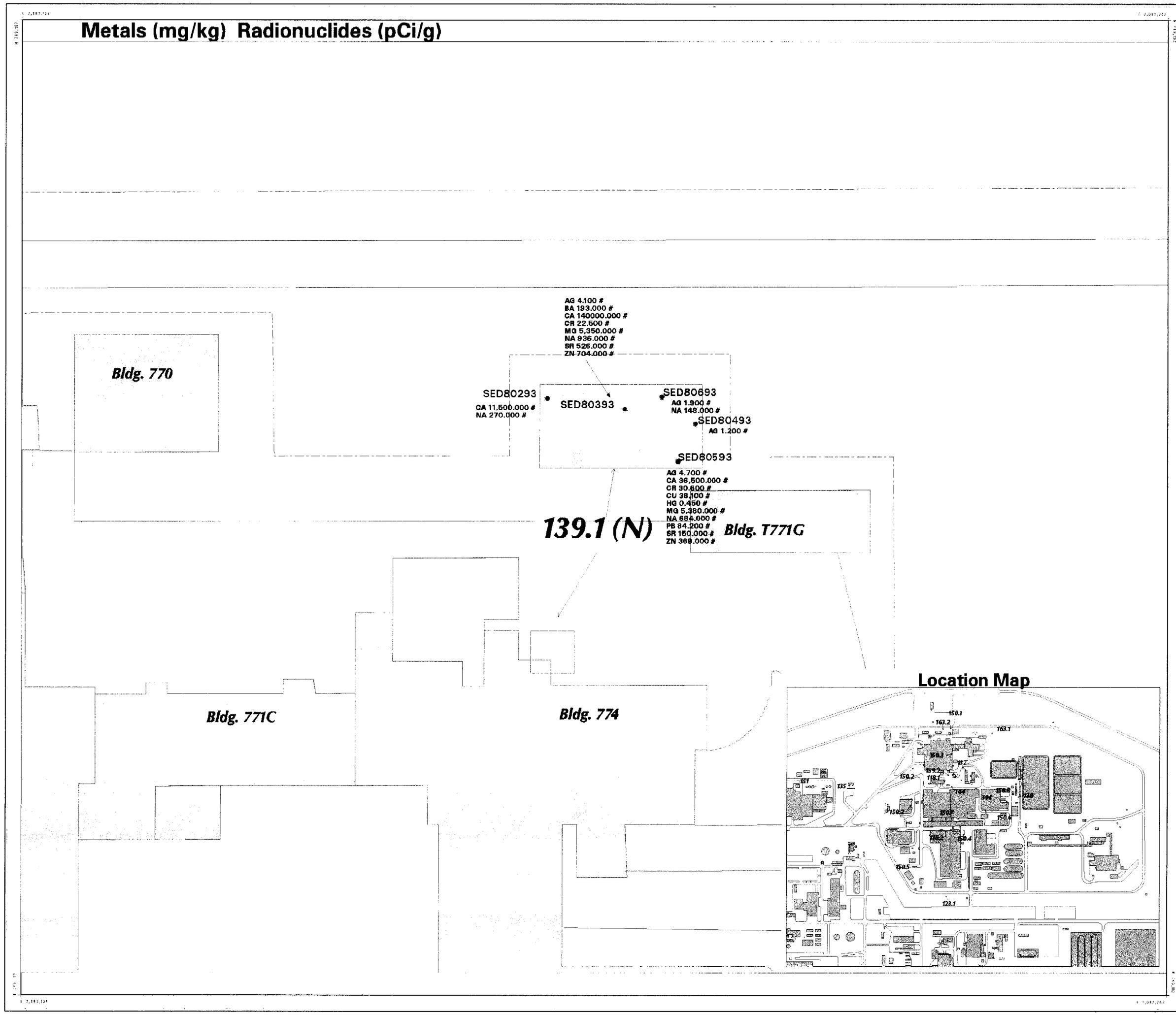

FIGURE 3-14

OU8-IHSS 139.1

SEDIMENT SAMPLE ANALYTICAL RESULTS

EXPLANATION

- Sediment Sample Location
- Sample not Available
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
BA = Barium
CA = Calcium
CR = Chromium
CU = Copper
HG = Mercury
MG = Magnesium
NA = Sodium
PB = Lead
SR = Strontium
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/sed1391.aml

237

237

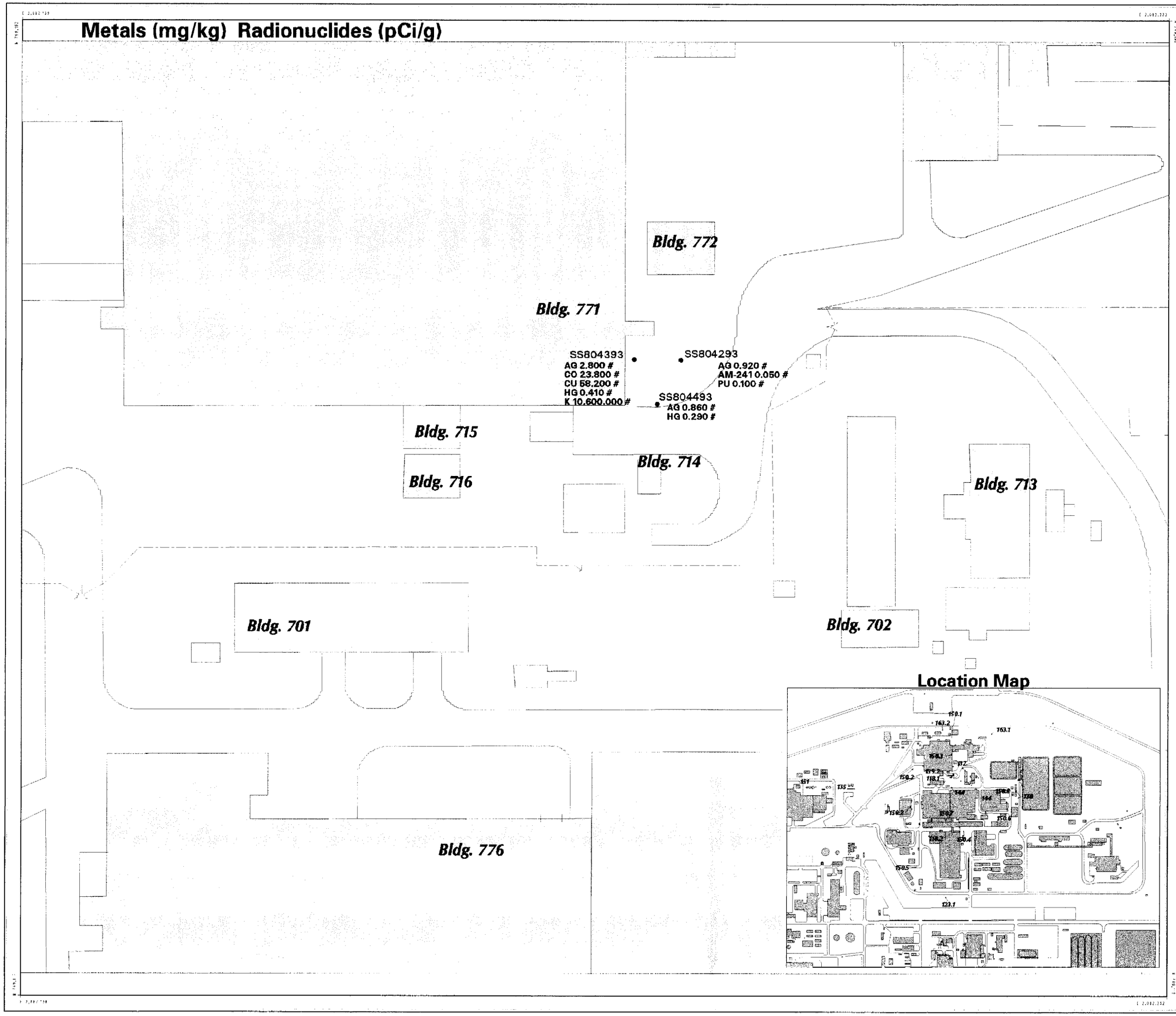

FIGURE 3-15

OU8-IHSS 139.2

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
CO = Cobalt
CU = Copper
HG = Mercury
K = Potassium
PU = Plutonium-239/240

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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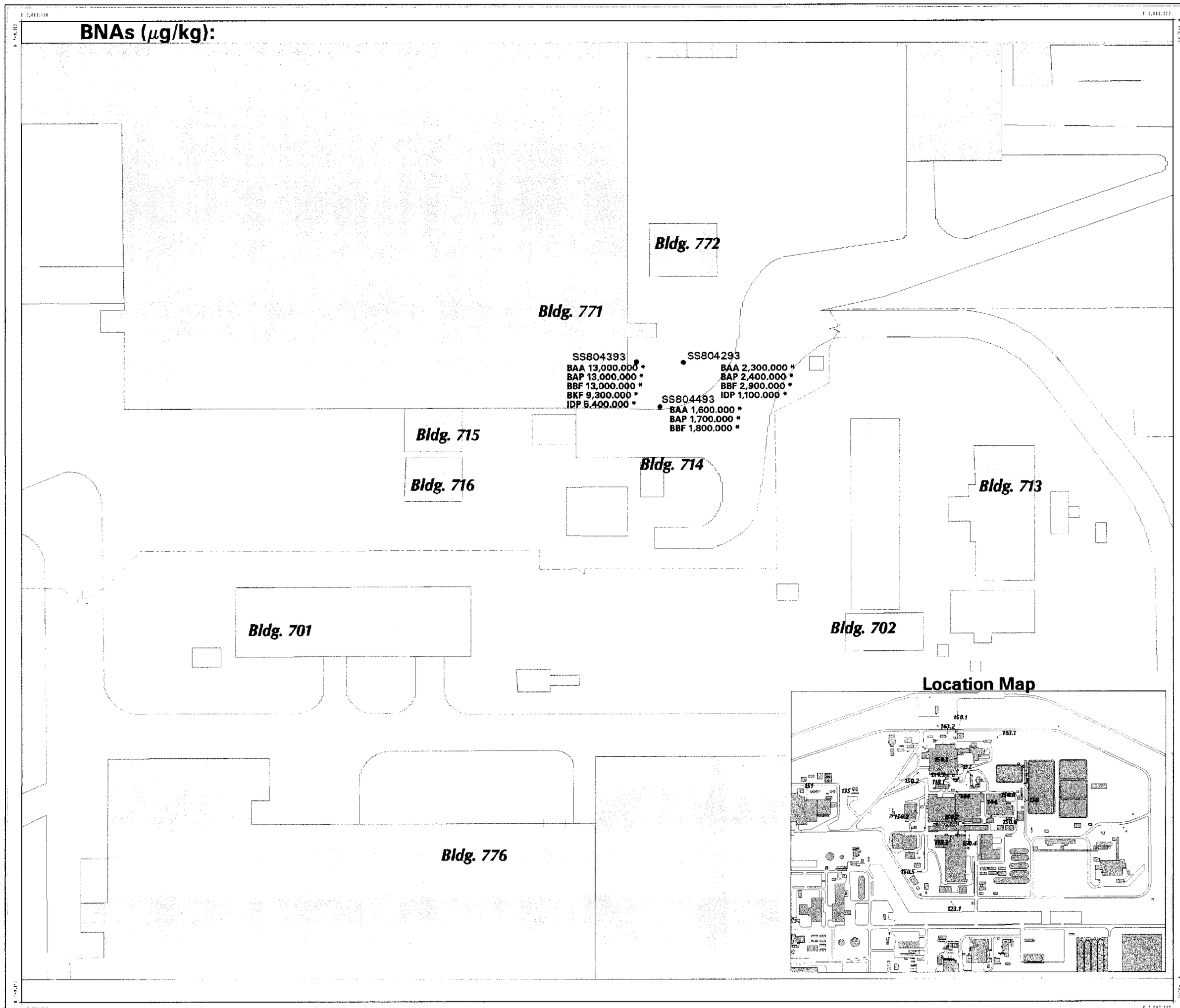

FIGURE 3-16

OU8-IIHSS 139.2

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
BKF = Benzo(k)fluoranthene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/e521905/projects/ou/ou8/sogplates/eso1392.aml

239

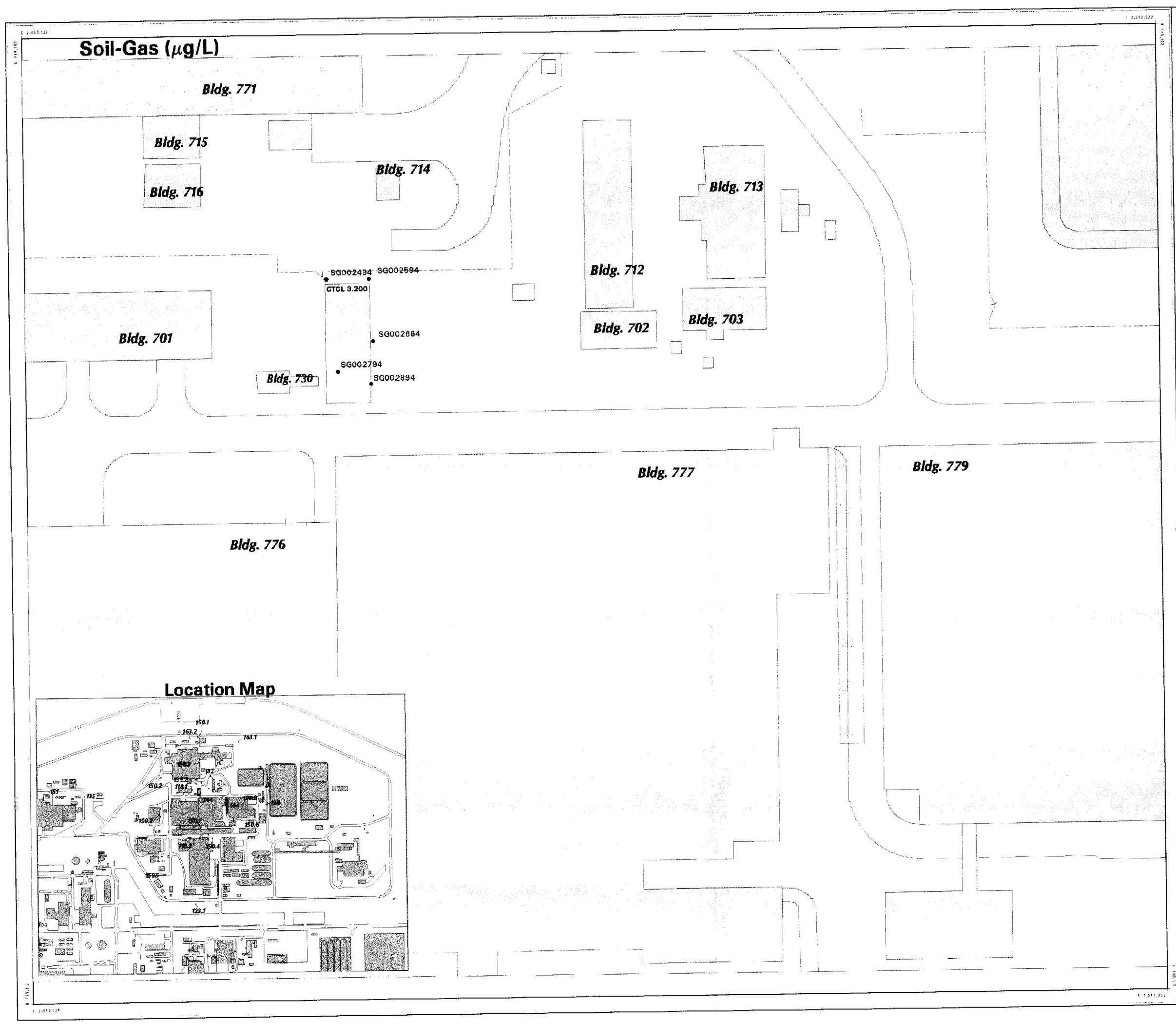

FIGURE 3-17

OU8-IHSS 144

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

CTCL = Carbon Techrachloride

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/sg144.aml

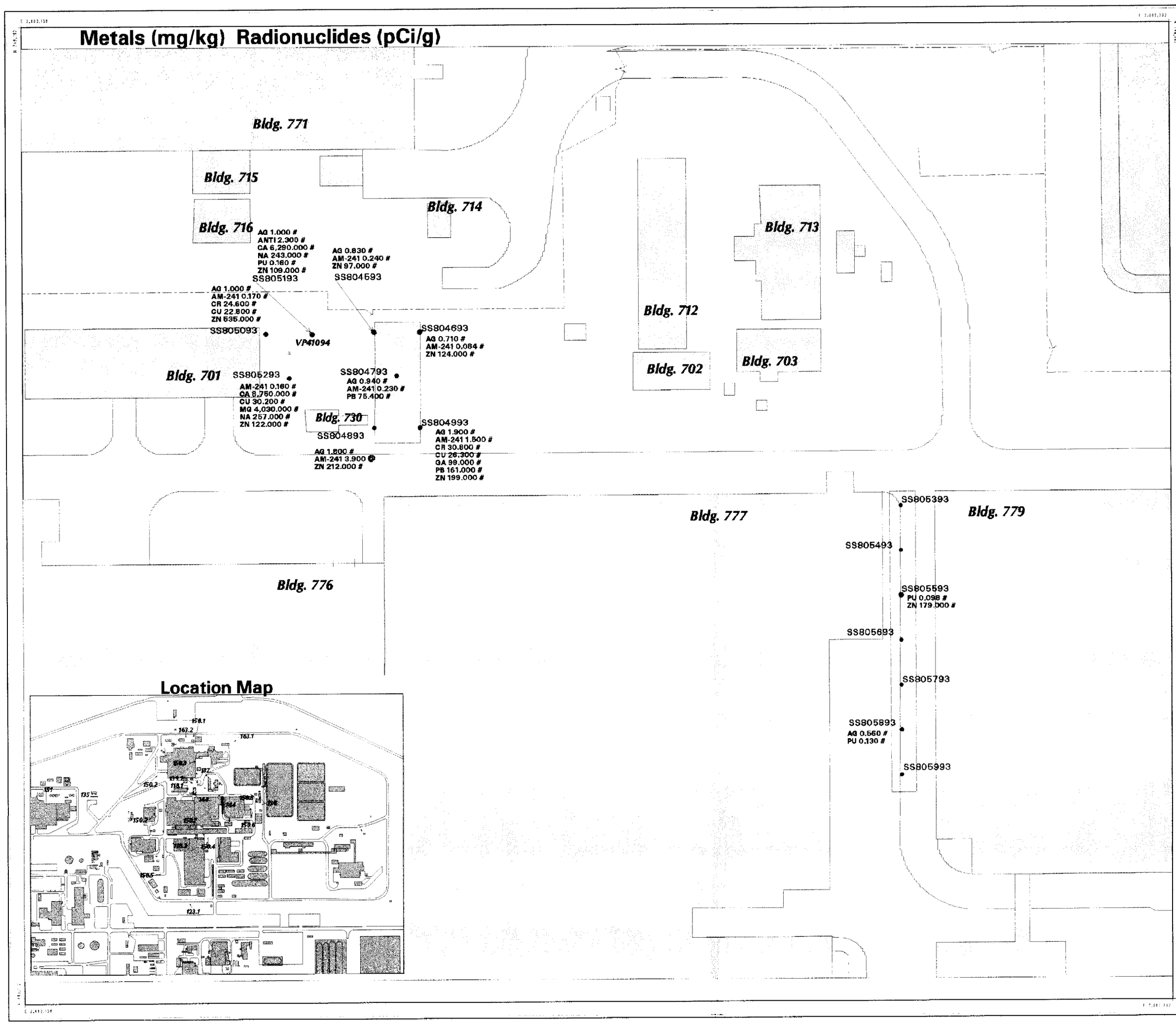

FIGURE 3-18

OU8-IHSS 144

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
CA = Calcium
CR = Chromium
CU = Copper
GA = Gross Alpha
MG = Magnesium
NA = Sodium
PB = Lead
PU = Plutonium-239/240
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- \# Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/ssi144.aml

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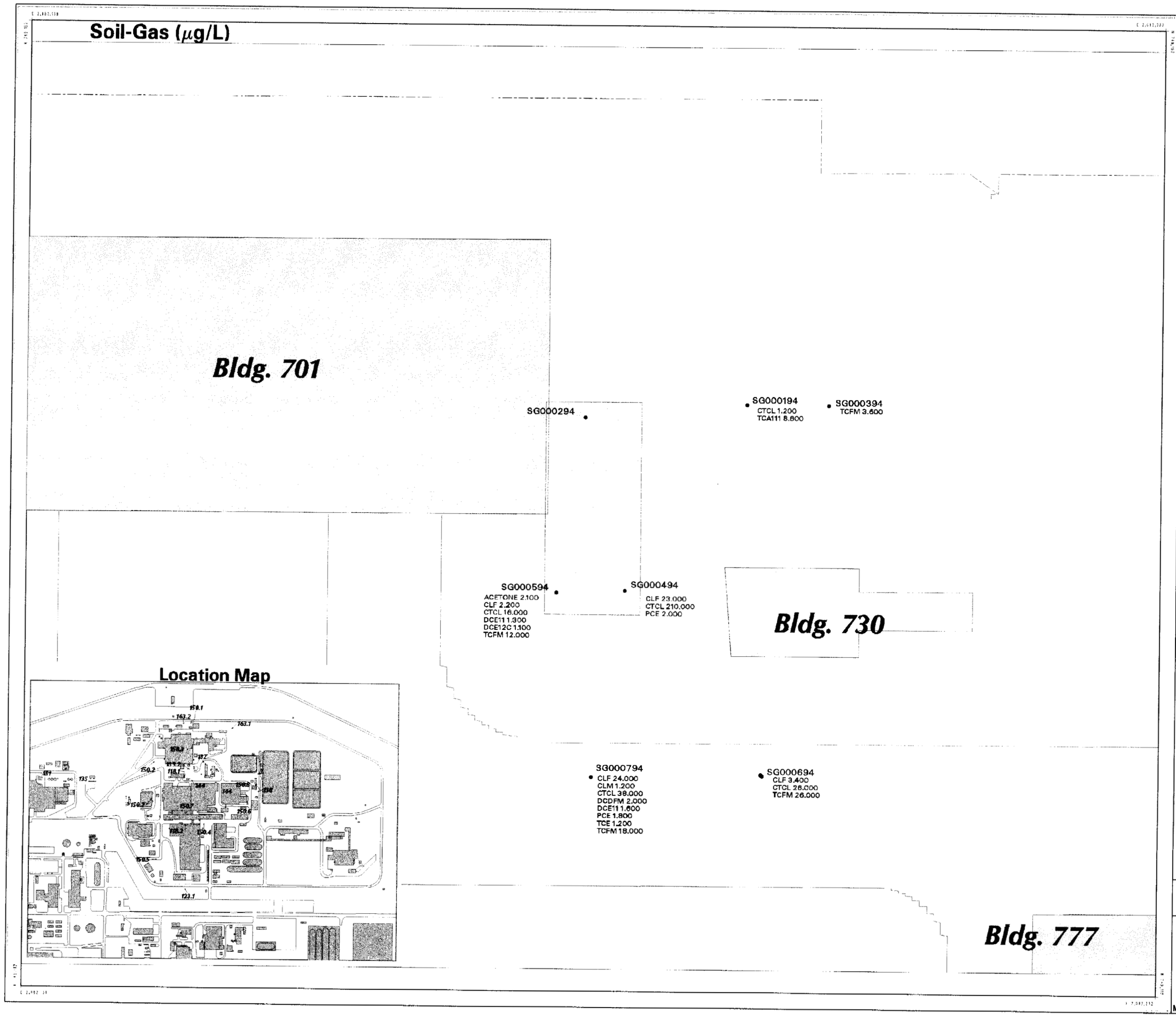

FIGURE 3-1

OU8-IHSS 118.1

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

ACETONE = Acetone
CLF = Chloroform
CLM = Chloromethane
CTCL = Carbon Techrachloride
DCDFM = Dichlorodifluoromethane
DCE11 = 1,1-Dichloroethene
DCE12C = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
TCA111 = 1,1,1-Trichloroethane
TCE = Trichloroethene
TCFM = Trichlorofluoromethane

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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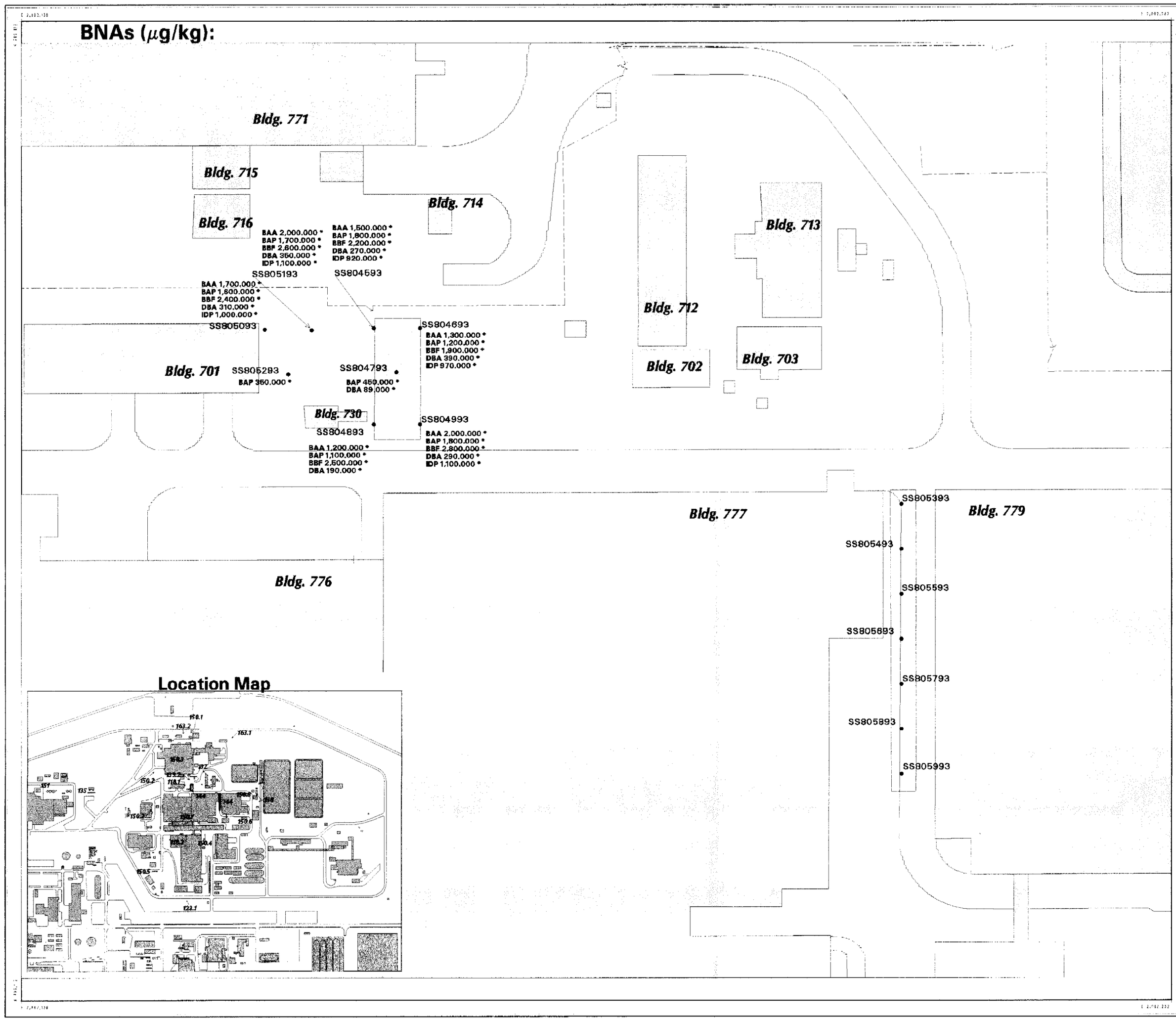

FIGURE 3-19

OU8-IHSS 144

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
DBA = Dibenzo(a,h)antracene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/r521905/projects/ou/ou8/sogplates/eso144.aml

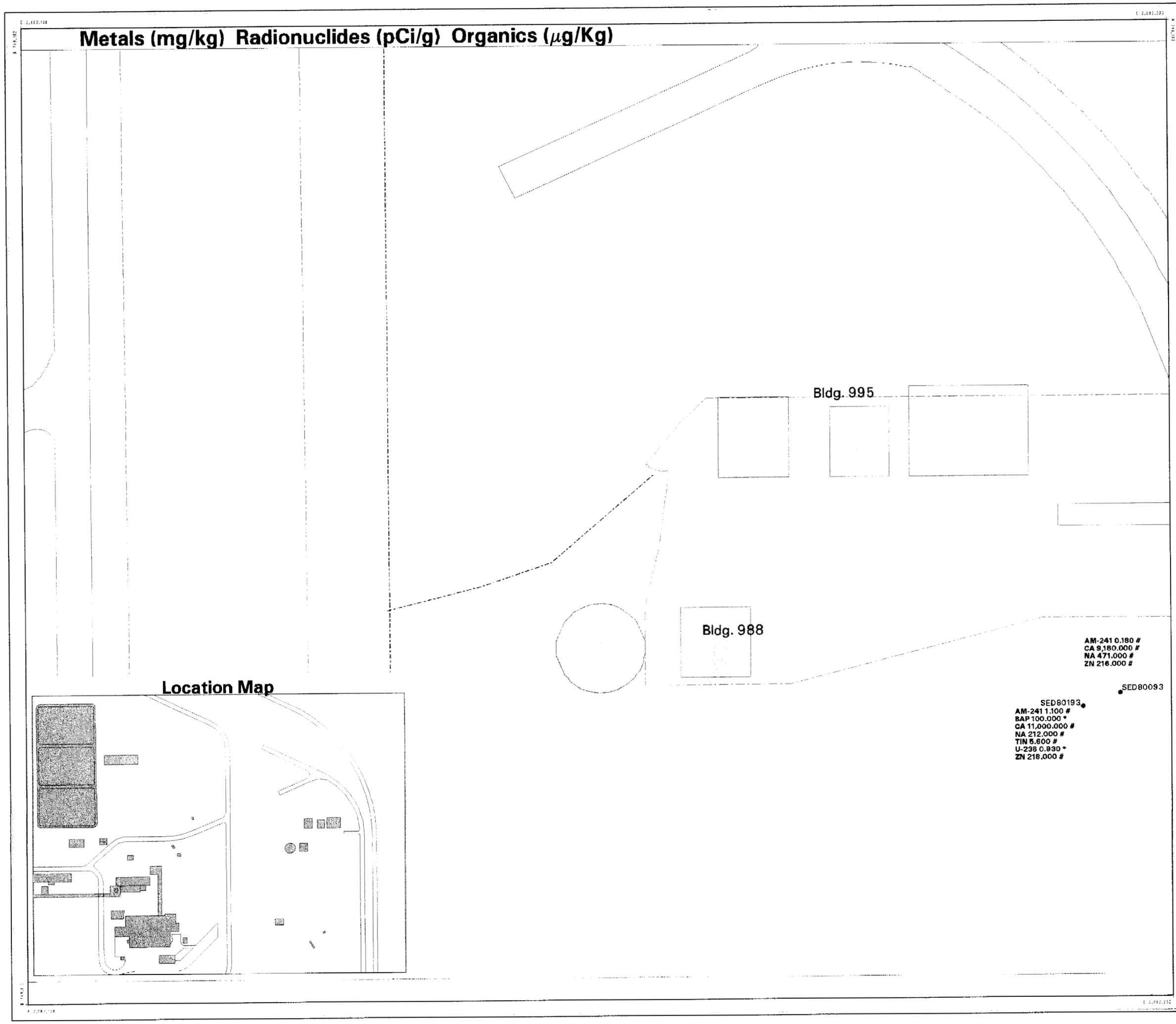

FIGURE 3-20

OU8-IHSS 144

SEDIMENT SAMPLE ANALYTICAL RESULTS

EXPLANATION

- ● Sediment Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AM-241 = Americium-241
BAP = Benso(a)pyrene
CA = Calcium
NA = Sodium
TIN = Tin
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

20 0 40 80 ft

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/users/vkjera/s521905/projects/iou/ou8/soogplates/sed144.aml

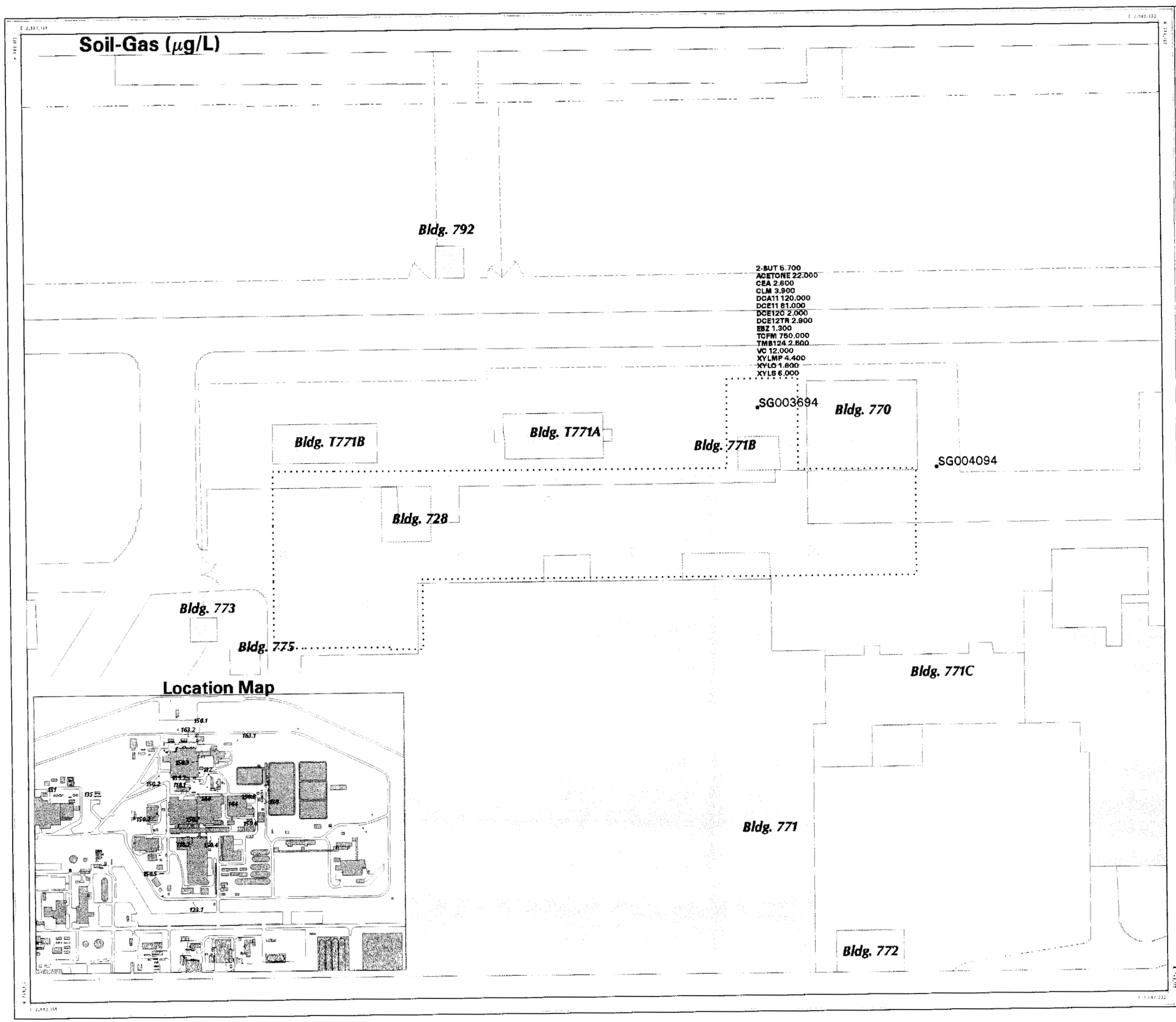

FIGURE 3-21

OU8-IHSS 150.1

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

2-BUT = 2-Butanone
ACETONE = Acetone
CEA = Chloroethane
CLM = Chloromethane
DCA11 = 1,1-Dichloroethane
DCE11 = 1,1-Dichloroethene
DCE12C = cis-1,2-Dichloroethene
DCE12TR = Trans-1,2-DCE
EBZ = Ethylbenzene
TCFM = Trichlorofluoromethane
TMB124 = 1,2,4-Trimethylbenzene
VC = Vinyl Chloride
XYLMP = m & p-Xylenes
XYLO = o-Xylene
XYLS = Total Xylenes

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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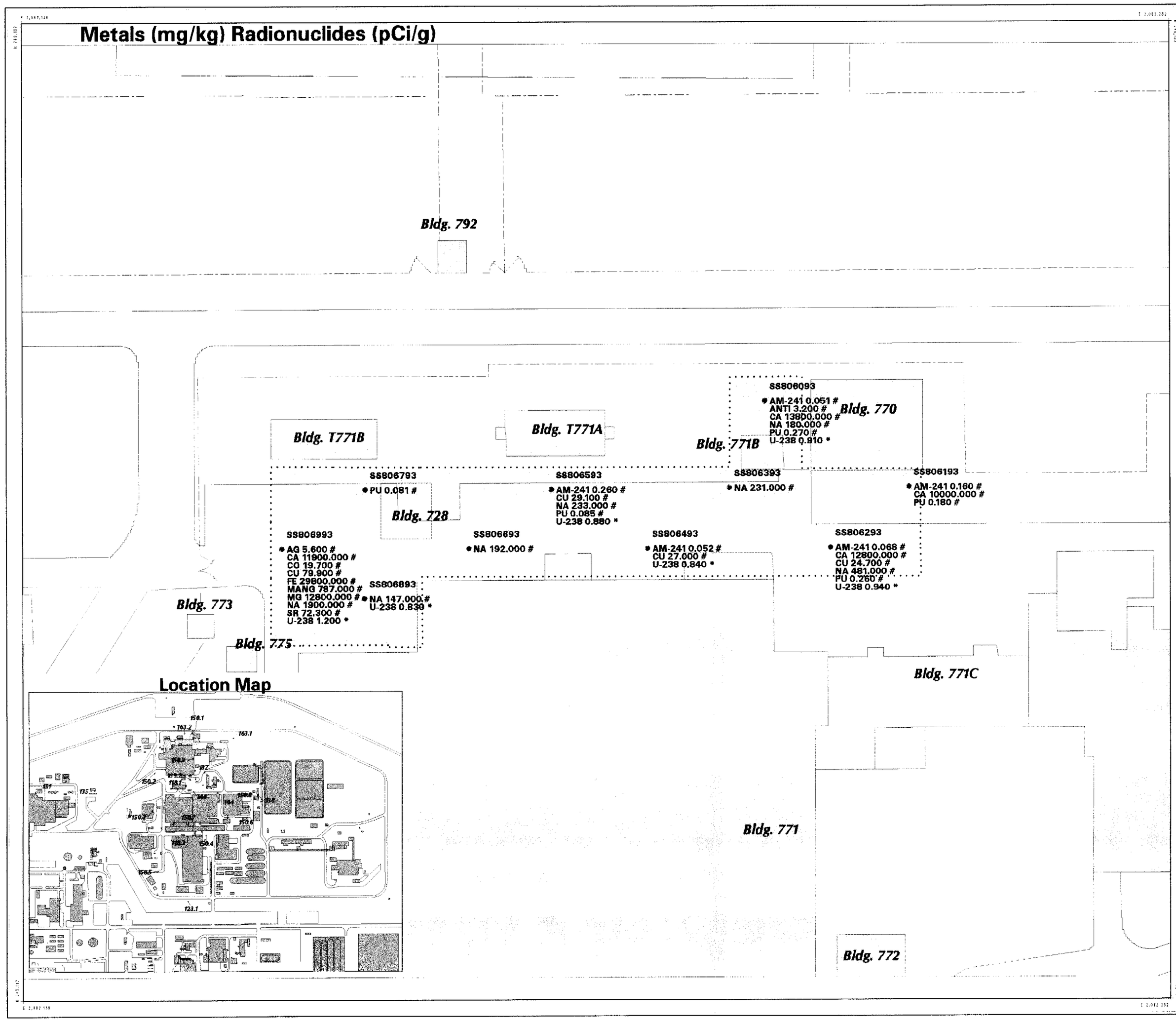

FIGURE 3-22

OU8-IHSS 150.1

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
CA = Calcium
CO = Cobalt
CU = Copper
FE = Iron
MANG = Manganese
MG = Magnesium
NA = Sodium
PU = Plutonium-239/240
SR = Strontium
U-238 = Uranium-238

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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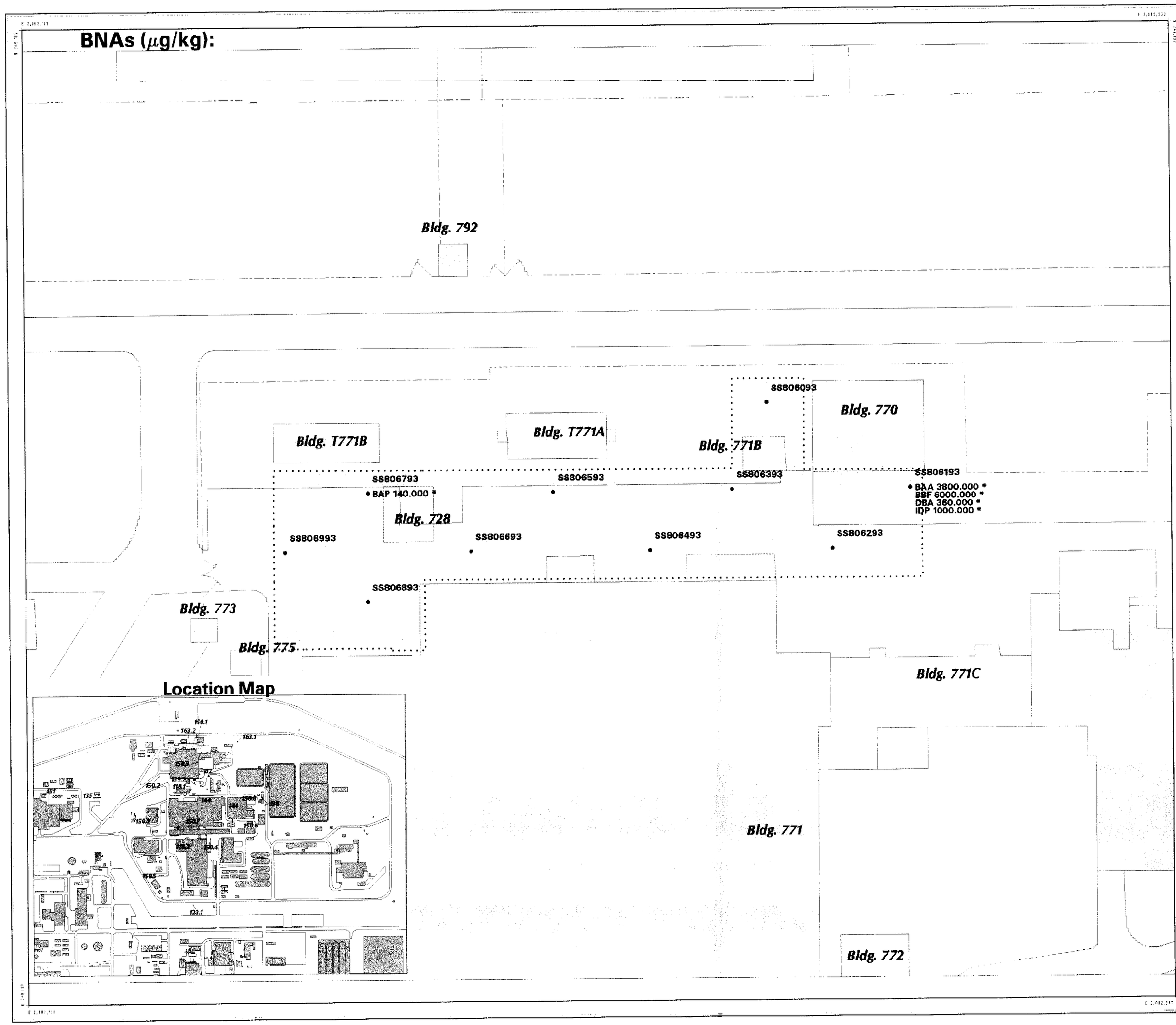

FIGURE 3-23

OU8-IHSS 150.1

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
DBA = Dibenzo(a,h)antracene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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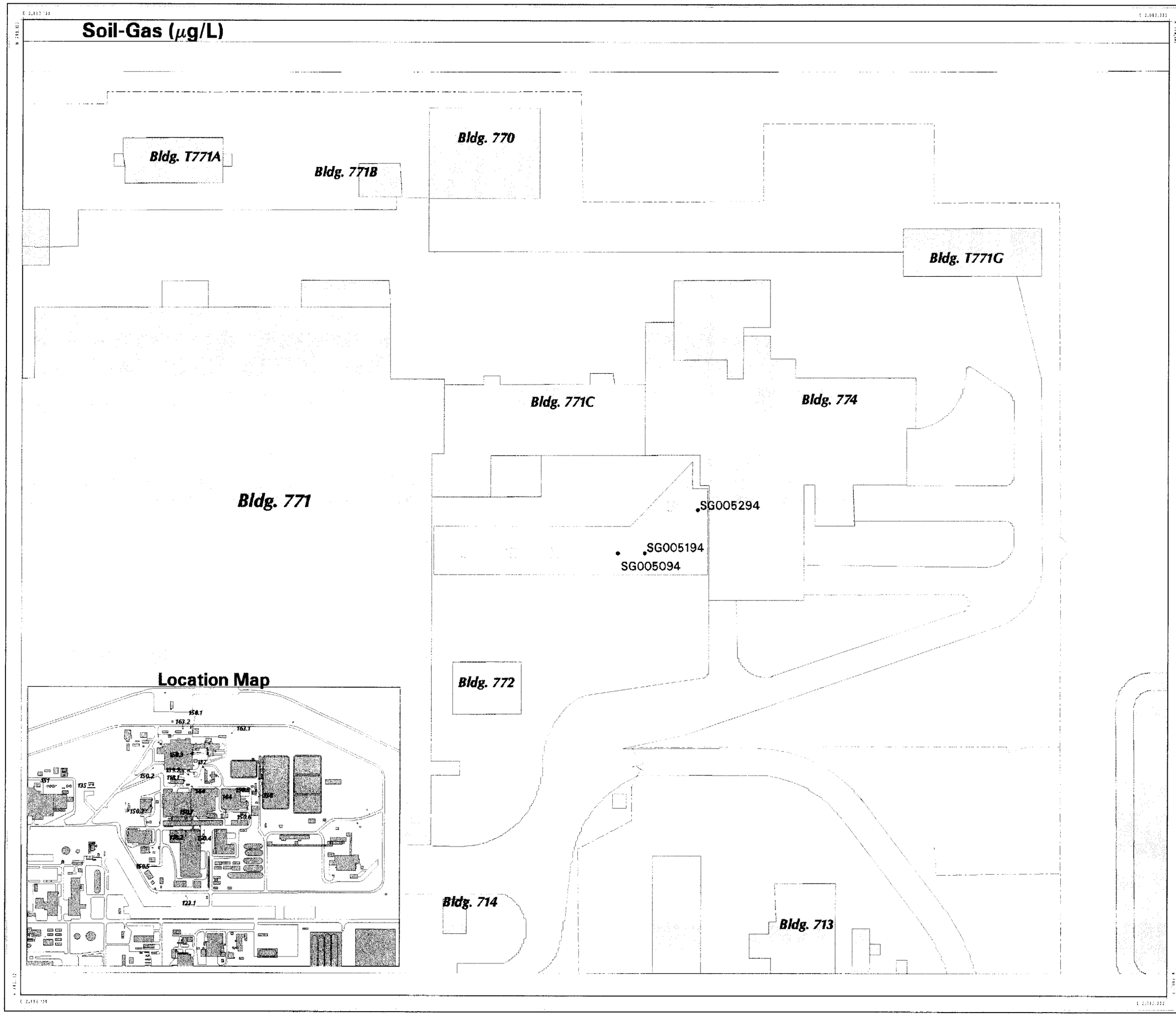

FIGURE 3-24

OU8-IHSS 150.3

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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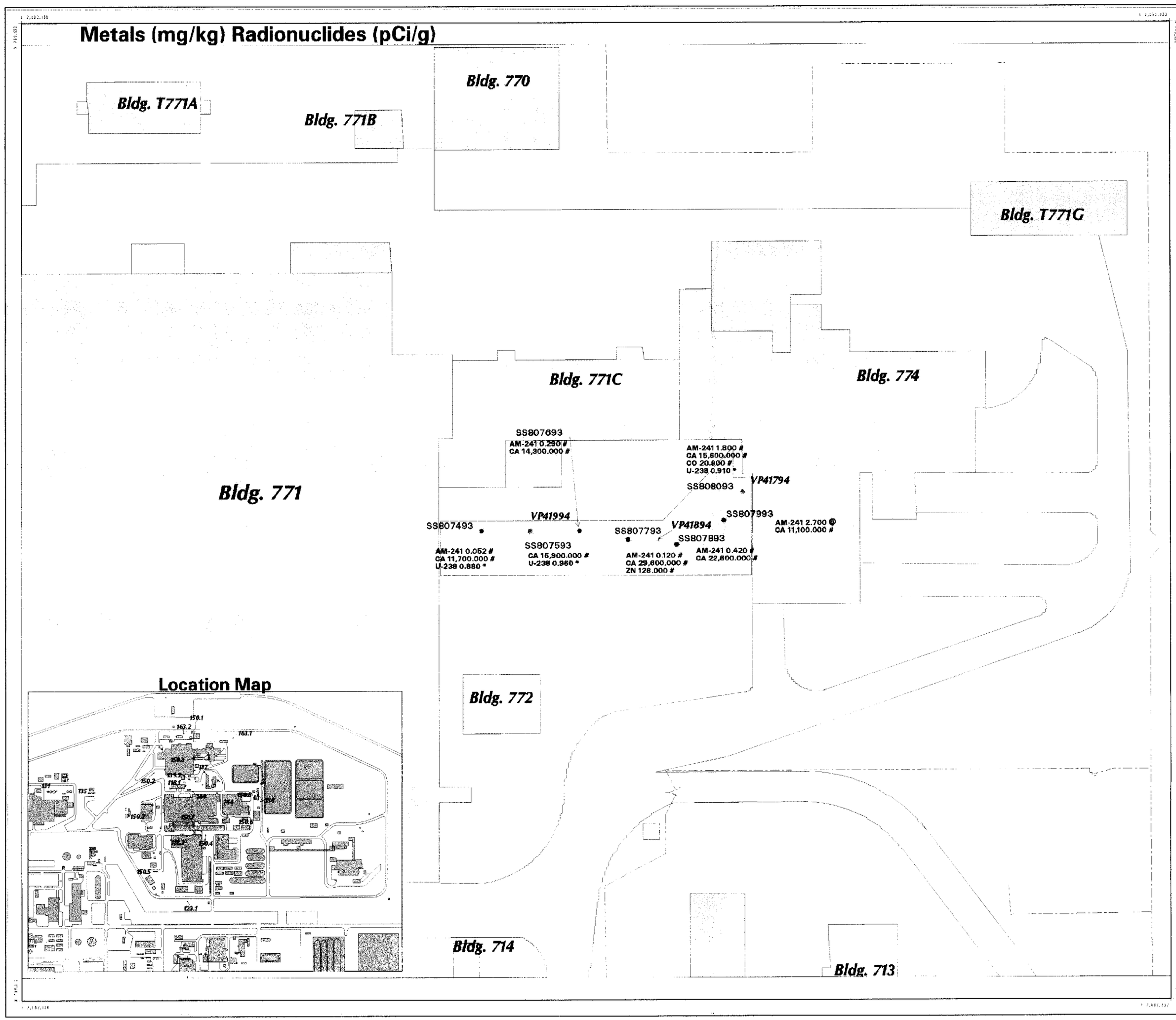

FIGURE 3-25

OU8-IHSS 150.3

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- * Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AM-241 = Americium-241
CA = Calcium
CO = Cobalt
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- \# Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/esi1503.aml

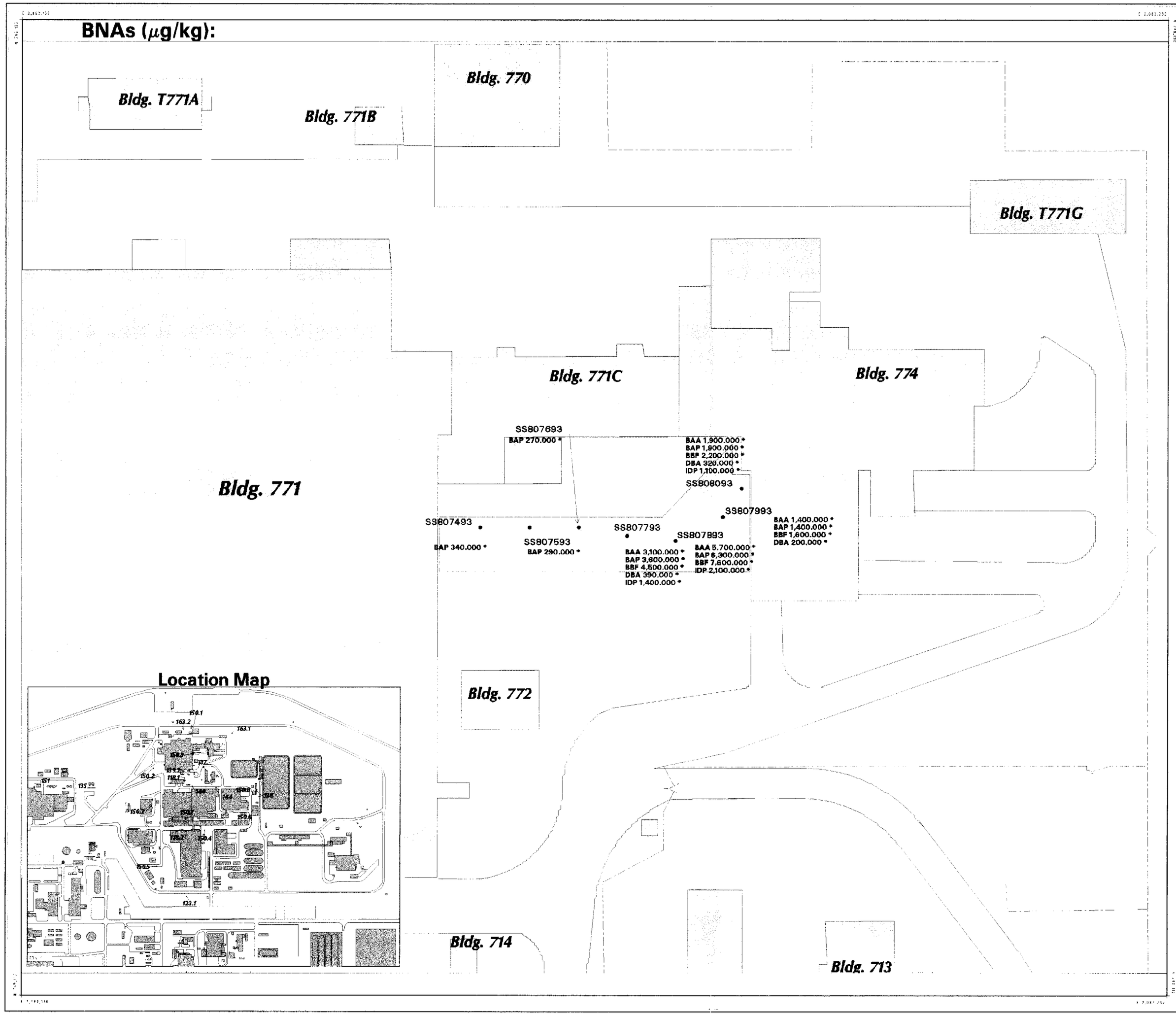

FIGURE 3-26

OU8-IHSS 150.3

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
DBA = Dibenzo(a,h)antracene
IDP = Indeno(1,2,3-cd)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/sso1503.aml

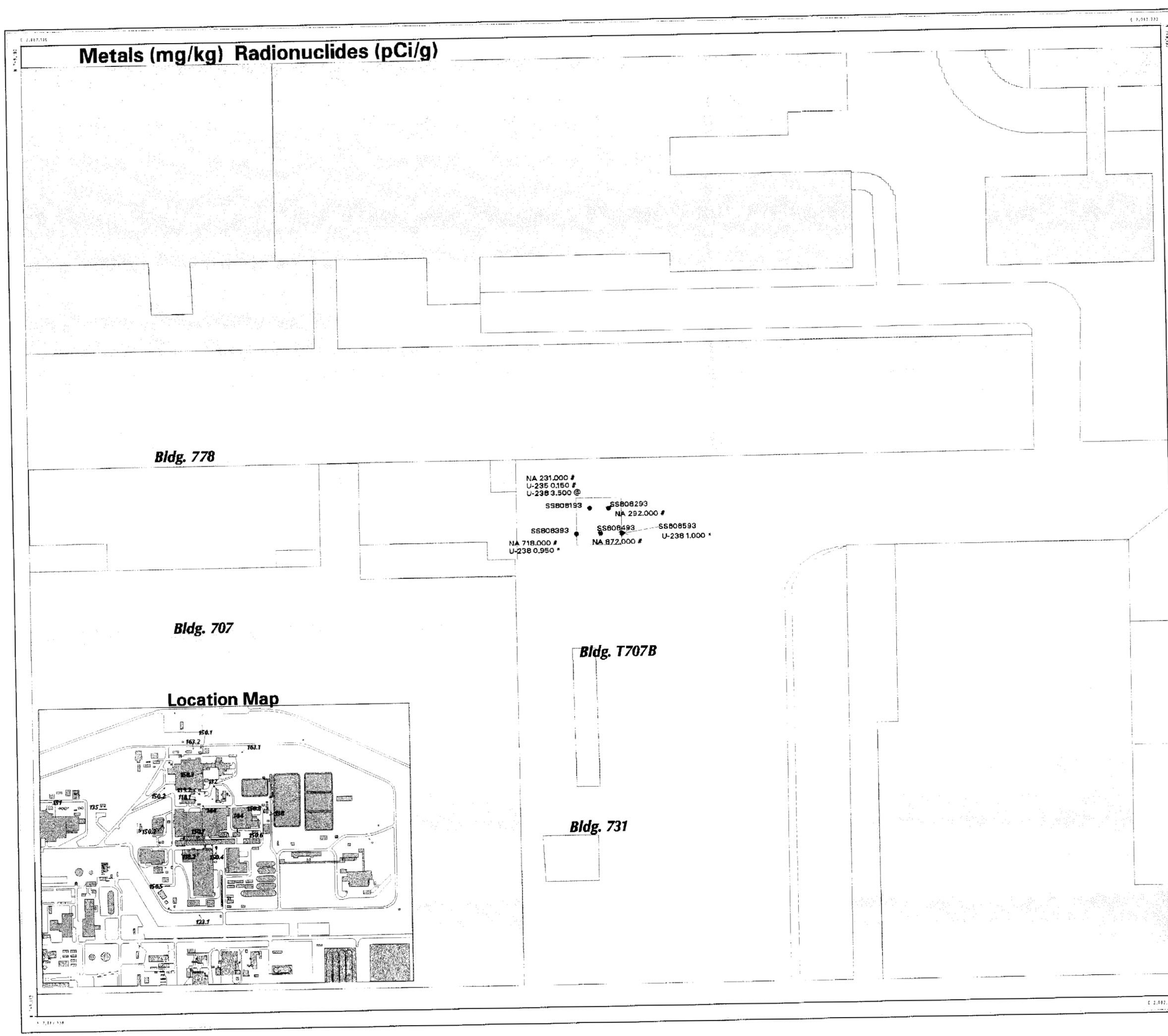

FIGURE 3-27

OU8-IHSS 150.4

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

NA = Sodium
U-235 = Uranium-235
U-238 = Uranium-238

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/ssi1504.aml

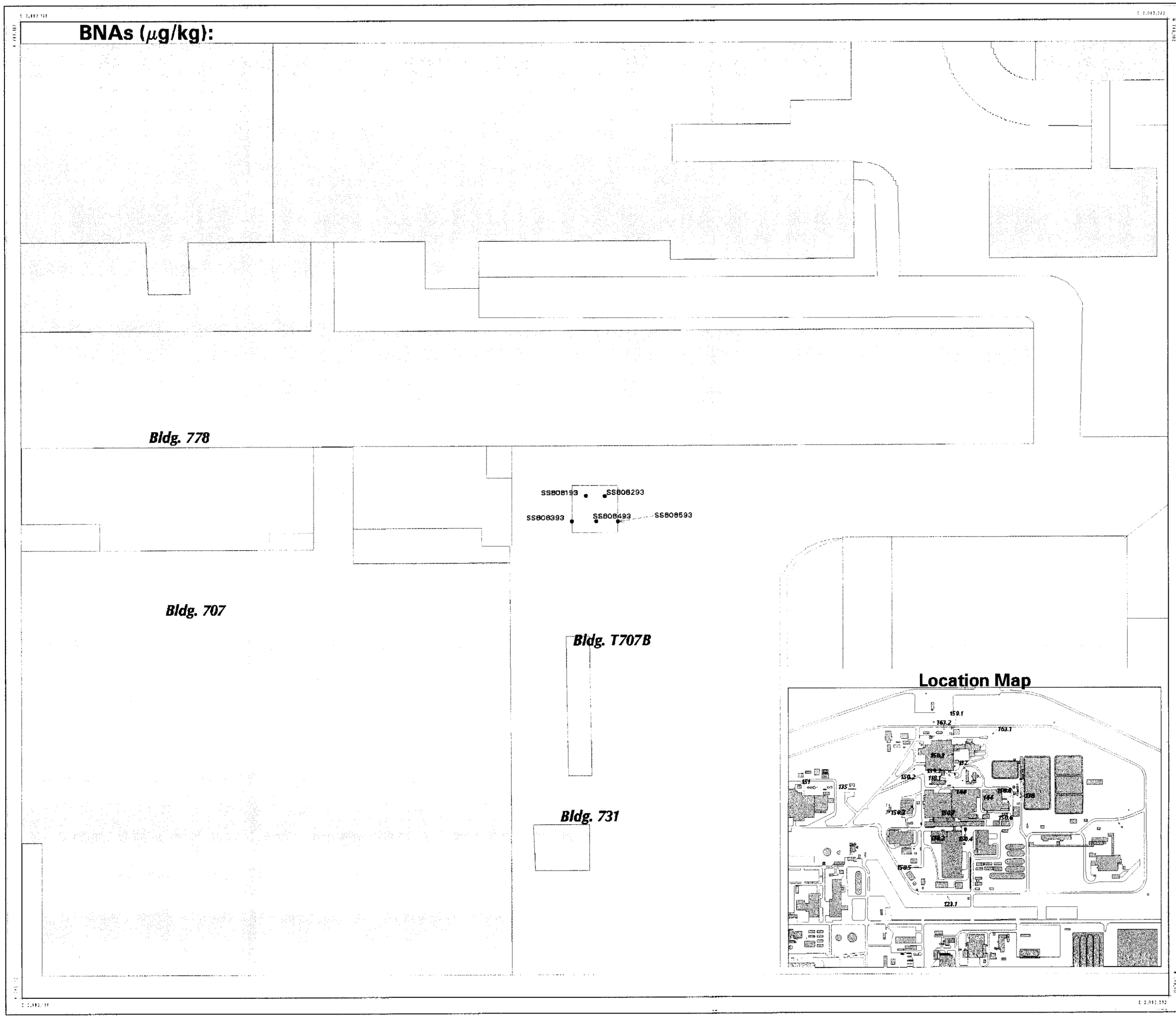

FIGURE 3-28

OU8-IHSS 150.4

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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August 23, 1995

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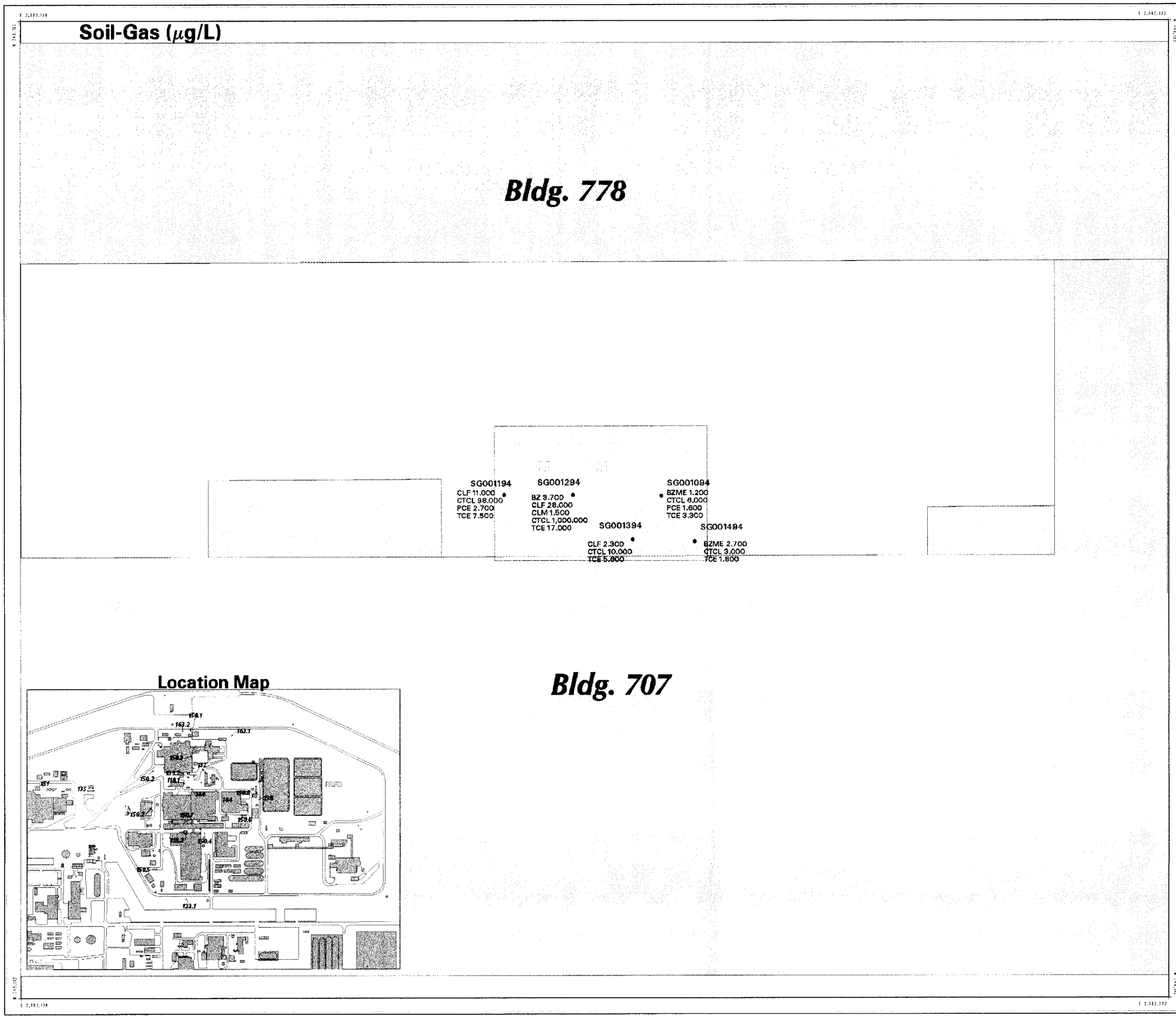

FIGURE 3-2

OU8-IHSS 118.2

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BZ = Benzene
BZME = Toluene
CLF = Chloroform
CLM = Chloromethane
CTCL = Carbon Techrachloride
PCE = Tetrachloroethene
TCE = Trichloroethene

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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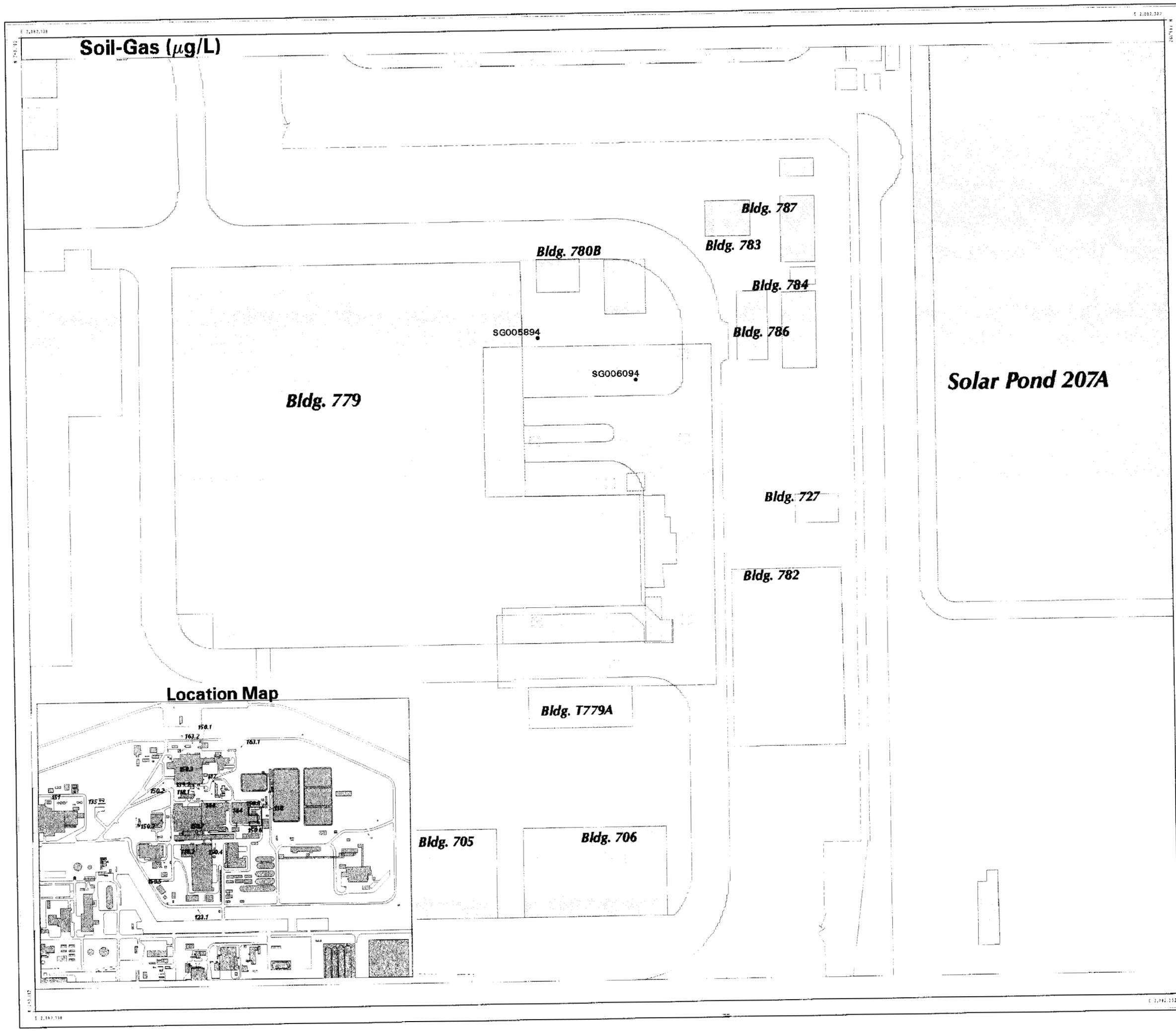

FIGURE 3-29

OU8-IHSS 150.6/150.8

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/sg1506.aml

242

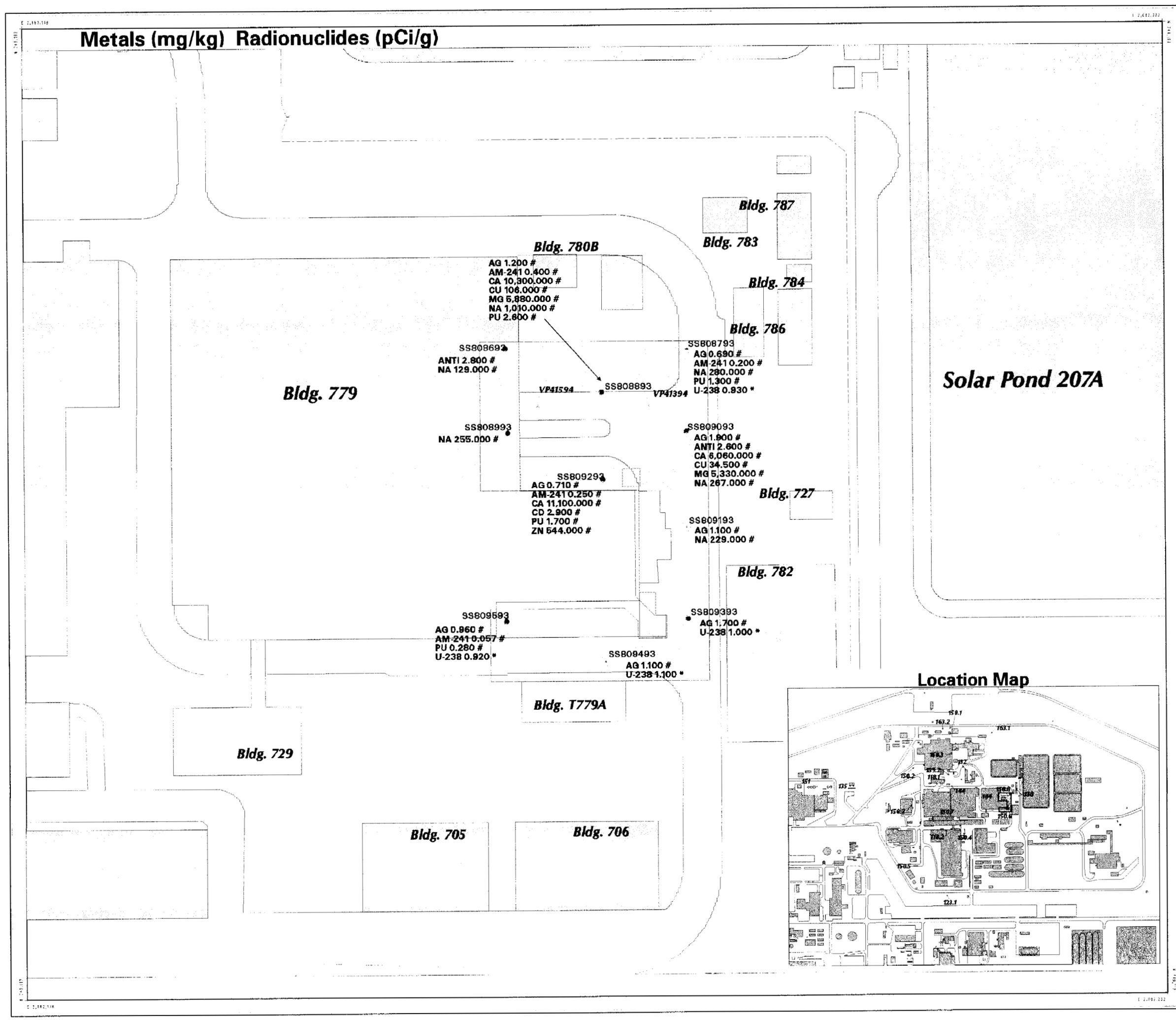

FIGURE 3-30

OU8-IHSS 150.6/150.8

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Surface Soil and Asphalt Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sammple Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
CA = Calcium
CD = Cadmium
CU = Copper
MG = Magnesium
NA = Sodium
PU = Plutonium-239/240
U-235 = Uranium-235
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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243

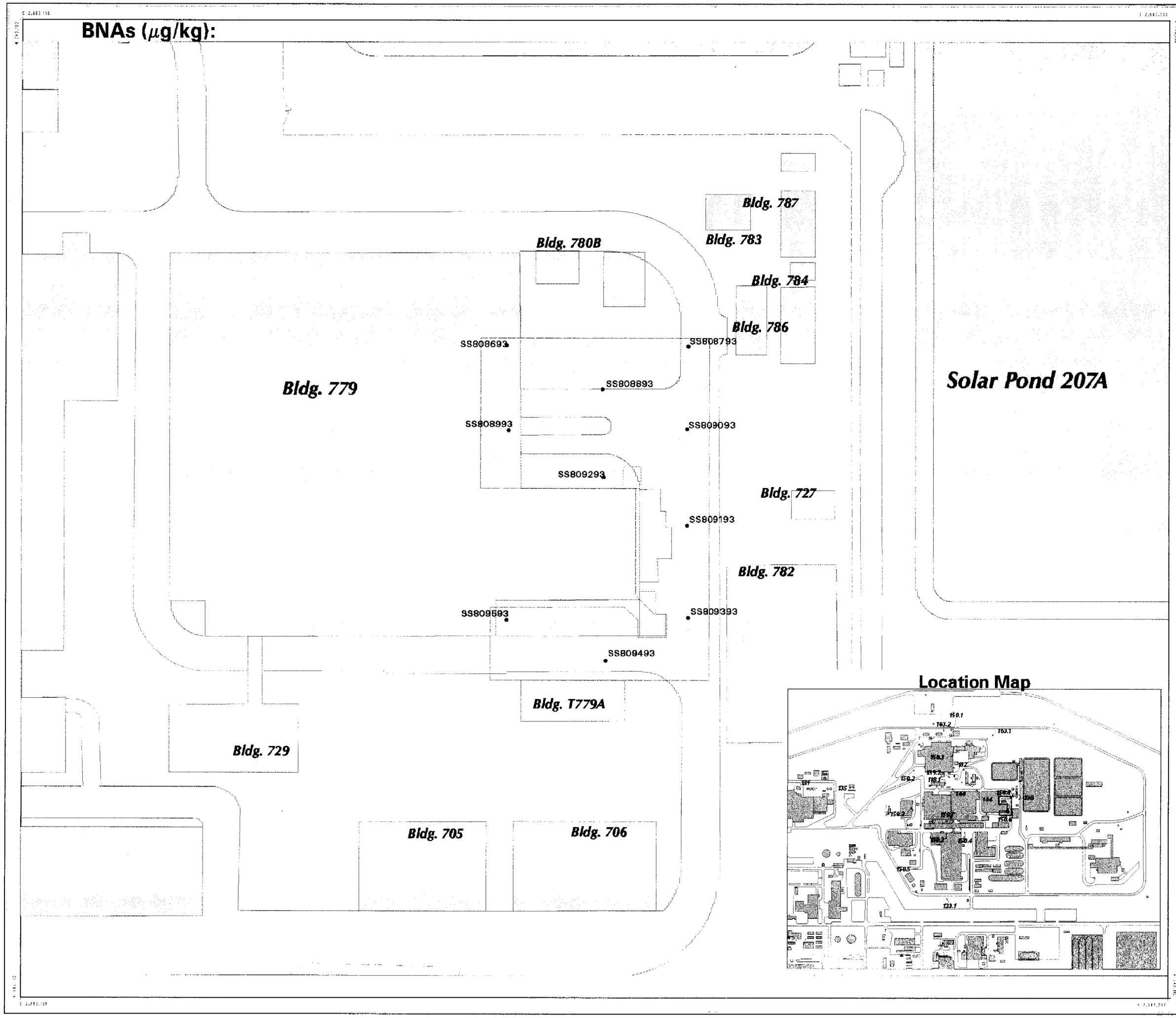

FIGURE 3-31

OU8-IHSS 150.6/150.8

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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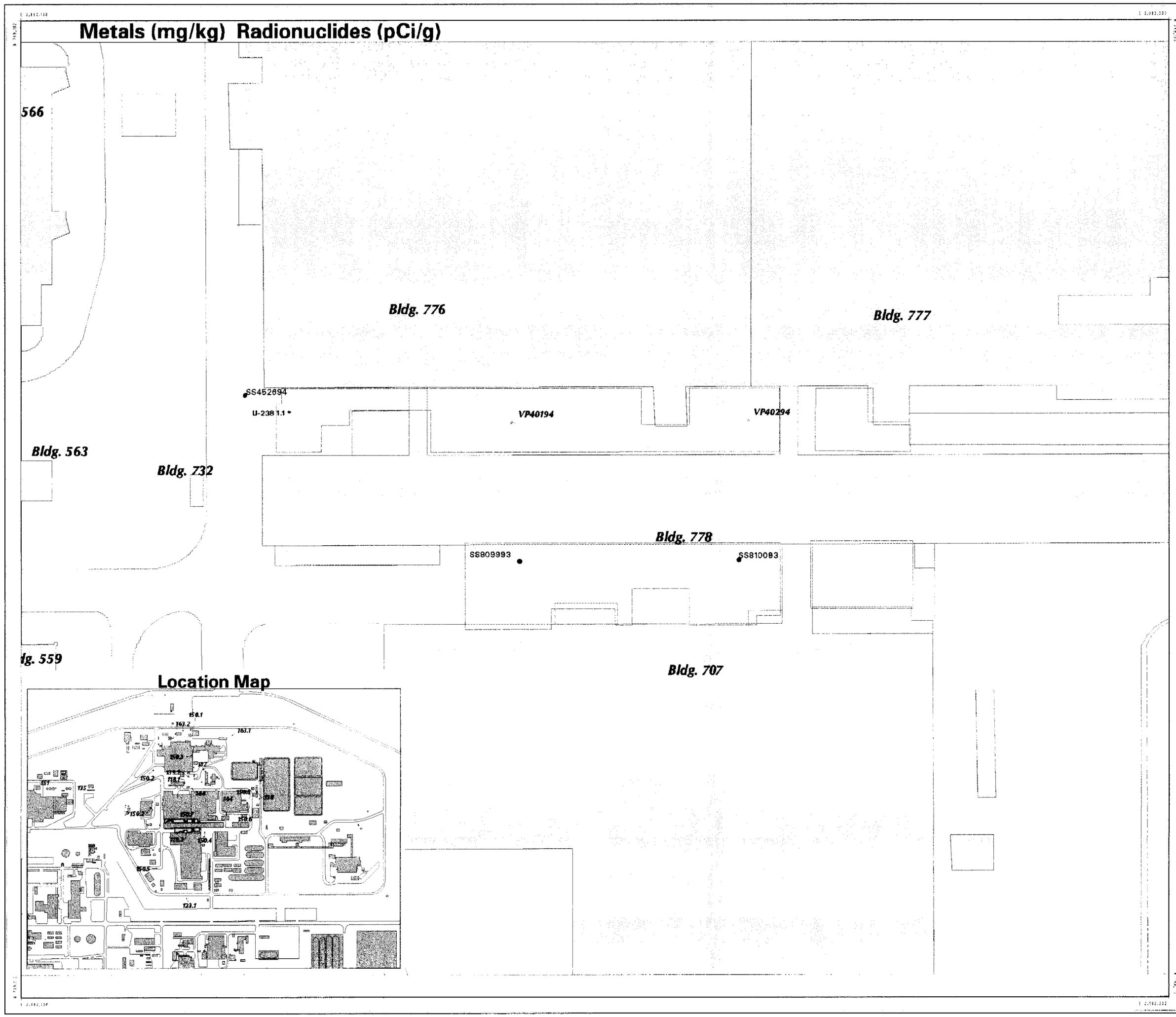

FIGURE 3-32

OU8-IHSS 150.7

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

U-238 = Uranium-238

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/ssi1507.aml

245

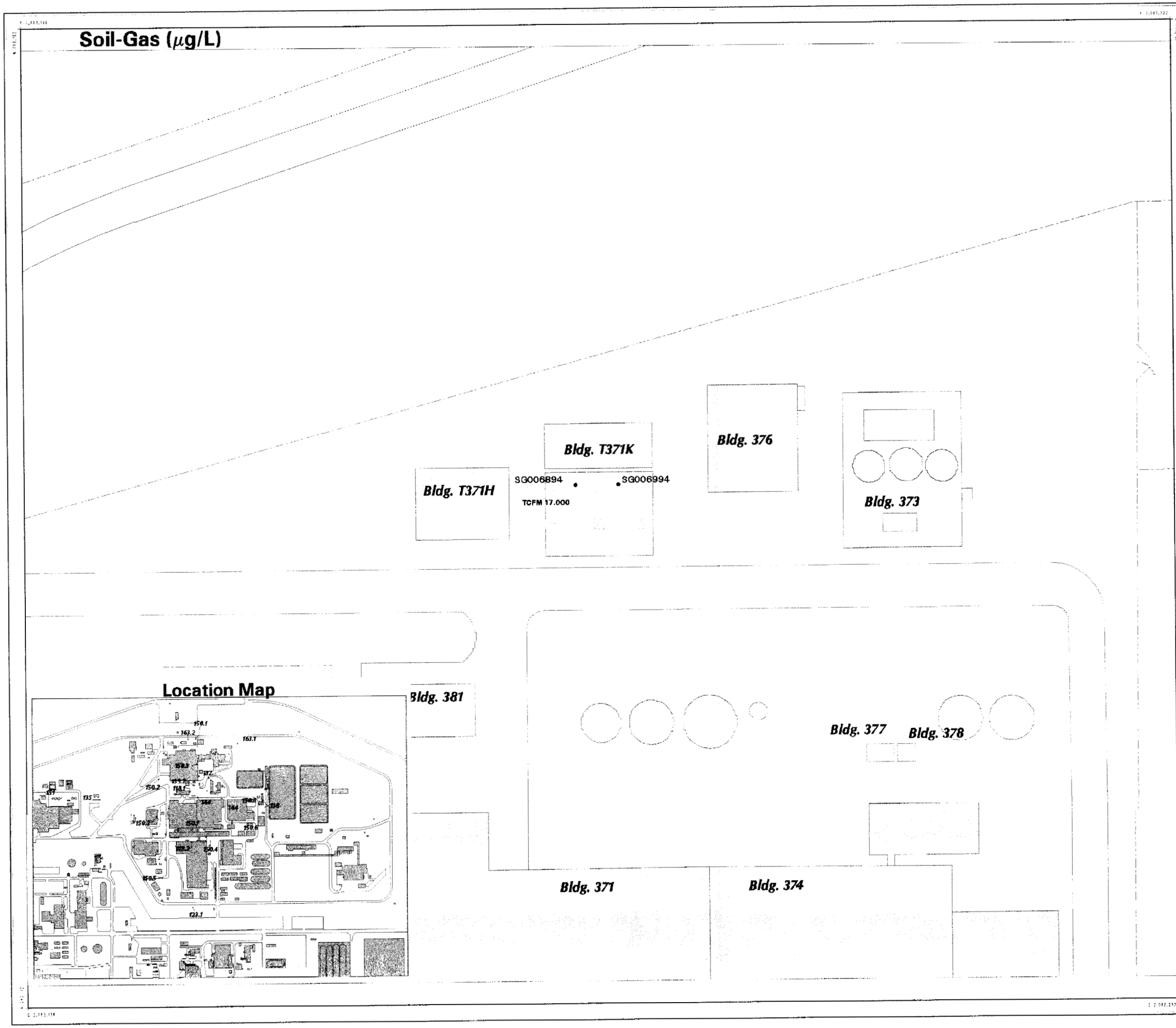

FIGURE 3-33

OU8-IHSS 151

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

TCFM = Trichlorofluoromethane

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/sg151.aml

246

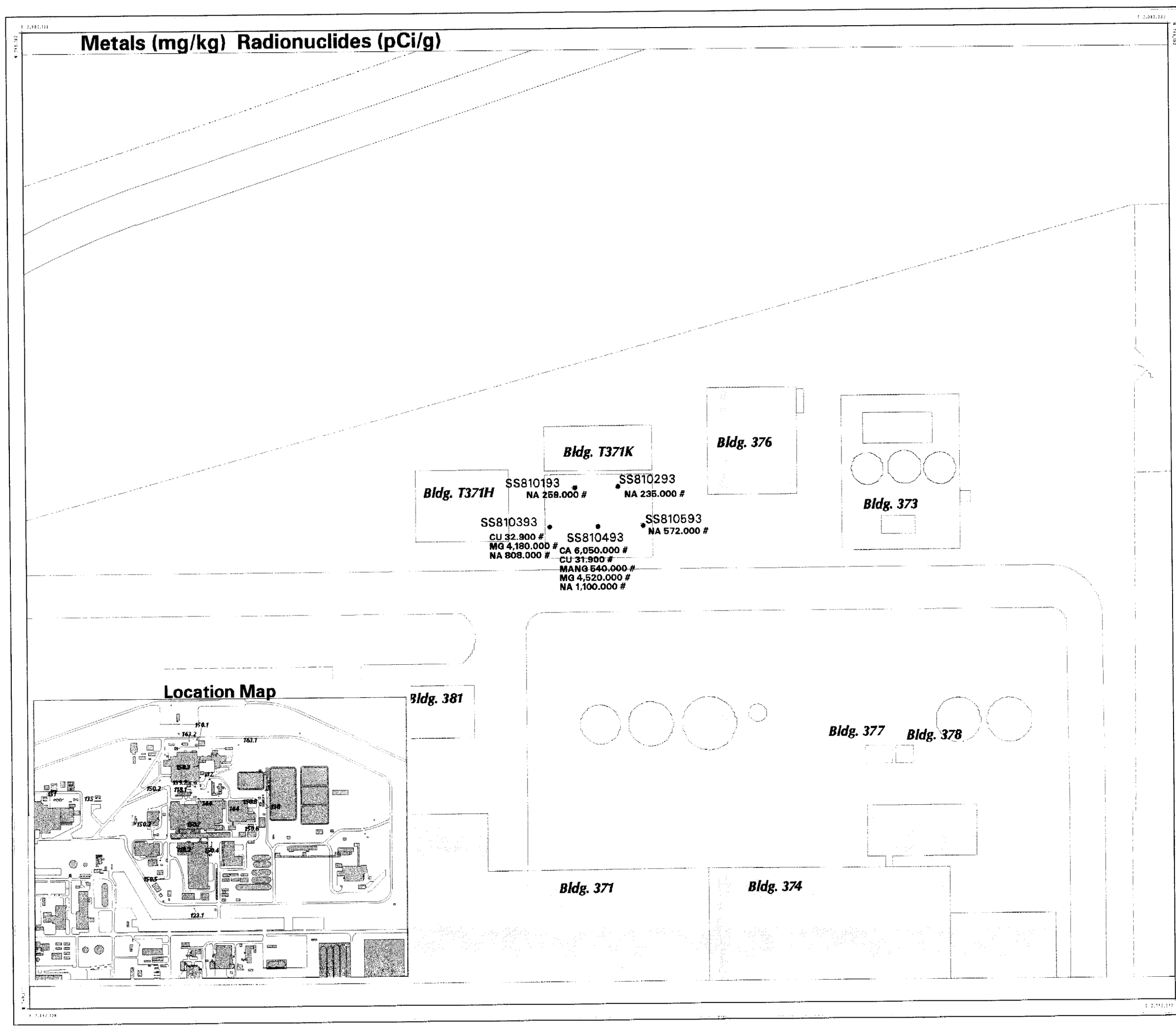

FIGURE 3-34

OU8-IHSS 151

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

CA = Calcium
CU = Copper
MANG = Manganese
MG = Magnesium
NA = Sodium

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/esi151.aml

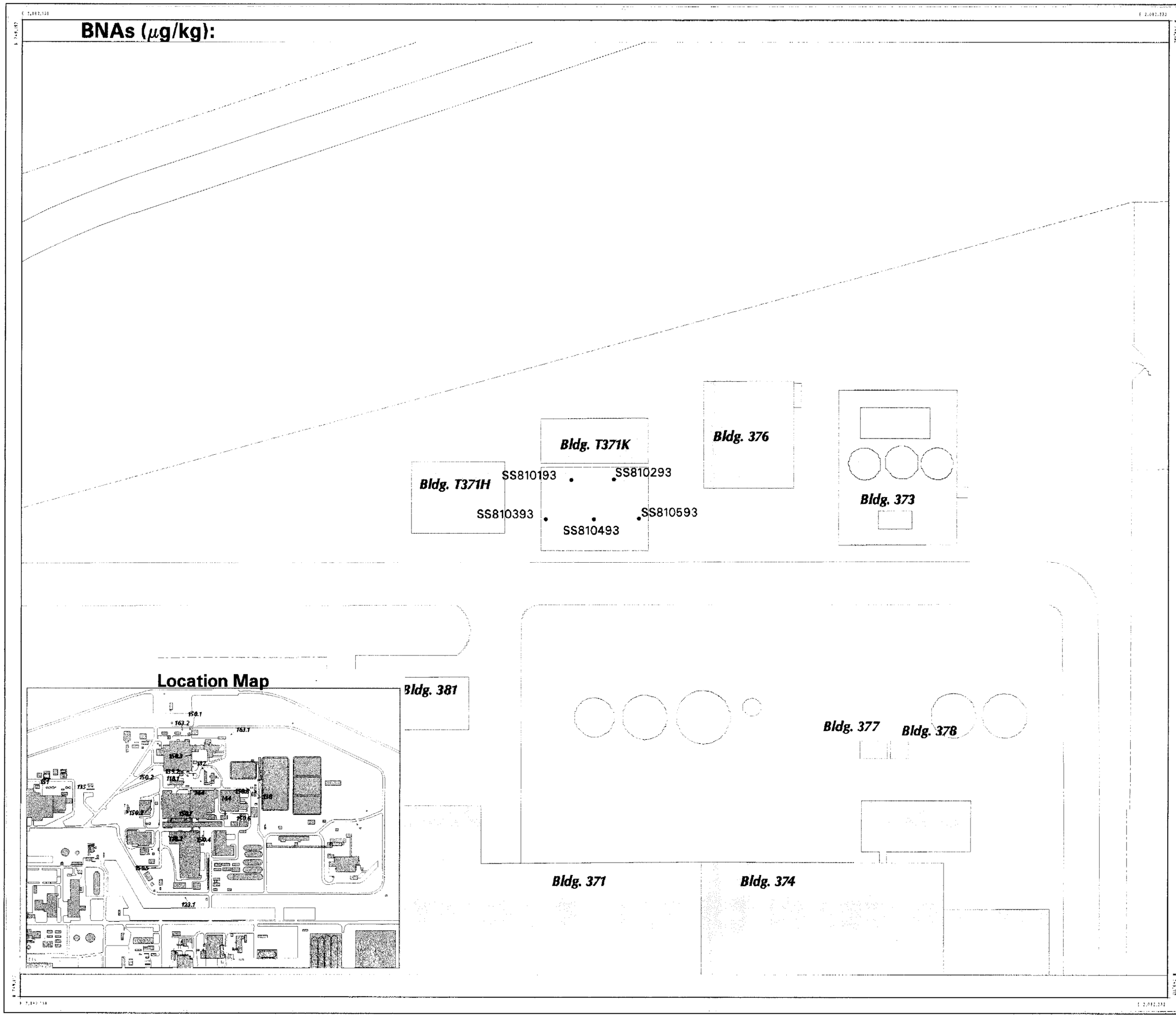

FIGURE 3-35

OU8-IHSS 151

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/seo151.aml

248

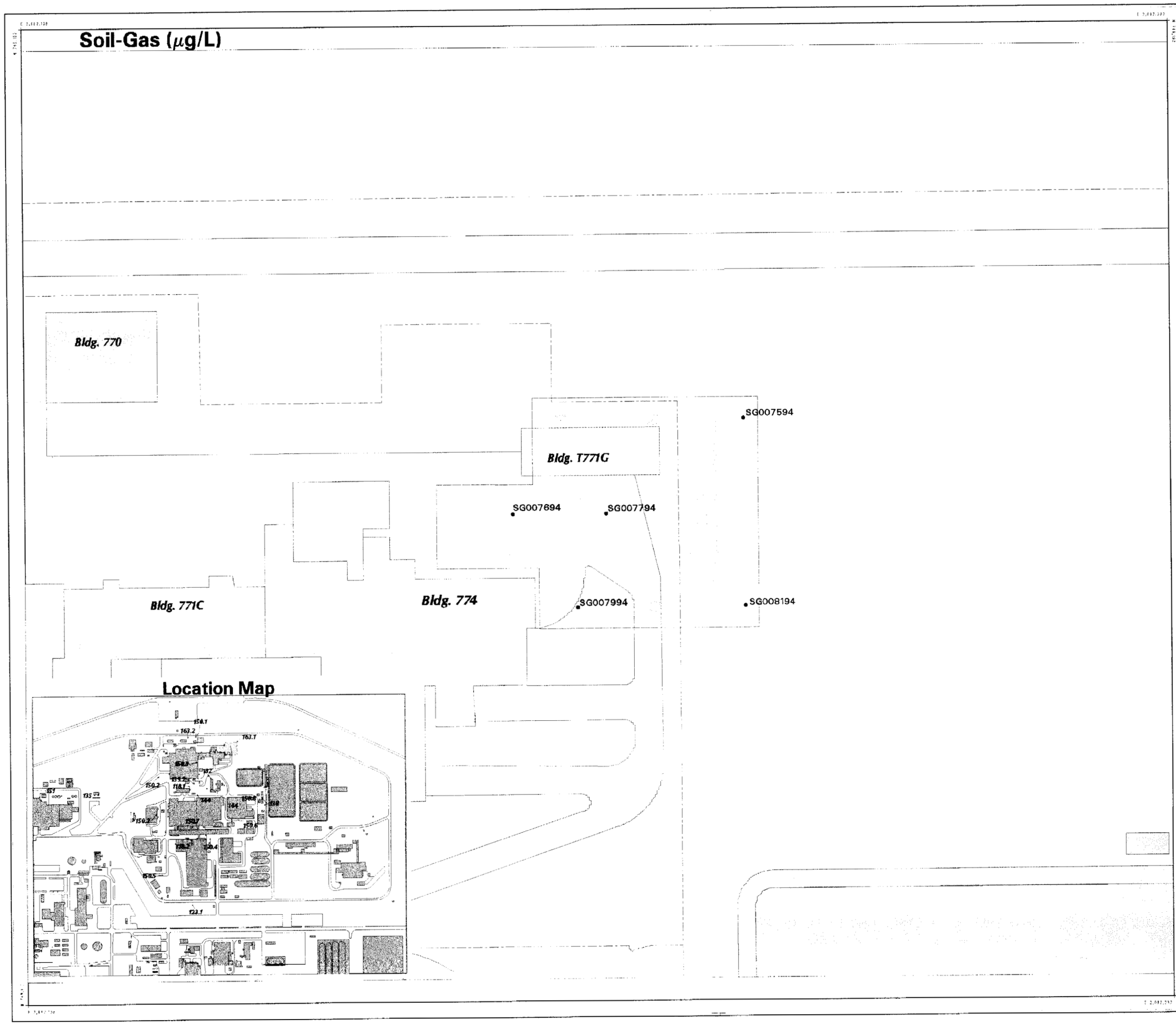

FIGURE 3-36

OU8-IHSS 163.1

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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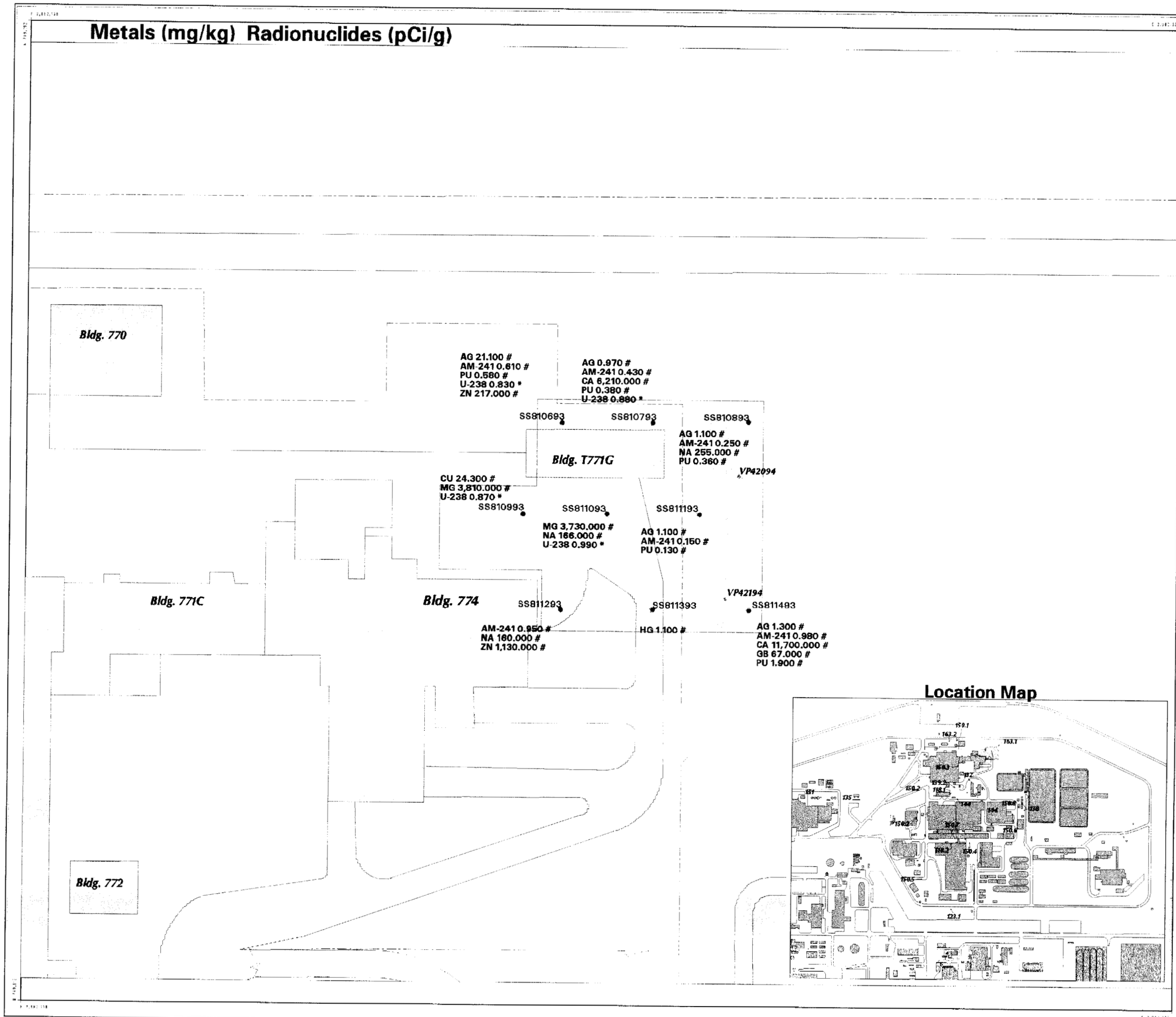

FIGURE 3-37

OU8-IHSS 163.1

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
CA = Calcium
GB = Gross Beta
HG = Mercury
NA = Sodium
U-238 = Uranium-239
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjeral/s521905/projects/iou/ou8/soqplates/ssi1631.aml

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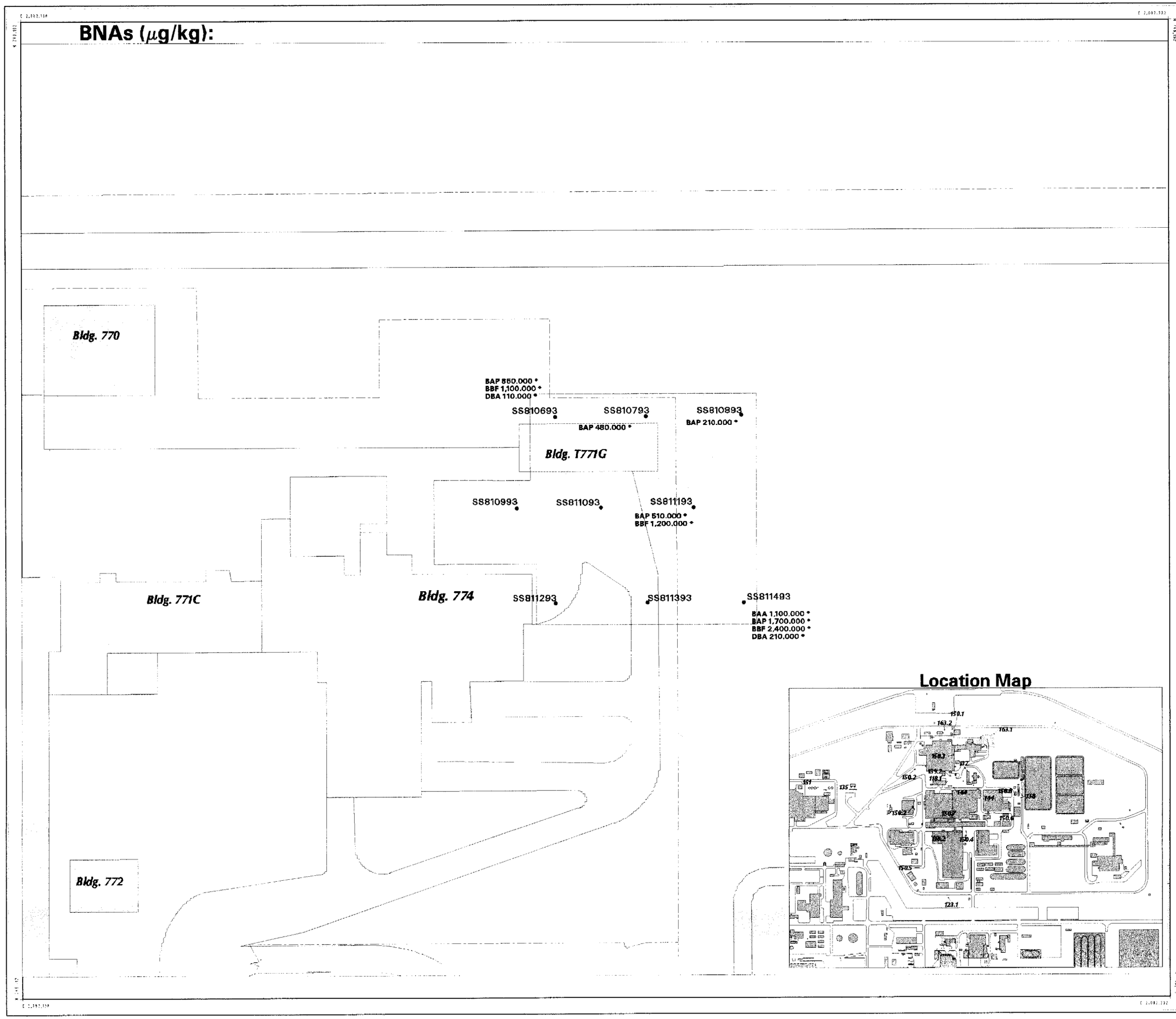

FIGURE 3-38

OU8-IHSS 163.1

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAA = Benzo(b)anthracene
BAP = Benso(a)pyrene
BBF = Benzo(b)fluoranthene
DBA = Dibenzo(a,h)antracene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjara/s521905/projects/iou/ou8/sogplates/soi631.aml

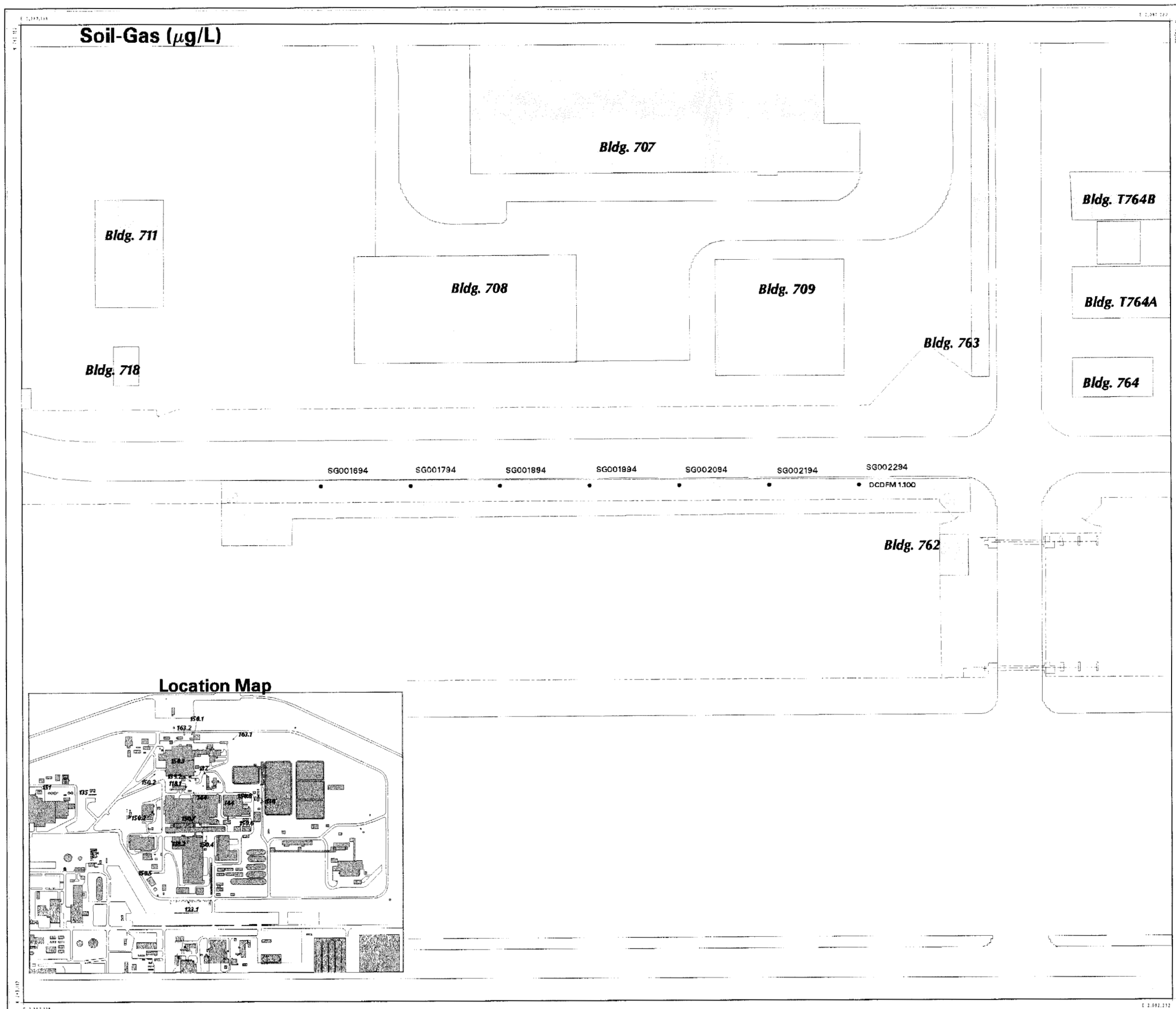

FIGURE 3-3

OU8-IHSS 123.1

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

DCDFM = Dichlorodifluoromethane

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/e521905/projects/ou/ou8/sogplates/sg1231.aml

226

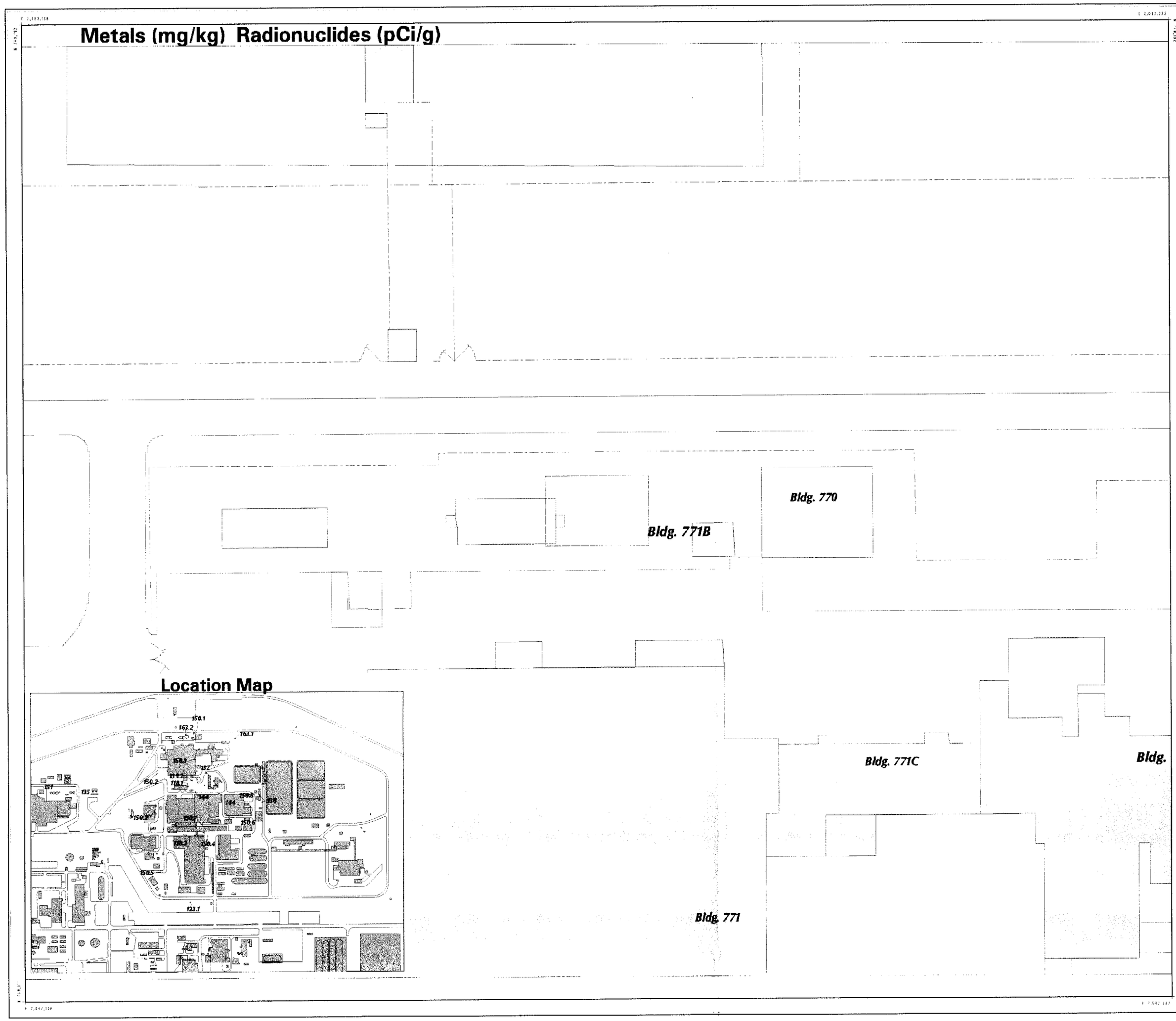

FIGURE 3-39

OU8-IHSS 163.2

LOCATION MAP

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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252

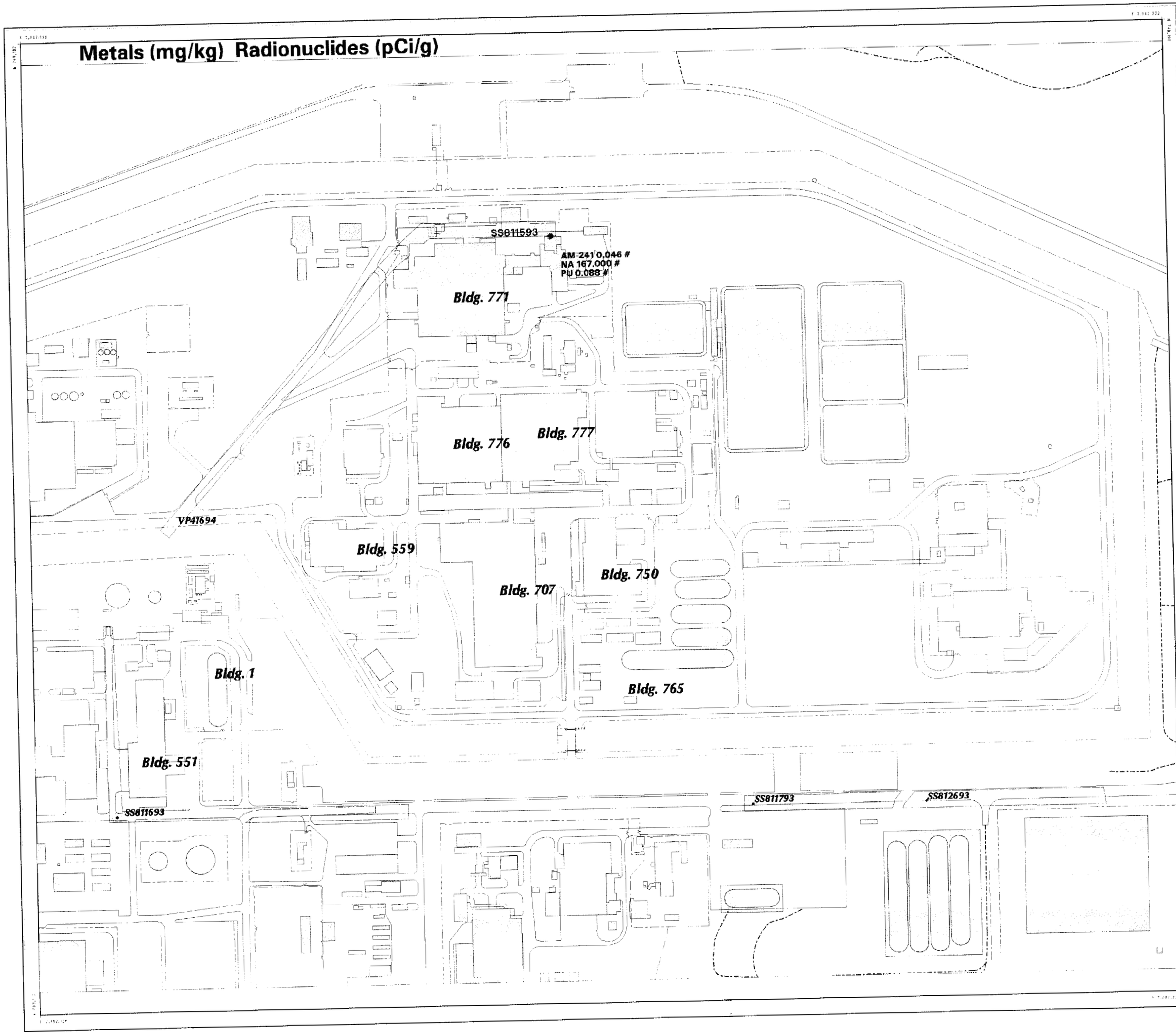

FIGURE 3-40

OU8-IHSS 172

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Asphalt Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AM-241 = Americium-241
NA = Sodium
PU = Plutonium-239/240

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

100 0 200 400 ft

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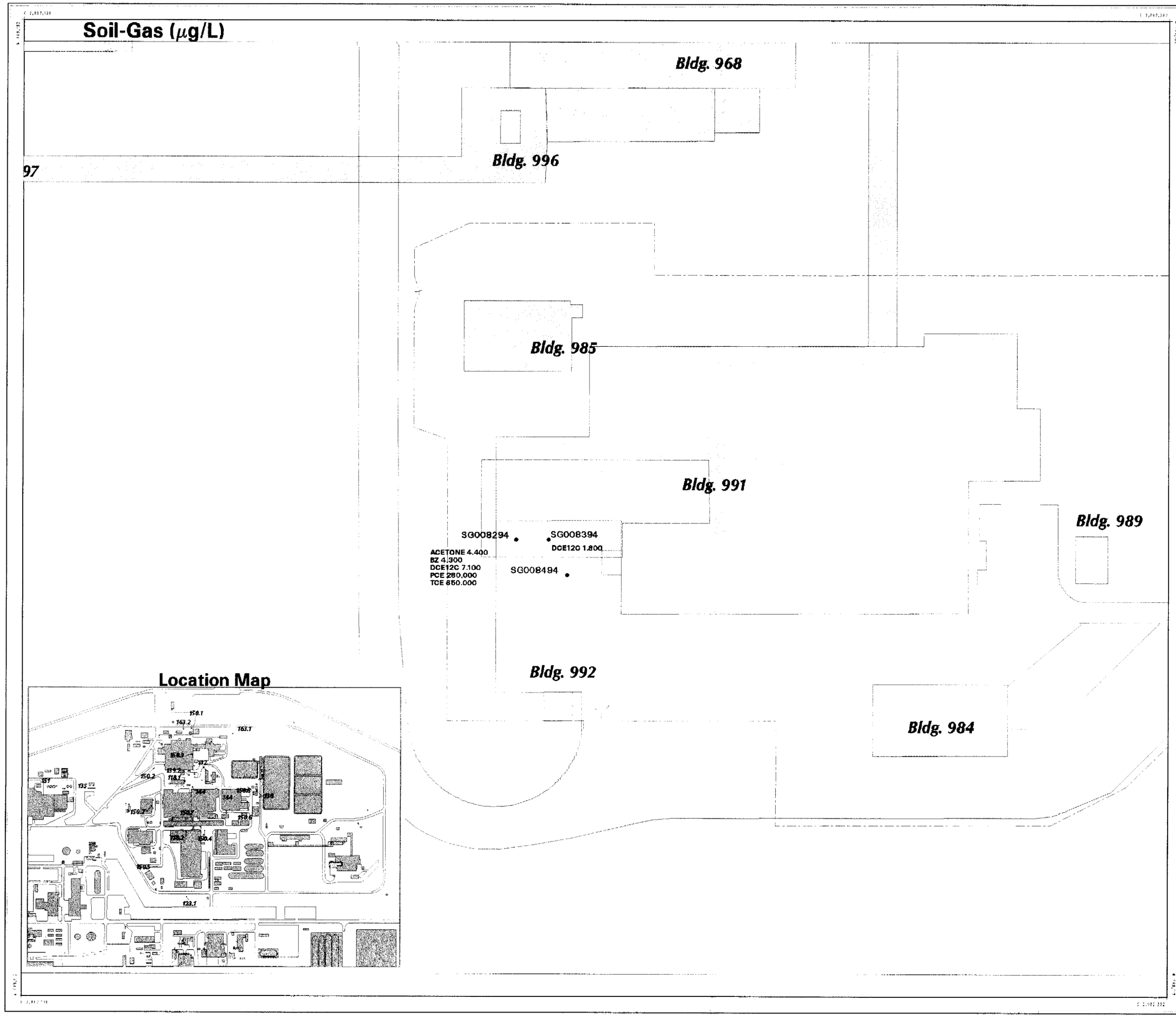

FIGURE 3-41

OU8-IHSS 173

ANALYTICAL RESULTS FOR SOIL-GAS SAMPLES

EXPLANATION

- Soil-Gas Sample Location
- Sample location not accessable
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

ACETONE = Acetone
BZ = Benzene
DCE12C = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

20 0 40 80 ft

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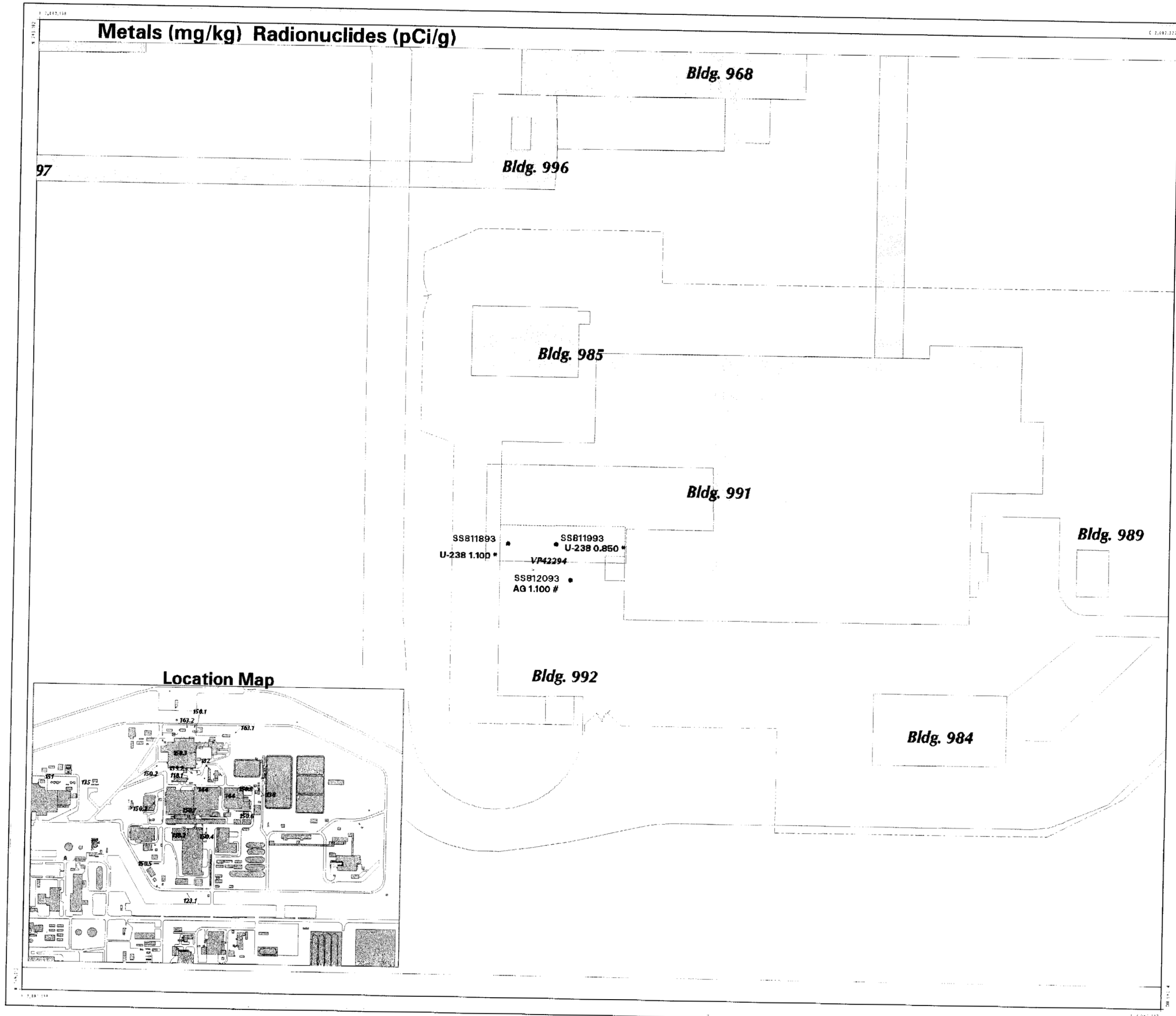

FIGURE 3-42

OU8-IHSS 173

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
U-238 = Uranium-238

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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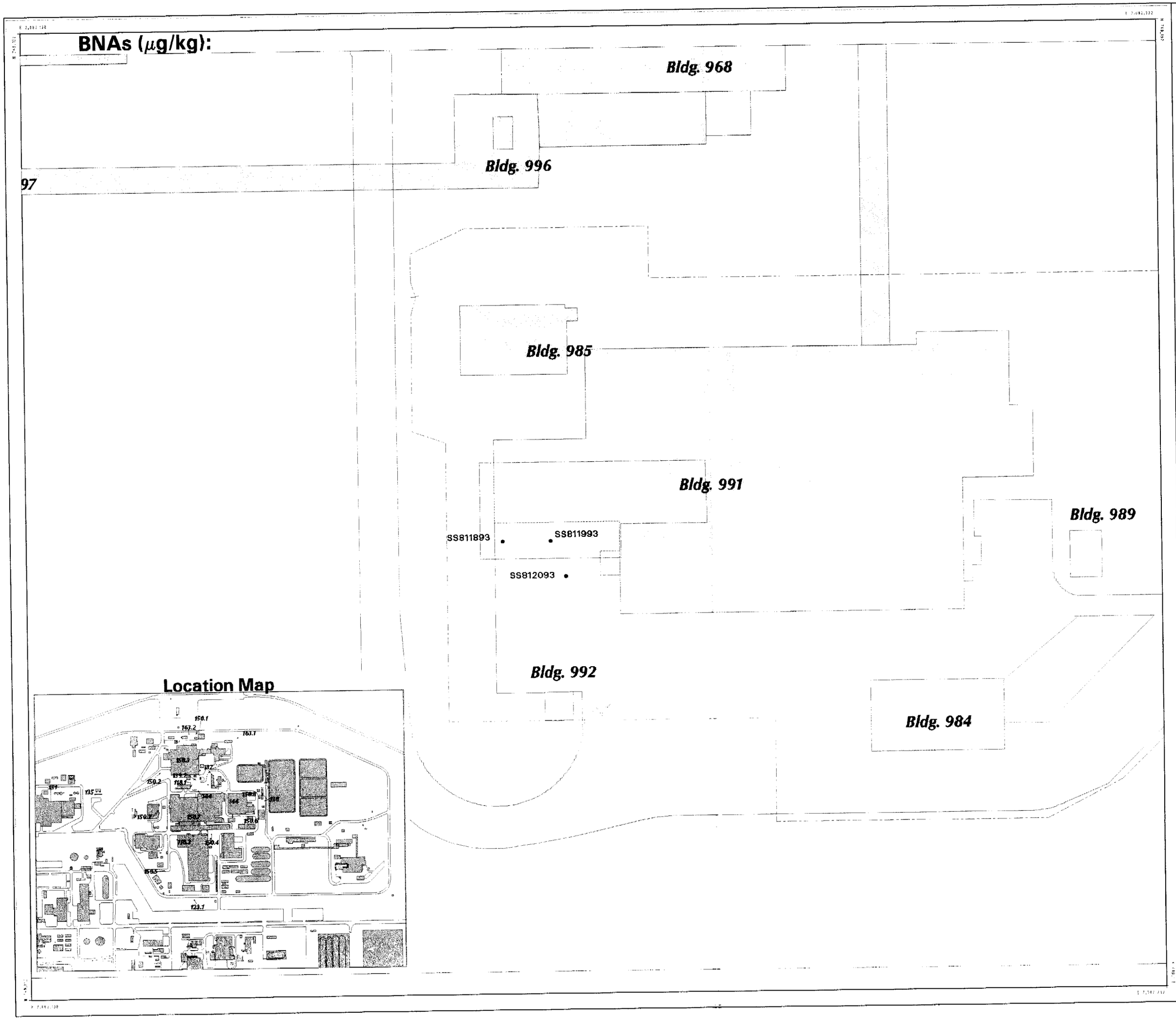

FIGURE 3-43

OU8-IHSS 173

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

- * Positive detection above PRG
- # Positive detection above background
- @ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/sso173.aml

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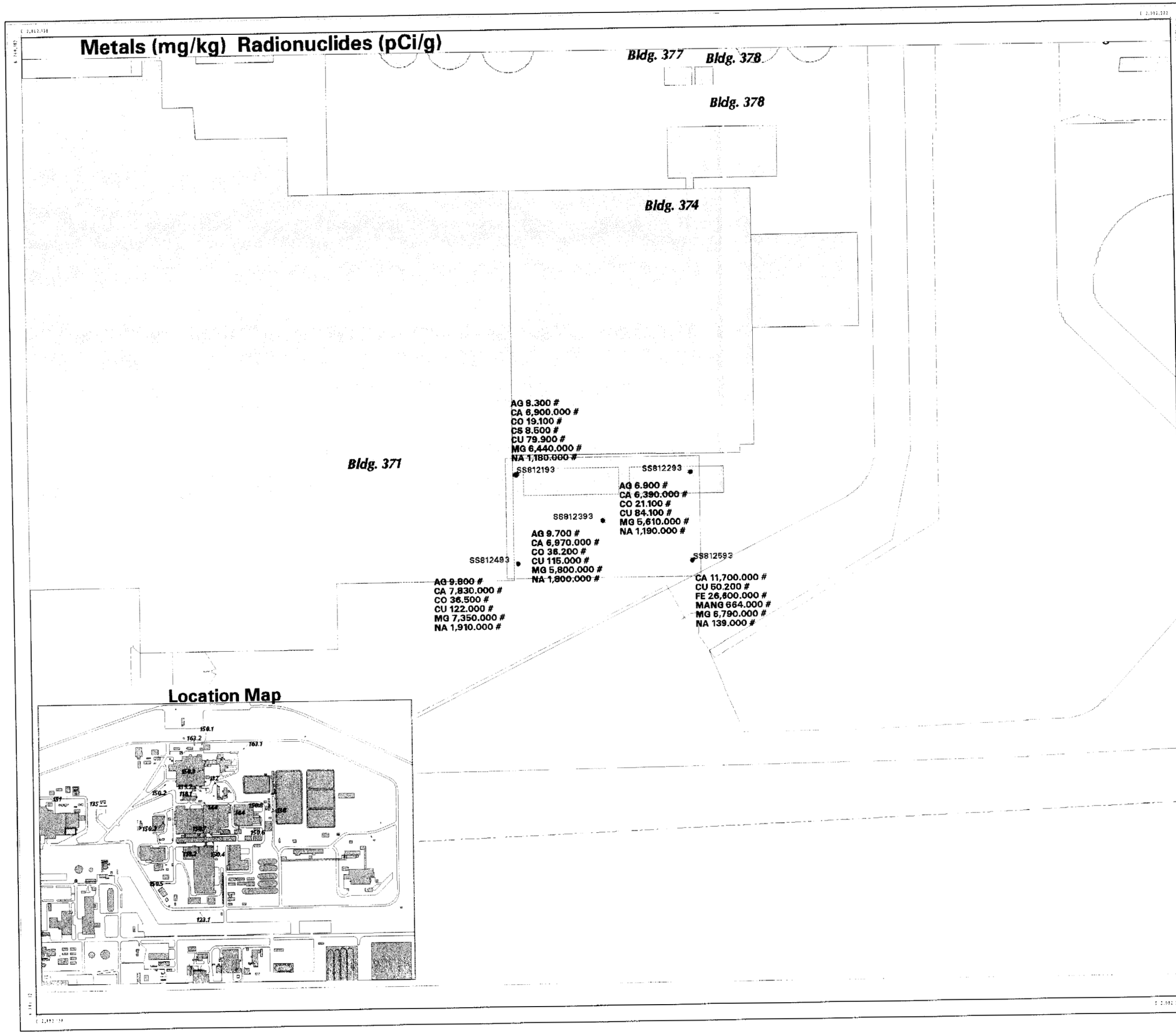

FIGURE 3-44

OU8-IHSS 188

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
CA = Calcium
CO = Cobalt
CS = Cesium
CU = Copper
MANG = Manganese
MG = Magnesium
NA = Sodium

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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257

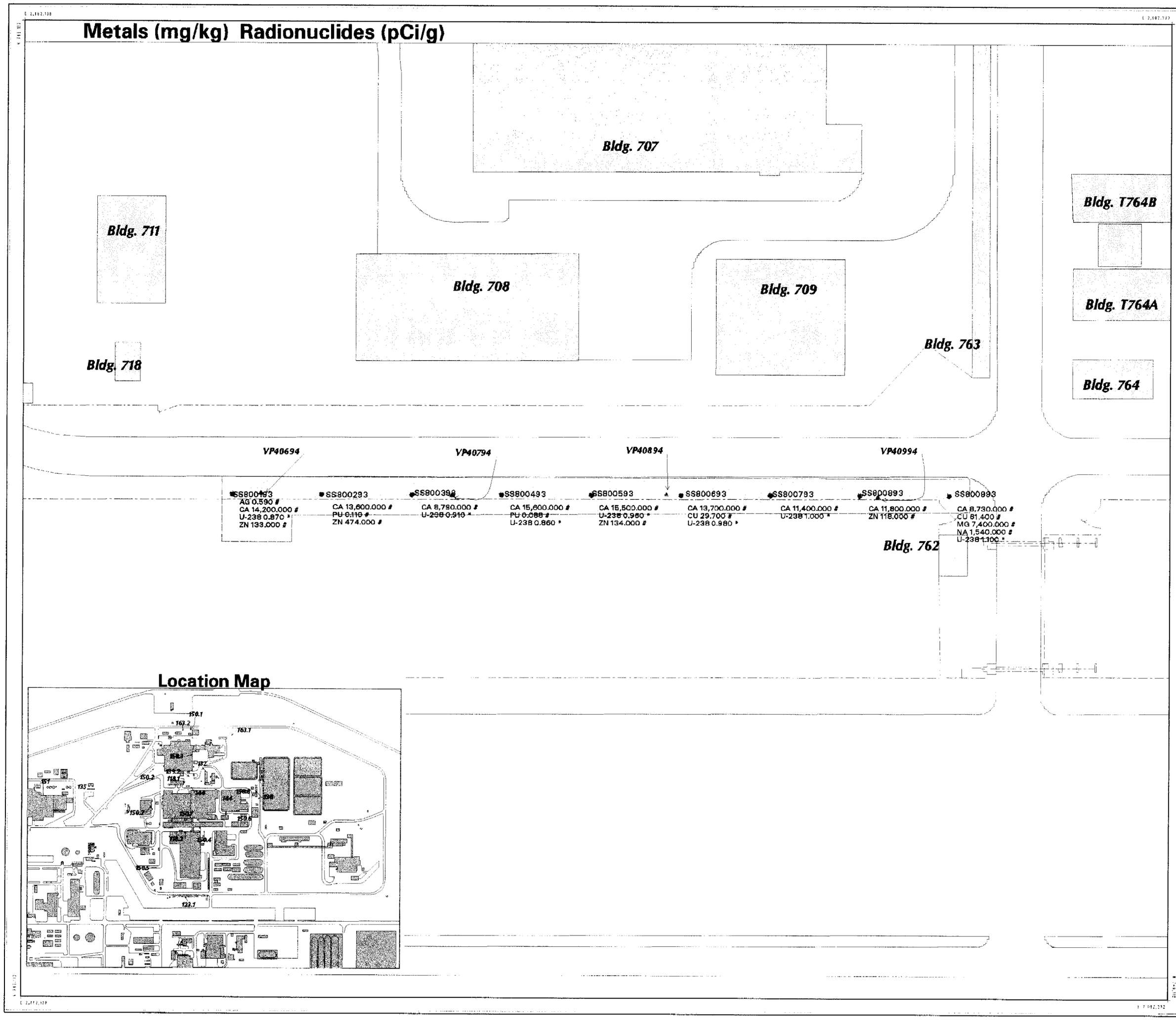

FIGURE 3-4

OU8-IHSS 123.1

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
CA = Calcium
CU = Copper
MG = Magnesium
NA = Sodium
PU = Plutonium-239/240
U-238 = Uranium-238
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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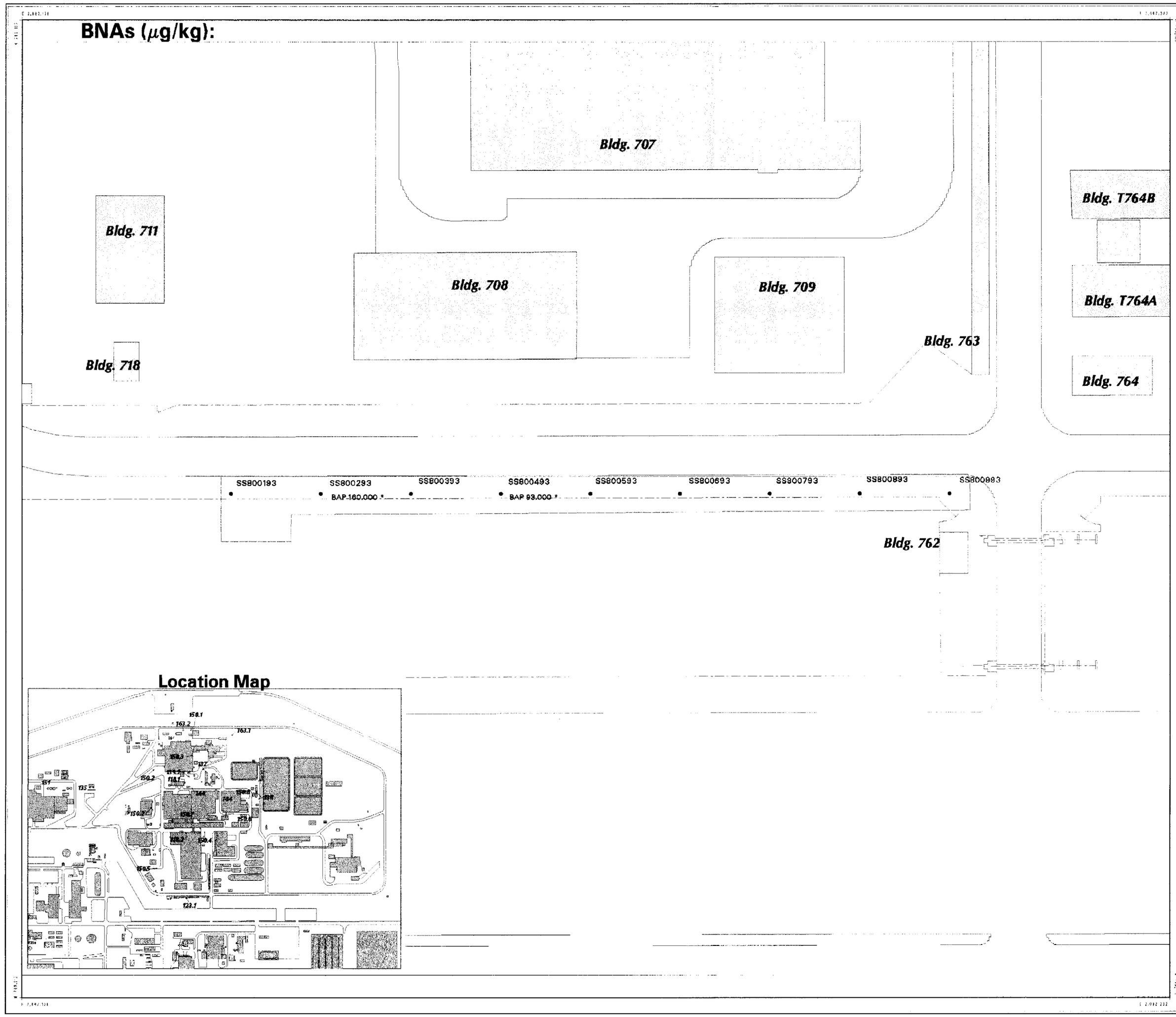

FIGURE 3-5

OU8-IHSS 123.1

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

BAP = Benzo(a)pyrene

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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228

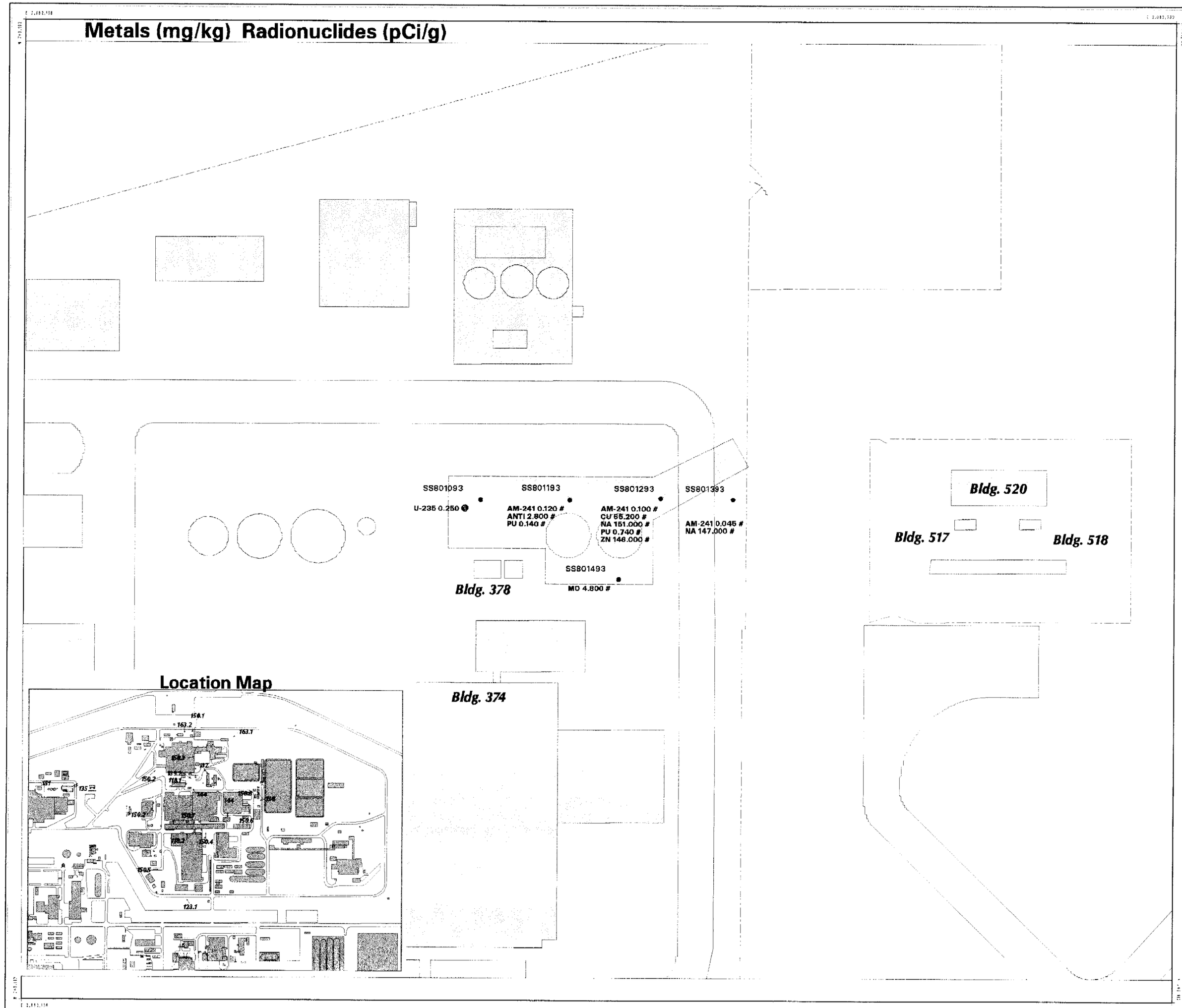

FIGURE 3-6

OU8-IHSS 135

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AM-241 = Americium-241
ANTI = Antimony
CU = Copper
MO = Molybdenum
NA = Sodium
PU = Plutonium-239/240
U-235 = Uranium-236

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

Rocky Mountain Remediation Services
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7100 East Belleview Avenue, Suite 300
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MAP ID: ou-8

August 23, 1995

/users/vkjera/s521905/projects/iou/ou8/soqplates/ssi135.aml

229

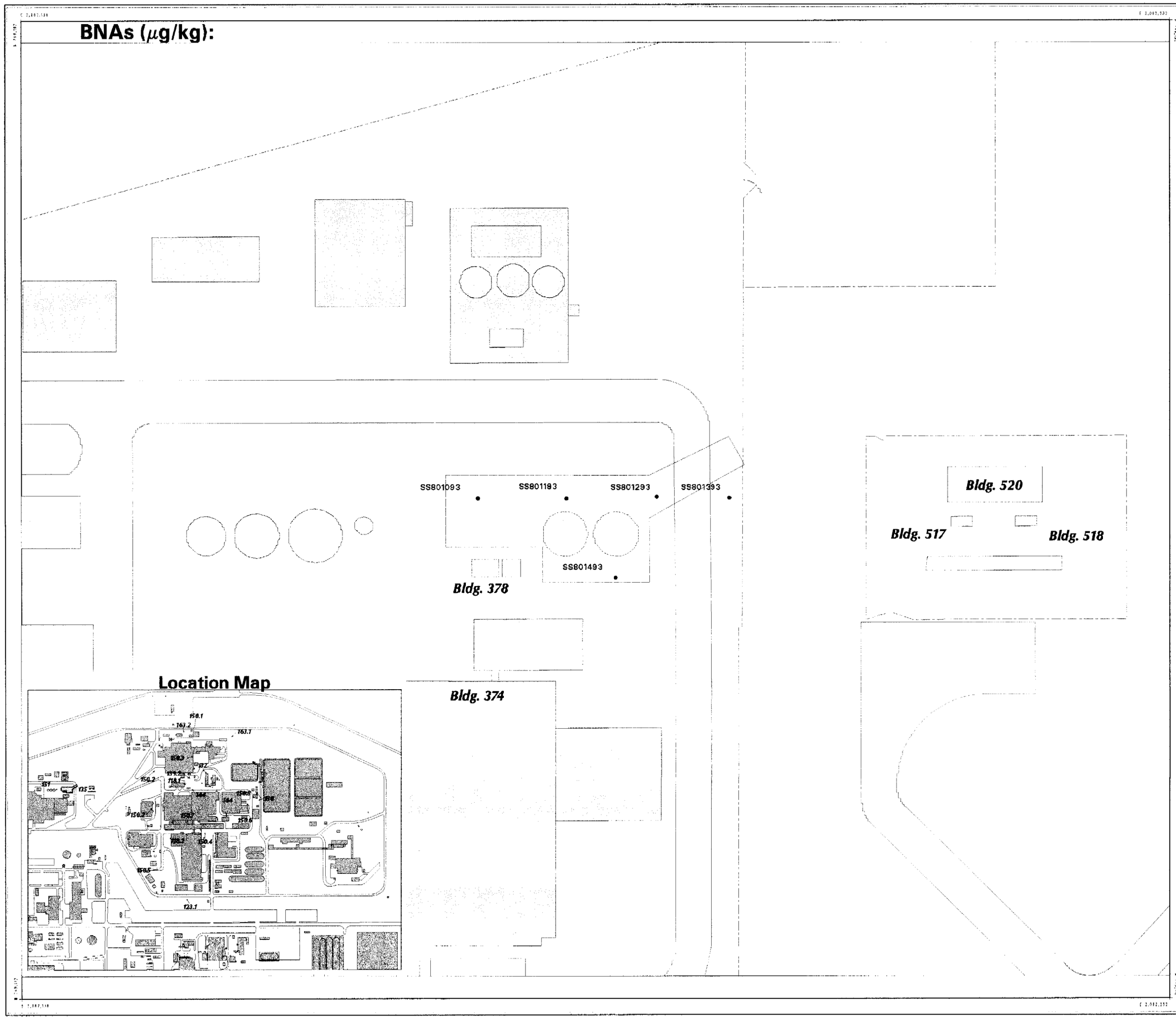

FIGURE 3-7

OU8-IHSS 135

SURFACE-SOIL ANALYTICAL RESULTS FOR ORGANICS

EXPLANATION

- Surface Soil Sample Location
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/iou/ou8/sogplates/seo135.aml

230

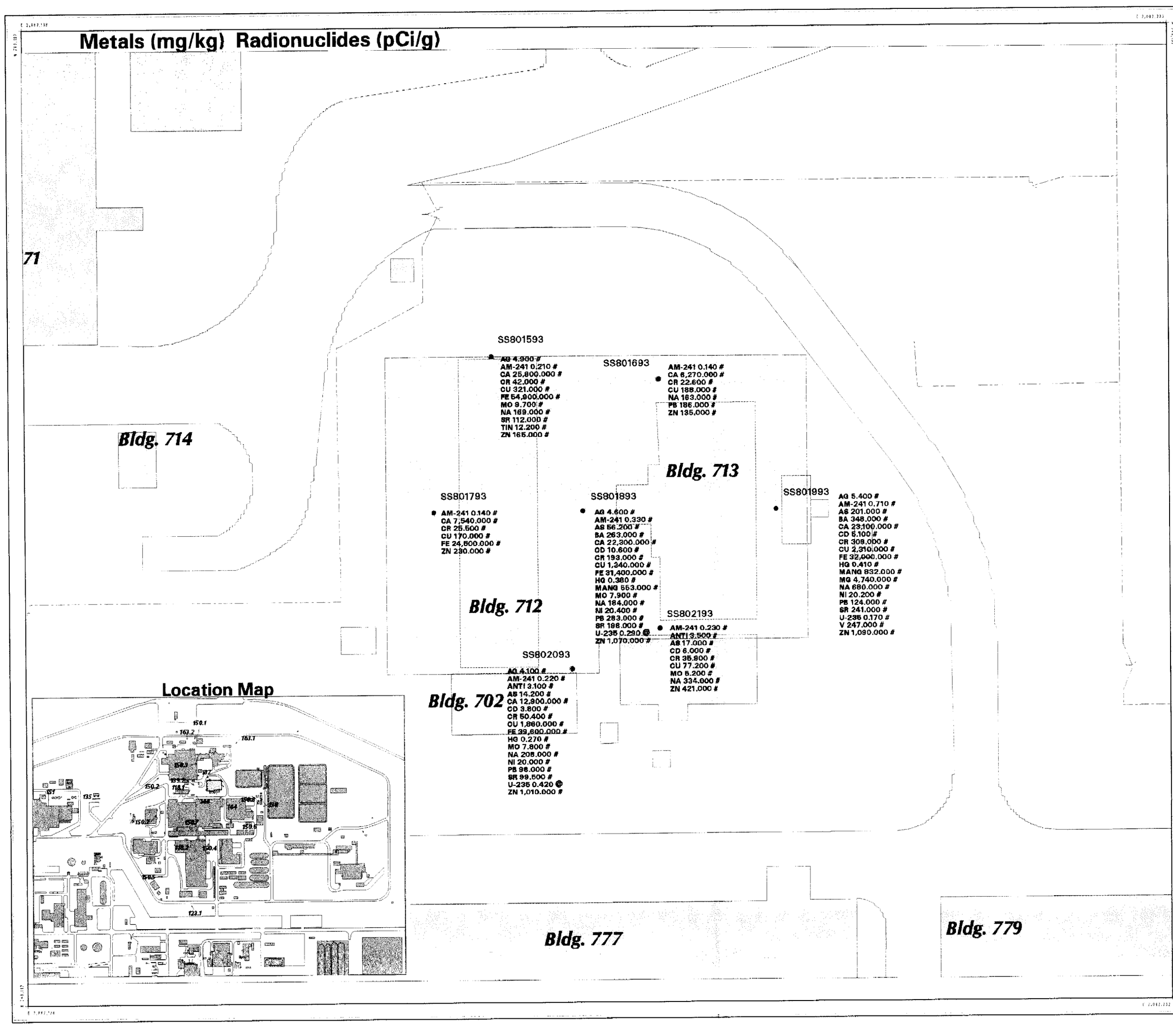

FIGURE 3-8

OU8-IHSS 137

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- ● Surface Soil Sample Location
- Analyte elevated above background
- ▲ Vertical Soil Profile Sample Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
AS = Arsenic
BA = Barium
CA = Calcium
CD = Cadmium
CR = Chromium
CU = Copper
FE = Iron
HG = Mercury
MANG = Manganese
MG = Magnesium
MO = Molybdenum
NA = Sodium
NI = Nickel
PB = Lead
SR = Strontium
TIN = Tin
U-235 = Uranium-235
V = Vanadium
ZN = Zinc

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
@ Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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/users/vkjera/s521905/projects/ou/ou8/sogplates/ssi137.aml

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