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FINAL

ANNUAL REPORT FOR TREATABILITY STUDIES PROGRAM FISCAL YEAR 1993

ROCKY FLATS PLANT

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

ENVIRONMENTAL RESTORATION PROGRAM

March 1994

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This *Final Annual Report for Treatability Studies Program - Fiscal Year 1993* (FY 93) presents a summary of activities completed under the Environmental Restoration (ER) Treatability Studies Program at the Rocky Flats Plant (RFP). The ER Treatability Studies Program coordinates site characterization activities, Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigations, corrective measures studies/feasibility studies (RFI/RIs, CMSs/FSs), and remedial and/or corrective actions which address environmental contamination on a sitewide basis at RFP. These efforts are conducted in accordance with the Interagency Agreement (IAG) signed by the U. S. Department of Energy (DOE), the U. S. Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH).

An overall Treatability Studies Plan (TSP) and annual reports for FY 91 and FY 92 have been prepared prior to this report. The earlier documents identified and evaluated the applicability of a wide variety of potential remediation treatment technologies and a status of activities for each fiscal year. The TSP was prepared pursuant to the IAG, while the annual reports have been prepared in accordance with agreements between the EPA and DOE.

The FY 93 Annual Report provides:

- A summary of new environmental site characterization data from the Rocky Flats Environmental Database System (RFEDS).
- A complete review of preliminary chemical-specific Treatability Study Benchmarks (TSBs). TSBs are standards used in developing sitewide Applicable or Relevant and Appropriate Requirements (ARARs).
- A literature search review to identify new and/or innovative potentially applicable treatment technologies.
- A complete review of active and/or planned RFP treatability studies and Interim Measures/Interim Remedial Actions (IMs/IRAs), which include:
    - Operable Unit (OU) 1 groundwater treatment under an IM/IRA
    - OU 2 surface water IM/IRA
    - OU 2 subsurface soils Interim Measures/Interim Remedial Action Plan (IM/IRAP)

- OU 3 portable wind tunnel studies
- The current status of OU 4 interim activities and treatability projects
- Water treatment using a proprietary colloid polishing filter as part of the Superfund Innovative Technology Evaluation (SITE) program
- Various plutonium-in-soils treatability studies
- Colloidal and solution phase transport of plutonium and americium in groundwater
- A sitewide treatability study for commercially-available adsorbents and ion exchange resins for water treatment
- A treatability study to evaluate thermally-enhanced aqueous extraction of radionuclides
- A discussion of the RFP Comprehensive Treatment Management Plan (CTMP)
- The sitewide treatability study/feasibility study integration at RFP
- A proposed oxidation/reduction (redox) processes treatability study plan
- A proposed photocatalytic detoxification process for aqueous waste streams using ultraviolet light
- Issues surrounding secondary residues from treatability studies
- A comprehensive review of the RFP technology screening process, as presented in the TSP, by an outside review committee.

- A review of future plans, priorities, and schedules for RFP treatability projects.
- A screening and selection of potentially applicable treatment technologies for use at RFP in the future. Four treatment technologies newly identified during completion of the FY 93 Annual Report are:

- Biosorption for capture/degradation of pesticides in aqueous media
- Membrane-based oil extraction for metal ion isolation in aqueous media
- Ultrasonic degradation of volatile organic compounds (VOCs) in aqueous media
- X-ray treatment for VOCs in aqueous media.

Technologies initially evaluated in the TSP or either the FY91 or FY92 annual reports were reevaluated in this report. The reevaluation included a review of the reasons stated in the TSP or previous annual reports for eliminating certain technologies from further consideration in the Rocky Flats Sitewide Treatability Study Program. If a technology was eliminated because it was known to be ineffective at treating a particular waste stream, then it was not considered further as part of the FY 93 Annual Report technology screening. If, however, a technology was eliminated due to a lack of supporting performance data (i.e., the technology was in a very early stage of development) a reconsideration of the technology was made in the FY 93 screening.

A literature search of treatment technology data revealed no additional documented efforts that warranted returning the previously eliminated technologies to the Rocky Flats Sitewide Treatability Study Program. However, the literature search did identify four new technologies that were not previously identified in the TSP or annual reports. After the technology screening process was completed, a determination was made that these four new technologies were not appropriate for future treatability testing under the Rocky Flats Sitewide Treatability Study Program. Detailed descriptions of the four newly identified treatment technologies are presented in this report. A description of the reevaluation process for specific water and soil/sediment treatment technologies recommended for treatability testing in the TSP is presented in Section A.3, Appendix A of this report.

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ADS	Activity Data Sheet
ARAR	Applicable or Relevant and Appropriate Requirement
ATTIC	Alternative Treatment Technology Information Center
AWC	AWC-Lockheed, Inc.
AWQC	Ambient Water Quality Criteria
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
cm	centimeters
CMS	corrective measure study
CMS/FS	corrective measures study/feasibility study
CPFM	Colloid Polishing Filter Method
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
CTMP	Comprehensive Treatment Management Plan
CWQCC	Colorado Water Quality Control Commission
DOE	U. S. Department of Energy
DOT	U. S. Department of Transportation
EG&G	EG&G Rocky Flats, Inc.
ER	Environmental Restoration
EPA	U. S. Environmental Protection Agency
FFCA	Federal Facility Compliance Agreement
FS	feasibility study
FY	fiscal year
GAC	granular activated carbon
gpm	gallons per minute
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
HEPA	high-efficiency particulate air
HGMS	High-Gradient Magnetic Separation

IAG	Interagency Agreement
IDL	Instrument Detection Limit
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IM/IRAP	Interim Measure/Interim Remedial Action Plan
INEL	Idaho National Engineering Laboratory
IRA	Interim Remedial Action
kg	kilogram
LANL	Los Alamos National Laboratory
LDR	Land Disposal Restriction
LIA	linear induction acceleration
LLM	low-level mixed
m	meter
M	Molar
MBX	MBX, Inc.
MCLG	maximum contaminant level goal
MCL	maximum contaminant level
MDL	method detection limit
MeV	million electron volts
mg/L	milligram per liter
ml	millileters
mm	millimeters
nCi/g	nanocuries per gram
NAPL	nonaqueous phase liquid
NRT	Nuclear Remediation Technologies
NTIS	National Technical Information Service
NTS	Nevada Test Site
O&M	operation and maintenance
OU	operable unit
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzodioxin
PCDF	polychlorinated dibenzofurane
pCi/g	pico curies per gram

pCi/L	pico Curies per liter
PCP	pentachlorophenol
POP	proof-of-principle
ppb	parts per billion
PQL	practical quantification limit
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
R&D	research and development
redox	oxidation/reduction
RFEDS	Rocky Flats Environmental Database System
RFP	Rocky Flats Plant
RFI/RI	RCRA facility investigation/remedial investigation
RWMC	Radioactive Waste Management Complex
SITE	Superfund Innovative Technology Evaluation
SMO	Sample Management Office
SO	Systems Operation
SOW	Statement of Work
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TBC	to be considered
TCE	trichloroethylene
TDS	total dissolved solid
TEA	triethylamine
TSB	Treatability Study Benchmark
TSP	Treatability Studies Plan
USGS	U. S. Geological Survey
UV/peroxide	ultraviolet light and hydrogen peroxide
VISITT	Vendor Information System for Innovative Treatment Technologies
VOC	volatile organic compound
µg/L	microgram per liter
µm	micrometer
µmhos/cm	micro mhos/centimeter

1.0 INTRODUCTION

The Final *Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1993* (hereinafter referred to as the FY 93 Annual Report) summarizes activities directly associated with the Treatability Studies Program of the Rocky Flats Plant (RFP) Environmental Restoration (ER) Program. The purpose of the ER Program is to coordinate the performance of environmental site characterization activities, Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigations, corrective measures studies/feasibility studies (RFI/RIs, CMSs/FSs), and remedial and/or corrective actions for individual operable units (OUs) sitewide if necessary. The FY 93 Annual Report addresses the status of the treatability studies and the data completed between the period beginning October 1, 1992 and ending September 30, 1993.

Environmental contaminants of concern have been identified in OUs 1, 2, 4, 5, 6, 7, 11, and the Industrialized Area OU (i.e., OUs 8, 9, 10, 12, 13, and 14). The RFP Sitewide Treatability Study Program was initiated to identify and evaluate remediation treatment technologies potentially applicable to contaminants specifically identified at more than one OU. A technology screening process was formalized in the Final Treatability Studies Plan (TSP) (EG&G 1991a). New and/or innovative technologies have been identified and subjected to this same screening process as part of previous annual reports. The FY 93 Annual Report also identifies and evaluates new potentially applicable technologies and completes a review, reevaluation, and rescreening of relevant treatment technologies originally described in the TSP and the previous annual reports (EG&G 1992a; EG&G 1993a).

To supplement the technology review and status update for treatability study activities at RFP, recently collected site characterization data for the OUs have been reviewed and compared to preliminary chemical-specific Treatability Study Benchmarks (TSBs). TSBs are numerical chemical concentrations published by various regulatory agencies and they may form the basis for evaluating Applicable or Relevant and Appropriate Requirements (ARARs). A preliminary chemical-specific TSB review was necessary to ensure standards developed or under consideration since issuance of the FY 92 Annual Report were addressed.

The following briefly describes the sections and organization of this report.

1.1 SUMMARY OF NEW CHARACTERIZATION DATA

Analytical site characterization data made available from the Rocky Flats Environmental Database System (RFEDS) since the FY 92 Annual Report are reviewed in Section 2. The data review provided information with regard to the presence of potential contaminants at RFP not previously

identified; and, the presence of contaminants differing in concentration from those previously detected (FY 91 and 92 Annual Reports). In addition, the RFEDS data includes new contaminant data recently validated and/or corrected since the FY 92 Annual Report. As a result of this review, contaminants and their maximum and minimum concentrations were identified for various media for eight OUs. The contaminant summary data table from the FY 92 Annual Report was updated for this report.

1.2 PRELIMINARY CHEMICAL-SPECIFIC TSBs REVIEW

A review of potential Federal and State chemical-specific TSBs (i.e., state groundwater quality standards, Federal surface water quality standards, statewide and basin surface water quality standards, and stream segment surface water standards) has been conducted and is presented in Section 3. Revisions to information from the FY 92 Annual Report were made based on this review. Preliminary chemical-specific TSBs may be considered as preliminary remediation goals to be used in the RFI/RI, CMS/FS process for individual OUs. Preliminary TSBs identified hereinafter are consistent with RFP's Potential Sitewide Table of Benchmarks, and may be used in the initial development of potential sitewide ARARs for environmental remediation. The benchmark table was conditionally-approved by the Colorado Department of Health (CDH) in FY 93 pending incorporation of specific CDH comments for chemical-specific standards. U. S. Environmental Protection Agency (EPA) comments received to date have been incorporated by EG&G Rocky Flats, Inc. (hereinafter referred to as EG&G) into the current benchmark table.

1.3 LITERATURE SEARCH AND REVIEW

Section 4 presents results of the review of various scientific literature databases and identifies new, innovative, or emerging treatment technologies for consideration in the technology screening and selection process. The literature review also considered new information on treatment technologies discussed in the TSP and the FY 91 and 92 annual reports.

1.4 TREATABILITY STUDY PROJECTS

Section 5 summarizes ongoing treatability study projects at RFP, active interim remedial actions, and additional information from other applicable research studies available subsequent to the FY 92 Annual Report. Planned treatability testing projects for individual OUs and the sitewide program are also discussed.

1.5 FUTURE PLANS, PRIORITIES, AND SCHEDULES

Future plans, priorities, and schedules for treatability study projects at RFP are discussed in Section 6. Issues affecting treatability project selection are also discussed.

1.6 APPENDICES

Detailed background information was used to prepare the discussion in this FY 93 Annual Report. This background information is provided in the appendices for support purposes. The appendices in this report are:

- Appendix A - Technology Selection and Screening
- Appendix B - FY 93 RFEDS Data and Preliminary Chemical-Specific TSBs for the Sitewide Treatability Studies Program
- Appendix C - 1993 Annual Update Workplan for the Control of Radionuclide Levels in Water Discharges from the Rocky Flats Plant
- Appendix D - Technology Data Summaries for Treatment Technologies Reviewed in FY 93 Annual Report.

Technology selections completed in the TSP and the FY 91 and 92 annual reports were reviewed and reevaluated based on currently available characterization data and reported in Appendix A. Accordingly, modifications and/or additions to the previous reports are addressed in the FY 93 Annual Report. The review, evaluation, and screening steps for the technologies were completed using the same process as in the TSP and the FY 91 and 92 annual reports. The technology screening process is provided in Appendix A of this report. Results of the screening process for the four technologies newly identified in FY 93 Annual Report indicate none would be candidates for future treatability testing at RFP. Future treatability testing at RFP will be based, in part, upon favorable recommendations for specific technologies that may be identified in future fiscal year annual reports. Appendix B provides summary tables of all current RFEDS data, as well as the chemical-specific TSB tables for RFP. Appendix C contains the annual update of the Workplan for the Control of Radionuclide Levels in Water Discharges from RFP. Appendix D provides data summaries for the four treatment technologies newly identified in FY 93.

2.0
SUMMARY OF NEW CHARACTERIZATION DATA

A review of new analytical data from RFEDS was completed to evaluate additions and other modifications to existing site contaminant data on an OU-by-OU basis. Media for which data were available include groundwater, surface water, subsurface soils, surface soils, and sediments.

Contaminant information from RFEDS was evaluated to identify maximum contaminant concentrations observed, by media and by analyte. Raw data were received from EG&G in list ASCII format and were converted into dBase III + files to aggregate and evaluate data. Status of data validation was not considered to significantly impact the data in this report. These data represent analytical concentrations from samples collected within the boundaries of the 10 on-site OUs. Data are available for: OUs 1, 2, 4, 5, 6, 7, 11, and the Industrialized Area OU (designated for convenience as OUs 8, 9, 10, 12, 13, and 14). RFEDs data summary tables, by OU and medium, are presented in Appendix B. Maximum and minimum detectable contaminant concentrations are listed in Tables B-1 through B-29. Data are not currently available for each environmental media in each of the above-mentioned OUs. With regard to OUs 15 and 16, no data has been collected outside of the buildings which comprise the OUs. In addition, a No Further Action Justification Document has been approved by the EPA, CDH, and U. S. Department of Energy (DOE) for OU 16.

To incorporate analytical data in the FY 93 Annual Report, the data were aggregated by media as follows: groundwater, surface water, subsurface soils, surface soils, and sediments. Analyte specific maximum and minimum concentrations were extracted from the data set. These concentrations are summarized in Table 2-1. The OU designation for the maximum analyte concentrations, where available, is presented in Table 2-2. Analytical data obtained prior to October 1988 was not subjected to a validation procedure. Some of the chemical values reported in this table also have not yet been validated; thus the analyte list may be changed after the data are validated.

A significant number of the maximum contaminant concentrations shown in Table 2-1 have been modified from FY 92 to FY 93. Table 2-3 summarizes analytes in RFEDS where the FY 93 maximum concentrations are actually lower than the previously-reported, FY 92 maxima. The source of the discrepancy is not traceable. As a result, questionable contaminant values from previous reports have been eliminated from the data summary and replaced with traceable RFEDS data points.

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
METALS (Total and Dissolved)	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Aluminum	1460	0.0000	0.05	442 N	0.0002	0.200	102000	3.847	39106	33900	9.7	21387
Antimony	76	0.0000	0.006	1.9 B	0.0008 B	0.060	348	2.1517		69.7	1	17.7
Arsenic	3.0 J	0.0007	0.05	1.03	0.0007	0.01	64	0.0000	.5	49.2	0.03	10.1
Barium	11.3	0.0001	2.0	7.07	0.0001 B	1.0	11600	0.0270	321	706	10.6	254
Beryllium	0.16	0.0000	.004	0.170	0.0002 J	0.005	131	0.0005 J	15.7	15.5	0.15	11.6
Boron	0.218	0.0311	.75									
Cadmium	1.72	0.0003 J	0.005	0.4	0.0010	0.005	550	0.001	2.2	20.6	0.41 B	2.6
Calcium	713000	0.05		1760	0.0115		312000	1.53	44733	296000	27	18446
Cesium	0.5 B	0.0010 B		2.53	0.0001		2410	0.025	889	700 B	0.58 WN*	442
Chromium	5.02 *	0.0020	0.05	0.4340	0.002	0.05	8310	0.0048	76.3	142	0.89	31.9
Cobalt	1.62	0.0020	0.05	0.489	0.0013		88.9	0.0042 J	32.6	43.3 B	1.3	16.4
Copper	30.5	0.001 B	0.2	0.6230	0.0002	0.025	6920	0.0043	42.4	425	0.42	36.8
Iron	2020	0.0001	0.3	3220	0.0001	0.30	132000	2.54	45421	112000	E* 1040	28613
Lead	3.66	0.0000	0.015	0.950	0.0001	0.005	935	0.0035	27.3	536	1.9	138
Lithium	882	0.0010 B	2.5	83.9	0.0001 J		776	0.52 B	38.5	958	0.53	41.0
Magnesium	210000	0.0097		8720	0.01		32500	0.64	10426	17000	62	5358
Manganese	52.5	0.0000	0.05	27.7	0.0002	0.050	7650	0.0098	1014	4790	9	907
Mercury	0.013	0.0000	0.002	40591	0.0001	0.0002	114	0.0001	2.2	3.8	0.034	0.46
Molybdenum	1.6	0.0020 B		0.680	0.0001		274	0.56 B		177	0.58	31.8
Nickel	4.95	0.0020 B	0.1	0.82	0.0001	0.4	4750	0.0035 J	69	114	1.2	24.2
Phosphorus	100 B	0.0100		12	0.0100					655	198	
Potassium	34300	0.0017		4140	0.07		18700	0.4590 J	7003	67000	183	3160
Selenium	450	0.0000	0.010	0.55	0.0007	0.005	5.8	0.0000	6.7	21.3	0.08	2.2

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
METALS (Total and Dissolved) (continued)	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Silicon	354	0.881 B		11500	0.0802 B		14000	6		7100	64.9	1742
Silver	3.04	0.0020 B	0.050	0.74 B	0.0000	0.010	311	0.47 B	34.4	420	0.48	3.1
Sodium	370000	0.0134		1500000	0.0028		7540	0.16		7170	23.3 B	593.1
Strontium	6400	0.0003		295	0.0002		545	0.0044 J	235	1230	1	291
Thallium	0.2900	0.0005	0.0005	1.13 J	0.0009	0.01	5.7409	0.0000		90	0.2	1.1
Tin	208	0.0075		0.969	0.0001		579	2.1 B	323	1080	1.7	40.6
Vanadium	3.14	0.001	0.1	1.65	0.0011 B		3900	0.0039	97.9	114	3.4	63.4
Zinc	688	0.0000	2.0	45.4	0.0001	0.110	11900	0.0100	158	1660	6.5	139
ANIONS	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Ammonia as N	284	0.0520		65	0.015	0.5	8.38	0.335				N/A
Alkalinity as $CaCO_3$	3151	0.0000		341	10		3200	1000		81000	4	19840
Bicarbonate as $CaCO_3$	2000	1		19200	1		442	310		5340	10	18994
Carbonate as $CaCO_3$	220	0.0000		230	0.0000				0			
Chloride	21500	(0.76)	250	1200	(1.7)	230	76	13		210	1.6	N/A
Cyanide	3.8	0.001 B	0.2	1	0.001	0.01	43	0.190 B		1.2 B	0.005	N/A
Fluoride	8.6	0.07	2.0	9	0.1	5.0	1.5	1.5				
Nitrate as N	1450	0.02	10.0	1185.72	0.2	10.0	14.5	0.2160		19	0.159	
Nitrate + Nitrite as N	9640	0.012	10.0	9800	0.02	10.0	20000	0.0000	1.75	163	0.3	57.2
Nitrite as N	2.2	0.01	1.0	2.4	0.01	5.0				3.1	0.3	1.2
Orthophosphate	15	0.01		7.9	0.01							
Phosphate	100 B	0.01		12	0.01					665	198	

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
ANIONS (continued)	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Sulfate	19000	0.1 J	250	1900	0.46	250	400	41		744	17	
Sulfide	29	2.0		39	0.28	2.0	488	2	9.9	211	3	
Total Kjeldahl Nitrogen				61	2							
Total Organic Carbon	22	1		160	1		58000	0.08 X		54400	G 1480	24000
INDICATORS	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Biochemical O_2 Demand	45	0.87		260	19							
Conductivity Minimum (umho/cm)	1400	15.3		115			4.5					
Conductivity Maximum (umho/cm)				3880			590					
Dissolved Oxygen (mg/L)						3.0						
Minimum												
Maximum												
Oil and Grease	32	(95)		665	0.0000		567	0.057	0.17	68000	1600	
Percent Solids (%)												
Minimum							1.2			61.7		
Maximum							89.7			67		
pH minimum (pH units)	3.38		6.5	1.4		6.5	5.85		7.6	6.05		6.05
pH maximum (pH units)	12		8.5	84		9.0	12.2		9.6	12		9.34
Temperature (degrees C)												
Minimum												
Maximum												

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
INDICATORS (continued)	(mg/L)			(mg/L)			(mg/kg)			(mg/kg)		
Total Dissolved Solids (mg/L)	88000	0.201	400	46000	5	250	620 mg/L	210 mg/L				
Total Suspended Solids (mg/L)	47000	1		46000	1		17 mg/L	17 mg/L				
RADIONUCLIDES (Total and Dissolved)	(pCi/L)			(pCi/L)			(pCi/g)			(pCi/g)		
Americium 241	46.54 x	(0.4610) J		90	(1.8)	0.05	270.4	(0.1550)	0.02	389.4	(0.04)	1.77
Cesium 137	25.12	(4.8L, J		12	(8.0)		4.7	(0.800)	0.11	2.81	(0.0266) J	1.54
Gross Alpha	2000	2.0	7.0	2169	(1.47)	7.0	742	(0.4980) J	49.48	4000	3.9 J	87.5
Gross Beta	1200	(19)	5.0	3800	(10)	5.0	1706	3.309 J	41	247.1	3	66.8
Plutonium 238	0.0520	(0.053) J	0.05	0.5	(0.0210) J		9.838	(0.0015) J		0.045	(0.0001) J	0.00
Plutonium 239 + 240	1001	(3.2)	15(a,c)	120	(0.0690)	15(a,c)	7300	(0.12)	0.02	1174	(0.05)	5.62
Radium 226	170	(0.2)	5(b)	30	(0.2)	5(b)	11.8	0.0000	1.45	5.1	(0.34)	2.22
Radium 228	14.34	0.21	5(b)	52	(1.1)	5(b)	16	0.0000	2.37	8.1	0.04	4.55
Strontium 89 + 90	1128.57	(0.7)		64.248	(0.6)		6.54	(0.7)	.98	4.86	(0.6)	1.07
Strontium 90	4.1	(0.29)	8.0	33.34	(2.761)	8.0	2.6	(0.8000)		1.6	(0.5)	
Tritium	39030	(700)	500(c)	23000	(6930)	500(c)	510	(0.1660)	477	1.09	(0.067)	1030.6
Uranium 233 + 234	1000	(0.4)	5(d)	1500	(1.19) J		971	(0.0600)	3.25	25.22	0.0000	5.29
Uranium 233 + 238 + 239			5(d)			5(d)						
Uranium 235	47	(0.2)	5(d)	72.87	0.25	5(d)	37.68	(0.5740)	0.14	1.302	(0.0129)	0.21
Uranium 235 + 236			5(d)			5(d)						
Uranium 238	750	(0.9)	5(d)	1211	(0.1)	5(d)	1210	(0.12)	1.73	43.09	0.067	4.82
Uranium (Total)									3.55			6.57

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater					Surface Water					Soils					Sediments				
	Maximum*		Minimum**		Preliminary TSBs	Maximum*		Minimum**		Preliminary TSBs	Maximum*		Minimum**		Background Concentration**	Maximum*		Minimum**		Background Concentration**
VOLATILES	(µg/L)					(µg/L)					(µg/kg)					(µg/kg)				
1,1-Dichloroethane	660		0.2			50		0.2			49		2	J						4.0
1,1-Dichloroethene	48000		0.1		7	160	D	0.1	J	5.0	2000	J	1	J		5.0	J	5.0	J	4.0
1,1,1-Trichloroethane	30250		0.1	DF	200	42		0.12		200	240000	E	1	J		9	J	1	J	4.0
1,1,2-Trichloroethane	14740		0.1	DF	5.0	24		1	J	5.0	27		6	J						4.0
1,1,2,2-Tetrachloroethane	180		0.1	DF	5	3	J	1	J	5.0	51		1	J						4.0
1,2-Dichloroethane	16000		0.1		5	23		0.2	J	5.0	120		2	J						4.0
1,2-Dichloroethene (Total)	12000	D	0.5	J		460	E	1	J	100 (trans)	110		1	J						4.0
1,2-Dichloropropane	200	E	0.2	DF	0.0056	3	J	1	J	5.0	6	B	2	J						4.0
1,3-Dichloropropane	100	DF	0.2	DF						10										4.0
2-Butanone	1500	D	1	J		76		1	J		29000		1	J		37000	B	1	JB	9.25
2-Chloroethylvinylether											31	J	31	J						
2-Hexanone	975		1	BJ		12		1	J		2000	JB	1	J		17		9	J	8.5
4-Methyl-2-Pentanone	1200	E	1	J		87	J	1	JB		42000		1	J		9500		3	J	8.5
Acetone	15000	BD	0.9	J	10	1100	E	1	JB		5100000	B	1	J		110000	B	4	JB	85
Benzene	200	DF	0.08	J	5.0	150	D	0.3		5	8000		1	J		11000	J	3	J	4.0
Bromodichloromethane	540	J	0.09	J	5.0	12		0.25		5.0										4.0
Bromoform	500	DF	0.8	J	5.0	2	J	0.2	J	5.0	6	J	6	J						4.0
Bromomethane	1000	DF	1	J	10					48	6.0	J	6	J						8.5
Carbon Disulfide	46		0.1	J	5.0	19		1	JB		110000		1	J		6000	J	1	J	4.0
Carbon Tetrachloride	100000	D	0.1		5.0	1005		0.1	J	5.0	140000		1	J		52000		13	J	4.0

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
VOLATILES (continued)	(µg/L)			(µg/L)			(µg/kg)			(µg/kg)		
Chlorobenzene	100 DF	0.2 DF	100	180 D	0.45	100	3000 J	1 J		4.0 J	4 J	4.0
Chloroethane	500 DF	0.34 J		62	1 J		50 J	8 J				8.5
Chloroform	64000 E	0.08 J	5.0	130	0.1	5.0	63000	1 J		10000	3 J	4.0
Chloromethane	500 DF	0.2F J		130	1 J	10.0				3000 J	18	8.5
Dibromochloromethane	200 DF	0.4 DF	14	3 J	0.3 J	8.0	0 J	0 J				4.0
Ethylbenzene	500 J	0.2 DF	680	19	1 J	680	42000	1 J		10000 J	1 J	4.0
Methylene Chloride	35000 B	0.1 B	5.0	340	0.1	5.0	2400000 B	1 J		190000 B	1 J	18.0
Styrene	100 DF	0.08 J	100	2 J	0.1 J	100	6000 B	1 J		36	2 J	4.0
Tetrachloroethene	528000	0.05 J	5.0	300 E	0.05	5.0	13000000 D	1 J		39000	1 J	4.0
Toluene	1200 E	0.1 J	1000	170 D	0.0810	1000	860000	1 J		500000	1 J	4.0
Trichloroethene	221860	0.04	5.0	2500	0.04	5.0	120000	1 J		17000	1 J	4.0
Vinyl Acetate	39 J	1 J		80	1 J		1000 J	1 J				
Vinyl Chloride	930	0.1 J	10	37	0.2	10	83	60		57	24	8.5
Xylenes (Total)	1000 E	0.1 J	10000	40 J	0.5	10000	18000 J	1 J		16000	2 J	4.0
SEMIVOLATILES (Total)	(µg/L)			(µg/L)			(µg/kg)			(µg/kg)		
Acenaphthene	5 J	2 J		5.0 J	1 J	520	170000 J	42 J		9200	56 J	270
Acenaphthylene				10 J	10 J	S.S.(e)	600 J	38 J		450 J	50 J	280
Aldrin	53	0.0000 I	0.05	0.31 X	0.01 J	0.05	56	17		54	0.0000 I	
Alpha-BHC	0.12	0.0000 I		0.36 I	0.0000 I	0.05	15	15		4.7 J	0.0000 I	
Alpha-chlordane			0.5	2.6 I	0.0000 I	0.5				0.0000 I	0.0000 I	
Ametryn				0.18	0.18	S.S.(e)						

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
SEMIVOLATILES (Total) (continued)	(µg/L)			(µg/L)			(µg/kg)			(µg/kg)		
Anthracene				2.0 J	2 J	10	190000 J	37 JB		15000	37 J	310
Atrazine			3.0	2720.0	0.05 J	3.0						
Benzo(a)Anthracene	4 J	4 J	S.S.(e)	2.0 J	1 J	10	350000 J	36 J		71000 J	37 J	312
Benzo(b)Fluoranthene				3.0 J	3 J	S.S.(e)	230000 J	28 J		89000 J	48 J	312
Benzo(k)Fluoranthene				4.0 J	4 J	S.S.(e)	370000	32 JX		79000 J	37 J	280
Benzo(g,h,i)Perylene							210000 J	15 J		26000	64 J	280
Benzo(a)Pyrene			10.0	3.0 J	3 J	10	290000 J	36 J		71000 J	57 J	312
Benzo(k)Pyrene												
Benzoic Acid	2900 E	6 J		8.0 J	2 J		87000	42 J		3300 J	44 J	1300
Benzyl Alcohol				43	2 J		270 J	270 J		8200 D	41 J	265
Beta-BHC	0.055 X	0.0000 I		0.17 J	0.0000 I	0.05				220 DXZ	0.0000 I	
Bis(2-ethylhexyl)phthalate	44	1 J	10	1000	1 J	10	25000000	9 J		3700000	36 J	360
Butyl Benzyl Phthalate	2.0 J	1 J		3.0 J	1 J	3000	51000 JB	45 J		2300	56 J	265
4-Chloro-3-methylphenol				1.0 J	1 J	30	740	72				
4-Chlorophenyl Phenyl Ether							40 J	40 J				
Chrysene	4 J	4 J	S.S.(e)	2.0 J	1 J	10	420000	36 J		100000 J	41 J	312
Cyanazine				0.3	0.3							
4,4-DDT	53	0.0000 I	0.1	0.88 X	0.011 J	0.1	140	26		95 XZ	2.9 J	
Delta-BHC	0.0000 I	0.0000 I		0.18 I	0.0000 I		23	23		13	0.0000 I	
Dibenzo(a,h)Anthracene						10	14000 J	37 J		9100	150 J	265
Dibenzofuran				2 J	1 J		86000 J	36 J		4100	37 J	265
Dicamba				2.1	0.28							

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater					Surface Water					Soils				Sediments			
	Maximum*		Minimum**		Preliminary TSBs	Maximum*		Minimum**		Preliminary TSBs	Maximum*		Minimum**	Background Concentration**	Maximum*		Minimum**	Background Concentration**
SEMIVOLATILES (Total) (continued)	(µg/L)					(µg/L)					(µg/kg)				(µg/kg)			
1,4-Dichlorobenzene	100	DF	0.2	DF	75	4.0	J	0.1	J	75	110	J	43 J					265
1,3-Dichlorobenzene	100	DF	0.17		620					620	180	J	180 J					265
Dichloroprop						1.8		1.8		S.S.(e)								
Diethyl Phthalate	310		2	J		7	J	1	J	23000	16000		26		460	J	460 J	265
Di-n-Butyl Phthalate	21		1	J	10	50	J	0.9	J	2700	43000	JB	33 JB		290000	JB	20 J	330
Di-n-Octyl Phthalate						24	B	1	J		91000	J	39 J		59000	D	66 J	265
2,4-Dimethylphenol	8	J	7	J		3	J	2	J	2120	89	J	89 J					265
2,4-Dinitrotoluene			2	J	S.S.(e)	4.0	J	4	J	10	73		73					265
Endosulfan															20	J	0.0000 I	
Ethyl Parathion																		
Fluoranthene	4	J	3	J		2.0	J	2	J	42	880000		37 J		300000	J	41 J	360
Fluorene	4	J	2	J		3.0	J	1	J	10	160000	J	37 J		8900		80 J	312
Gamma-BHC (Lindane)	86		0.0000	I	0.018	0.46	X	0.05	I						55	DXZ	0.0000 I	
Hexachlorobenzene					10						1300		160 J		440	J	440 J	280
Indeno (1,2,3-cd) Pyrene					1050						190000	J	39 J		22000		60 J	280
Isophorone	8	J	8	J	S.S.(e)	1.0	J	1	J	10 S.S.(e)	96	J	82 J					265
2 Methylnaphthalene	1	J	1	J	S.S.(e)	29		8	J		45000	J	37 J		1900	DJ	58 J	265
2-Methylphenol	14		3	J		24		24		S.S.(e)	1800		96 J					265
4-Methylphenol	2100	E	6	J		46		2	J		9300		61 J		130000	J	68 J	330
Naphthalene	200	DF	0.15	J		26		0.11	JB	10	130000	J	37 J		4400		46 J	265
2-Nitrophenol										230					450	J	350 J	265

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater					Surface Water					Soils			Sediments		
	Maximum*		Minimum**		Preliminary TSBs	Maximum*		Minimum**		Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
SEMIVOLATILES (Total) (continued)	(µg/L)					(µg/L)					(µg/kg)			(µg/kg)		
4-Nitrophenol	61	DJ	61	DJ	S.S.(e)					230	160 J	53 J		380 J	240 DJ	1350
4-Nitroaniline														5300 J	5300 J	1350
N-Nitroso-di-n-Propylamine	200	D	200	D	S.S.(e)	5	J	5	J	10						
N-Nitrosodiphenylamine	162	B	1	J	10	300		1	J	10	69000 J	33 J		280000 J	59 J	265
Pentachlorophenol	62	DJ	2	J	50	20	J	5	J	50	2400 J	41 J		350 J	350 J	1350
Phenanthrene	6	J	2	J		6.0	J	2	J	10	1000000	35 J		88000 J	53	312
Phenol	130		2	J	10	39		1	J	10	56000	53 J		9800 E	54 J	265
Prometon						0.31		0.09								
Prometryn						0.18		0.18		S.S.(e)						
Propazine						1		0.09								
Pyrene	3	J	2	J		4	J	2	J	10	850000	40 J		150000 J	41 J	312
Simazine					4	330		0.06		4.0						
Simetryn						0.64		0.21								
Terbuthylazine						0.09		0.09		S.S.(e)						
1,1,2,2-Tetrachloroethane	180		0.1	DF	5	3	J	1	J	5.0	51	1 J				
1,2,4-Trichlorobenzene	200	DF	0.1	DF	70	4	J	0.1	J	70				130 J	130 J	265

TABLE 2-1

MAXIMUM AND MINIMUM ANALYTE CONCENTRATIONS FOR COMBINED OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater			Surface Water			Soils			Sediments		
	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Preliminary TSBs	Maximum*	Minimum**	Background Concentration**	Maximum*	Minimum**	Background Concentration**
POLYCHLORINATED BIPHENYLS (PCBs)	(µg/L)			(µg/L)			(µg/kg)			(µg/kg)		
Aroclor-1254			.5	24	0.15 J	1.0	860000	9.7 J		67000	230 J	

* = *Present in laboratory blank*
** = Background concentrations taken from Final Background Geochemical Characterization Report, Rocky Flats Plant, September, 1993
\+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against RFEDS.
\+ + = Value listed is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Rounte Analytical Services Protocol (G.R.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.
B = For organics, compound also detected in method blank. For metals, the concentration is between the Contract Required Detection Limit (CRDL) and the Instrument Detection Limit (IDL).
D = Result calculated from diluted sample.
E = Concentration exceeds the instrument calibration range
F = Estimated, compound off scale in both columns; for organic compounds
J = Analyzed below detection limit
mg/kg = *miligram per kilogram*
mg/L = miligram per liter
N = For organics, compound identified tentatively. For inorganics, matrix spike recovery out of acceptable range.
pCi/g = pico Curie per gram
pCi/L = pico Curie per liter
µg/kg = microgram per kilogram
µg/L = microgram per liter
W = Percent recovery for pre- and post-digestion spikes exceeded acceptable range.
X = Result calculated manually.
Z = *For organics, identification is questionable. Matrix interference* in columns may have occurred.
(a) = Plutonium 238 + 239 + 240
(b) = Radium 226 + 228
(c) = Site-specific standards
(d) = Total uranium
(e) = Species specific

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
METALS (Total and Dissolved)	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	
Aluminum	1460	2	442 N	None	102000	None	33900	16
Antimony	78	4, 8, 10, 14, 16	1.9 B	6, 10, 16	348	None	69.7	5
Arsenic	3.0 J	6	1.03	5	64	4, 8, 10, 14, 16	49.2	5
Barium	11.3	2	7.07	5	11600	None	706	5
Beryllium	0.16	None	0.170	8, 9, 10, 14, 16	131	None	15.5	5
Boron	0.218	6						
Cadmium	1.72	None	0.4	6, 10, 16	550	None	20.6	None
Calcium	713000	4, 8, 10, 14, 16	1760	4, 8, 10, 14, 16	312000	None	296000	None
Cesium	0.5 B	None	2.53	5	2410	None	700 B	16
Chromium	5.02 *	5	0.4340	None	8310	None	142	None
Cobalt	1.62	None	0.489	5	88.9	None	43.3 B	16
Copper	30.5	4, 8, 10, 14, 16	0.6230	None	6920	None	425	None
Iron	2020	2	3220	5	132000	None	112000 E*	5
Lead	3.66	6, 14	0.950	5	935	None	536	None
Lithium	862	4, 8, 10, 14, 16	83.9	6, 16	778	None	958	5
Magnesium	210000	4, 8, 10, 14, 16	8720	6	32500	None	17000	5
Manganese	52.5	4, 8, 10, 14, 16	27.7	5	7650	None	4790	None
Mercury	0.013	2	40591	6, 8, 10, 16	114	None	3.8	5
Molybdenum	1.6	None	0.680	None	274	None	177	5
Nickel	4.95	1, 10	0.82	5	4750	None	114	None
Phosphorus	100 B	7, 16	12				655	5
Potassium	34300	4, 8, 10, 14, 16	4140	4, 8, 10, 14, 16	18700	None	67000	5
Selenium	450	5	0.55	6, 16	5.8	7, 16	21.3	5

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum[+]	Operable Units	Maximum[+]	Operable Units	Maximum[+]	Operable Units	Maximum[+]	Operable Units
METALS (Total and Dissolved) (continued)	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	
Silicon	354	5	11500	5	14000	None	7100	5
Silver	3.04	6, 7, 16	0.74 B	6, 10, 16	311	None	420	6
Sodium	370000	4, 8, 10, 14, 16	1500000	6, 8, 10, 16	7540	None	7170	None
Strontium	6400	4, 8, 10, 14, 16	295	6, 8, 10, 16	545	None	1230	5
Thallium	0.2900	6, 8, 10, 16	1.13 J	6, 8, 10, 16	5.7409	4, 8, 10, 14, 16	90	6
Tin	206	4, 8, 10, 14, 16	0.969	5	579	None	1080	5
Vanadium	3.14	2	1.65	5	3900	None	114	None
Zinc	686	6, 14	45.4	4, 10, 14, 16	11900	None	1660	None
ANIONS	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	
Ammonia as N	284	7, 16	65	None	8.38	None		
Alkalinity as $CaCO_3$	3151	7, 16	341	4, 8, 10, 14, 16	3200	None	81000	None
Bicarbonate as $CaCO_3$	2000	6, 7, 16	19200	None	442	None	5340	5
Carbonate as $CaCO_3$	220	None	230	None				
Chloride	21500	None	1200	8, 10, 14, 16	76	5	210	8, 9, 10, 14, 16
Cyanide	3.8	7, 16	1	5	43	4, 8, 10, 14, 16	1.2 B	None
Fluoride	8.6	7, 16	9	None	1.5	5		
Nitrate as N	1450	4, 8, 10, 14, 16	1185.72	6, 8, 10, 16	14.5	6, 8, 10, 16	19	None
Nitrate + Nitrite as N	9640	4, 8, 10, 14, 16	9900	4, 8, 10, 14, 16	20000	6	163	6, 8, 10, 16
Nitrite as N	2.2	6, 8, 10, 16	2.4	6, 10, 16			3.1	5
Orthophosphate	15	None	7.9	None				
Phosphate	100 B		12				665	

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
ANIONS (continued)	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	
Sulfate	19000	6	1900	6, 16	400	None	744	6
Sulfide	29	16	39	5	498	None	211	None
Total Kjeldahl Nitrogen			61	None				
Total Organic Carbon	22	6, 7, 16	160	None	56000	None	54400 G	6
INDICATORS	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	
Biochemical O_2 Demand	45	6, 7, 16	260	None				
Conductivity Minimum (umho/cm)			115		4.5			
Conductivity Maximum (umho/cm)	1400	None	3880	6, 16	590	None		
Dissolved Oxygen (mg/L)								
Minimum								
Maximum								
Oil and Grease	32	1, 10	665	4, 8, 10, 14, 16	567	None	68000	5
Percent Solids (%)								
Minimum					1.2		61.7	
Maximum					89.7	None	67	5
pH minimum (pH units)	3.38		1.4		5.85		6.05	
pH maximum (pH units)	12	None	84	6, 8, 10, 16	12.2	None	12	None
Temperature (degrees C)								
Minimum								
Maximum								
INDICATORS (continued)	(mg/L)		(mg/L)		(mg/kg)		(mg/kg)	

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
Total Dissolved Solids (mg/L)	88000	None	46000	4, 8, 10, 14, 16	620 mg/L	5		
Total Suspended Solids (mg/L)	47000	6	46000	5	17 mg/L	None		
RADIONUCLIDES (Total and Dissolved)	(pCi/L)		(pCi/L)		(pCi/g)		(pCi/g)	
Americium 241	46.54	x 2	90	4, 8, 10, 14, 16	270.4	None	389.4	6
Cesium 137	25.12	None	12	5	4.7	None	2.81	6
Gross Alpha	2000	4, 8, 10, 14, 16	2169	4, 8, 10, 14, 16	742	None	4000	6
Gross Beta	1200	11	3800	4, 8, 10, 14, 16	1706	None	247.1	1, 10
Plutonium 238	0.0520	None	0.5	6	9.838	None	0.045	None
Plutonium 239 + 240	1001	2	120	4, 8, 10, 14, 16	7300	None	1174	6
Radium 226	170	None	30	5	11.8	None	5.1	5
Radium 228	14.34	6, 8, 10, 16	52	4, 10, 14, 16	16	None	8.1	5
Strontium 89 + 90	1128.57	None	64.248	None	6.54	5	4.86	5
Strontium 90	4.1	6, 16	33.34	5	2.6	None	1.6	6
Tritium	39030	None	23000	4, 8, 10, 14, 16	510	None	1.09	6
Uranium 233 + 234	1000	4, 8, 10, 14, 16	1500	4, 8, 10, 14, 16	971	6, 16	25.22	6
Uranium 233 + 238 + 239								
Uranium 235	47	4, 8, 10, 14, 16	72.87	4, 8, 10, 14, 16	37.68	None	1.302	6
Uranium 235 + 236								
Uranium 238	750	4, 8, 10, 14, 16	1211	4, 8, 10, 14, 16	1210	None	43.09	6
Uranium (Total)								

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
VOLATILES	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
1,1-Dichloroethane	660	2	50	8, 10, 14, 16	49	None		
1,1-Dichloroethene	48000	1, 10	160 D	9, 10, 14, 16	2000 J	None	5.0 J	6
1,1,1-Trichloroethane	30250	1, 10	42	6	240000 E	None	9 J	None
1,1,2-Trichloroethane	14740	1, 10	24	None	27	None		
1,1,2,2-Tetrachloroethane	180	2	3 J	9, 10, 14, 16	51	None		
1,2-Dichloroethane	16000	1, 10	23	8, 10, 14, 16	120	None		
1,2-Dichloroethene (Total)	12000 D	1, 10	460 E	8, 10, 14, 16	110	None		
1,2-Dichloropropane	200 E	2	3 J	5	6 B	None		
1,3-Dichloropropane	100 DF	2						
2-Butanone	1500 D	2	76	6, 7, 16	29000	None	37000 B	5
2-Chloroethylvinylether					31 J	None		
2-Hexanone	975	2	12	6, 8, 9, 10, 14, 16	2000 JB	None	17	None
4-Methyl-2-Pentanone	1200 E	6, 7, 16	87 J	6, 7, 16	42000	None	9500	None
Acetone	15000 BD	2	1100 E	None	5100000 B	None	110000 B	6
Benzene	200 DF	2	150 D	9, 10, 14, 16	8000	None	11000 J	5
Bromodichloromethane	540 J	2	12	None				
Bromoform	500 DF	2	2 J	6	6 J	None		
Bromomethane	1000 DF	2			6.0 J	None		
Carbon Disulfide	46	8, 9, 10, 14, 16	19	6, 16	110000	None	6000 J	6
Carbon Tetrachloride	100000 D	2	1005	2	140000	None	52000	8, 9, 10, 14, 16

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
VOLATILES (continued)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
Chlorobenzene	100 DF	2	180 D	9, 10, 14, 16	3000 J	None	4.0 J	6
Chloroethane	500 DF	2	62	6, 7, 16	50 J	None		
Chloroform	64000 E	2	130	None	63000	None	10000	8, 9, 10, 14, 16
Chloromethane	500 DF	2	130	8, 10, 15, 16			3000 J	6
Dibromochloromethane	200 DF	2	3 J	None	0 J	None		
Ethylbenzene	500 J	1, 10	19	6, 7, 16	42000	None	10000 J	6
Methylene Chloride	35000 B	2	340	6	2400000 B	None	190000 B	5
Styrene	100 DF	2	2 J	None	6000 B	None	36	None
Tetrachloroethene	528000	2, 13	300 E	None	13000000 D	None	39000	8, 9, 10, 14, 16
Toluene	1200 E	6, 7, 16	170 D	9, 10, 14, 16	860000	None	500000	None
Trichloroethene	221860	2	2500	2	120000	None	17000	8, 9, 10, 14, 16
Vinyl Acetate	39 J	1, 10	80	6, 16	1000 J	None		
Vinyl Chloride	930	6, 9, 13	37	6, 8, 9, 10, 14, 16	83	None	57	16
Xylenes (Total)	1000 E	None	40 J	2	18000 J	None	16000	None
SEMIVOLATILES (Total)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
Acenaphthene	5 J	5	5.0 J	5	170000 J	None	9200	6, 8, 10, 16
Acenaphthylene			10 J	6, 16	600 J	None	450 J	None
Aldrin	53	6, 8, 10, 14, 16	0.31 X	5	56	None	54	6
Alpha-BHC	0.12	1, 10	0.38 I	6, 7, 16	15	5	4.7 J	5
Alpha-chlordane			2.6 I	10			0.0000 I	5
Ametryn			0.18	None				

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum*	Operable Units	Maximum+	Operable Units
SEMIVOLATILES (Total) (continued)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
Anthracene			2.0 J	8, 10, 14, 16	190000 J	None	15000	6, 8, 10, 16
Atrazine			2720.0	6				
Benzo(a)Anthracene	4 J	5	2.0 J	5	350000 J	None	71000 J	None
Benzo(b)Fluoranthene			3.0 J	5	230000 J	None	89000 J	None
Benzo(k)Fluoranthene			4.0 J	5	370000	None	79000 J	None
Benzo(g,h,i)Perylene					210000 J	None	26000	6, 8, 10, 16
Benzo(a)Pyrene			3.0 J	5	290000 J	None	71000 J	None
Benzo(k)Pyrene								
Benzoic Acid	2900 E	7, 16	8.0 J	5	97000	None	3300 J	5
Benzyl Alcohol			43	None	270 J	None	8200 D	None
Beta-BHC	0.055 X	1, 10	0.17 J	5			220 DXZ	1, 10
Bis(2-ethylhexyl)phthalate	44	7, 16	1000	6, 16	25000000	None	3700000	6
Butyl Benzyl Phthalate	2.0 J	11	3.0 J	6	51000 JB	None	2300	6, 8, 10, 16
4-Chloro-3-methylphenol			1.0 J	5	740	None		
4-Chlorophenyl Phenyl Ether					40 J	None		
Chrysene	4 J	5	2.0 J	5	420000	None	100000 J	None
Cyanazine			0.3	None				
4,4-DDT	53	6, 8, 10, 14, 16	0.88 X	5	140	None	95 XZ	8, 9, 10, 14, 16
Delta-BHC	0.0000 I	7, 16	0.18 I	6, 7, 16	23	None	13	None
Dibenzo(a,h)Anthracene					14000 J	None	9100	6, 8, 10, 16
Dibenzofuran			2 J	6, 7, 16	86000 J	None	4100	6, 8, 10, 16
Dicamba			2.1	6				

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
SEMIVOLATILES (Total) (continued)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
1,4-Dichlorobenzene	100 DF	2	4.0 J	5	110 J	5		
1,3-Dichlorobenzene	100 DF	2			180 J	5		
Dichloroprop			1.8	6				
Diethyl Phthalate	310	2	7 J	6, 10, 16	16000	4, 8, 10, 14, 16	460 J	None
Di-n-Butyl Phthalate	21	2	50 J	5	43000 JB	None	290000 JB	6
Di-n-Octyl Phthalate			24 B	6	91000 J	None	59000 D	None
2,4-Dimethylphenol	8 J	7, 16	3 J	6, 7, 16	89 J	1, 10		
2,4-Dinitrotoluene			4.0 J	5	73	1, 10		
Endosulfan							20 J	
Ethyl *Parathion*								
Fluoranthene	4 J	5	2.0 J	8, 10, 14, 16	880000	None	300000 J	6
Fluorene	4 J	5	3.0 J	6, 7, 16	160000 J	None	8900	6, 8, 10, 16
Gamma-BHC (Lindane)	86	6, 8, 10, 14, 16	0.46 X	5			55 DXZ	1, 10
Hexachlorobenzene					1300	7, 16	440 J	None
Indeno (1,2,3-cd) Pyrene					190000 J	None	22000	6, 8, 10, 16
Isophorone	8 J	None	1.0 J	6, 10, 16	96 J	None		
2-Methylnaphthalene	1 J	7, 16	29	6, 7, 16	45000 J	None	1900 DJ	None
2-Methylphenol	14	6, 7, 16	24	5	1800	6, 7, 16		
4-Methylphenol	2100 E	6, 7, 16	46	None	9300	7, 16	130000 J	None
Naphthalene	200 DF	2	26	6, 7, 16	130000 J	None	4400	6, 8, 10, 16
2-Nitrophenol							450 J	None

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
SEMIVOLATILES (Total) (continued)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
4-Nitrophenol	61 DJ	7, 16			160 J	None	380 J	None
4-Nitroaniline							5300 J	6, 8, 10, 16
N-Nitroso-di-n-Propylamine	200 D	6, 7, 16	5 J	5				
N-Nitrosodiphenylamine	162 B	6, 8 10, 16	300	6	69000 J	None	280000 J	5
Pentachlorophenol	62 DJ	7, 16	20 J	6, 16	2400 J	None	350 J	None
Phenanthrene	6 J	5	6.0 J	6, 7, 16	1000000	None	88000 J	None
Phenol	130	6, 7, 16	39	6	56000	None	9800 E	None
Prometon			0.31	None				
Prometryn			0.18	None				
Propazine			1	None				
Pyrene	3 J	5	4 J	5	850000	None	150000 J	None
Simazine			330	6				
Simetryn			0.64	6				
Terbuthylazine			0.09	None				
1,1,2,2-Tetrachloroethane	180	2	3 J	9, 10, 14, 16	51	None		
1,2,4-Trichlorobenzene	200 DF	2	4 J	5			130 J	6

TABLE 2-2

MAXIMUM ANALYTE CONCENTRATIONS FOR OUS 1-14 AND THE INDUSTRIALIZED AREA OUS AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES
(Continued)

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units	Maximum+	Operable Units
POLYCHLORINATED BIPHENYLS (PCBs)	(µg/L)		(µg/L)		(µg/kg)		(µg/kg)	
Aroclor-1254			24	8, 9, 10, 14, 16	860000	None	67000	6, 8, 10, 16

A blank indicates an analyte was not detected in more than one OU.

- • = Present in laboratory blank
- \+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against RFEDS.
- B = For organics, compound also detected in method ! lank. For metals, the concentration is between the Contract Required Detection Limit (CRDL) and the Instrument Detection Limit (IDL).
- D = Result calculated from diluted sample
- E = Concentration exceeds the instrument calibration range.
- F = Estimated, compound off scale in both columns; for organic compounds
- G = For inorganics, the native analyte is greater than four times the spike added.
- J = Analyzed below detection limit
- mg/kg = miligram per kilogram
- mg/L = miligram per liter
- None = Value could not be traced to a specific OU using data provided.
- pCi/g = pico Curie per gram
- pCi/L = pico Curie per liter
- µg/kg = microgram per kilogram
- µg/L = microgram per liter
- X = Result calculated manually
- Z = For organics, identification is questionable. Matrix interference in columns may have occurred.

TABLE 2-3

ANALYTES WITH LOWER MAXIMA
THAN REPORTED IN FY 92 ANNUAL REPORT

Analyte	Media	Old Maxima	New Maxima
Metals (mg/L or mg/kg)			
Barium	SW	11600	7.07
Cadmium	SW	25	0.4
Cesium	SW	12	2.53
Copper	SW	0.908	0.623
Lithium	SW	85.2	83.9
Magnesium	SD	103000	17000
Manganese	SW	32.1	27.7
Molybdenum	GW	1.92	1.6
Nickel	GW	11.7	4.95
Potassium	SW	4260	4140
Selenium	Soils	6.5	5.8
Sodium	Soils	44000	7540
Strontium	Soils	1030	545
Thallium	GW	0.544	0.29
Tin	SW	1.53	0.969
Anions (mg/L or mg/kg)			
Bicarbonate as $CaCO_3$	GW	2640	2000
Carbonate as $CaCO_3$	GW	510	220
	SW	270	230
	SD	130	No Data
Nitrate as N	SD	35.86	19
Nitrate and Nitrite as N	GW	12100	9640
Sulfide	SW	120	39
	Soils	5000	498
Indicators			
Conductivity (Maximum) (μmhos/cm)	SW	37120	3880
Dissolved O_2 (mg/L) Maximum	SW	70	No Data
Percent Solids Maximum	Soils	96.4%	89.7%
Maximum	SD	98.95%	67%

TABLE 2-3

ANALYTES WITH LOWER MAXIMA
THAN REPORTED IN FY 92 ANNUAL REPORT
(Continued)

Analyte	Media	Old Maxima	New Maxima
Indicators (continued)			
Temperature (degrees C) Maximum	SW	33	No Data
Total Dissolved Solids (mg/L)	SW	47000	46000
Radionuclides (pCi/L or pCi/g)			
Cesium 137	SD	3.2	2.81
	GW	12.4	4.1
Strontium 90	Soils	4.57	2.6
Tritium	SD	580	1.09
Uranium 235	SD	1.34	1.302
Volatiles (μg/L or μg/kg)			
1,1,2-trichloroethane	Soils	62	27
1,1,2,2-tetrachloroethane	SW	440	3 J
1,2-dichloroethene (total)	GW	14000	12000 D
	Soils	140	110
1,2-dichloropropane	SW	7	3 J
1,3-dichloropropene	GW	3 J	No Data
	SW	7	No Data
	Soils	6 J	No Data
2-Chloroethylvinylether	SW	5	No Data
2 Hexanone	SW	87	12
Bromoform	SW	3	2 J
Bromomethane	SW	8	No Data
Carbon disulfide	SW	29	19
Dibromochloromethane	SW	5	3 J
Styrene	SW	6	2 J
Semivolatiles (μg/L or μg/kg)			
Benzo(k) Pyrene	Soils	130 J	No Data
Beta - BHC	SD	13000	220 DXZ
Bis(2-ethylhexyl)phthalate	GW	100	44

TABLE 2-3

ANALYTES WITH LOWER MAXIMA THAN REPORTED IN FY 92 ANNUAL REPORT
(Continued)

Analyte	Media	Old Maxima	New Maxima
Semivolatiles (µg/L or µg/kg) (continued)			
Chrysene	GW	420	4 J
Diethyl phthalate	SD	1200	460 J
Di-n-butyl phthalate	GW	170	21
Di-n-octyl phthalate	GW	56	No Data
2,4-Dimethylphenol	SW	6	3 J
Endosulfan	SD	1600	20 J
Ethyl Parathion	GW	0.04	No Data
	SW	270	No Data
2-Methylphenol	SW	43	24
	SD	2300	No Data
4-Methylphenol	SW	160	46
2-Nitrophenol	GW	3 J	No Data
Propazine	SW	2.4	1
Terbuthylazine	SW	1.4	0.09
PCBs (µg/kg)			
Aroclor 1254	SD	1600000	67000

SW = Surface Water
GW = Groundwater
SD = Sediment
D = Result computed from diluted sample
J = Estimated
X = Result calculated manually
Z = For organics, questionable identification, matrix interference in columns
mg/kg = miligram per kilogram
mg/L = miligram per liter
pCi/g = pico Curie per gram
pCi/L = pico Curie per liter
µg/kg = microgram per kilogram
µg/L = microgram per liter
µmhos/cm = micro mohs per centimeter

Table 2-4 summarizes the frequencies of untraceable maxima by media and analyte group. Overall, approximately 14% of the maximum concentrations presented in the FY 92 Annual Report were greater than the maximum concentrations currently present in RFEDS. As summarized in Table 2-5, approximately 26% of the maximum contaminant concentrations identified in the FY 92 Annual Report have remained unchanged. Therefore, 60% of the maximum concentrations presented in FY 92 were superseded by higher maxima currently present in RFEDS. This effect is due to the evolution of RFEDS and since data exclusively contained in RFEDS was summarized in this report. Previous annual reports have used data from RFEDS as well as data from other sources.

Once the contaminant data are compiled, an evaluation is performed to determine whether treatability testing for a given analyte is warranted. The following two criteria must be met before an analyte is considered for sitewide treatability testing:

- The analyte must be detected at concentrations greater than preliminary chemical-specific TSBs for a specific media.

- The analyte must be detected in the same media in at least two OUs.

Constituents of concern identified at the individual OUs will be subject to a detailed ARARs analysis during the scheduled RFI/RI, CMS/FS process for that specific OU. A discussion of the new maximum analyte concentrations for all media, and how they pertain to preliminary chemical-specific TSBs, is provided in Section 3.

Data extraction from RFEDS for the FY 93 Annual Report specified the data must:

- Have a field Quality Control (QC) indicator of "REAL"
- Not be qualified with a "U"
- Be received as of October 14, 1993
- Be either validated or unvalidated.

Some of the maximum values lower than those reported in previous annual reports can be attributed to the continuous improvement effort associated with RFEDS. Much of the RFEDS data have been validated and researched (i.e., the total percent of validated data has never been greater in RFEDS). The RFEDS data is the recognized "best" source of environmental data at RFP.

Other maximum value changes cannot be attributed to RFEDS at all. Since the source of data in previous years was not exclusively from RFEDS, its quality, usability, and reliability is unknown and undocumented in the Sample Management Office (SMO). Thus, data not traceable to RFEDS was eliminated from the summary in Table 2-1.

TABLE 2-4

PERCENT OF PREVIOUSLY REPORTED MAXIMUM ANALYTE CATEGORY CONCENTRATIONS FOR EACH MEDIA EXCEEDING CURRENT RFEDS MAXIMA*

Analyte	Groundwater		Surface Water		Soils		Sediments	
	New Maxima **	%	New Maxima **	%	New Maxima **	%	New Maxima **	%
Metals	3/31	9.68	8/30	26.67	3/29	10.34	1/30	3.33
Anions	3/15	20.00	3/16	1.75	1/11	9.09	2/12	16.67
Indicators	0/7	0.00	7/12	5.33	2/9	11.11	1/5	20.00
Radionuclides	4/17	23.53	3/17	1.65	2/15	13.33	6/17	35.92
Volatiles	1/27	3.70	10/28	3.71	3/26	11.54	0/15	0.00
Semivolatiles	7/43	16.28	6/60	1.00	1/51	1.96	4/45	8.33
PCBs			0/1	0.00	0/1	0.00	1/1	100.00
Media Totals	18/140	12.86	37/164	22.56	11/142	7.75	15/128	11.72

Overall Total = 81/574
= 14.11%

- These percentages represent only the data from previous annual reports for which no value equal to OR greater could be found in the RFEDS data. These are not the percentages of total errors in Table 2-1 since it does not include data for which higher numbers exist in the RFEDS data.

** The numerator is the number of previously reported maximum concentrations exceeding current RFEDS maximum values; the denominator is the total number of detects for the given category.

TABLE 2-5

PERCENT OF PREVIOUSLY REPORTED UNCHANGED MAXIMUM ANALYTE CATEGORY CONCENTRATIONS FOR EACH MEDIA

Analyte	Groundwater		Surface Water		Soils		Sediments	
	Unchanged Maxima*	%	Unchanged Maxima*	%	Unchanged Maxima*	%	Unchanged Maxima*	%
Metals	3/31	9.68	10/30	33.33	6/29	20.69	15/30	50.00
Anions	4/15	26.67	7/16	43.75	2/11	18.18	4/12	33.33
Indicators	2/7	28.57	2/12	16.67	1/9	11.11	0/5	0.00
Radionuclides	5/17	29.41	8/17	47.06	1/15	6.67	0/14	0.00
Volatiles	5/27	18.52	7/28	25.00	6/26	23.08	2/15	13.33
Semivolatiles	7/43	16.28	35/60	58.33	5/51	9.80	8/48	16.67
PCBs			0/1	0.00	0/1	0.00	0/1	0.00
Media Totals	26/140	18.57	69/164	42.07	21/142	14.79	29/128	22.66

Overall Total = 145/574
= 25.26%

* The numerator is the number of unchanged maximum concentrations; the denominator is the total number of detects for the given category.

3.0
PRELIMINARY CHEMICAL-SPECIFIC TSBs REVIEW

This section contains an update of preliminary constituents of concern at RFP for FY 93, and lists new TSBs identified during FY 93 (i.e., as of September 30, 1993). A summary of preliminary chemical-specific TSBs is presented in Tables B-30 through B-33 of Appendix B. The TSBs identified are consistent with RFP's *Sitewide Benchmark Tables and Analytical Methods Compendium*, December 1992. The RFP chemical-specific "benchmarks" are specific standards that will be used in developing ARARs for sitewide remediation. The benchmark table was conditionally approved by CDH in FY 93 pending incorporation of specific CDH comments for chemical-specific standards. EPA comments received to date have been incorporated into the benchmark table.

Numerical values for preliminary chemical-specific TSBs at RFP have been updated from the FY 92 Annual Report based on a detailed review of Federal and State environmental regulations and guidance. The chemical-specific TSBs used hereinafter are preliminary and are subject to change for the following reasons.

- TSBs selected for specific OUs may change through the ARARs development process during the RFI/RI, CMS/FS.

- Additional site-specific information from individual baseline risk assessments may change TSBs.

- Site characterization investigations for the OUs may change chemicals of concern and thus the TSBs.

Preliminary chemical-specific TSBs will assist in developing ARARs. In turn, an assessment, including chemical contamination levels, volumes for treatment, and project-specific remedial action objectives, will guide the development of TSPs. In this report, preliminary chemical-specific TSBs are compared to sitewide maximum and minimum concentrations for a wide variety of analytes. The sitewide maximum and minimum concentrations for soil and sediment are compared to established background concentration values. This facilitates a preliminary screening of media (e.g., water, soil, etc.) and chemicals that could be candidates for treatability studies. This preliminary screening compares maximum reported concentrations against the lowest numeric preliminary chemical-specific TSBs.

Preliminary TSBs used to evaluate chemical concentrations include: Federal maximum contaminant levels (MCLs) for drinking water; Federal Ambient Water Quality Criteria (AWQC); and Colorado Statewide, basinwide, and stream-segment standards for surface water. Federal MCLs and State

groundwater quality standards are also used in the evaluation of chemicals reported in groundwater. MCLs that were effective in January of 1994 are included for consideration as preliminary TSBs. Background concentrations for soil and sediment were used as guidance in the preliminary soil chemical-specific TSBs evaluation (EG&G 1993b).

RFP background concentrations are categorized as "to be considered" (TBC). TBCs are not standards in the regulatory context. However, both TBCs and TSBs are used during RFI/RI, CMS/FS development to assess clean-up goals. Future effective maximum contaminant level goals (MCLGs) are identified as a TBC in this report.

As Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) investigations proceed for each OU, additional information will enable refinement of acceptable levels of constituents of concern at RFP. Initial establishment of an acceptable contaminant level occurs while developing remediation goals for the CMS/FS. Remediation goals defined in a CMS/FS focus on the development of candidate remedial alternatives.

Preliminary TSB values in Appendix B have been compared to maximum and minimum analyte levels detected in groundwater, surface water, soils, and sediments at RFP, as summarized in Table 2-1. As with the FY 92 Annual Report, the most stringent Federal or State standard (excluding MCLGs at zero) or health-based criterion for water was used as the preliminary TSB for groundwater and surface water. A revision of the 1992 Benchmark Tables eliminated RFP Practical Quantification Limits (PQLs) on the Benchmark Tables shown in Appendix B. The RFP detection limit (i.e., the quantitation limit for the analytical method used by RFP) is used as the preliminary TSB when a standard is below detection limits. The analytical detection limits for laboratory methods are shown on Table B-33.

Maximum soil analyte concentrations presented in Table 2-1 of this report are compared to available soil and sediment background concentrations at RFP unless otherwise specified. The preliminary TSB value for plutonium in soils or sediments was based on CDH Rules and Regulations Pertaining to Radiation Control. Preliminary TSBs for gross alpha and gross beta emissions from soils and sediments are also based on CDH requirements.

The following subsections discuss the comparison of TSBs to maximum analyte concentrations by medium for the OUs in which analytical data were available in RFEDS. The TSBs are also shown in Table 2-1. Analytes are discussed which exceed TSBs for groundwater and surface water and background concentrations for soils and sediments.

3.1 GROUNDWATER TSBs

Elevated levels (i.e., above preliminary TSB) of inorganics, metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and radionuclides have been detected at various Individual Hazardous Substance Sites (IHSSs) within the OUs at RFP. Analytes which exceed preliminary TSBs in two or more OUs are considered for sitewide treatability studies.

The following inorganics exceed preliminary groundwater TSBs: fluoride, chloride, cyanide, sulfate, nitrate as N, nitrate plus nitrite as N, and nitrite as N. The pH measurements from groundwater were both above and below preliminary TSB pH levels. Also, total dissolved solids (TDS) concentrations exceed preliminary TSBs.

The VOCs exceeding groundwater TSBs are: 1,1-dichloroethene; 1,1,1-trichloroethane; 1,1,2-trichloroethane; carbon tetrachloride; methylene chloride; tetrachloroethene; trichloroethene; vinyl chloride; 1,2-dichloroethane; 1,2-dichloropropene; benzene; chloroform; 1,1,2,2-tetrachloroethane; acetone; bromodichloromethane; bromoform; bromethane; carbon disulfide; dibromochloromethane; and toluene. The SVOCs in groundwater identified for FY 93 as exceeding preliminary TSBs are: bis(2-ethylhexyl)phthalate; N-nitrosodiphenylamine; 1,2,4-trichlorobenzene; 1,4-dichlorobenzene; di-n-butyl phthalate; pentachlorophenol; and phenol.

Pesticides detected in groundwater that exceed TSBs are: aldrin, alpha-BHC (hexachlorocyclohexane, alpha), and 4,4-DDT. Metals exceeding groundwater TSBs are: aluminum, arsenic, antimony, barium, beryllium, cadmium, cobalt, copper, chromium, iron, lead, lithium, manganese, mercury, nickel, vanadium, selenium, silver, thallium, and zinc.

Radionuclides which exceed preliminary groundwater TSBs are gross alpha activity, gross beta activity, radium-226, radium-228, tritium, plutonium-238, -239, and -240.

3.2 SURFACE WATER TSBs

State surface water numeric standards for organics declare zero as the standard for any chemical for which a value is not specified. The result is that practical laboratory quantification limits established by RFP are the preliminary surface water TSBs.

The reported maximum inorganic chemical values in surface waters exceeding preliminary TSBs are: chloride, cyanide, sulfate, nitrate as N, and nitrate plus nitrite as N. Values for pH are both above (basic) and below (acidic) the preliminary TSB for pH. Also, TDS concentrations exceed preliminary TSBs. Additional inorganics (anions and cations) identified in FY 93 as exceeding TSBs are: ammonia, fluoride, and sulfide.

Metals in surface water exceeding preliminary surface water TSBs are aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc.

The VOCs exceeding preliminary surface water TSBs are 1,1-dichloroethene; tetrachloroethene; carbon tetrachloride; trichloroethene; methylene chloride; 1,1,2-trichloroethane; 1,2-dichloroethene; chloroform; and vinyl chloride. Other VOCs in surface water which exceed preliminary TSBs are: 1,2-dichloroethane; benzene; bromodichloromethane; chlorobenzene; and chloromethane.

SVOCs reported in FY 93 as exceeding preliminary surface water TSBs are N-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, naphthalene, phenol, and N-nitroso-di-n-propylamine.

Pesticides, herbicides, and polychlorinated biphenyls (PCBs) which exceed preliminary surface water TSBs are: aldrin; alpha-BHC (hexachlorocyclohexane, Alpha); chlordane-Alpha; beta-BHC (hexachlorocyclohexane-Beta); 4,4-DDT; Lindane (hexachlorocyclohexane-Gamma); simazine; atrazine; and aroclor-1254.

Radionuclides exceeding surface water TSBs are americium-241, gross alpha, gross beta, plutonium-239 and -240, radium-226 and -228, strontium-90, and tritium. Total uranium identified in FY 92 as exceeding a preliminary TSB does not exceed the preliminary TSB in FY 93. Total uranium was calculated adding the sum of all isotopes of uranium reported in the RFEDS.

3.3 SOIL AND SEDIMENT TSBs

Table 2-1 presents soil and sediment background concentrations and concentrations from the RFEDS database. Numerous analyte values exceed background values according to the values in Table 2-1. Soil and sediment samples were collected at representative background (i.e., undisturbed) locations at RFP to quantify background concentrations of chemical and radiological parameters (EG&G 1993b).

Most metal concentrations given in RFEDS in soil at RFP exceed background concentrations, except selenium. Analytical results are not available for phosphorous, and background concentrations are not available for sodium, silicon, thallium, and molybdenum. Limited background information is available for anions. Anions which exceed known background values at RFP are nitrate plus nitrite as N, and sulfide. The reported soil concentrations at RFP during FY 92 varied from FY 93 in some of the detected metals.

Radionuclides which exceed background soil concentrations in more than one OU are americium-241, cesium 137, plutonium 239 and 240, radium 226, radium 228, strontium-89 and -90, uranium-233 and -234, uranium-235 and uranium-238, tritium, gross beta activity, and gross alpha activity.

Background concentrations for organics in soils are not available.

Metal concentrations in RFEDS for sediments exceed available background concentrations for all metals, including the radionuclides. Alkalinity as $CaCO_3$ and bicarbonate as $CaCO_3$ are exceeded in sediments for background values. Nitrate plus nitrite as N and nitrite as N values also exceed background concentrations.

Many VOCs and SVOCs in sediment which exceed background concentrations. VOCs exceeding background concentrations are 1,1 dichloroethene; 1,1,1 trichloroethane; 2-butanone; 2-hexanone; 4-methyl-2-pentanone; benzene; carbon disulfide; carbon tetrachloride; chloroform; ethylbenzene; methylene chloride; styrene; tetrachloroethene; toluene; trichloroethene; vinyl chloride; and total xylene.

SVOCs which exceed background concentrations are acenaphthene; acenaphthylene; anthracene; benzo(a) anthracene; benzo(b) fluoranthene; benzo(k) fluoranthene; benzo(g,h,i) perylene; benzo(a) pyrene; benzoic acid; benzyl alcohol; bis(2-ethylhexyl)phthalate; butyl benzyl phthalate; chrysene; dibenzo(a,h) anthracene; dibenzofuran; diethylphthalate; di-n-butyl phthlate; di-n-octyl phthlate; fluorene; hexachlorobenzene; indeno (1,2,3-cd)pyrene; 4-methylphenol; 2-methylnaphthalene; naphthalene; 2-nitrophenol; n-nitro sodiphenylamine; phenanthrene; and phenol.

4.0
LITERATURE SEARCH AND REVIEW

A literature search of newly available or recently published materials was conducted to compile and review potentially applicable remediation treatment technologies for contamination issues at RFP. Available literature databases were used to access a variety of information on technology types for known RFP wastes. The following databases were searched for potentially applicable treatment technologies from 1992 and 1993 citations:

- The EPA Alternative Treatment Technology Information Center (ATTIC)
- The EPA CLU-In (Clean-Up Information) Through the Office of Solid Waste and Emergency Response
- Compendex (Engineering Information)
- Georef (American Geological Institute)
- National Technology Information Service (NTIS)
- Pollution Abstracts (Cambridge Scientific Abstracts)
- The EPA Vendor Information System for Innovative Treatment Technologies (VISITT)
- Water Resources Abstracts [U.S. Geological Survey (USGS)]
- Uncover (Current Periodicals, University of Colorado).

The Dialog database search system was also used to access three other databases:

- Energy Science & Technology (DOE Office of Scientific and Technology Information)
- Enviroline (Environment Abstracts Congress Information Service, Inc.)
- Environmental Bibliography (Environmental Studies Institute).

A literature search was conducted that sought information regarding new, innovative, and/or emerging technologies for waste treatment not previously considered in the TSP or Annual Reports. Key words and categories were broad and inclusive for this Annual Report, rather than specific, to avoid elimination of newly developed treatment methods and allow the inclusion of previously screened technologies. Key words for the FY 92 Annual Report were more focused toward specific technologies. Key words used for different categories in the literature search follow.

- Media
  - Soil
  - Water

- Waste
  - Radioactive
  - Mixed-Waste
  - Transuranic
    - Americium
    - Plutonium
    - Uranium
  - Organic
    - Chlorinated Hydrocarbons
    - Pesticides
    - Polynuclear Aromatic Hydrocarbons
    - Semivolatile Organics
    - Solvents
    - Volatile Organic Compounds
  - Metals

- Technologies
  - Disposal
  - Extraction
  - Isolation
  - Separation
  - Treatment.

The FY 93 database search yielded approximately 200 citations for review. Abstracts were printed and reviewed for each citation. Reprints were obtained for each promising technology for further review. The references related to specific treatment technologies believed to be potentially applicable to the sitewide treatability study program at RFP were used in part to prepare the treatment technology descriptions provided in Appendix D of this report. Copies of citations listed for the technology descriptions provided in Appendix D are contained in project files for future reference. The following four treatment technologies were newly identified during the FY 93 literature review process as potentially applicable at RFP and were subjected to the following established technology screening process:

- Biosorption for capture/degradation of pesticides in aqueous media
- Membrane-based oil extraction for metal ion isolation in aqueous media
- Ultrasonic degradation of chlorinated hydrocarbons in aqueous media
- X-ray treatment of VOCs in aqueous media.

The literature review also revealed no new information related to those treatment technologies previously considered but rejected in the TSP or the Annual Reports. The screening and selection process used to evaluate these four potentially applicable technologies is presented in Appendix A.

5.0
TREATABILITY STUDY PROJECTS

A variety of treatability studies and interim remedial treatment actions have been proposed or are in progress at RFP. This section is a status report for the various FY 93 studies proposed, completed, or ongoing. Also, a brief description of various treatability activities planned for FY 94 is included as appropriate.

To date, treatability and remedial treatment studies have been initiated for OUs 1 and 2. In addition, several treatability related studies were undertaken as part of the sitewide treatability program for specific tasks related to a variety of contaminated media sitewide, unrelated to a specific OU. These treatability studies, which in some cases will continue into FY 94, are discussed in the following subsections. Treatability studies planned for FY 94 include those for OU 7 and OU 9 (EG&G 1993b). Results for studies in these OUs will be included in the FY 94 Annual Report, if available. In addition, bioremediation workplans have been completed, and this treatability testing will be completed in FY 94.

An annual update of the *Workplan for the Control of Radionuclide Levels in Water Discharges from Rocky Flats Plant* (EG&G 1993c) was prepared in addition to the annual report during FY 93. This workplan describes sampling methods, analytical protocols, methods, and limitations for determining radionuclide levels, summarizes statistical assessments of analytical results, and presents recommendations for additional radionuclide studies to characterize RFP discharge water quality. This workplan will be updated annually and will include updates on the control of radionuclide releases, a water quality assessment, analytical techniques used for the water quality assessment, and treatment evaluations and proposals. The FY 93 update of this workplan is included as Appendix C and complements information presented in the FY 93 Annual Report.

5.1 OPERABLE UNIT 1 ACTIVITIES

OU 1 includes the 881 Hillside area and is comprised of 11 IHSSs. Operable Unit 1 FS treatability studies were initiated for groundwater at OU 1 during FY 92, and continued into FY 93. An Interim Measure/Interim Remedial Action (IM/IRA) for groundwater collected from various locations at the 881 Hillside area began treatment operation in FY 92. Treatability work for OU 1 surface and subsurface soils was proposed in FY 92, although no treatability work has been performed to date. A status update for groundwater and soil testing studies at OU 1 are discussed in the following subsections.

5.1.1 Groundwater IM/IRA

Bench-scale tests were conducted for VOC-contaminated groundwater at OU 1 during FY 88 and FY 91 (EG&G 1992a). As reported in the FY 92 Annual Report, these tests examined the effectiveness of oxidizing VOCs in recovered groundwater using ultraviolet light and hydrogen peroxide (UV/peroxide). Optimization tests were performed for a full-scale groundwater treatment system for groundwater collected from the Building 881 footing drain, recovery well CW001 located southeast of Building 891, and the OU 1 French Drain system located at the base of the 881 Hillside area. In addition to these groundwater sources collected for treatment, the treatment plant began accepting decontamination water generated from environmental investigation activities site-wide during FY 93.

The full-scale OU 1 groundwater treatment plant began operating in April 1992 and is still in operation. Information regarding the full-scale optimization study and system operation was summarized in the FY 92 Annual Report using information provided by the OU 1 Interim Remedial Action (IRA) Site Manager and the *Final Systems Operation and Optimization Test Report* (SO Report) (EG&G 1992b). The SO Report was made final during FY 93 (EG&G 1993d). Results contained in the final version of the SO Report are the same as those reported in the Draft SO Report and summarized in the FY 92 Annual Report.

Operation of the groundwater treatment system in FY 93 was similar to the FY 92 operation with minor modifications. The treatment process schematic for the system was shown in the FY 92 Annual Report and remains unchanged. During FY 93 an on-line gamma spectrometer was installed at the treatment plant to provide real-time gamma emission monitoring of the treated groundwater. An on-line gas chromatograph is planned to be installed at the treatment plant in FY 94 for real-time organic compound monitoring of treated groundwater.

A total of approximately one million gallons of groundwater was collected and treated during FY 93. The treatment system is comprised of a UV/peroxide unit operation for organic contaminant destruction followed by ion exchange for radionuclide and metals removal and finally a degassifier to remove carbon dioxide generated in the ion exchange beds, followed by two more ion exchange columns to reduce TDS. Treated effluent is pH adjusted if outside discharge parameters, and temporarily stored to verify effective contaminant removal prior to discharge to the South Interceptor Ditch. The FY 93 average flow rate through the treatment system was approximately 30 gallons per minute (gpm), which is the same as the average flow rate during FY 92. A 35- to 50-milligram per liter (mg/L) dose of hydrogen peroxide is fed directly to the UV reaction chamber. No variations to the treatment system were reported during FY 93.

5.1.2 Subsurface Soils Testing

As reported in the FY 92 Annual Report, an attempt was made in FY 92 to retrieve subsurface soils from IHSS 119.1 for laboratory-scale tests as part of the FS. These tests were to focus on the ability of soil washing techniques and bioremediation to remove/destroy VOC contaminants present on the soils. A sampling program failed to retrieve contaminated soils with high enough concentrations to perform a treatability study, and the tests were abandoned in FY 92.

5.2 OPERABLE UNIT 2 ACTIVITIES

OU 2 is comprised of the 903 Pad, Mound Area, and East Trenches, as well as several other smaller IHSSs. Waste management practices in the past at OU 2 have included solid and liquid waste disposal, reactive metals destruction, and waste burning (EG&G 1992c). A formal RFI/RI is currently being prepared for OU 2. Prior to completing the OU 2 RFI/RI and initiating the CMS/FS, however, two IM/IRAs were initiated for surface water and subsurface soil. Work previously completed for these IM/IRAs was initially described in the FY 92 Annual Report. This section updates FY 93 results for these IM/IRAs at OU 2. In addition, several other treatability studies were performed on plutonium-contaminated soils from OU 2. Each of these studies is also discussed in the following subsections.

5.2.1 Surface Water IM/IRA

A final IM/IRA plan was prepared (EG&G 1992c) to address potential surface water contamination in the South Walnut Creek drainage within OU 2. The intent of this action was to minimize contaminant migration downgradient from OU 2 and RFP prior to completing the formal RFI/RI, CMS/FS process, which may or may not require remedial action. Contaminants of concern in the surface water collection points (i.e., SW-59, SW-61, and SW-132) include VOCs, radionuclides, and metals. Table 5-1 lists the specific contaminants of concern in surface water at OU2.

Potential interim remedial action alternatives were analyzed; the recommendation was made for implementing a field treatment system comprising chemical precipitation, coagulation, membrane filtration, and granular activated carbon (GAC) (EG&G 1992c). A field treatment program was divided into two phases.

TABLE 5-1

BASIS OF DESIGN CONTAMINANT OF CONCERN CONCENTRATIONS AT OU 2

Analyte	Unit	Estimated Concentration (IM/IRAP)	Potential ARAR
Radionuclides			
Am-241	pCi/L	0.53	0.05
Gross α	pCi/L	730.00	11.00
Gross β	pCi/L	545.00	19.00
Pu-239/240	pCi/L	3.28	0.05
U-total	pCi/L	11.69	10.00
VOCs			
1,1-Dichloroethene	µg/L	142	7.00
Carbon Tetrachloride	µg/L	219	5.00
Chloroform	µg/L	82	1.00
Tetrachloroethene	µg/L	279	1.00
Trichloroethene	µg/L	153	5.00
Vinyl Chloride	µg/L	–	2.00
Metals-Dissolved			
Iron	µg/L	–	300.00
Manganese	µg/L	0.5790	50.00
Metals-Total			
Aluminum	µg/L	25.1214	200.00
Arsenic	µg/L	–	50.00
Barium	µg/L	1.8530	1,000.00
Beryllium	µg/L	0.0519	100.00
Cadmium	µg/L	0.0132	5.00
Chromium	µg/L	0.1918	10.00
Copper	µg/L	0.2664	25.00
Iron	µg/L	183.9643	1,000.00
Lead	µg/L	0.1954	5.00
Manganese	µg/L	3.3068	1,000.00
Mercury	µg/L	0.0022	0.20
Nickel	µg/L	0.2239	40.00
Selenium	µg/L	0.0070	10.00
Zinc	µg/L	1.3475	50.00

pCi/L = pico Curie per liter
µg/L = microgram per liter
– = data not available

Phase I involved implementing a surface water collection system for two surface water sources and GAC treatment for VOC removal. The Phase I operation was started in May 1991 and completed in early 1992. Two surface water collection stations were constructed for the Phase I operation. The collection basins were constructed of precast concrete and were fitted with float-controlled submersible pumps.

Influent was directed to a 10,000-gallon flow equalization tank prior to bag filtration. Bag filters were operated in parallel for sediment removal prior to GAC treatment. Two GAC units were operated in a rotating lead and polish mode; the lead unit was taken out of service either by estimating an approximate contaminant breakthrough time based on design data, or if head loss became significant. Backwashing the lead GAC unit was performed by directing flow to the polishing unit and using this treated effluent as the upflow stream in the lead unit. All backwash water was recycled to the flow equalization tank.

Phase II of the IM/IRA added chemical precipitation, coagulation, and membrane filtration unit operations upstream of the GAC treatment. Phase II treatment was designed to remove radionuclides, metals, and suspended solids, in addition to VOCs. Phase II treatment operations began April 27, 1992. A third surface water source was added to the surface water collection system. Flow from the equalization tank was directed to a set of two flash mix reaction tanks. Iron salt and sulfuric acid were added in Reaction Tank No. 1, and the pH was reduced to approximately 4.0. Flow was directed to Reaction Tank No. 2, where lime was added to raise the pH to approximately 9.5 for metals precipitation. This stream flowed to a solids concentration tank. Supernatant from the solids concentration tank flowed through the 0.1 micron microfilters; filtrate was directed to a neutralization tank, where acid addition lowered the pH to the neutral range. Solids from the concentration tank were pumped to a sludge holding tank. Neutralized filtrate entered the GAC system. The rotating lead/polish treatment mode for the GAC system was the same operation used in Phase I. Changeout of GAC units were based on a calculated time using design basis concentrations. Sludge holding overflow was directed back to the solids concentration tank, while the sludge was directed to a filter press for dewatering. Dewatered sludge was drummed for temporary storage and analytical testing prior to proper storage and management. Filtrate was returned to the solids concentration tank.

The Phase II operation encountered several problems. The first problem related to the membrane cleaning solution. Originally, a sodium hypochlorite solution was used weekly with a monthly treatment of sulfuric acid. The treatment procedure proved to be ineffective after several months. A cleaning solution of hydrogen peroxide and sulfuric acid was developed with help from the vendor and membrane manufacturer. Cleaning with the peroxide/sulfuric acid solution was successful and was performed every several weeks. The sodium hypochlorite solution also caused corrosion of the welds on the GAC Cyclesorb units. This resulted in pinhole leaks in several welds which were subsequently repaired by the vendor.

Phase I treatment data were summarized in the FY 92 Annual Report, and indicated successful system performance for VOC removal (EG&G 1992c). Available data from the Phase II operation also indicate successful system performance for metals, radionuclide, and VOC removal (EG&G 1993e). Table 5-2 summarizes analytical data for the OU 2 IM/IRA treatment system operation.

A total of 12.7 million gallons of water were treated in the IM/IRA plant during Phase II operations (650 days) for an average flow rate of 13.5 gpm. Table 5-2 summarizes treatment effectiveness, which compares the influent contaminant concentrations (sample location RS1) to effluent concentrations (sample location RS7). Percent removal efficiencies are considered approximations only since data collected at each sampling location was not necessarily correlated in time; further, data from RS1 may be suspect for selected analytes. For radionuclides, gross alpha activity was reduced by nearly 68%, and uranium was removed by over 81%. Determination of other radionuclides removed was difficult to assess due to low influent concentrations. For plutonium and americium, effluent samples taken indicated an ARAR exceedance for each on one occasion. Americium exceeded twice the ARAR value and plutonium exceeded ten times the ARAR value. However, in both cases the corresponding influent samples showed their concentrations to be below ARAR levels. Influent and effluent sample do not necessarily correlate in time.

VOCs were effectively removed by the Phase II treatment process. No VOCs were present in the effluent (RS7) at concentrations greater than the ARAR levels using EPA Method 524.2. VOCs were originally analyzed using an SW-846 Method; however, the detection limits for this method were greater than ARAR levels, and the method was subsequently abandoned. Metals removal efficiencies varied greatly (from 0 to 83%). The data indicate arsenic, beryllium, cadmium, nickel, and selenium were not removed with the Phase II system. However, only aluminum, copper, lead, manganese, and zinc were above ARAR levels, and only in isolated instances. Further, all mean concentrations of the metals of interest were below ARAR levels.

5.2.2 Subsurface Soils IM/IRA

An IM/IRA Pilot Test Plan was finalized and submitted for final agency review for OU 2 subsurface soils in FY 92 (EG&G 1992d). The primary objective of the Subsurface IM/IRA is to provide information that will aid in the selection and design of final remedial actions at OU 2 that will address removal of suspected residual free-phase VOC contamination (EG&G 1992d). The IM/IRA and the Interim Measures/Interim Remedial Action Plan (IM/IRAP) (EG&G 1992e) for OU 2 subsurface soils outlined proposed field- and pilot-scale testing of in situ vacuum-enhanced soil vapor extraction (SVE) for soils beneath the 903 Pad, Mound, and the East Trenches.

TABLE 5-2

SUMMARY OF OU 2 IM/IRA SURFACE WATER TREATMENT DATA

Analyte	ARAR	RS1 Mean Influent *	RS7 Mean Effluent	Percent Removal
Radionuclides (pCi/L)				
Americium-241	0.05	0.0085	0.0080	5.9
Gross Alpha	11.00	4.5205	1.4556	67.8
Gross Beta	19.00	6.6472	5.4196	18.5
Plutonium-239/240	0.05	0.0098	0.0162	**
Uranium, Total	10.00	6.3318	1.1952	81.1
TCL Volatiles (µg/L)				
1,1-Dichloroethene	7	3.25	2.50	23
Carbon Tetrachloride	5	29.50	2.50	91.5
Chloroform	1	5.83	2.50	57.1
Tetrachloroethene	1	21.50	2.50	88.4
Trichloroethene	5	27.00	2.50	90.7
Vinyl Chloride	2	5.00	5.00	0
TCL Volatiles EPA Method 524.2 (µg/L)				
1,1-Dichloroethene	7	0.51	0.13	74.5
Carbon Tetrachloride	5	14.30	0.16	98.9
Chloroform	1	3.64	0.06	98.4
Tetrachloroethene	1	6.72	0.08	98.8
Trichloroethene	5	9.96	0.09	99.1
Vinyl Chloride	2	0.65	0.10	84.6
Dissolved Metals (µg/L)				
Iron	300.00	57.44	20.19	64.9
Manganese	50.00	28.03	24.50	12.6
Total Metals (µg/L)				
Aluminum	200.00	251.36	93.98	62.6
Arsenic	50.00	0.71	0.80	**
Barium	1000.00	144.39	65.14	54.9
Beryllium	100.00	0.65	0.69	**
Cadmium	5.00	1.16	1.20	**
Chromium	10.00	1.96	1.77	9.7
Copper	25.00	4.61	2.37	48.6
Iron	1000.00	399.03	67.00	83.2
Lead	5.00	1.30	0.87	33.1
Manganese	1000.00	35.32	24.82	29.7
Mercury	0.20	0.10	0.10	0
Nickel	40.00	3.11	3.31	**
Selenium	10.00	1.67	1.78	**
Zinc	50.00	121.99	20.46	83.2

* Data available to RS-1 is questionable due to sampling discrepancies. Use of data from RS-1 is for informational purposes only, not as a means of characterizing influent water quality.

** Mean effluent concentrations exceed mean influent concentrations. This indicates removal of the analyte is not occurring and should not imply that the analyte is being added to the water by way of treatment. This "error" is due to the quantitation of low concentrations of analytes and/or the inherent error of comparative analysis using mean concentrations.

pCi/L = pico Curie per liter
µg/L = microgram per liter

Generally, collected information includes subsurface characterization and site-specific technology performance data which will subsequently be used in FS alternative evaluation and final remedial system design. Specifically, the data generated from the SVE pilot testing will include: VOC mass recovered per unit cost, VOC mass recovered per unit time, area of influence of the SVE system at each location, and overall ability to control VOC migration and aquifer dewatering.

Details of the proposed in situ SVE testing for OU 2 were provided in the FY 92 Annual Report. Vapor extraction will be accomplished in wells designed specifically for vapor extraction, and in wells having the dual purpose of groundwater and vapor extraction. In addition to the extraction wells, the pilot-scale tests will use selected wells for ambient and heated air injection to evaluate enhanced VOC recovery in the subsurface.

Results of the SVE pilot-scale testing were originally anticipated to be available in FY 94. However, nonaqueous phase liquids (NAPLs) were encountered during FY 93 OU 2 subsurface drilling activities. The presence of NAPLs presented a concern related to SVE system operation under the proposed configuration from the IM/IRA. The primary concern related to the potential for a fire hazard in the air-phase GAC adsorpters used to treat the extracted VOCs. The fire hazard was a concern due to the increased heat of adsorption from the higher than expected VOC concentrations. Further, the higher VOC concentrations in the SVE off-gas will require greater-than-expected GAC usage. This in turn would create additional waste management issues at RFP, where limited on-site storage availability exists. System and schedule modifications were approved among DOE, EPA, and CDH. SVE pilot-scale data will be reported in the FY 94 Annual Report if available.

5.2.3 Plutonium in Soils Treatability Studies

A treatability studies workplan for removing plutonium from RFP soils was approved during FY 93 to conduct laboratory- and bench-scale tests with the TRUclean® process, and High-Gradient Magnetic Separation (HGMS), respectively (EG&G 1991b). The key objective of the tests was to evaluate each technology in terms of effectiveness at removing low levels of plutonium from contaminated surface soils originating at RFP. The TRUclean® process testing was completed in FY 93. No HGMS tests have been performed to date; however, a contract with Los Alamos National Laboratory (LANL) has been established to perform a treatability study in FY 94. In addition to the TRUclean® testing, four other treatability tests related to plutonium removal from soil were performed in FY 93. Summary results of the five treatability studies are described in the following subsections.

5.2.3.1 AWC-Lockheed TRUclean® Study

AWC-Lockheed, Inc. (AWC) of Las Vegas, Nevada performed tests on surface soils obtained from the vicinity of the 903 Pad at RFP. The 903 Pad was previously used as a storage area for wastes which contained plutonium. Some of these wastes, including plutonium, were dispersed through weathering actions over time to the surrounding soils. The primary objective of the tests was to evaluate the ability of AWC's TRUclean® process to reduce plutonium activity concentrations (plutonium-239 and -240), gross alpha, and gross beta activities in RFP soils to regulatory-based acceptable levels, below 0.9 picocuries per gram (pCi/g), 5 pCi/g, and 50 pCi/g, respectively. These levels have been agreed upon between EPA, CDH, and DOE. The tests were conducted in two phases. Phase 1 tests were conducted using magnetite and bismuth as plutonium surrogates and provided information needed to optimize the TRUclean® process treatment sequence to establish equipment settings for Phase 2. The actual treatment sequence and equipment descriptions will be included in AWC's report on the TRUclean® tests performed. Phase 2 was comprised of four tests using 90 to 100 kilograms (kg) of soil at the Phase 1 settings established with surrogates. One of the significant findings of the tests is that naturally occurring organic materials in the soil sample contained significant amounts of plutonium. Plutonium association with organic matter in RFP soil has not been identified in previous research.

Soil material greater than two inches was rejected in the field sampling process and represented approximately 21% of the soil mass collected. Although radionuclide activity measurements were not made on this soil fraction, results of a trommel test performed on +1/4 inch materials indicated that plutonium contamination can probably be removed from this material and result in an activity level that is below the clean-up criteria of 0.9 pCi/g. When considering the +2 inch material and the +1/4 inch trommel stream material which was successfully cleaned to below 0.9 pCi/g, 44.9% of the RFP soil sample from the vicinity of the 903 Pad exists at or below the plutonium clean-up criteria. Achieving soil cleanup standards for the +1/4 inch material will depend upon removing the naturally occurring organic materials.

A preliminary AWC report indicated that the -1/4 inch material fraction could not be treated to achieve the clean-up goal for plutonium of 0.9 pCi/g. Tests with the shaker table, mineral jig, and hydrocyclone indicated that no particles of plutonium are of sufficient size to be removed by gravity separation devices. Tests on the -1/4 inch soil fraction in the spiral classifier indicated that size separation produces the plutonium separation for this size range. The spiral classifier underflow plutonium activity was approximately 9 pCi/g, while the overflow was approximately 228 pCi/g, indicating some success at plutonium separation. The report emphasized the importance of removing organic material which contains high concentrations of plutonium activity from this fraction.

5.2.3.2 Nuclear Remediation Technologies Study

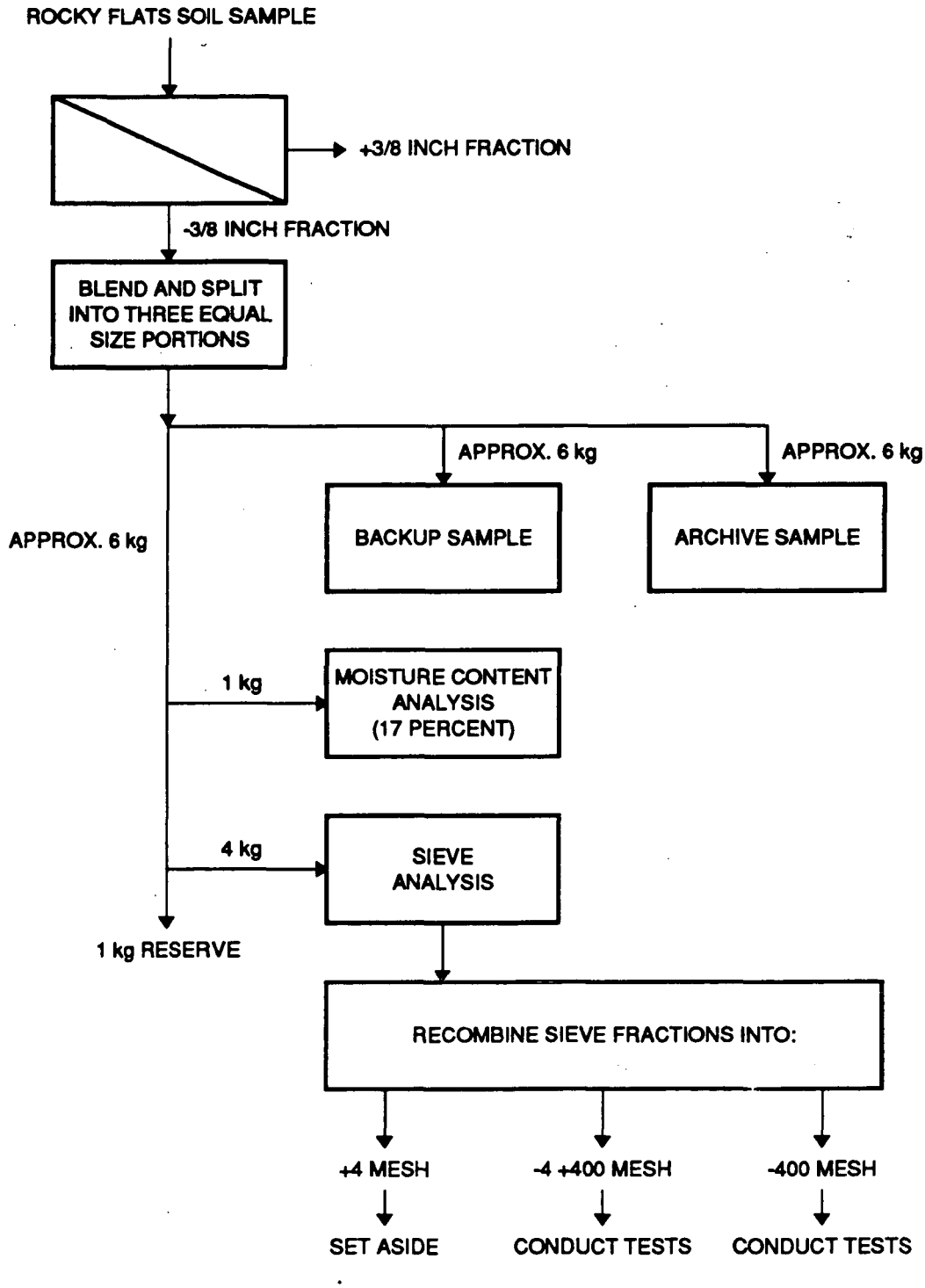
Nuclear Remediation Technologies (NRT) performed an assessment of several procedures for isolating plutonium from contaminated RFP soil samples. These procedures included flotation/attrition scrubbing and soil washing with three different leaching solutions. Specific information related to the composition or type of the three leaching solutions was not given in the NRT report.

A soil sample received by NRT was first sieved to remove the +3/8 inch material. The -3/8 inch material was blended and split into three equal parts. One of the three portions of the -3/8 inch material was subsequently sieved through a series of sieve sizes ranging from +4 mesh to less than 400 mesh. Greater than 4 mesh refers to particles having a diameter greater than 4.76 millimeters (mm), while less than 400 mesh refers to particles having a diameter of less than 0.037 mm. The second portion was used to determine moisture content. The third portion was archived for possible later use. The sample portion that underwent the full sieve analysis was recombined to form a greater than 4 mesh fraction, a less than 4 mesh to greater than 400 mesh fraction, and a less than 400 mesh fraction. The flotation/attrition tests and leaching solutions tests were performed on these less than 4 mesh size fractions. Figure 5-1 is a general flow diagram for the soil sample use obtained from RFP.

Table 5-3 summarizes performance of the flotation/attrition tests with regard to plutonium removal. The results provide a minimal amount of information for the different plutonium isolation methods. Although more data will be needed to verify performance consistency, each of the test methods apparently achieved a reduction in the plutonium concentrations for the three soil particle size fractions. No specific conclusions can be drawn with the existing data as to which treatment method would provide the greatest isolation of plutonium.

5.2.3.3 Plutonium Solubility in Triethylamine Study

Lockheed Environmental (Lockheed) was selected by EG&G Idaho, Inc. to perform remediation of waste materials located at the Radioactive Waste Management Complex (RWMC) at the Idaho National Engineering Laboratory (INEL). Since some RWMC waste materials originated at RFP, Lockheed offered to perform treatability tests on selected RFP soils at no cost to EG&G for their proof-of-principle (POP) testing needs.



NRT Test Soil Utilization

Figure 5-1

TABLE 5-3

NRT PLUTONIUM ISOLATION TESTING RESULTS

Test Results	Test Series #1		Test Series #2	Test Series #3
	-400 mesh	-4 to +400 mesh	-4 to +400 mesh	-400 mesh
Flotation/Attrition				
Initial pCi/g	–	18.8	18.8	–
Final pCi/g	–	15.4	9.9	–
% Removal	–	18.3	47.6	–
Leaching Solution A				
Initial pCi/g	41.7	–	18.8	–
Final pCi/g	26.1	–	1.6	–
% Removal	37.4	–	91.3	–
Leaching Solution B				
Initial pCi/g	41.7	–	18.8	41.7
Final pCi/g	15.8	–	3.8	10.4
% Removal	62.1	–	79.9	75.1
Leaching Solution C				
Initial pCi/g	–	–	–	41.7
Final pCi/g	–	–	–	16.1
% Removal	–	–	–	61.4

– = Indicates test results not obtained
pCi/g = pico Curie per gram

The treatability work completed by Lockheed in FY 93 included plutonium recovery using the B.E.S.T. solvent extraction process. The process uses triethylamine (TEA), an unlisted and non-regulated solvent under RCRA. TEA exhibits the property of inverse miscibility. Below 15°C, TEA is miscible with water. Not only can solids be dewatered with TEA at this temperature, but organic contaminants can also be removed. At temperatures greater than 15°C, the remaining organic contaminants can be removed. However, no research had been performed to date to evaluate plutonium solubility in TEA.

A composite soil sample was collected at known hot-spot areas at OU 2, east of 903 Pad. Field radioactivity measurements indicated an activity of 2.63 nanocuries per gram (nCi/g) in the hot-spot areas composite sample. The composite sample weighed 49 pounds. Coarse materials contained within the composite were removed, and the sample was homogenized with a standard fixed-flight concrete mixer. The homogenized sample weighed 36 pounds and had a measured plutonium activity of 6.3 nCi/g. The sample was then sieved with a 50 mesh screen; the +50 mesh material weighed 25 pounds and was set aside. The -50 mesh material (i.e., the remaining 11 pounds) had a measured plutonium activity of 5.86 nCi/g.

A quantitative mass balance was not performed as part of the study. However, results show that approximately 26% of the plutonium was recovered in the TEA stream. The plutonium was expected to remain in the soil; however, the form of plutonium that reported to the TEA is not known. The study noted that RFP soils tend to be high in organic content; therefore, the plutonium may tend to form complexes due to organic content, and remain difficult to remove from RFP soils.

Lockheed believes that by increasing the TEA to soil ratio to 8:1, a greater percent of plutonium would be recovered. Additional tests are planned during FY 94, and results of these tests will be reported if available in the FY 94 Annual Report.

5.2.3.4 Plutonium Volatility in a Plasma Melter

Plutonium contaminated Rocky Flats soil was obtained for plasma melter treatability testing at INEL. The soil sample taken at RFP was intended to simulate similar materials from RFP previously placed in Pit 9 of the RWMC. Plasma melter treatment vitrifies the soil and waste materials into a glass or glass-like substance to stabilize radionuclides and metals. Plasma melting is achieved using a heating process which converts a gas into a plasma through applying energy with an electric arc. This plasma arc then causes the waste material to melt into a molten state which forms a glass-like substance upon cooling. Contaminants of concern (radionuclides or metals)

become immobilized into the treated material. The contaminants may take one or more of three potential pathways during the treatment phase.

- Physical/chemical immobilization in glass end product or a precipitate
- Recovery from treatment system off-gasses
- Unintended escape to the environment.

The objective intent of the treatability tests conducted at INEL was to demonstrate the ability of plasma melting technology to successfully immobilize plutonium contained in the soil samples and to determine the percentage of Pu that would volatilize in the Plasma Melter. This objective was accomplished through completion of a mass balance of plutonium present in the soil sample to within a 10% level of accuracy.

A total of four treatability tests were completed with a bench-scale plasma furnace that approximated operating conditions in a full-scale plasma centrifugal furnace. The first two tests were conducted using cerium oxide as a surrogate for plutonium due to its similar physical properties. The remaining two tests were performed with 1.5 kg of plutonium contaminated RFP soil. Measured activity in the RFP soil sample used was approximately 2 nCi/g. Off-gas from the bench-scale system was passed through a high-efficiency particulate air (HEPA) filter before release to the atmosphere. Upon completion of each test, slag, debris, filters, and surface swipes from the furnace were taken for analysis. Results of the plutonium mass balance within the bench-scale system were not available for inclusion in the FY 93 Annual Report.

5.2.3.5 MBX, Inc. Treatability Study

A biological reduction process intended to solubilize plutonium from soils was developed by MBX, Inc. (MBX). This was a very preliminary test to determine whether any fatal flaws existed with this process. MBX subjected representative plutonium-bearing RFP soils for bench-scale treatability testing. The process uses thiobacillus amendments to assist with plutonium solubilization. Data available on testing completed during FY 93 indicate removal of americium and plutonium from RFP soils of 87% and 88%, respectively. Evaluation of test results indicate that since the soils were not sterilized, native microbes probably competed with the proprietary microbes; thus, MBX suggests greater actinide removal may be possible.

5.3 OPERABLE UNIT 3 ACTIVITIES

Portable wind tunnel tests were completed at OU 3 to quantify wind resuspension emissions of soil particulates (MRI 1993). This testing was not directed at identifying contaminant concentrations in particulate suspensions. The testing was conducted at three discreet locations:

- Standly Lake shoreline
- Great Western Reservoir shoreline
- Selected terrestrial sites between the two reservoirs.

The study was completed using a portable pull-through wind tunnel capable of extracting isokinetic particulates generated by the wind and determining mass emissions and particle size distribution. The result is an ability to evaluate wind erosion processes on specific ground surface types over a wide-range of wind speeds.

Results of the study indicate the greatest soil erosion potential was along the Walnut Creek inlet to the Great Western Reservoir. This was expected due to the uncompacted nature of the sediments in this area. This area is generally similar to other reservoir shoreline areas. The report also showed that particulate emissions were greatest on the most disturbed ground surfaces.

5.4 OPERABLE UNIT 4 ACTIVITIES

Treatability studies at OU 4 consist of work with solar ponds material and groundwater treatment from the OU 4 interceptor pump house. Each of these activities are described in the following subsections.

5.4.1 Solar Ponds Treatability Testing

Treatability work for stabilization of the solar pond salts at OU 4 was originally expected to be performed as part of the RFI/RI, CMS/FS. However, these plans were changed in FY 93. Treatability work for OU 4 will be performed, as needed, under the sitewide treatability program. No exact schedule for treatability tests has been identified. Trade-off studies of various treatment train configurations are intended to be performed during FY 94 as an initiation of a conceptual system design for pondcrete and saltcrete. The current emphasis of the solar pond project is focused on pond sludge removal, which includes designing a series of above ground tanks for pond sludge storage until sludge processing begins.

5.4.2 Colloid Polishing Filter Testing

The Colloid Polishing Filter Method (CPFM) was preliminarily tested in FY 91 for treatment effectiveness to remove uranium, plutonium, and americium from groundwater samples obtained at the OU 4 interceptor trench pump house. Initial results obtained in FY 91 proved favorable for metals and radionuclide removal. An EPA Superfund Innovative Technology Evaluation (SITE) demonstration for the CPFM was completed by Filter Flow Technology at RFP during FY 93.

The CPFM operates in a two-step process: (1) prefiltration of bulk solids in the influent stream, and (2) sorption and chemical complexation of contaminants in a filter bed of insoluble oxide, silica, and quartz materials. The proprietary filter material has an affinity for chelated and complexed metals, including radionuclides.

Results of the FY 91 bench-scale testing were presented in the FY 92 Annual Report. After this phase of testing, a SITE program was developed to evaluate the specific test parameters to define the most favorable conditions for effective contaminant removal. The technical objectives of the SITE demonstration for CPFM were to:

- Assess the ability of CPFM to remove trace non-tritium radionuclides and heavy metals.
- Develop capital and operating costs for this technology that can be used in the Superfund and DOE decision-making process.
- Determine the ability of CPFM to produce an effluent that meets ARARs which for this project are the Colorado Water Quality Control Commission (CWQCC) standards. These standards are not identical for each surface water body at RFP.
- Evaluate disposal options and costs for the effluent and filter cake generated from this process.
- Document the operating conditions and identify operational needs, such as utility and labor requirements for CPFM.

While all testing was completed in FY 93, analytical results will not be available for summary in the FY 93 Annual Report. These results will be provided in the FY 94 Annual Report if available. In addition, the EPA is expected to develop a report based on analytical results of the CPFM tests in FY 94.

5.5 COLLOIDAL/SOLUTION - PHASE TRANSPORT OF RADIONUCLIDES

A joint study was initiated between DOE and the USGS in FY 92 to evaluate colloidal-and solution-phase transport of americium and plutonium in groundwater at RFP (USGS, 1992). Research objectives of the project were to:

- Determine chemical and mineralogical characteristics of colloidal material in groundwater and surface water for evaluating sorption affinity of the radionuclides to colloids
- Determine phase distribution of the radionuclides between colloidal and solution phases
- Determine distribution variations of the radionuclides along a groundwater flow path
- Interpret phase distribution results related to radionuclide transport to evaluate remediation issues.

The study was divided into two phases. Phase I was completed in April 1992 and involved preliminary groundwater sampling, colloidal filtration for radiochemical and scanning electron microscope analysis, and preparation of an initial report. The five conclusions reached during Phase I research follow.

- Particulate and colloidal material in water facilitate the transport of plutonium in the groundwater; up to 65% of the plutonium -239 and -240 activity in the groundwater was associated with the colloidal (22%) and particulate (43%) fractions. The dissolved fraction contained the remaining 35% of plutonium activity. Isotopes of americium and uranium concentrations were too low for analysis.
- Mineral species such as iron oxyhydroxide (greater than 5 microns) and clay minerals (from 0.1 to 5 microns) in the particulate fraction may potentiate the transport of radionuclides by sorption, increasing mobility. Organic species may contribute to the transport of actinides in the colloidal fraction.
- Relatively high concentrations of zinc and copper found in the smallest colloidal fraction suggest organic complexation of the metals by humic and fulvic acids. The role of organics as complexation agents for actinides both in the particulate/colloid and the dissolved fraction will be studied further in Phase II.
- Colloid concentrations are much less than 1 mg/L in the groundwater, which poses challenges to the isolation and characterization of the colloidal phase. Phase II sampling will require filtration of larger volumes and require longer storage times.

- Enhanced transport is possible during periodic leaching events. Future sampling will need to coincide with rain or snow melt to evaluate the effect of episodic leaching events.

For purposes of this report, particle size fractions are defined as follows:

- Particulate fractions - particles greater than 0.45 μm in size
- Colloidal fractions - particles between 0.001 μm and 0.45 μm in size
- Dissolved fractions - particles less than 0.001 μm in size.

Water samples from RFP examined during the study originated from groundwater well number 1587, and surface water seeps SW-51 and SW-53. Well 1587 is a shallow alluvial monitoring well located about 100 meters (m) east of the 903 Pad at RFP; SW-51 is a shallow stream that empties into a drainage ditch at the perimeter of the 903 Pad area; SW-53 is a marshy area about 300 m east-southeast of the 903 Pad.

The draft Phase II report was being prepared and reviewed at the time it was being investigated for inclusion in the FY 93 report. As a result, the following findings are the only findings that can be reported in the FY 93 report at this time. These findings summarize the draft Phase II report based on the studies performed by the USGS.

- Colloidal-size particles comprised significant weight percentages of the total particle mass in each of the water samples examined. On a weight percent basis, they were the predominant particle size range in two of the water samples, i.e., the groundwater from Well 1587 and the surface water from SW-51. Particulate-size particles comprised most of the particle mass in the water sample from SW-53.

- The isolated particulates appeared to be predominantly inorganic in composition, including iron oxides, layer silicates, and, at SW-53, calcite particles. Colloidal particles included the above minerals, but differed from the particulate composition in that organic carbon was a major constituent.

- Plutonium-239 and -240 activity in the water samples was associated predominantly with the particulate fraction.

- Americium-241 activity distribution was more variable than the plutonium distribution among the water samples examined. In the groundwater sample, 73% of the total activity was associated with the dissolved and colloidal size fractions. In the surface water sample at SW-53, 97% of the total activity was associated with the particulate fraction.

- More than 99% of the total uranium-233 and -234 activity is associated with the dissolved fraction in the water samples examined. Dissolved fulvic acids are a potentially important sorption substrate for uranium in these waters.

5.6 SITEWIDE TREATABILITY STUDIES - ION EXCHANGE AND ADSORPTION

The TSP specified performing treatability studies for ion exchange and adsorption processes as part of the sitewide treatability study program. The Final Workplan for these treatability studies was submitted in FY 93 (EG&G 1993f). Bench-scale treatability testing was completed in FY 93 to evaluate the ability of selected adsorbents to remove a variety of groundwater and surface water contaminants previously identified at RFP (EG&G 1993g). The ion exchange study results are expected to be available in FY 94.

The chemical contaminants evaluated for the adsorption study were: beryllium, chromium, iron, lead, manganese, mercury, selenium, americium, plutonium, and uranium. Two groundwater samples and one surface water sample were obtained from RFP locations believed to contain the chemicals of interest based on existing analytical data. The three water samples were composited to comprise the test feed solution. A portion of the feed solution was then obtained from the total composite sample for testing six specific commercially-available adsorbents: GAC (Filtrasorb-300), granular activated alumina (F-1), immobilized biological agent (BIO-FIX), natural zeolite (clinoptilolite), mixed metal oxide (SORBPLUS), and bone charcoal (BRIMAC-216).

The adsorbents were slurried with deionized water and placed in columns 2.0 centimeters (cm) in diameter and 15 cm in height. A peristaltic pump was used to ensure a constant feed solution flow rate to the columns, which then flowed by gravity through the column. Approximately 3.7 liters of treated effluent were passed through each column; the first 250 milliliters (ml) passed through the column were discarded from use for analytical testing. Residence time in the columns was held between 9 and 10 minutes. Approximately 80 total column volumes (based on sorbent pore volume) passed through each of the six test columns.

Tight schedule constraints prevented analytical testing to be completed on the composite feed water sample prior to initiating the column tests. As a result, treatability test data were of limited use since only manganese and selenium concentrations in the feed solution were above TSB levels. Iron and total uranium concentrations were below TSBs but above analytical detection limits. The remaining chemicals evaluated in the study were not present in the feed solution above analytical detection limits and thus could not be used to calculate adsorbent removal efficiencies.

Table 5-4 summarizes test results of feed solution chemical concentrations and effluent concentrations from each column. Table 5-5 summarizes removal efficiencies for manganese, total uranium, selenium, and iron. Filtrasorb-300 and SORBPLUS were effective sorbents in removing between 23 and 70% of the manganese present. Only SORBPLUS was effective in removing selenium (99% removal). Each sorbent showed a 66% iron removal efficiency; however, this percentage is based on analytical quantitation limits and may be actually greater. For uranium, F-1 and SORBPLUS were 99% effective, while the remaining sorbents ranged from 0 to 61% effective.

Since analytical data for the feed solution was not available before testing began, additional testing would be needed to evaluate the treatment effectiveness for specific radionuclides for the selected sorbents. The study will be repeated with fresh field samples from recently analyzed wells in FY 94.

5.7 LANL CHELATING AGENT TREATABILITY STUDY

A treatability study was performed at LANL to evaluate thermally enhanced aqueous extraction of radionuclides from RFP soils at the 903 Pad area of OU 2. The study combined redox, chelation, and steam extraction technologies into a single effort. The study completed during FY 93 was for POP evaluation to mobilize radionuclides from soil (EG&G 1993h).

The study was comprised of the following three phases:

- Phase I - Choose potentially promising chelation/redox systems using bench-scale chemically enhanced steam extraction tests
- Phase II - Identify most promising chelation/redox systems with bench-scale soil-column washing tests
- Phase III - Optimize best chelation/redox systems with parametric bench-scale soil-column washing tests.

For the three phases of this study, the stated objectives were to:

- Select appropriate chelation/redox systems for OU 2 soils and define the bench-scale test plan
- Perform bench-scale tests to evaluate mobilization and removal efficiencies for plutonium and americium with chemically enhanced steam

TABLE 5-4

SITEWIDE TREATABILITY STUDIES, ADSORPTION STUDY RESULTS FOR CONTAMINATED GROUNDWATER AND SURFACE WATER[1]

Analyte	Units	F-1[2]	BIO-FIX[2]	Zeolite[2]	Filtrasorb-300[2]	SORBPLUS[2]	BRIMAC-216[2]	Feed Solution
Beryllium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	mg/L	0.077	0.056	0.067	<0.005	<0.005	0.030	0.10
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium	mg/L	0.18	0.20	0.19	0.18	<0.005	0.18	0.18
Americium^{241}	pCi/L	0.00 ± 0.03	0.00 ± 0.02	0.00 ± 0.02	0.00 ± 0.03	0.01 ± 0.03	-0.01 ± 0.02	0.16 ± 0.07
Plutonium$^{239+240}$	pCi/L	0.00 ± 0.01	0.00 ± 0.01	0.06 ± 0.05	0.00 ± 0.01	-0.01 ± 0.02	0.01 ± 0.02	0.01 ± 0.03
Uranium (Total)	µg/L	<0.1	2.4	3.2	2.9	<0.1	1.2	3.1
Uranium^{234}	pCi/L	0.0 ± 0.1	1.0 ± 0.2	1.6 ± 0.2	1.4 ± 0.2	0.0 ± 0.1	0.6 ± 0.2	1.5 ± 0.3
Uranium^{238}	pCi/L	0.0 ± 0.1	0.9 ± 0.2	0.9 ± 0.2	1.0 ± 0.2	0.0 ± 0.1	0.5 ± 0.1	1.2 ± 0.2
TDS @ 180°C	mg/L	680	730	740	690	350	720	740
TDS @ 105°C	mg/L	6	<5	<5	<5	6	6	<5
pH		8.0	7.8	7.8	8.0	11.2	7.8	7.6

[1] All values reported as dissolved concentrations. Solutions were filtered at 0.45µm prior to analyses.
[2] Commercial trade name for a proprietary sorbent material.

mg/L = miligram per liter
pCi/L = pico Curie per liter
µg/L = microgram per liter

TABLE 5-5

SUMMARY OF REMOVAL EFFICIENCIES (%) FOR
ADSORPTION TREATABILITY STUDY RESULTS

Adsorbent	Analyte			
	Manganese	Total Uranium	Selenium	Iron
Filtrasorb-300	99	6	0	67
F-1	23	99	0	67
BIO-FIX	44	23	0	67
Zeolite	23	0	0	67
SORBPLUS	99	99	99	67
BRIMAC-216	70	61	0	67

- Perform bench-scale tests to evaluate mobilization and removal efficiencies for plutonium and americium simulating in situ redox conditions.

A summary of soil washing studies at RFP, along with descriptions of redox and chelation chemistry and steam stripping, were given in the treatability study workplan (EG&G 1993h). The concept of chemically enhanced steam stripping is similar to conventional steam injection systems with chemical addition modifications to the system.

Leaching agents used to begin the study were selected based on previous experience with plutonium-bearing soils from the Nevada Test Site (NTS). Previous studies with NTS soils indicated the majority of the plutonium was associated with soil particles less than or equal to 53 microns in size. Key experimental parameters were soil to solution ratio, contact time, solution concentrations, and method of phase separation.

Each test combination for batch desorption tests was performed at 80°C, with complexing agent concentrations of approximately 0.1 molar (M), redox agent concentrations of approximately 30 to 50% of the complexing agent, a 1:20 soil to solution ratio, a 24-hour contact time, and centrifugal phase separation. The most effective combinations were then taken to bench-scale column tests. In these tests, 10 to 20 column volumes were passed through the columns to evaluate radionuclide leaching under in situ conditions. Finally, bench-scale studies were completed to optimize key experimental parameters, namely to maximize plutonium recovery and minimize the total chemical loading to the system. Mass balances for plutonium concentrations were calculated for each experimental phase during the optimization testing.

Data for the work completed in FY 93 available to date are summarized in Table 5-6 for americium and plutonium extraction effectiveness. These results are based on gamma counting of the treated soil. Alpha counts of the liquid extractants are not yet available. As seen in Table 5-6, sodium citrate was the most effective extractant used in combination with a majority of the various redox agents used. The most effective combination was sodium citrate with $Na_2S_2O_4$. Both citric acid and EDTA provided promising results for americium and plutonium extraction.

5.8 TREATABILITY STUDY WORK PLAN FOR OXIDATION/REDUCTION PROCESSES

A workplan to examine the treatment effectiveness of a variety of oxidation/reduction (redox) processes on representative groundwater and surface water samples at RFP was finalized in FY 92 (EG&G 1992f). Three phases of work, which are likely to require 29 weeks to complete, were identified in the workplan. However, the proposed activities were not initiated in FY 93. These activities are expected to be performed in FY 95.

TABLE 5-6

LANL CHELATING AGENT PRELIMINARY TREATABILITY STUDY RESULTS

Extractant	% Am Extracted	% Pu Extracted
0.1 M Citric Acid	13	23.5
0.1 M Citric Acid/2 eq NaOH	39	18
0.1 M EDTA/2 eq NaOH	39	8
0.1 M EDTA/3 eq NaOH	45	8
0.1 M Tiron	0	24
0.1 M EGTA/2 eq NaOH	29.5	7
0.1 M DPTA/3 eq NaOH	46	24.5
0.1 M Tartaric Acid/1 eq NaOH	0	5
5% NaOCl	15	7.5
0.1 M $(NH_4)_2CO_3$	0	6
0.1 M Na_2CO_3/5% NaOCl	10.5	28
0.1 M Na_2CO_3/3% H_2O_2	0	0
0.1 M Na_2CO_3/0.1 M $Na_2S_2O_8$	0	9.5
0.1 M Citric Acid/0.1 M $Na_2S_2O_4$	14.5	50.5
0.1 M Citric Acid/0.1 M $NH_2OH \cdot HCl$	1.5	25
0.1 M Citric Acid/0.1 M Ascorbic Acid	15.5	18
0.1 M TETA/0.1 M $NaHCO_3$/5% NaOCl	8.5	13
0.1 M TETA/0.1 M $NaHCO_3$/3% H_2O_2	0	0
0.1 M TETA/0.1 M $NaHCO_3$/0.1 M $Na_2S_2O_8$	4.5	17.5
0.1 M TETA/0.1 M $NaHCO_3$/0.1 M $Na_2S_2O_4$	0	0
0.1 M TETA/0.1 M $NaHCO_3$/0.1 M $NH_2OH \cdot HCl$	0	12
0.1 M TETA/0.1 M $NaHCO_3$/0.1 M Ascorbic Acid	3	10.5
0.1 M Na_2CO_3/0.01 M Fe^{3+}/3% H_2O_2	0	13.5
0.1 M $NaHCO_3$/0.01 M Fe^{3+}/3% H_2O_2	0	5
0.1 M TEG/0.1 M $NaHCO_3$	0	0
0.1 M TEG-DME/0.1 M $NaHCO_3$	0	0
0.1 M TEG-DME/5% NaOCl	0	8
0.1 M TEG-DME/0.1 M $Na_2S_2O_8$	0	0
0.1 M TEG-DME/0.1 M $Na_2S_2O_4$	0	0
0.1 M TEG-DME/0.1 M $NH_2OH \cdot HCl$	0	3
0.1 M TEG-DME/0.1 M Ascorbic Acid	0	0
0.1 M TEG-DME/0.01 M Fe^{3+}/3% H_2O_2	N/A	N/A
0.1 M Sodium Citrate/0.01 M Fe^{3+}/3% H_2O_2	42.5	43

TABLE 5-6

LANL CHELATING AGENT PRELIMINARY TREATABILITY STUDY RESULTS
(continued)

Extractant	% Am Extracted	% Pu Extracted
0.1 M Citric Acid/3% H_2O_2	20	39
0.1 M Na_2CO_3/0.1 M $Na_2S_2O_4$	0	3
0.1 M Na_2CO_3/0.1 M $NH_2OH \cdot HCl$	0	0
0.1 M Na_2CO_3/0.1 M Ascorbic Acid	26.5	20
0.1 M $NaHCO_3$	2	11.5
0.1 M $NH_2OH \cdot HCl$	0	0
0.1 M $NaHCO_3$/5% NaOCl	13	14
0.1 M $NaHCO_3$/3% H_2O_2	0	0
0.1 M $NaHCO_3$/0.1 M $Na_2S_2O_8$	0	9.5
0.1 M $NaHCO_3$/0.1 M $Na_2S_2O_4$	0	3.5
0.1 M $NaHCO_3$/0.1 M $NH_2OH \cdot HCl$	0	2
0.1 M $NaHCO_3$/0.1 M Ascorbic Acid	22	10.5
0.1 M Nitrilotriacetic Acid/2 eq NaOH	47.5	2
0.1 M Nitrolotriacetic Acid/3 eq NaOH	40.5	22.5
0.1 M Sodium Citrate/5% NaOCl	12	0
0.1 M Sodium Citrate/3% H_2O_2	42	19
0.1 M Sodium Citrate/0.1 M $Na_2S_2O_8$	45	28.5
0.1 M Sodium Citrate/0.1 M $Na_2S_2O_4$	57	60.5
0.1 M Sodium Citrate/0.1 $NH_2OH \cdot HCl$	41	36
0.1 M Sodium Citrate/0.1 M Ascorbic Acid	58	51
0.1 M Nitric Acid	6.5	0
0.1 M Ascorbic Acid	0	0
0.1 M Citric Acid/5% NaOCl	3	32
0.1 M Citric Acid/3% H_2O_2	13.5	41.5
0.1 M Citric Acid/0.1 M $Na_2S_2O_8$	6.5	30
0.1 M EDTA/3% H_2O_2	46.5	26
0.1 M EDTA/0.01 M Fe^{3+}/3% H_2O_2	0	0
0.1 M TETA/3% H_2O_2	0	9
0.1 M TETA/0.01 M Fe^{3+}/3% H_2O_2	N/A	N/A
0.1 M TEG/3% H_2O_2	0	0
0.1 M TEG/0.01 M Fe^{3+}/3% H_2O_2	4	3

5.9. SOLAR DETOXIFICATION PROJECT

Science Applications International Corporation (SAIC) has proposed the demonstration of a reactor at RFP for photocatalytic detoxification of water using the ultraviolet component of sunlight. The photoreactor can be used to detoxify a variety of compounds commonly found in contaminated groundwater, such as trichloroethene. Previous bench-scale tests at SAIC have indicated that the fixed-catalyst system was able to reduce trichloroethene concentrations from 1 ppm to below 5 ppb in less than three hours of exposure.

The SAIC one-sun reactor is rugged, flexible, low-cost, and modular. The unit consists of a plastic film envelope that is welded together to form multiple flow passages. Water is detoxified as it is pumped through the flow passages and comes in contact with a supported titanium dioxide catalyst and ultraviolet light from the sun.

A field demonstration of the SAIC photoreactor has been proposed at RFP for FY 94 and FY 95. A final site for such a demonstration has not been confirmed, although multiple OUs have been identified as potential candidates.

5.10 COMPREHENSIVE TREATMENT MANAGEMENT PLAN

The Comprehensive Treatment Management Plan (CTMP) was developed by DOE to comply with Land Disposal Restrictions (LDRs) specified in Title 40 of the Code of Federal Regulations (40 CFR), Section 268. This RCRA restriction requires that a generator of a hazardous and/or mixed waste must treat the waste to meet specific concentration based treatment standards or must treat the waste utilizing specific treatment technologies prior to disposal of the waste. The LDRs also prohibit long term storage of hazardous or mixed waste that do not meet the treatment standards unless such storage is specifically "... for the purpose of accumulation of such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal..." (40 CFR 268.50). Because of acknowledged lack of mixed waste capacity on an RFP-specific and on a national basis, accumulation of mixed waste at RFP may be inconsistent with the storage prohibition of 40 CFR 268.50. As a result, DOE and EPA entered into a Federal Facility Compliance Agreement (FFCA) which provided time for RFP to systematically address and achieve total compliance with the LDR regulations. The agreement does not place RFP into compliance; however, it does provide a mechanism for DOE to take a variety of steps to resolve the LDR issues. At the current time, all compliance requirements specified in the FFCA were met on or ahead of schedule. The FFCA expired in May 1993; however, RFP continues to pursue the requirements of the agreement as it were still in place to continue to demonstrate RFP's commitment to compliance with the LDR regulations.

The primary mechanism for achieving compliance is stated in the CTMP, in which RFP has outlined the approach, schedules, and milestones for developing and implementing systems for treating mixed wastes to satisfy the treatment standards specified in the LDR regulations. Specific milestones scheduled in the CTMP include:

- Submitting treatability study exemptions
- Submitting research and development (R&D) permit applications
- Submitting Part B permit application modifications
- Initiating SO testing on the production facility or system
- Submitting a waste processing schedule.

To treat the wastes subject to LDRs as described in the CTMP, the following treatment systems were recommended by DOE:

- Low-level mixed (LLM) waste solvent contaminated waste treatment system
- LLM solidified sludge treatment system
- Miscellaneous LLM waste form treatment system
- Building 374/774 waste treatment system
- LLM surface organics removal treatment system.

The proposed schedule for achieving the various CTMP milestones extends from FY 92 through FY 2012.

In support of the development of these treatment systems, a variety of mixed waste treatment technologies are being developed and evaluated including polymer encapsulation, cementation, microwave solidification, incineration, alternatives to incineration, and others.

Although RFP is still pursuing those development activities outlined in the CTMP, the CTMP is currently being replaced by a "Site Treatment Plan." Each site within the DOE complex is preparing a Site Treatment Plan as required by the Federal Facility Compliance Act of 1992. This Site Treatment Plan recommends that ongoing CTMP mixed waste treatment studies continue to achieve compliance with the LDR regulations.

5.11 SITEWIDE TREATABILITY STUDY/FEASIBILITY STUDY INTEGRATION

Activity Data Sheets (ADSs) for sitewide projects contain work packages that support the Interagency Agreement (IAG) work on the various OUs directly. The purpose of the sitewide integration program is to provide DOE and EG&G management a concise document that will support continued funding of the sitewide projects by showing:

- A concise narrative of each project and how it relates technically to OU RFI/RI, IRA, FS, and final remediation schedules.

- A schedule for each project, demonstrating how the project parallels and integrates into the RFI/RI, CMS/FS processes and into final remediation. The schedule shows the manner in which sitewide projects are interfaced with the individual OUs' IAG schedules.

- Deficiencies and impacts should sitewide projects not be funded to full levels.

While necessary data for these report items has been compiled in a tabular format, no schedule for preparing a formal document has been defined to date.

5.12 SECONDARY RESIDUES FROM TREATABILITY STUDIES

Treatability study processes will produce secondary residues as a by-product of treatment. Requirements for handling the residues and wastes will vary with regard to the contaminants involved as well as the treatment methods employed in the treatability study. Therefore, the residues produced by each treatability study must be considered separately as part of a waste management plan.

In general, it is expected that the secondary residues from water treatment processes will be minimal. The residues will consist of treatment materials, ion exchange resins, adsorption materials, treatment sludges, and contaminated equipment (gloves, miscellaneous laboratory equipment, etc.). The treated water itself will be disposed of at the treatment site, in accordance with the permits held by the treatment facility. Untreated water, depending on the volume remaining, the contaminant involved, and the contaminant level, will either be disposed of at the treatment site (i.e., off-site treatability study laboratory) or returned to RFP for treatment and/or disposal.

Secondary residues from the soil treatability studies are expected to fall into one or more of the following categories:

- Clean soil fraction which does not require any further treatment and could be used as back fill in the area where the soil was obtained

- Concentrated plutonium fraction

- Fraction containing concentrated heavy metals

- Fraction containing organic materials

- Miscellaneous (gloves, laboratory equipment, etc.)

All secondary residues will be maintained as separate products.

Once the treatability study has been completed, it is expected that all of the secondary soil residues will be returned to RFP along with any untreated soils for proper treatment and disposal. The miscellaneous fraction may or may not be returned to the RFP depending on the treatability study vendor's procedure for handling these waste materials. Any concentrated plutonium fraction will require extra consideration to determine if the elevated plutonium levels will require more stringent handling in accordance with Department of Transportation (DOT) regulations.

The issue of secondary treatment will be considered as necessary for each treatability study. For most studies the quantities involved range from 50 to a few hundred pounds and likely will not fill more than one or two 55-gallon drums.

6.0
FUTURE PLANS, PRIORITIES, AND SCHEDULES

FY 95 plans are to be developed following release of this FY 93 Annual Report and will be based on the latest data and information contained in this FY 93 Annual Report and review of specific data needed to support OU CMS/FS reports.

After a technology has been screened using technological criteria, administrative screening must take place prior to approving and funding a study for prioritization. Administrative factors historically used for technology selection and prioritization include:

- Project cost
- Anticipated degree of clean-up success
- Applicability to RFP environmental remediation efforts
- Internal scheduling.

Use of these factors has resulted in identifying the technologies and deliverables in Table 6-1. The majority of the treatability studies listed in Table 6-1 will be completed (i.e., bench-scale testing will be complete and preliminary results reviewed with the Agencies) by November 12, 1994. The exceptions to this follow.

- Chemically Enhanced Steam Stripping (CESS) will be conducted at LANL. The target date for completion is November 12, 1994. A final date will be negotiated with LANL during contract negotiations.

- Solvent Extraction requires a "hot laboratory." EG&G and DOE/RFO are currently auditing four laboratories located in the Denver/Fort Collins area which have an applicable Colorado Department of Public Health Radioactive Materials License. Should the laboratories not require upgrading, the test programs will be completed by November 12, 1994.

- A workplan will be developed by November 12, 1994 for stabilization/solidification. Bench-scale treatability studies will be conducted in FY 95.

- Solar Detoxification is scheduled for completion in FY 95.

DOE will submit a workplan outline for agency review and comment. DOE will subsequently incorporate agency comments in the final workplan outline with the agreement of the other participants in the treatability study.

To improve communications, the three parties to the IAG will continue to hold quarterly meetings to present and discuss the status of various studies, as well as provide weekly highlights and/or monthly summaries of programs. In addition, when significant events affect current schedules, formal notification will take place requesting schedule extensions per Part 42 (Extensions) of the IAG.

TABLE 6-1

SUBMITTAL DATES AND PROJECT SCHEDULE

Treatability Study	Workplan to RFO	Workplan to Agencies	Agency Approval of Workplans	Testing Completed	Report to RFO Completed	Report to Agencies	Comments
			STATUS				
Soil Washing-NRT*	Jul-92	Jul-92	Yes	Aug-93	16-May-94	30-May-94	Revised schedule will be submitted after contract negotiation is completed.
TRUclean*•	Nov-91	Feb-92	Feb-93	Sep-93	15-Apr-94	29-Apr-94	
EPA SITE Demo	N/A	N/A	N/A	Sep-93		3-Oct-94	Document to be issued by EPA SITE Program.
Plasma Melter	N/A	N/A	N/A	Jan-94	30-May-94	13-Jun-94	
Adsorption*	Jun-93	Yes	Yes	Jul-94	11-Oct-94	25-Oct-94	
Ion Exchange*	Jun-93	Yes	Yes	Aug-94	11-Oct-94	25-Oct-94	
TRUclear*	Feb-94	Open	Open	Aug-94	27-Oct-94	10-Nov-94	
Magnetic Separation*	Nov-91	Nov-91	Yes	Jul-94	1-Jul-94	15-Jul-94	
Chemically Enhanced Steam Stripping	Mar-94	Open	Open	Oct-94	21-Nov-94	6-Dec-94	Phase 1 (FY 94) Report.
Bioremediation	Mar-94	Open	Open	Sep-94	17-Nov-94	1-Dec-94	Phase I and II.
Solvent Extraction	Jul-94**			Oct-94	24-Nov-94	8-Dec-94	Schedule being developed.
Physical Separation	Nov-91	Feb-92	Feb-93				Samples from TRUclean* to be resubmitted for metals analysis.
Stabilization/Solidification	Sep-94						Workplan to cover four studies.
Oxidation/Reduction*	Dec-91	Jan-92	Open	1995			Revised Workplan to DOE/RFO - Aug-94.
Ultra/Microfiltration*	N/A	N/A	N/A	1993	2-May-94	16-May-94	Report to be issued by the USGS to DOE.
Rad Discharge Control	Sep-91	Yes	Yes	Yearly	Yearly		Phase III completed in Sep-94; results presented in Annual TS Report.
Soil Washing - LANL	N/A	N/A	N/A	1993	21-Mar-94	4-Apr-94	
Solar Detoxification	May-94	Open	Open	Apr-95	17-Jul-95	31-Jul-95	

* Original 13 T.S.

** Tentative Date

OUTSTANDING ISSUES

a) Plasma Melter - Issuance of EG&G Rocky Flats report to DOE/RFO delayed until approximately May 1994 when EG&G Idaho completes proprietary evaluation of Lockheed technology report for Pit 9 remediation program expected in April 1994.

NOTE: This schedule is a draft schedule. DOE/RFO, EPA, and CDH are negotiating the schedule for these treatability studies.

7.0
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APPENDIX A
TECHNOLOGY SELECTION AND SCREENING

APPENDIX A
TECHNOLOGY SELECTION AND SCREENING

Appendix A of the FY 93 Annual Report provides a review, reevaluation, and rescreening of technologies identified in the TSP and the FY 91 and 92 Annual Reports for consideration as part of the RFP sitewide Treatability Studies Program. To this end, Appendix A of the FY 93 Annual Report presents new site characterization data, changes and/or additions to chemical-specific TSBs, and results of a literature search to identify potentially applicable technologies not previously considered for remediation efforts at the RFP. New technologies were identified and screened during preparation of the FY 93 Annual Report using the methodology identified in both the TSP and the FY 91 and 92 Annual Reports. This section briefly reiterates the previously outlined methodology, and the recent technology screening effort.

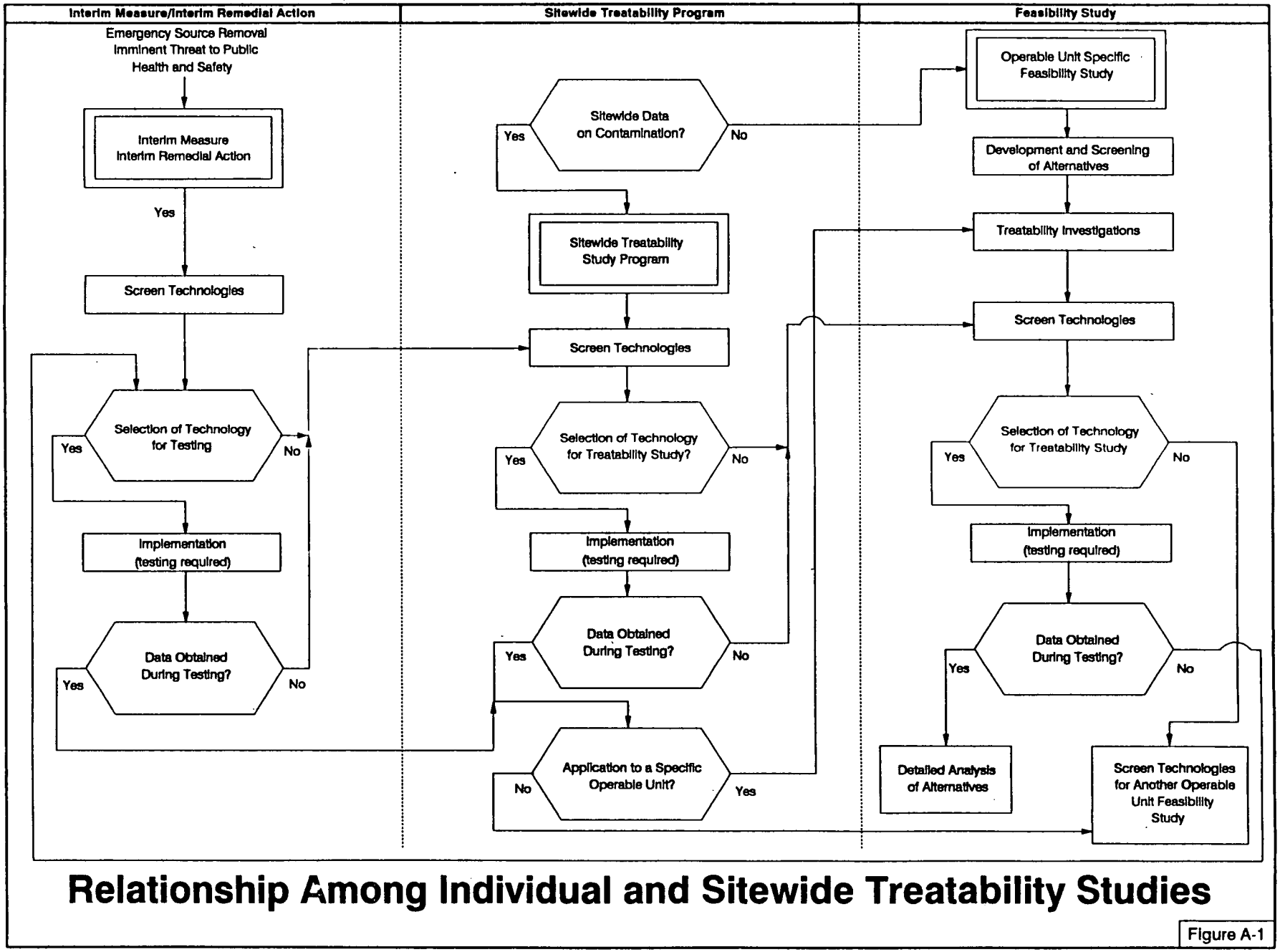
A decision process schematic defines the relationship among Treatability Study Programs at RFP for individual OU and sitewide efforts. Figure A-1 shows this process, which graphically depicts management decision factors and their relation to the technology selection process. The process has three components for the screening effort, which include: (1) emergency source removal completed under an IM/IRA; (2) sitewide consideration of technologies; and (3) OU-specific consideration of technologies as part of the FS process.

The FY 92 Annual Report recommended treatability testing of radio frequency heating. This recommendation was based on the belief that radio frequency heating offered significant promise of contributing to remediation efforts at RFP. At the completion of this FY 93 Annual Report, no further commitments regarding testing radio frequency heating have been made at the RFP.

In addition to the screening process for the treatment technologies newly identified in FY 93, a reevaluation of water treatment and soil/sediment treatment technologies selected from bench- or laboratory-scale treatability testing in the TSP was performed. Results of this reevaluation are presented in Section A.3, following the current technology screening review.

A.1 TECHNOLOGY SELECTION PROCESS

The site characterization data available through RFEDs as of September 30, 1993 were reviewed and compared to potential TSBs in order to identify major contaminant types and associated media that exist at RFP. This review focused on data newly incorporated into RFEDS during the period between completion of the Draft FY 92 Annual Report and September 1993. A literature/database search was conducted to identify new or innovative technologies not previously described, and new information on existing technologies potentially applicable to the contaminant types and media identified in more than one OU.



Relationship Among Individual and Sitewide Treatability Studies

Figure A-1

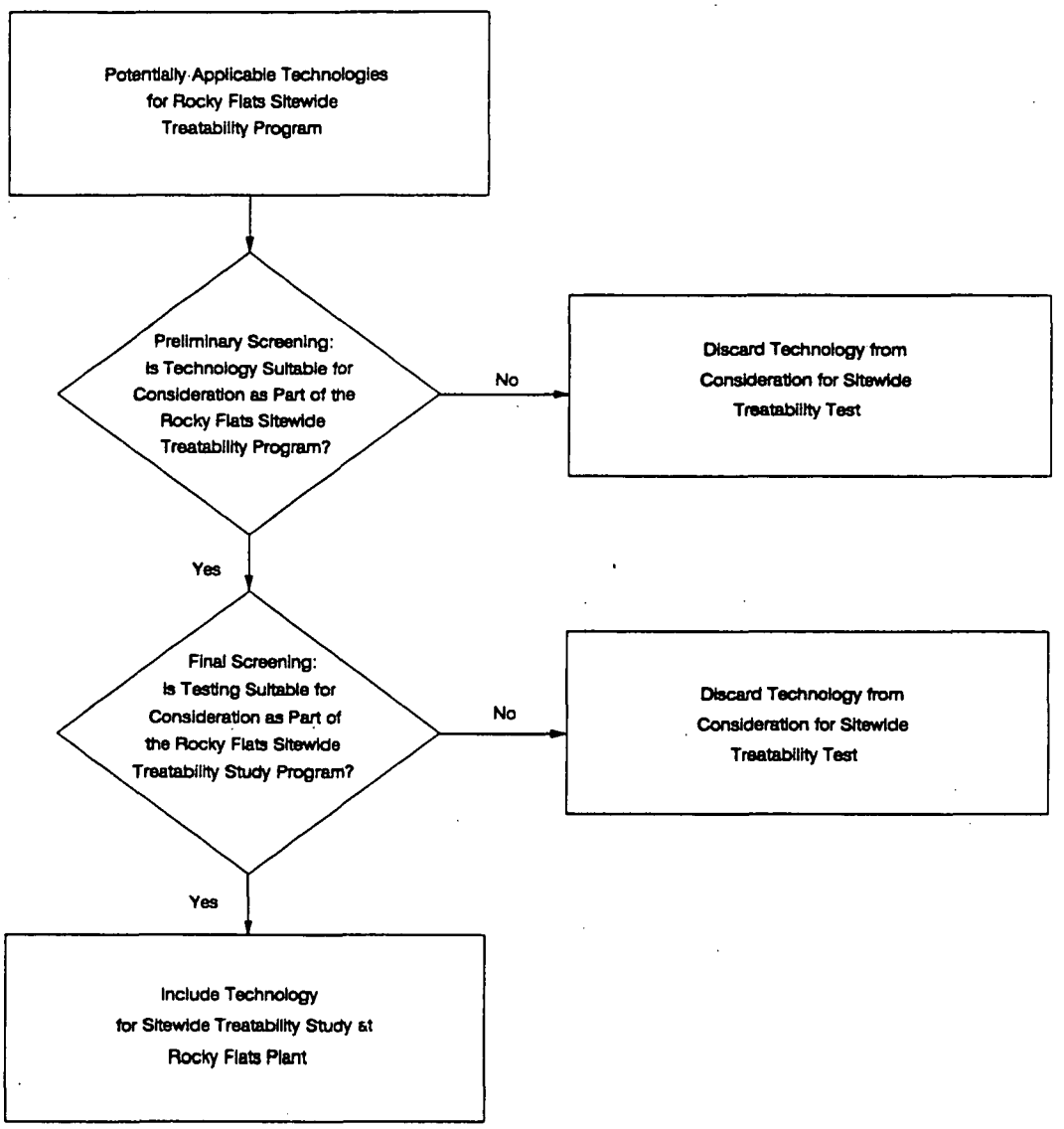
Technologies identified from the literature/database search were subjected to a two-step screening process. Technologies were selected for screening if they had not been evaluated in the TSP or the FY 91 and 92 Annual Reports, or if new information was available on previously considered technologies regarding their potential performance. The first step, preliminary screening, identified technologies suitable for consideration as part of the RFP sitewide TSP using screening criteria described in detail in Section A.1.3. The second step, final screening, evaluated whether those technologies passing the preliminary screening and deemed appropriate for final screening would provide beneficial information to the sitewide TSP. A judgment was made as to whether treatability testing would be needed to evaluate the technology under consideration. The two-step screening method is illustrated in Figure A-2 and described in Sections A.1.3 and A.1.4.

A.1.1 Site Characterization Data and Potential TSBs Review

The site characterization data and potential TSBs were updated and reviewed as noted in Sections 2 and 3, respectively. The contaminants identified during the review of site characterization data were grouped in broad categories by contaminant type (e.g., volatile organics, radionuclides) and medium (e.g., groundwater, surface water). Potential TSBs were also grouped by contaminant and medium.

A.1.2 Technology Data Review

The review of technology data included an investigation of the status of ongoing treatability test programs and interim remedial actions at RFP, and a search for new information on potentially applicable technologies. The status of treatability tests and interim actions in progress at RFP was summarized in Section 5.0 of the FY 93 Annual Report. Sources of new information on potentially applicable technologies include literature/database searches, reviews of conference proceedings, EPA guidance documents, DOE reports, and vendor supplied materials. Overall, the technology data review was primarily focused on treatment technologies that are applicable to existing contaminant categories, including technologies previously screened, and technologies that were not considered in the TSP and FY 91 and 92 Annual Reports but are appropriate for screening in the FY 93 Annual Report based on information regarding treatment performance capability.



Treatment Technology Screening Process Rocky Flats Sitewide Treatability Program

Figure A-2

A.1.3 Preliminary Screening Process

A two-step preliminary screening of treatment technologies identified as being applicable to the major contaminant categories was performed on technologies screened during FY 93. This screening shown in Figure A-3 resulted in the selection of technologies considered suitable for further consideration as part of the RFP sitewide TSP. The first step screening criteria were used to determine the applicability of a technology to the Rocky Flats Sitewide Treatability Program. These criteria included:

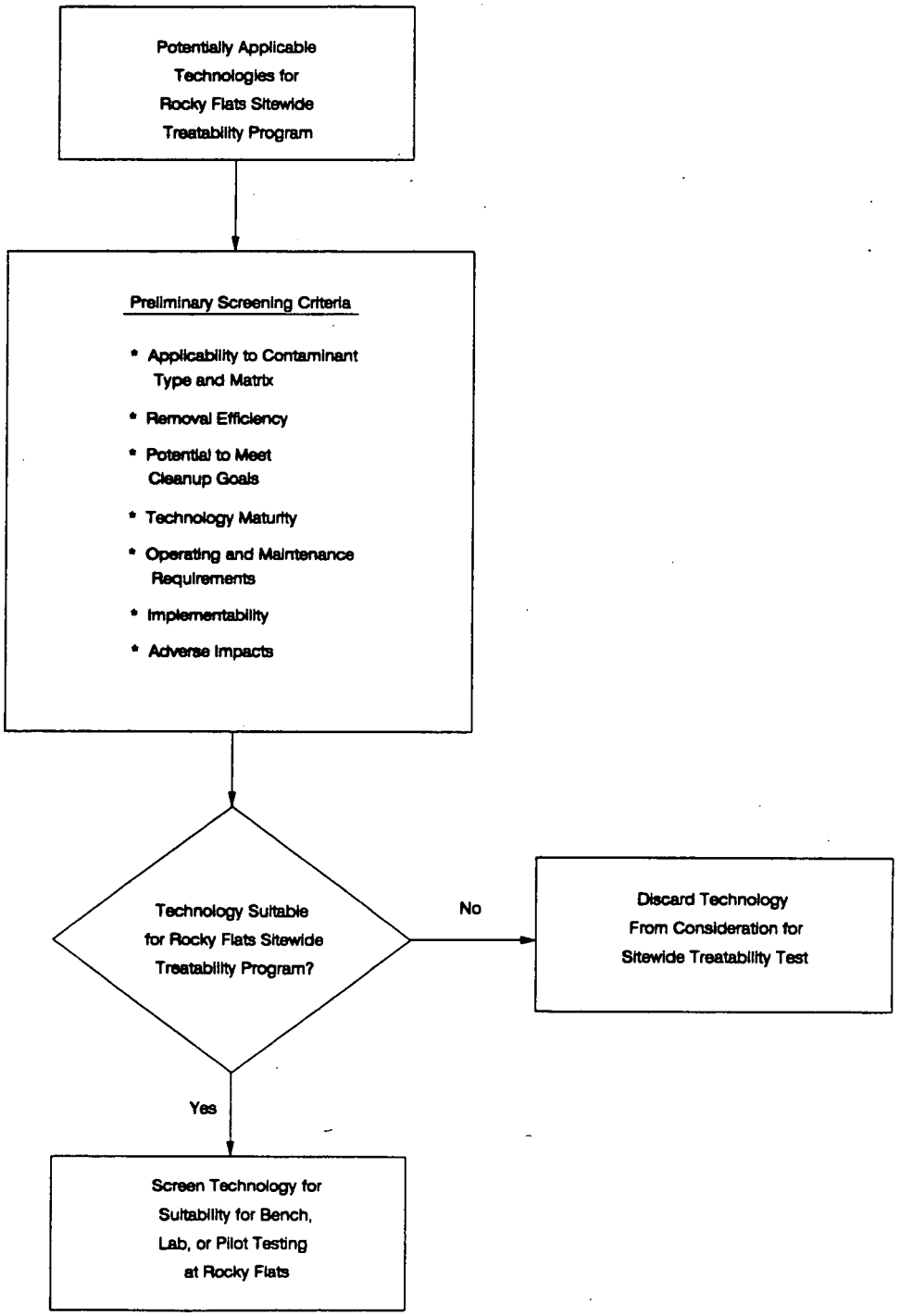
- Potential applicability to **new** major contaminant categories that were identified during review of new site characterization data
- Potential applicability to **any** major contaminant category, including categories previously identified
- Potential applicability of innovative technologies for which information was available on performance capabilities as identified from ongoing or completed testing
- Potential applicability to contaminant categories present at more than one OU.

Technologies that pass the first step are further screened against the following second set of preliminary screening criteria:

- Removal efficiency
- Potential to meet clean-up goal(s)
- Technology maturity
- Operation and maintenance (O&M) requirements
- Implementability
- Adverse impacts.

The screening performed for the FY 93 Annual Report assumed each of these criteria carry equal weight; however, as the environmental remediation process matures at RFP some of the criteria may become more important than they were originally. This could result in changes in ranking of screened technologies. How the criteria are weighted for use in the technology screening process is part of the management decision process (see Section A.1.4).

Newly identified technologies applicable to existing contaminant categories were included in the preliminary screening process. Technology description summaries were prepared for each of the newly identified technologies that survived the preliminary screening criteria. These summaries are presented in Appendix D. No new contaminant categories were identified at RFP during FY 93.



Treatment Technology Preliminary Screening Rocky Flats Sitewide Treatability Study Program

Figure A-3

A.1.4 Management Decision Factors

Management decision factors related to technology screening include:

- State and community acceptance
- Schedule constraints
- Budget constraints
- Weighting factors for the technology screening criteria.

State and community acceptance are important factors and ER Management must be aware of how potential treatability processes are regarded by the community. Testing a technology which would not be acceptable to the community would be a misuse of resources. Also, if there is not sufficient funding or time to test all of the selected technologies, ER Management will select the technologies which will be tested.

A.1.5 Final Screening Process

The final screening process illustrated in Figure A-4 selected technologies potentially applicable for use in the RFP Treatability Study Program. The overall objective of final screening is to review and update the technology selection completed in the TSP and the FY 91 and 92 Annual Reports. The final screening applies to technologies:

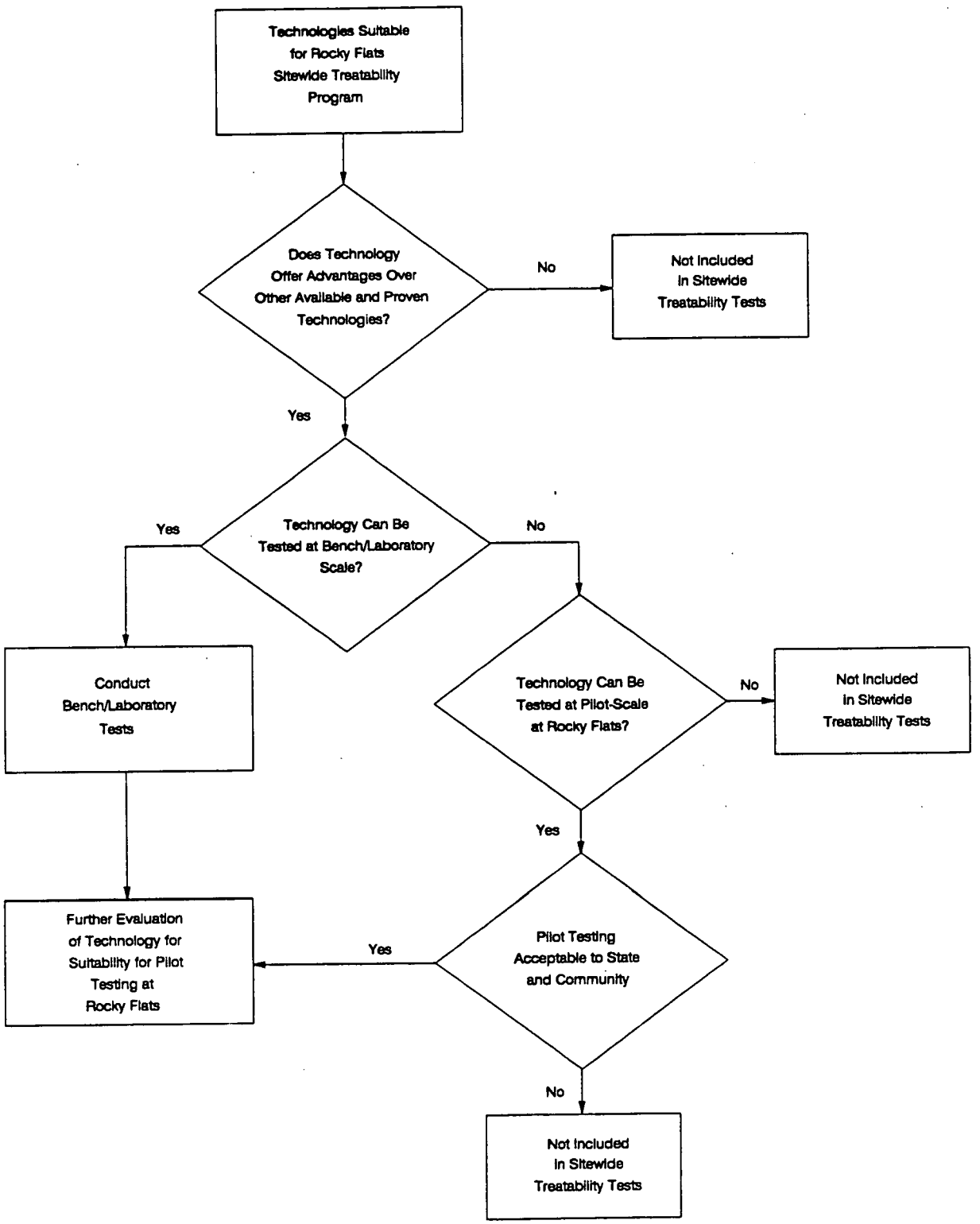
- Retained following the preliminary screening

- For which new significant information has become available since their initial consideration in the final screening process of the Final TSP

- Which were retained in the TSP or FY 91 and 92 Annual Reports after preliminary screening and were not subjected to the final screening because analytes exceeding potential TSBs were not identified in more than one OU in the TSP.

The following technologies were subjected to a final screening based on the updated review of potential TSBs and contamination data in the FY 93 Annual Report.

- Biosorption for capture/degradation of pesticides in aqueous media
- Membrane-based oil extraction for isolation of metal ions in aqueous media
- Ultrasonic degradation of chlorinated hydrocarbons in aqueous media
- X-ray treatment of VOCs in aqueous media.



Treatment Technology Final Screening Process
Rocky Flats Sitewide Treatability Study Program

Figure A-4

All of the treatment technologies evaluated as part of the FY 93 Annual Report target contaminants in aqueous media (i.e., contaminated groundwater and/or surface water) and would require no more than bench- or laboratory-scale testing. As shown in Figure A-4, special consideration regarding State or community acceptance must be given to those technologies deemed appropriate for pilot-scale testing. This particular criterion was not applicable for technologies considered in the FY 93 Annual Report.

A.1.6 Pilot-Scale Testing Evaluation

The process for implementing treatability studies for pilot-scale testing is presented in Figure A-5. This procedure, adapted from the EPA guidance document for conducting treatability studies, was designed to allow the continuous evaluation of new information for each technology based on bench-scale testing and a literature search through the life of the treatability program. Technologies selected for bench- and/or pilot-scale testing in the TSP and the FY 91 and 92 Annual Reports will be reevaluated annually. The review will include additional information on potential TSBs, permits, cleanup levels, agency approval, and environmental risks of pilot testing. Relative costs for implementing a program for pilot- and full-scale testing will be prepared as appropriate.

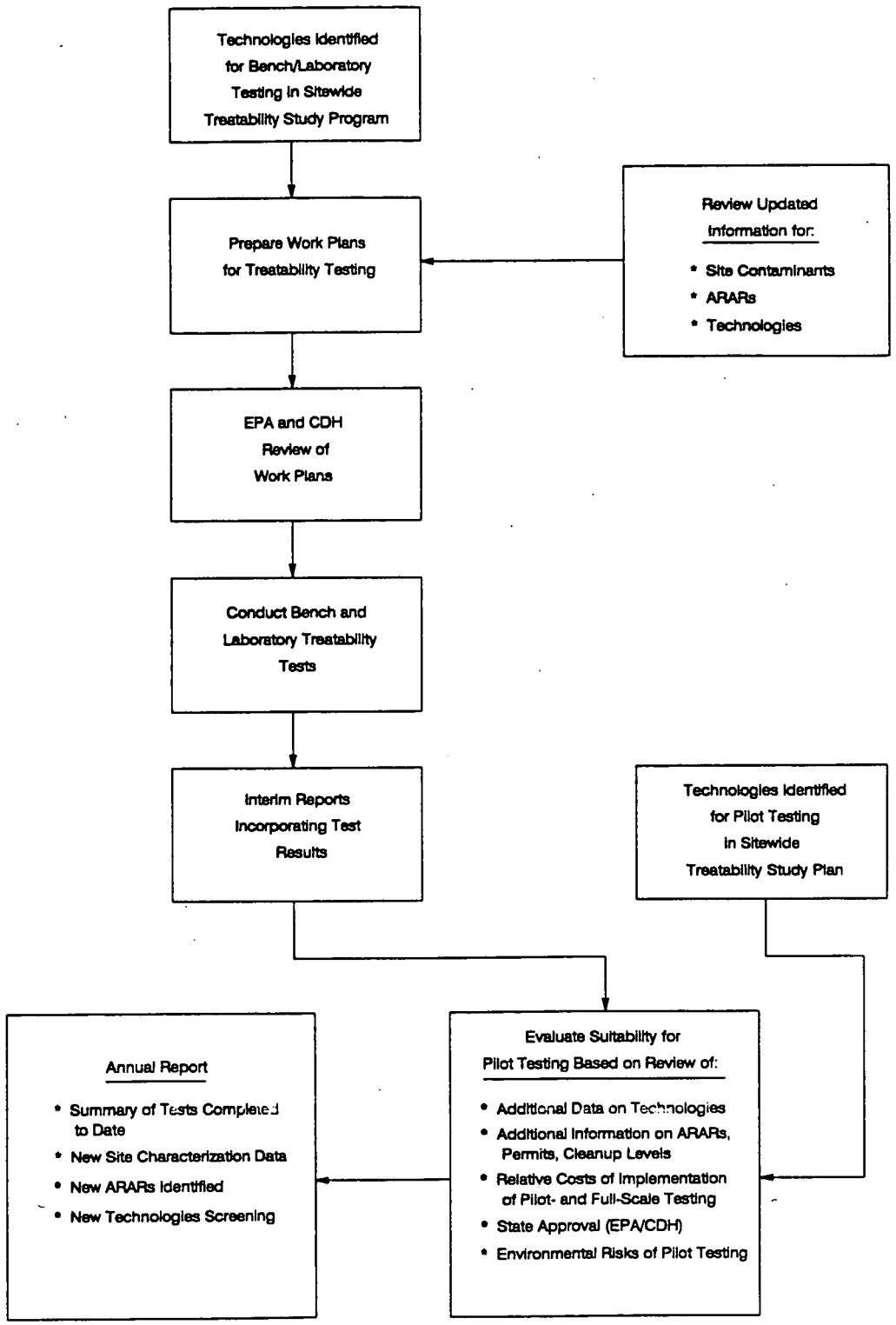
A.2 TECHNOLOGIES EVALUATION AND SELECTION SUMMARY

This section presents results of the technology selection process for technologies that were considered potentially applicable for the sitewide TSP. The technologies which passed preliminary screening are presented in Section A.2.1. The final technology screening process results are presented in Section A.2.2.

A.2.1 Preliminary Screening

A technology data summary was prepared for each treatment technology that passed preliminary screening in the FY 93 Annual Report. These data summaries are included in Appendix D.

Table A-1 provides a summary of the technologies which passed preliminary screening and were considered for incorporation into the sitewide TSP. None of these technologies were evaluated previously in the Final TSP or the previous annual reports. Consideration of these new technologies



Implementation of Treatability Testing - Pilot Test
Rocky Flats Sitewide Treatability Study Program

Figure A-5

TABLE A-1

PRELIMINARY TREATMENT TECHNOLOGY SCREENING
ROCKY FLATS SITEWIDE TREATABILITY PROGRAM

Technology	Applicability	Removal Efficiency	Potential to Meet Clean-up Goal	Technology Maturity	O&M Requirements	Implementability	Adverse Impacts	Retain Yes/No[1]
Biosorption	Adsorption and biodegradation of organic compounds, including pesticides	>99% for conc ranging from 0.1-0.5 ppb	High	Full scale trickling filters (fixed biomass GAC) are currently available	Expected to be low to moderate	Easily implementable as part of pump-and treat system	Possible toxic metabolites	No
Membrane-Based Oil Extraction	Extraction of VOCs and SVOCs, heavy metals and possibly metallic radionuclides from aqueous waste streams	Not Available	Moderate	Emerging technology performed at laboratory-scale	Expected to be moderate to high depending on contaminant concentration, dissolution capacities of solvent and membrane durability	Moderate to difficult depending on system size and membrane durability	Additional treatment of residual waste maybe necessary following separation	No
Ultrasonic Degradation	Degradation of refractory organic and chlorinated organic compounds in aqueous or solvent based waste streams	80->99% (time dependent)	High	Innovative technology, laboratory-scale	Expected to be moderate	Technology currently available at laboratory-scale	Incomplete degradation may produce toxic intermediates	No
X-Ray Treatment	Degradation of refractory organic compounds in soil or aqueous solutions	Not Available	Not known	Emerging technology laboratory-scale	High - skilled equipment operation	Difficult	Incomplete degradation may produce toxic intermediates. Possible dangerous working conditions	No

ppb = parts per billion

[1] See Section A.2.2 for explanation of why none of the screened technologies were retained for further treatability testing.

does not stem from the discovery of new contaminants/media at RFP. Their consideration is due to information collected during preparation of the FY 93 Annual Report which revealed their potential applicability to treatment of previously identified contaminants and media. Their evaluation in this report supplements those technologies investigated during the TSP and the annual reports.

A.2.2 Final Screening

None of the new technologies considered in the FY 93 Annual Report (ultrasonic degradation of chlorinated hydrocarbon compounds, membrane-based oil extraction, x-ray treatment, and biosorption) were retained beyond the first screening criterion shown in Figure A-4. None of the technologies offered advantages over other previously considered available and proven technologies.

Each of the technologies targeted clean-up of aqueous media, i.e., groundwater and/or surface water contaminated with VOCs and or metals, and each technology was eliminated during the screening process due to their very early stage of development, a characteristic of each of the technologies, and their lack of demonstrating significant potential improvements over technologies considered for similar applications to date. The latter reason cited for eliminating these technologies is especially significant given the status of ER activities at the RFP. Specifically, treatability studies with these developmental technologies is not warranted considering that they offer no significant benefits over those technologies currently being tested or utilized on a large scale at the site (e.g., UV/Oxidation treatment of VOC-contaminated groundwater at OU 1 and precipitation/filtration for metals removal at OU 2).

A.3 REEVALUATION OF TECHNOLOGIES RECOMMENDED IN TSP

The TSP selected five water treatment and eight soil/sediment treatment technologies for bench- or laboratory-scale treatability testing. These technologies were reevaluated as part of the FY 93 Annual Report, which is described in the following subsections. The reevaluation was in accordance with the screening process depicted in Figures A-2 through A-5.

A.3.1 Water Treatment Technologies

Technologies selected for bench- or laboratory-scale treatability studies for RFP groundwater and surface water in the TSP were:

- Redox
- Ion Exchange
- Adsorption
- Potassium ferrate precipitation
- Ultrafiltration/Microfiltration.

Oxidation and ion exchange have been successfully implemented for groundwater treatment as part of the OU 1 IM/IRA (Section 5.1.1). Oxidation of organics is achieved by UV/peroxide treatment, while radionuclides are removed using four ion exchange reactors in series. These technologies are conventional and proven methods for organic destruction and radionuclide removal. Based on the results of the OU 1 IM/IRA, these technologies warrant additional consideration for treating contaminated water from other OUs at RFP. Treatability tests would only be needed should significant differences in water chemistry exist for a given water source as compared to the OU 1 groundwater. Oxidation by UV/peroxide treatment and radionuclide removal by ion exchange have essentially been carried through pilot-scale treatability testing with the OU 1 IM/IRA. No additional tests would therefore be needed to demonstrate its effectiveness.

Specific tests for redox treatability testing have not been performed to date, although work plans for such work have been completed. Redox testing is expected to be completed during FY 94, and will be reported in the FY 94 Annual Report if available. Redox treatment is also a conventional and proven technology for both organic destruction and radionuclide removal, and results are expected to be favorable. Redox chemistry was used successfully in the precipitation treatability work at the OU 2 Surface Water IM/IRA, and lends support to this technology as proven and reliable for RFP contaminants. Future treatability testing is recommended for the redox technology. The technology would only be dropped from further consideration if results of such testing indicate its ineffectiveness.

Adsorption treatability testing was performed for surface and groundwater samples from RFP sources believed to contain selected metals and radionuclides above TSB levels. The testing evaluated a variety of commercially available sorbents. Results were generally inconclusive since most of the target analytes were below TSB levels. Since adsorption has been demonstrated elsewhere as effective for metals and radionuclide removal, similar positive results would be expected at RFP. Additional treatability testing using field samples with higher levels of contaminants of concern, if necessary, are warranted to evaluate its effectiveness for RFP OU-specific water contamination issues. In addition to the aforementioned treatability testing, GAC adsorption was used as a polishing step for the OU 2 Surface Water IM/IRA. Results available to date suggest GAC adsorption is effective in organics removal. Future treatability testing is recommended for adsorption treatment. The technology would only be dropped from further consideration if results of such testing indicate its ineffectiveness.

Potassium ferrate precipitation has been demonstrated as a proven and reliable technology on a full-scale basis for metals and radionuclide (uranium) removal associated with environmental remediation projects conducted by Analytical Development Corporation of Colorado Springs, Colorado. To date no treatability testing using this process from RFP water samples has occurred. However, the completed work on aqueous media contaminated with similar constituents as those at RFP suggest favorable results would be achieved, thus resulting in a recommendation to conduct future treatability testing. Potassium ferrate precipitation would be dropped from further consideration if positive results are not indicated.

Membrane filtration (microfiltration) was also a unit operation in the OU 2 Surface Water IM/IRA treatment system, and was successful in removing precipitated metals and radionuclides. Some difficulties were encountered in the membrane cleaning process; however, these problems were resolved and overall results of this technology are favorable and should prove effective with similar applications with other RFP contaminated water sources. Membrane filtration has essentially been carried through pilot-scale treatability testing with the OU 2 IM/IRA. No additional tests would therefore be needed to demonstrate its effectiveness.

A.3.2 Soil/Sediment Treatment Technologies

Technologies selected for bench or laboratory scale treatability studies in the TSP for RFP soil and sediments were:

- Physical Separation
- TRUclean®
- Polymerization Stabilization - Epoxy
- Polymerization Stabilization - Polyester
- Portland Cement Stabilization
- Masonry Cement Stabilization
- Soil Washing
- Magnetic Separation.

As discussed in Section 5.2.3.1 of this FY 93 Annual Report, treatability tests have been performed on plutonium-contaminated soils from the RFP using AWC's TRUclean® process. TRUclean® is a physical separation process that isolates fractions of soil based on factors which include particle size and density. Preliminary results of the treatability study indicate that the identified clean-up goal of 0.9 pCi/g plutonium 239 and 240 can likely be achieved through size fractionation of the RFP soil; i.e., all soil material greater than 1/4 inch, when separated from the bulk soil sample, had a total plutonium activity of less than the clean-up goal. This size fraction amounts to approximately 45 percent of the soils in vicinity of the RFP 903 Pad. Further tests

using various unit operations of the TRUclean® process on the -1/4 inch material did not achieve the clean-up goal of 0.9 pCi/g. Overall, results of the TRUclean® tests suggest that physical separation techniques are viable options for achieving volume reductions in radioactively contaminated (specifically plutonium) soils at the RFP. Before further tests with physical separation are performed, clarification of clean-up goals for radionuclides in soils should be addressed. A firm definition of soil standards would allow physical separation processes such as TRUclean® to be evaluated more effectively in terms of its ability to meet treatment needs at RFP. However, future treatability testing of specific individual unit operations which comprise the TRUclean® process is recommended to evaluate their individual effectiveness. These specific unit operations would be dropped from further consideration only if such tests indicated ineffective treatment.

Full-scale stabilization operations at the RFP have met with success in terms of meeting waste acceptance criteria for the disposal of stabilized material (i.e., Solar Ponds Pondcrete evaluation). However, experience indicates that increases in waste volume associated with stabilization technologies identified in the TSP may be prohibitive in considering waste storage volume limitations at RFP. DOE may prefer to find either alternative stabilization techniques which do not increase waste volume significantly, or innovative technologies that provide contaminant isolation to reduce waste volume significantly prior to stabilization. This technology is recommended for future treatability testing only if the potential exists for minimizing waste volume increases that are acceptable given storage availability at RFP.

Soil washing was identified for treatability studies for isolation/recovery of metals/radionuclides (although soil washing is also a demonstrated technology for the isolation/recovery of various organic contaminants). Very preliminary tests have been performed with soil washing to determine its effectiveness at recovering plutonium from RFP soils (see Section 5.2.3.2 of this FY 93 Annual Report). These tests met with limited success, although the available test data do not allow a thorough evaluation of the effectiveness of soil washing. The limited success to date does, however, lend support to recommending future treatability tests with soil washing, which would only be dropped from further consideration if conclusive results indicate its ineffectiveness.

Plutonium-contaminated soils from RFP (similar to those used in the TRUclean® process tests described above) will undergo recommended treatability tests for plutonium isolation with HGMS beginning in FY 94. A workplan has been prepared for conducting the treatability tests. These tests will be performed at LANL on soils retrieved from RFP. Due to the test results described to date for the TRUclean® process, treatability work with HGMS would also be expected to yield favorable results.

A.4 EVALUATION OF THE TECHNOLOGY SELECTION PROCESS

The Rocky Mountain Universities Consortium provided EG&G with an independent review/report of the TSP. The consortium was formed to provide independent review and assessment of environmental restoration efforts. It is comprised of universities from several western states. Reviews are conducted independently by selected teams of faculty and research staff. The review of the TSP was directed towards Sections 3, 5, and 6 and Appendices B and C of the FY 93 Annual Report. The review team consisted of two environmental engineers and a chemical engineer.

The review team's major conclusions and recommendations focused on the technology screening process utilized in the TSP. Specific recommendations provided by the consortium and appropriate discussions of the recommendations follow.

- Site characterization data should be compiled for each OU to support the technology selection process.

  Discussion:

  Generally, the background on site contamination provided in Section 4 of the FTSP contains sufficient detail to permit a thorough screening of potentially applicable treatment technologies. This section identifies, by OU, the categories of contaminants (e.g., VOCs, metals, radionuclides, etc.) present and the types of contaminated media (e.g., groundwater, surface soil, etc.).

- Engineering predesign of treatment trains early in the investigation using site-specific data should be an integral part of the technology selection process.

  Discussion:

  Technology screening occurs for a given category of contaminant in a given medium (e.g., VOCs in groundwater). This allows the screening process to be focused. Other technologies (unit operations of a complete treatment train) would likely deal with treatment of other categories of contaminants such as radionuclides in the same medium. Although conditioning, or pretreatment, would still be an important element of an overall treatment system, it is generally not a critical element in terms of treatment viability. Since the technologies can be screened independently, there is no reason to evaluate the design of treatment trains early in the investigation, except to determine if a complete waste stream can be treated to remove, stabilize, etc. all the contaminants.

- The technology selection process for each OU should not be limited to individual technologies in isolation but should consider combinations of technologies.

  Discussion:

  The discussion provided for the second recommendation listed applies to this recommendation also. Generally, the combination of technologies is dependent on the contaminants of concern identified for an OU. For instance, an OU may have multiple categories of contaminants and media, but based on the results of the risk analysis performed for the site, some of these contaminants may not be of concern. If the contaminants are not contaminants of concern, and they have no regulatory limits, then they will not require treatment. This kind of flexibility, with regard to contaminants that may be targeted for cleanup through treatment, promotes the evaluation of individual treatment technologies as opposed to treatment technology trains.

- Final technology selections should be made using criteria based upon performance, waste volumes, environmental impacts, and public acceptance.

  Discussion:

  Each of these criteria is considered when selecting a treatment process option for a given contaminated media both in the scoping for treatability studies and in the FS screening process.

- Innovative technologies should be considered for remediation, especially in cases where there is a potential for superior performance, increased protection of workers and the environment, and greater community acceptance of the innovative option.

  Discussion:

  Only those innovative technologies lacking performance data at the time the FTSP was prepared were rejected from further consideration. These technologies will be reevaluated with the preparation of each treatability studies annual report. If sufficient data has been accumulated on a given innovative technology, then it will be considered a viable canditate for treatability studies that are specific for the RFP.

Some innovative technologies were retained for future consideration at the RFP. These technologies included: In Situ Bioremediation (for groundwater) and Radio-Frequency Heating (for soils and sediments). Both of these technologies are considered innovative; however, there is enough data currently existing on the technology that indicates its potential for success in applications at the RFP.

A.5 OTHER TECHNOLOGY SCREENING METHODS

The U. S. EPA and the U. S. Air Force completed the *Remediation Technologies Screening Matrix and Reference Guide* (1993) to summarize strengths and limitations of treatment technologies (both conventional and innovative) for soil, sediments, sludges, water, and air. The intent of the document was to provide relevent information on a wide-variety of technologies and their relative ranking of applicability to specific contaminants in specific media. The result of the summary was a detailed matrix providing a visual and quick reference to each technology discussed and its general applicability. The process used to assign relative scores of applicability to the technologies discussed was fundamentally similar to the screening process described in the TSP. Technologies identified in the report have been considered for potential use at RFP either in the TSP or annual reports. Since the EPA/Air Force document is to be updated periodically, review of summary information presented in the document should be made to evaluate whether newly identified technologies may be useful for RFP concerns.

APPENDIX B
FY 93 RFEDS DATA AND PRELIMINARY CHEMICAL-SPECIFIC TSBs FOR THE SITEWIDE TREATABILITY STUDIES PROGRAM

APPENDIX B

FY 93 RFEDS DATA AND PRELIMINARY CHEMICAL-SPECIFIC TSBs FOR THE SITEWIDE TREATABILITY STUDIES PROGRAM

This appendix provides summary tables of all current RFEDS data, as well as chemical-specific TSB tables for RFP. The sitewide benchmark tables and corresponding summary of analytical methods were created to assist RFP project managers and technical staff in planning and preparing for documented remediation activities. The tables provide a guide in considering benchmarks (standards and criteria), EPA approved sampling methods, sampling detection limits, and RFP's sampling protocols. Tables B-30 through B-32 identify preliminary potential chemical-specific benchmarks for groundwater and surface water. The tables were designed for sitewide application in accordance with the IAG. Specific application of the benchmark tables and summary of analytical methods is left to the judgement of the individual OU managers and technical support staff, as the identification of specific chemicals, standards, and sampling to be performed is OU-specific.

The benchmark tables are current as of January 25, 1994 and reflect the existing final regulations on that date. It is recommended that managers verify the status of individual chemicals, as there are proposed changes to some of the standards and criteria which may become effective in the near future. The benchmark tables do not include proposed standards or criteria.

The summary of analytical methods in Table B-33 was taken from the General Radiochemistry and Routine Analytical Services Protocol (GRRASP) Statement of Work (SOW) document entitled *PART A General Analytical Services Protocol (GASP) Organics, Inorganics, Water Quality Parameters, Biochemistry, Biota* (EG&G August 20, 1991; Version 2.1). The laboratory required detection limits in the summary of GRRASP analytical methods tables are: the Contract Required Quantitation Limit (CRQL) or CRDL for Contract Laboratory Program (CLP) analyses, and the PQL for non-CLP analyses. PQL may be defined as 10 times the EPA published Method Detection Limit (MDL) when not otherwise published. Therefore, it will be necessary for OU managers to take this into account when establishing which analytical method is to be used for each analyte.

It is recommended that OU managers establishing the most appropriate analytical methods should review the GRRASP SOW, which outlines the analytical laboratory's requirements for sample analysis, deliverables, and documentation when performing analytical work for RFP. In addition, it is suggested to contact EG&G's SMO for assistance. EG&G's SMO staff is responsible for maintaining information on historical method performance and the cost of laboratory quoted analytical methods.

Detailed discussion of EG&G's approach in using benchmarks and analyzing for specific chemicals is found in "A Managed Approach to Developing Analytical Programs, Site Characterization, and Regulatory Benchmarks" (Draft of November 4, 1993). This document focuses on the importance of performing different analytical methods depending on the phase of the site investigation and need for data.

The following list provides descriptions of data qualifiers found in Tables B-1 through B-29. The lack of a qualifier on a specific data point may or may not indicate the data has been validated to date.

- B - For organics, the compound was also detected in the method blank. For metals, concentration is between CRDL and IDL.
- C - For pesticides, the identity is confirmed by gas chromatograph/mass spectrometer.
- D - Result computed from the diluted sample.
- E - Concentration exceeds the instrument calibration range.
- F - For organics, the concentration is estimated. The compound is off scale in both columns.
- G - For inorganics, the native analyte is greater than four times the spike added.
- I - Interference.
- J - Estimated.
- K - Result between IDL and MDL.
- N - For organics, the compound is tentatively identified. For inorganics, the matrix spike recovery is out of acceptable range.
- S - A method of standard addition is used to compute concentration.
- W - Percent recovery for pre- and post-digestion spikes exceeded the acceptable range.

- X - Result is calculated manually.

- Z - For organics, identification is questionable. Matrix interference in columns may have occurred.

Table B-1

FY 93 Operable Unit 1 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,4-DICHLOROBENZENE	78.0000 J	84.0000 BJ	UG/KG	Aug 28,1991	Sep 11,1991	4
2,4-DIMETHYLPHENOL	89.0000 J	89.0000 J	UG/KG	Oct 7,1991	Oct 7,1991	2
2,4-DINITROTOLUENE	73.0000	73.0000	UG/KG	Dec 14,1991	Dec 14,1991	2
2-BUTANONE	5.0000 J	5.0000 J	UG/KG	Oct 10,1991	Oct 10,1991	2
2-METHYLNAPHTHALENE	1200.0000 DJ	1200.0000 DJ	UG/KG	Oct 7,1991	Oct 7,1991	4
4-CHLORO-3-METHYLPHENOL	72.0000	72.0000	UG/KG	Dec 14,1991	Dec 14,1991	2
4-METHYLPHENOL	140.0000 J	140.0000 J	UG/KG	Oct 7,1991	Oct 7,1991	2
ACENAPHTHENE	63.0000 J	3600.0000 D	UG/KG	Sep 10,1991	Oct 7,1991	4
ACETONE	1.0000 J	330.0000 BD	UG/KG	Oct 16,1991	Dec 14,1991	42
ALUMINUM	2940.0000 *	20500.0000	MG/KG	Sep 19,1991	Sep 18,1991	68
AMERICIUM-241	-0.0030	3.1950	PCI/G	Aug 28,1991	Oct 2,1991	78
ANTHRACENE	91.0000 J	4800.0000 D	UG/KG	Sep 10,1991	Oct 7,1991	4
ANTIMONY	2.9000 BN	23.4000 N	MG/KG	Sep 19,1991	Oct 16,1991	34
AROCLOR-1248	7.2000	7.2000	MG/KG	Sep 10,1991	Sep 10,1991	2
AROCLOR-1254	0.4800	5.2000	MG/KG	Oct 9,1991	Sep 10,1991	4
ARSENIC	0.8200 B	13.9000 N	MG/KG	Sep 6,1991	Oct 3,1991	69
BARIUM	27.3000 BN	690.0000	MG/KG	Oct 10,1991	Sep 3,1991	68
BENZO(a)ANTHRACENE	130.0000 J	7300.0000 D	UG/KG	Aug 30,1991	Oct 7,1991	6
BENZO(a)PYRENE	220.0000 J	6000.0000 D	UG/KG	Sep 10,1991	Oct 7,1991	4
BENZO(b)FLUORANTHENE	230.0000 J	5200.0000 D	UG/KG	Sep 10,1991	Oct 7,1991	4
BENZO(ghi)PERYLENE	3300.0000 D	3700.0000	UG/KG	Oct 7,1991	Oct 7,1991	2
BENZO(k)FLUORANTHENE	110.0000 J	6100.0000 D	UG/KG	Aug 30,1991	Oct 7,1991	4
BERYLLIUM	0.3800 B	2.3000	MG/KG	Oct 2,1991	Sep 5,1991	71
BIS(2-ETHYLHEXYL)PHTHALAT	53.0000 J	4500.0000	UG/KG	Sep 10,1991	Sep 10,1991	6
CADMIUM	0.4400 B	3.6000	MG/KG	Oct 14,1991	Sep 6,1991	16
CALCIUM	2110.0000	82100.0000 *	MG/KG	Apr 3,1992	Oct 7,1991	68
CARBON TETRACHLORIDE	18.0000	18.0000	UG/KG	Sep 24,1991	Sep 24,1991	2
CESIUM	1.8000 B	16.1000 B	MG/KG	Apr 3,1992	Oct 16,1991	10
CESIUM-134	0.0000	0.0000	PCI/G	Oct 14,1991	Oct 16,1991	16
CESIUM-137	-0.0553 J	0.1998	PCI/G	Sep 27,1991	Sep 18,1991	142
CHLOROFORM	3.0000 J	3.0000 J	UG/KG	Apr 3,1992	Apr 3,1992	2
CHROMIUM	3.1000 *	101.0000 *	MG/KG	Sep 11,1991	Sep 20,1991	70
CHRYSENE	180.0000 J	7100.0000 D	UG/KG	Aug 30,1991	Oct 7,1991	6
COBALT	2.1000 B	36.0000	MG/KG	Sep 19,1991	Sep 20,1991	69
COPPER	4.0000 B	34.4000	MG/KG	Mar 27,1992	Sep 20,1991	67
DI-n-BUTYL PHTHALATE	80.0000 J	410.0000 J	UG/KG	Sep 11,1991	Aug 30,1991	10
DIBENZO(a,h)ANTHRACENE	1600.0000 D	1700.0000	UG/KG	Oct 7,1991	Oct 7,1991	2
DIBENZOFURAN	1700.0000	1700.0000 D	UG/KG	Oct 7,1991	Oct 7,1991	4
DIETHYL PHTHALATE	520.0000 J	520.0000 J	UG/KG	Aug 29,1991	Aug 29,1991	2
FLUORANTHENE	160.0000 J	15000.0000 E	UG/KG	Oct 2,1991	Oct 7,1991	12
FLUORENE	3100.0000	3100.0000 D	UG/KG	Oct 7,1991	Oct 7,1991	4
GROSS ALPHA	8.9200	44.0000	PCI/G	Oct 4,1991	Apr 3,1992	26
GROSS ALPHA - DISSOLVED	4.0940	68.1000	PCI/G	Oct 10,1991	Aug 29,1991	69
GROSS ALPHA - SUSPENDED	8.7780	22.2900	PCI/G	Oct 9,1991	Oct 9,1991	4
GROSS BETA	17.8700	42.0000	PCI/G	Sep 19,1991	Apr 3,1992	26
GROSS BETA - DISSOLVED	11.1800	48.6000	PCI/G	Oct 14,1991	Aug 29,1991	77
GROSS BETA - SUSPENDED	17.9000	29.1500	PCI/G	Mar 27,1992	Oct 9,1991	4
INDENO(1,2,3-cd)PYRENE	3500.0000 D	3800.0000	UG/KG	Oct 7,1991	Oct 7,1991	2
IRON	3230.0000 *	26600.0000	MG/KG	Sep 19,1991	Dec 14,1991	68
LEAD	2.8000	42.2000	MG/KG	Apr 3,1992	Sep 10,1991	69
LITHIUM	1.4000 B	23.4000	MG/KG	Aug 29,1991	Oct 16,1991	60
MAGNESIUM	1240.0000	6110.0000 E	MG/KG	Oct 7,1991	Aug 30,1991	68
MANGANESE	20.1000	1500.0000 N*	MG/KG	Sep 6,1991	Sep 19,1991	68
MERCURY	0.0900 B	0.1900	MG/KG	Nov 19,1991	Oct 9,1991	26
METHYLENE CHLORIDE	1.0000 J	67.0000 BD	UG/KG	Oct 7,1991	Dec 14,1991	53
MOLYBDENUM	0.7400 B	14.9000 B	MG/KG	Oct 10,1991	Sep 20,1991	45
NAPHTHALENE	4300.0000	4500.0000 D	UG/KG	Oct 7,1991	Oct 7,1991	2
NICKEL	5.6000 B	70.1000	MG/KG	Sep 6,1991	Sep 10,1991	68
PETROLEUM HYDROCARBONS, T	34.9000	1700.0000	MG/KG	Sep 10,1991	Oct 2,1991	12

Table B-1

FY 93 Operable Unit 1 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
PHENANTHRENE	160.0000 J	16000.0000 D	UG/KG	Sep 18,1991	Oct 7,1991	8
PLUTONIUM-239/240	-0.0015 J	31.6100	PCI/G	Oct 7,1991	Oct 2,1991	90
POTASSIUM	246.0000 BE	3640.0000 E	MG/KG	Aug 30,1991	Oct 16,1991	68
PYRENE	81.0000 J	14000.0000 E	UG/KG	Sep 4,1991	Oct 7,1991	12
RADIUM-226	0.0000	1.3650	PCI/G	Sep 6,1991	Sep 18,1991	73
RADIUM-228	0.0000	2.7840	PCI/G	Sep 6,1991	Sep 18,1991	73
SELENIUM	0.2200 BN	0.9600 B	MG/KG	Aug 28,1991	Sep 17,1991	34
SILICON	212.0000	1120.0000	MG/KG	Apr 3,1992	Dec 14,1991	20
SILVER	0.4700 B	3.1000	MG/KG	Sep 27,1991	Dec 14,1991	16
SODIUM	57.1000 B	1720.0000	MG/KG	Mar 26,1992	Oct 10,1991	60
STRONTIUM	7.1000 B	204.0000	MG/KG	Mar 27,1992	Oct 7,1991	69
STRONTIUM-89,90	0.0150	1.7500	PCI/G	Oct 14,1991	Aug 28,1991	70
TETRACHLOROETHENE	1.0000 J	12.0000	UG/KG	Aug 29,1991	Aug 30,1991	6
THALLIUM	0.2100 B	0.5000 B	MG/KG	Sep 20,1991	Nov 19,1991	69
TIN	76.0000	392.0000	MG/KG	Apr 3,1992	Sep 24,1991	4
TOLUENE	4.0000 J	1200.0000 E	UG/KG	Sep 3,1991	Oct 3,1991	79
TOTAL ORGANIC CARBON	0.3000 X	1.1000 X	%TOC	Oct 16,1991	Oct 16,1991	4
TRICHLOROETHENE	1.0000 J	12.0000	UG/KG	Sep 19,1991	Aug 30,1991	6
URANIUM-233,-234	0.3450	2.5100	PCI/G	Oct 16,1991	Aug 29,1991	85
URANIUM-235	-0.0190	0.2000	PCI/G	Oct 16,1991	Aug 29,1991	94
URANIUM-238	0.0320	2.3800	PCI/G	Oct 16,1991	Sep 5,1991	85
VANADIUM	11.1000 B	47.4000	MG/KG	Sep 27,1991	Dec 14,1991	68
ZINC	11.6000 E	148.0000	MG/KG	Mar 27,1992	Sep 5,1991	68
pH	7.1000	8.6000	MG/KG	Oct 16,1991	Aug 29,1991	49

Table B-2

FY 93 Operable Unit 1 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	3.0000 J	30250.0000	UG/L	Jun 12,1989	..	14
1,1,2,2-TETRACHLOROETHANE	5.0000 I	5.0000 I	UG/L	Oct 20,1989	Oct 20,1989	2
1,1,2-TRICHLOROETHANE	2.0000 J	14740.0000	UG/L	Oct 26,1989	Apr 14,1988	6
1,1-DICHLOROETHANE	2.0000 J	500.0000	UG/L	Oct 26,1989	Oct 17,1988	6
1,1-DICHLOROETHENE	7.0000	48000.0000	UG/L	Aug 6,1992	May 21,1987	10
1,2-DICHLOROETHANE	2.0000 J	16000.0000	UG/L	Jul 26,1989	May 21,1987	14
1,2-DICHLOROETHENE	7.0000	12000.0000 D	UG/L	Feb 25,1988	May 14,1991	5
2,6-DINITROTOLUENE	2.0000 J	2.0000 J	UG/L	Nov 12,1991	Nov 12,1991	2
2-BUTANONE	6.0000 J	580.0000 B	UG/L	Aug 18,1989	Oct 19,1990	10
4-METHYL-2-PENTANONE	3.0000 J	3.0000 J	UG/L	Aug 18,1989	Aug 18,1989	2
ACETONE	1.0000 J	540.0000 BD	UG/L	Oct 21,1992	May 17,1991	18
ALKALINITY AS CACO3	0.0000	340.0000	MG/L	Mar 7,1991	Jun 10,1992	6
ALUMINUM	0.0053 B	205.0000	MG/L	Feb 22,1992	Nov 12,1991	49
AMERICIUM-241	-0.0400	2.1690	PCI/L	Jul 6,1987	Dec 16,1991	43
ANTIMONY	0.0060 J	0.2100	MG/L	Oct 20,1987	Nov 12,1991	41
ARSENIC	0.0008	0.0182	MG/L	Oct 14,1992	Jun 12,1989	39
BARIUM	0.0255 B	1.8800	MG/L	Feb 14,1992	Nov 12,1991	49
BENZENE	0.2000 J	5.0000 J	UG/L	Oct 21,1992	Oct 17,1988	6
BENZENE, 1,2,4-TRIMETHYL	0.1200	0.1200	UG/L	Feb 10,1992	Feb 10,1992	2
BERYLLIUM	0.0003 B	0.0127	MG/L	Jun 12,1989	Nov 12,1991	28
BICARBONATE	23.1000	761.0000	MG/L	Oct 17,1988	Apr 19,1989	17
BICARBONATE AS CACO3	47.0000	910.0000	MG/L	May 20,1992	Nov 12,1991	51
BIS(2-ETHYLHEXYL)PHTHALAT	2.0000 J	11.0000	UG/L	Nov 12,1991	May 3,1993	6
BROMODICHLOROMETHANE	0.3000 J	20.0000	UG/L	Aug 7,1992	Oct 28,1992	2
BROMOMETHANE	1.0000 J	1.0000 J	UG/L	Oct 26,1989	Oct 26,1989	2
CADMIUM	0.0003 J	0.0100	MG/L	Nov 23,1987	Mar 7,1991	32
CALCIUM	16.9000	382.0000 E	MG/L	Oct 26,1989	May 3,1993	50
CARBON DISULFIDE	0.3000 J	5.0000	UG/L	Aug 7,1992	Aug 17,1989	8
CARBON TETRACHLORIDE	0.2000	28000.0000	UG/L	Feb 26,1992	May 21,1987	16
CARBONATE	4.0000	4.0000	MG/L	Jun 23,1992	Mar 6,1993	4
CARBONATE AS CACO3	0.0000	32.0000	MG/L	Aug 24,1990	Feb 22,1992	19
CESIUM	0.0300 B	0.4000 B	MG/L	May 6,1992	Aug 9,1990	14
CESIUM-134	0.4300	1.3600	PCI/L	Apr 26,1993	May 3,1993	6
CESIUM-137	-0.9640 J	2.0000	PCI/L	Sep 11,1990	Jun 12,1987	31
CHLORIDE	2.9000	1200.0000	MG/L	Oct 18,1988	Jun 23,1992	43
CHLOROFORM	0.4000 J	170.0000 DJ	UG/L	Oct 28,1992	Aug 9,1990	21
CHROMIUM	0.0023 B	1.0900	MG/L	Feb 25,1992	Jun 24,1992	44
COBALT	0.0027 B	0.1400	MG/L	Aug 15,1991	Aug 29,1986	32
COPPER	0.0022 B	3.1300	MG/L	Dec 9,1992	Jun 8,1989	44
CYANIDE	0.0019 B	1.0000	MG/L	Nov 5,1992	May 21,1987	30
DI-n-BUTYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Feb 18,1992	Nov 11,1991	4
DICHLORODIFLUOROMETHANE	2.7000	2.7000	UG/L	Jun 4,1992	Jun 4,1992	2
DIETHYL PHTHALATE	6.0000 J	8.0000 J	UG/L	Dec 11,1991	May 3,1993	6
ETHYLBENZENE	2.0000 J	500.0000 J	UG/L	Oct 26,1989	Oct 17,1988	5
FLUORIDE	0.1000	2.3000	MG/L	May 19,1993	Jun 7,1993	71
GROSS ALPHA	1.1740 J	68.9100	PCI/L	Feb 26,1993	Apr 26,1993	32
GROSS ALPHA - DISSOLVED	0.3139 J	58.9000	PCI/L	Dec 11,1991	Jun 21,1990	35
GROSS ALPHA - SUSPENDED	0.7000	100.0000	PCI/L	Jul 27,1989	Mar 9,1987	17
GROSS BETA	-8.0000	121.0000	PCI/L	Feb 25,1988	Mar 9,1987	35
GROSS BETA - DISSOLVED	2.5810 J	34.6000	PCI/L	Dec 17,1991	Jun 21,1990	35
GROSS BETA - SUSPENDED	1.9000	21.9000	PCI/L	Jan 30,1990	Feb 1,1990	8
HEPTACHLOR EPOXIDE	0.0001 X	0.0001 X	MG/L	Nov 12,1991	Nov 12,1991	2
HEXACHLOROBUTADIENE	0.2000	0.2000	UG/L	Feb 22,1993	Feb 22,1993	2
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	Jun 12,1987	Jun 12,1987	2
HYDROCYANIC ACID	0.1100	0.1100	MG/L	Aug 6,1992	Aug 6,1992	2
IRON	0.0048	193.0000	MG/L	Oct 23,1992	Nov 12,1991	46
LEAD	0.0003 J	0.0864	MG/L	Nov 17,1987	Nov 12,1991	46
LITHIUM	0.0048 B	0.7120	MG/L	Aug 19,1993	May 31,1990	52
MAGNESIUM	0.0500	110.0000	MG/L	Jul 18,1988	May 3,1993	52
MANGANESE	0.0002	3.6600	MG/L	Aug 14,1989	Nov 12,1991	47

Table B-2

FY 93 Operable Unit 1 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
MERCURY	0.0001 B	0.0023	MG/L	Oct 16,1990	Aug 29,1986	18
METHYLENE CHLORIDE	0.1000	620.0000 B	UG/L	May 6,1993	Feb 1,1990	38
MOLYBDENUM	0.0027 B	0.1700 B	MG/L	Jun 7,1991	Jun 24,1992	38
N-NITROSODIPHENYLAMINE	12.0000 B	12.0000 B	UG/L	Aug 29,1986	Aug 29,1986	2
NICKEL	0.0022 B	4.9500	MG/L	Feb 10,1992	Nov 18,1991	39
NITRATE	12.0000	32.0000	MG/L	Aug 7,1990	Aug 8,1990	6
NITRATE/NITRITE	0.0900	54.0000	MG/L	Feb 24,1993	Feb 25,1993	34
NITRATE/NITRITE (HISTORI	0.0200	91.2000	MG/L	Nov 23,1987	Aug 29,1986	48
NITRITE	0.0800	0.1600	MG/L	Aug 8,1990	Oct 16,1990	4
OIL AND GREASE	32.0000	32.0000	MG/L	Jun 12,1987	Jun 12,1987	2
ORTHOPHOSPHATE	0.0100	1.4000	MG/L	Aug 19,1993	Aug 8,1990	30
ORTHOPHOSPHATE (HISTORICA	0.0100	0.9200	MG/L	Feb 22,1992	May 14,1991	43
PHOSPHORUS	0.0200	1.4900	MG/L	Oct 25,1990	Oct 16,1990	18
PLUTONIUM-238	-0.0003 J	0.0029 J	PCI/L	Dec 11,1990	Oct 16,1990	8
PLUTONIUM-239	0.0000	0.1920	PCI/L	Aug 18,1989	Oct 31,1989	10
PLUTONIUM-239/240	-0.0800	0.6000	PCI/L	Jun 8,1989	Jul 6,1987	38
POTASSIUM	0.3980 B	30.0000	MG/L	Mar 11,1993	Feb 25,1988	50
RADIUM-226	0.0000	3.5300	PCI/L	Aug 23,1989	Aug 8,1990	31
RADIUM-228	1.4000	7.1000	PCI/L	Mar 15,1993	Oct 27,1992	10
SELENIUM	0.0010 BW	28.2000 NS	MG/L	Aug 8,1991	Feb 5,1990	54
SILICA, DISSOLVED (HISTOR	4.6000	32.0000	MG/L	Feb 14,1992	Nov 14,1990	34
SILICON	3.7100 B	132.0000 *	MG/L	Aug 8,1990	Apr 30,1992	37
SILVER	0.0020 B	0.0325	MG/L	Dec 16,1991	Mar 7,1991	31
SODIUM	15.0000	245.0000	MG/L	Sep 10,1990	Oct 30,1992	49
STRONTIUM	0.0008	4.4400	MG/L	Aug 14,1989	Feb 23,1993	50
STRONTIUM-89,90	-0.3000	3.4000	PCI/L	Jun 12,1989	Jun 12,1987	31
STRONTIUM-90	-0.0500	0.9730	PCI/L	Oct 26,1989	Aug 9,1990	12
SULFATE	27.0000	1300.0000	MG/L	Jun 23,1992	Feb 26,1992	42
TETRACHLOROETHENE	0.0700	13200.0000	UG/L	Dec 11,1991	May 21,1987	41
THALLIUM	0.0010 B	0.0460 J	MG/L	Apr 30,1992	Aug 18,1989	22
TIN	0.0151 B	0.1210	MG/L	Sep 10,1990	Jun 8,1989	36
TOLUENE	0.5900 B	500.0000 J	UG/L	May 20,1992	Oct 17,1988	19
TOTAL DISSOLVED SOLIDS	224.0000	3200.0000	MG/L	Oct 14,1992	Jun 23,1992	51
TOTAL RADIOCESIUM	0.0000	0.7100	PCI/L	Oct 27,1989	Nov 5,1992	6
TOTAL SUSPENDED SOLIDS	1.0000	18000.0000	MG/L	Jun 10,1989	Feb 25,1993	43
TOTAL XYLENES	0.4000 J	18.0000	UG/L	Oct 21,1992	Aug 4,1993	11
TRICHLOROETHENE	0.1000	72000.0000	UG/L	Dec 11,1991	May 21,1987	36
TRICHLOROFLUOROMETHANE	0.5000	7.9000	UG/L	Dec 17,1991	Dec 18,1991	4
TRITIUM	-200.0000	925.8000	PCI/L	Oct 27,1989	Jun 5,1992	41
URANIUM-233,-234	0.1000	60.7500	PCI/L	Jun 8,1989	Oct 25,1990	40
URANIUM-235	-0.0139 J	4.3000	PCI/L	Oct 29,1992	Feb 22,1988	40
URANIUM-238	-0.0086 J	39.2700	PCI/L	Feb 26,1993	Oct 25,1990	42
VANADIUM	0.0022 B	0.4030	MG/L	Jun 11,1989	Nov 12,1991	34
VINYL ACETATE	39.0000 J	39.0000 J	UG/L	Aug 23,1989	Aug 23,1989	2
ZINC	0.0001	43.5000	MG/L	Aug 14,1989	Jun 8,1989	50
alpha-BHC	0.0001	0.0001	MG/L	Nov 12,1991	Nov 11,1991	4
beta-BHC	0.0001 X	0.0001 X	MG/L	Feb 17,1992	Feb 17,1992	2
cis-1,2-DICHLOROETHENE	0.2400	0.2400	UG/L	Dec 16,1991	Dec 16,1991	2
m+p XYLENE	0.2000	0.2000	UG/L	Dec 16,1991	Dec 16,1991	2
p-CHLOROTOLUENE	0.6000	0.6000	UG/L	Feb 10,1992	Feb 10,1992	2
p-CYMENE	0.4400	0.4400	UG/L	Dec 16,1991	Dec 16,1991	2
pH	7.1000	8.0000	PH	Oct 31,1989	Jun 11,1989	32
sec-BUTYLBENZENE	0.9200 B	0.9200 B	UG/L	May 20,1992	May 20,1992	2
tert-BUTYLBENZENE	4.0000	4.0000	UG/L	Feb 10,1992	Feb 10,1992	2
trans-1,2-DICHLOROETHENE	4.0000	80.0000	UG/L	Jul 6,1987	Apr 9,1987	6
trans-1,3-DICHLOROPROPENE	5.0000 J	5.0000 J	UG/L	Aug 22,1989	Aug 22,1989	2

Table B-3

FY 93 Operable Unit 1 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
% MOISTURE	21.0000	22.0000	%MOIST	Dec 3,1990	Sep 20,1990	3
2-METHYLNAPHTHALENE	110.0000 J	350.0000 J	UG/KG	Aug 14,1991	Mar 21,1991	3
4,4'-DDT	0.0180 J	0.0730 J	MG/KG	Aug 14,1991	Mar 21,1991	2
ACENAPHTHENE	510.0000	1800.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
ACENAPHTHYLENE	52.0000 J	64.0000 J	UG/KG	May 28,1991	Mar 21,1991	2
ACETONE	5.0000 BJ	14.0000 B	UG/KG	Sep 20,1990	Mar 21,1991	2
ALKALINITY AS CACO3	513.0600	8590.0000	MG/KG	Sep 20,1990	Dec 3,1990	2
ALUMINUM	5650.0000	18300.0000 *	MG/KG	Aug 14,1991	Sep 20,1990	4
AMERICIUM-241	0.0100	0.0803	PCI/G	Aug 14,1991	Dec 3,1990	5
ANTHRACENE	470.0000	1900.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
AROCLOR-1254	0.4400 X	0.7900 DJX	MG/KG	Dec 3,1990	Dec 3,1990	2
ARSENIC	3.3000	6.4000 SN	MG/KG	Aug 14,1991	Sep 20,1990	4
BARIUM	95.7000	225.0000	MG/KG	Aug 14,1991	Mar 21,1991	4
BENZO(a)ANTHRACENE	59.0000 J	4500.0000	UG/KG	Sep 20,1990	Mar 21,1991	3
BENZO(a)PYRENE	970.0000	3900.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
BENZO(b)FLUORANTHENE	1500.0000	4100.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
BENZO(ghi)PERYLENE	630.0000	1900.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
BENZO(k)FLUORANTHENE	690.0000	3700.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
BENZOIC ACID	98.0000 J	98.0000 J	UG/KG	May 28,1991	May 28,1991	2
BERYLLIUM	0.6200	1.3000	MG/KG	Aug 14,1991	Sep 20,1990	4
BIS(2-ETHYLHEXYL)PHTHALAT	220.0000 J	220.0000 J	UG/KG	Aug 14,1991	Aug 14,1991	4
CADMIUM	0.7100	2.2000	MG/KG	May 28,1991	Sep 20,1990	2
CALCIUM	4290.0000	13500.0000	MG/KG	Sep 29,1992	Aug 14,1991	4
CARBON DISULFIDE	1.0000 J	1.0000 J	UG/KG	Sep 20,1990	Sep 20,1990	2
CESIUM	3.7000 WN*	3.7000 WN*	MG/KG	Sep 20,1990	Sep 20,1990	2
CESIUM-134	0.1112	0.1112	PCI/G	Aug 14,1991	Aug 14,1991	2
CESIUM-137	0.1448	0.9130	PCI/G	Aug 14,1991	Dec 3,1990	3
CHROMIUM	9.1000	26.7000	MG/KG	Aug 14,1991	Sep 20,1990	4
CHRYSENE	78.0000 J	4600.0000	UG/KG	Sep 20,1990	Mar 21,1991	3
COBALT	6.1000 B	11.8000 B	MG/KG	Dec 3,1990	Sep 20,1990	4
COPPER	10.2000	39.6000	MG/KG	Aug 14,1991	Jul 14,1992	4
DI-n-BUTYL PHTHALATE	39.0000 J	46.0000 J	UG/KG	Mar 21,1991	May 28,1991	2
DIBENZO(a,h)ANTHRACENE	220.0000 J	930.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
DIBENZOFURAN	230.0000 J	740.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
FLUORANTHENE	110.0000 J	11000.0000	UG/KG	Sep 20,1990	Mar 21,1991	3
FLUORENE	400.0000	1400.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
GROSS ALPHA	15.6400	15.6400	PCI/G	Sep 29,1992	Sep 29,1992	2
GROSS ALPHA - DISSOLVED	2.1990 J	26.5200	PCI/G	Mar 21,1991	Aug 14,1991	3
GROSS ALPHA - SUSPENDED	6.5600	24.0000	PCI/G	May 28,1991	Jul 14,1992	4
GROSS BETA	25.3500	25.3500	PCI/G	Sep 29,1992	Sep 29,1992	2
GROSS BETA - DISSOLVED	9.4500	247.1000	PCI/G	Aug 14,1991	Mar 21,1991	3
GROSS BETA - SUSPENDED	6.4600	24.0000	PCI/G	May 28,1991	Jul 14,1992	4
INDENO(1,2,3-cd)PYRENE	440.0000	1800.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
IRON	8150.0000	24000.0000 *	MG/KG	Aug 14,1991	Sep 20,1990	6
LEAD	14.8000 N	32.0000	MG/KG	Sep 20,1990	May 28,1991	4
LITHIUM	3.8000	15.5000	MG/KG	Aug 14,1991	Sep 20,1990	4
MAGNESIUM	1600.0000	4330.0000	MG/KG	Aug 14,1991	Sep 20,1990	4
MANGANESE	168.0000	686.0000	MG/KG	Dec 3,1990	Mar 21,1991	4
MERCURY	0.0600	0.1000	MG/KG	Dec 3,1990	Jul 14,1992	4
METHYLENE CHLORIDE	3.0000 J	10.0000 B	UG/KG	Dec 3,1990	Sep 20,1990	3
MOLYBDENUM	3.2000	3.2000	MG/KG	Sep 20,1990	Sep 20,1990	2
NAPHTHALENE	300.0000 J	870.0000	UG/KG	Aug 14,1991	Mar 21,1991	2
NICKEL	6.6000	24.7000	MG/KG	Aug 14,1991	Sep 20,1990	4
NITRATE	6.0000	6.0000	MG/KG	Dec 3,1990	Dec 3,1990	2
NITRATE/NITRITE (HISTORI	1.3000	9.4000	MG/KG	Aug 14,1991	Mar 21,1991	2
PHENANTHRENE	120.0000 J	11000.0000	UG/KG	Sep 20,1990	Mar 21,1991	3
PLUTONIUM-239/240	0.0700	0.5100	PCI/G	Aug 14,1991	Sep 20,1990	4
POTASSIUM	814.0000	3350.0000	MG/KG	Aug 14,1991	Sep 20,1990	4
PYRENE	170.0000 J	13000.0000	UG/KG	Sep 20,1990	Mar 21,1991	3
RADIUM-226	0.8000	1.5300	PCI/G	Aug 14,1991	Sep 20,1990	2
RADIUM-228	0.9000	3.3000	PCI/G	May 28,1991	Sep 20,1990	2
SELENIUM	3.5000	3.5000	MG/KG	Sep 29,1992	Sep 29,1992	2
SILICON	181.0000	530.0000	MG/KG	Aug 14,1991	May 28,1991	2

Table B-3

FY 93 Operable Unit 1 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
SILVER	1.3000	2.1000	MG/KG	Sep 29,1992	Jul 14,1992	2
SODIUM	75.9000	170.0000	MG/KG	Aug 14,1991	May 28,1991	4
STRONTIUM	31.9000	54.0000	MG/KG	Aug 14,1991	May 28,1991	6
STRONTIUM-89,90	0.1376	0.3087 J	PCI/G	Aug 14,1991	Mar 21,1991	3
TIN	10.4000	10.4000	MG/KG	Dec 3,1990	Dec 3,1990	2
URANIUM-233,-234	0.4350	2.1400	PCI/G	May 28,1991	Sep 20,1990	4
URANIUM-235	0.0050	0.0853 J	PCI/G	Sep 20,1990	Mar 21,1991	5
URANIUM-238	0.2200	1.5400	PCI/G	May 28,1991	Sep 20,1990	4
VANADIUM	15.4000	41.2000	MG/KG	Aug 14,1991	Sep 20,1990	4
ZINC	62.2000 E	190.0000 I	MG/KG	Sep 20,1990	May 28,1991	4
beta-BHC	0.1900 XZF	0.2200 DXZ	MG/KG	Dec 3,1990	Dec 3,1990	2
gamma-BHC (LINDANE)	0.0500 XZF	0.0550 DXZ	MG/KG	Dec 3,1990	Dec 3,1990	2
pH	7.9000	8.6000	PH	Mar 21,1991	Aug 14,1991	2

Table B-4

FY 93 Operable Unit 1 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	5.0000	5.0000	UG/L	Sep 22,1989	Sep 22,1989	2
2-BUTANONE	13.0000 B	13.0000 B	UG/L	Mar 17,1990	Mar 17,1990	2
ACETONE	2.0000 JB	25.0000	UG/L	Jul 18,1989	Sep 22,1989	6
ALDRIN	0.0000 J	0.0000 J	MG/L	Apr 8,1991	Apr 8,1991	2
ALKALINITY AS CACO3	233.1000	233.1000	MG/L	Sep 18,1990	Sep 18,1990	2
ALUMINUM	0.0006	8.7500	MG/L	Jul 18,1989	Jan 16,1990	10
AMERICIUM-241	-0.0013	0.2860	PCI/L	Aug 21,1990	Jan 16,1990	11
ANTIMONY	0.0076 B	0.0298 B	MG/L	Nov 28,1990	Jul 19,1990	4
ARSENIC	0.0010 B	0.0100	MG/L	Aug 21,1990	Jun 28,1988	4
BARIUM	0.0001 B	0.2500	MG/L	Oct 19,1989	Jan 16,1990	13
BERYLLIUM	0.0007 J	0.0042 B	MG/L	Apr 4,1989	Jul 19,1990	4
BICARBONATE	86.9000	318.0000	MG/L	May 26,1987	May 28,1987	9
BICARBONATE AS CACO3	136.0000	265.0000	MG/L	Mar 28,1991	Sep 5,1991	10
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	2.0000 J	UG/L	Oct 19,1989	Apr 8,1991	2
CADMIUM	0.0017	0.0033 B	MG/L	Nov 17,1987	Oct 16,1990	12
CALCIUM	0.0388	108.0000	MG/L	Oct 19,1989	Jan 16,1990	12
CARBON TETRACHLORIDE	6.0000	6.0000	UG/L	Nov 17,1987	Nov 17,1987	2
CARBONATE AS CACO3	0.0000	0.0000	MG/L	Jul 19,1990	Nov 28,1990	8
CESIUM	0.0145 B	0.0800	MG/L	Jan 10,1991	May 22,1991	2
CESIUM RADIOACTIVE UNKN I	-0.1000	0.0300	PCI/L	Dec 8,1989	Feb 19,1990	4
CESIUM-137	-0.6900	0.9000 J	PCI/L	Jan 16,1990	Sep 5,1991	7
CHLORIDE	10.8000	140.0000	MG/L	May 26,1987	Dec 7,1990	6
CHROMIUM	0.0027	0.0150	MG/L	Sep 5,1991	Sep 18,1990	5
COBALT	0.0040 B	0.0065 B	MG/L	Jul 19,1990	Jul 19,1990	4
COPPER	0.0040 B	0.0139 B	MG/L	Aug 21,1990	Dec 18,1990	9
CYANIDE	0.0035 B	1.0000	MG/L	Nov 28,1990	May 26,1987	10
DISSOLVED ORGANIC CARBON	3.8000	6.8000	MG/L	Oct 17,1991	Mar 28,1991	3
FLUORIDE	0.7000	1.1000	MG/L	Dec 7,1990	Dec 18,1990	9
GROSS ALPHA	4.4000	4.4000	PCI/L	Oct 17,1991	Oct 17,1991	2
GROSS ALPHA - DISSOLVED	4.0850	15.6000	PCI/L	Aug 8,1991	May 22,1990	6
GROSS ALPHA - SUSPENDED	-9.0000	32.0000	PCI/L	May 26,1987	May 28,1987	8
GROSS BETA	-5.0000	61.0000	PCI/L	May 26,1987	May 28,1987	8
GROSS BETA - DISSOLVED	2.0300 J	12.7000	PCI/L	Jun 25,1991	May 22,1990	6
GROSS BETA - SUSPENDED	5.7570	7.5150	PCI/L	Aug 21,1990	Sep 18,1990	6
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	May 26,1987	May 26,1987	4
IRON	0.0001	8.9100	MG/L	Oct 19,1989	Jan 16,1990	10
LEAD	0.0010 B	0.0144	MG/L	Sep 19,1990	Jan 16,1990	8
LITHIUM	0.0100	0.0310 B	MG/L	May 26,1987	Jan 16,1990	15
MAGNESIUM	9.6200	25.6000	MG/L	Dec 18,1990	Oct 16,1990	11
MANGANESE	0.0013 B	0.8510	MG/L	Dec 7,1990	Nov 28,1990	10
MERCURY	0.0002 J	0.9000	MG/L	Oct 19,1989	Jun 28,1988	7
METHYLENE CHLORIDE	1.0000 JB	29.0000	UG/L	Mar 17,1990	Mar 28,1991	4
MOLYBDENUM	0.0028 B	0.0149	MG/L	Aug 21,1990	Apr 4,1989	4
NEPTUNIUM-237	-0.3500	-0.0500	PCI/L	Mar 28,1991	Apr 8,1991	2
NICKEL	0.0045 B	0.0122 B	MG/L	Jul 19,1990	Jan 16,1990	2
NITRATE	4.1800	9.0600	MG/L	Oct 16,1990	Sep 18,1990	4
NITRATE/NITRITE (HISTORI	0.2000	11.0000	MG/L	May 26,1987	Apr 8,1991	8
NITRITE	0.0400	0.5400	MG/L	Jan 10,1991	Jul 9,1991	3
OIL AND GREASE	0.0000	52.0000	MG/L	Sep 18,1990	May 28,1987	6
ORTHOPHOSPHATE	0.0100	0.0790	MG/L	Aug 21,1990	May 22,1991	6
ORTHOPHOSPHATE (HISTORICA	0.0200	0.0200	MG/L	Aug 21,1990	Aug 21,1990	2
PHOSPHORUS	0.0600	0.6640 B	MG/L	Oct 16,1990	Oct 16,1990	4
PLUTONIUM-238	0.0004 J	0.0004 J	PCI/L	Jul 19,1990	Jul 19,1990	2
PLUTONIUM-239	0.0070	0.0340	PCI/L	Oct 19,1989	Jan 16,1990	5
PLUTONIUM-239/240	-0.0100	2.5700	PCI/L	Apr 4,1989	Jun 28,1988	6
POTASSIUM	0.8590 J	4.5600 J	MG/L	Sep 22,1989	Jan 16,1990	10
RADIUM-226	0.1000	1.1000	PCI/L	Aug 16,1989	Jun 21,1989	4
SELENIUM	0.0010 BWN	0.0180	MG/L	Nov 28,1990	Nov 17,1987	10
SILICA, DISSOLVED (HISTOR	4.3000	29.0000	MG/L	Jan 10,1991	Dec 7,1990	6
SILICON	2.4800	7.9800	MG/L	Mar 28,1991	Sep 5,1991	6
SILVER	0.0023 B	0.0140	MG/L	Aug 21,1990	Jun 27,1988	8
SODIUM	16.9000	61.0000	MG/L	Dec 18,1990	Oct 16,1990	10
SODIUM FLUORIDE	0.7000	1.1000	MG/L	Dec 7,1990	Dec 18,1990	4

Table B-4

FY 93 Operable Unit 1 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
SODIUM SULFATE	42.0000	67.0000	MG/L	Dec 18,1990	May 22,1991	4
SOLIDS, NONVOLATILE SUSPE	5.0000	35.0000	MG/L	Apr 8,1991	Jul 9,1991	2
SPECIFIC CONDUCTIVITY	754.0000	818.0000	US	Jun 28,1988	Jun 27,1988	4
STRONTIUM	0.0006 B	0.7620	MG/L	Oct 19,1989	Feb 19,1990	11
STRONTIUM-89,90	-0.2000	1.7800	PCI/L	Apr 4,1989	May 26,1987	8
STRONTIUM-90	-0.1301	3.6110	PCI/L	Sep 18,1990	Aug 21,1990	6
SULFATE	27.0000	95.0000	MG/L	May 26,1987	May 28,1987	15
SULFIDE	3.0000	3.0000	MG/L	Nov 28,1990	Nov 28,1990	2
TETRACHLOROETHENE	1.0000 J	128.0000	UG/L	Nov 28,1990	May 26,1987	7
THALLIUM	0.0060 J	0.0060 J	MG/L	Apr 4,1989	Apr 4,1989	4
TIN	0.0114 B	0.0368 B	MG/L	Nov 28,1990	Aug 21,1990	4
TOLUENE	4.0000 J	12.0000	UG/L	Mar 28,1991	Nov 17,1987	4
TOTAL DISSOLVED SOLIDS	5.0000	758.0000	MG/L	Jun 21,1989	Apr 8,1991	8
TOTAL ORGANIC CARBON	3.5000	6.3000	MG/L	Oct 17,1991	Apr 8,1991	3
TOTAL RADIOCESIUM	-0.1000	0.5000	PCI/L	Nov 10,1989	May 22,1990	4
TOTAL SUSPENDED SOLIDS	3.0000	1732.0000	MG/L	Sep 18,1990	Jun 28,1988	11
TRICHLOROETHENE	1.0000 J	14.0000	UG/L	Aug 16,1989	May 26,1987	5
TRITIUM	-190.0000	1100.0000	PCI/L	Oct 19,1989	Jun 27,1988	6
URANIUM-233,-234	2.2000	7.5000	PCI/L	May 28,1987	May 26,1987	7
URANIUM-234	2.6000	5.1000	PCI/L	Dec 18,1990	Nov 28,1990	4
URANIUM-235	0.0000 J	1.5800	PCI/L	Aug 8,1991	Jan 16,1990	11
URANIUM-238	0.9000	5.4100	PCI/L	May 26,1987	Oct 19,1989	8
VANADIUM	0.0025	0.0245 B	MG/L	Sep 5,1991	Jan 16,1990	6
ZINC	0.0002	0.6000	MG/L	Jul 18,1989	Jun 28,1988	10
alpha-CHLORDANE	0.0026 I	0.0026 I	MG/L	Apr 8,1991	Apr 8,1991	2
beta-BHC	0.0000 J	0.0000 J	MG/L	Oct 17,1991	Oct 17,1991	2
pH	7.6000	8.2000	PH	Mar 17,1990	Jun 21,1989	7

Table B-5

FY 93 Operable Unit 2 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	3.0000 J	3000.0000 J	UG/KG	Oct 31,1989	Oct 31,1989	12
2-BUTANONE	9.0000 J	9000.0000 J	UG/KG	Oct 31,1989	Oct 31,1989	4
ACETONE	3.0000 J	27000.0000 B	UG/KG	Nov 13,1989	Oct 31,1989	15
ALUMINUM	1560.0000	19300.0000	MG/KG	Nov 27,1989	Sep 9,1991	24
AMERICIUM-241	-0.0010	0.8640	PCI/G	Oct 10,1989	Nov 13,1989	14
ANTIMONY	2.7000 BN	22.2000	MG/KG	Sep 12,1991	Sep 26,1989	8
ARSENIC	1.0000 B	7.0000	MG/KG	Nov 10,1989	Nov 27,1989	23
BARIUM	0.6700 J	390.0000	MG/KG	Sep 26,1989	Oct 9,1991	24
BERYLLIUM	0.1500	1.2000	MG/KG	Sep 26,1989	Sep 26,1989	12
CADMIUM	0.7300 J	1.1000	MG/KG	Nov 13,1989	Nov 1,1989	4
CALCIUM	440.0000	201000.0000	MG/KG	Nov 27,1989	Nov 10,1989	24
CESIUM	15.0000 B	15.0000 B	MG/KG	Sep 12,1991	Sep 12,1991	2
CESIUM-137	0.0000	1.0900	PCI/G	Nov 27,1989	Nov 1,1989	74
CHROMIUM	3.1000	57.7000	MG/KG	Nov 17,1989	Oct 10,1989	24
COBALT	1.7000 B	21.8000	MG/KG	Sep 12,1991	Sep 12,1991	14
COPPER	3.2000 J	30.8000 N*	MG/KG	Sep 26,1989	Oct 9,1991	22
GROSS ALPHA - DISSOLVED	3.2900	53.1000	PCI/G	Oct 9,1991	Sep 9,1991	10
GROSS ALPHA - SUSPENDED	3.9000	39.0000	PCI/G	Oct 10,1989	Nov 1,1989	8
GROSS BETA	13.8000	33.8000	PCI/G	Oct 10,1989	Sep 26,1989	9
GROSS BETA - DISSOLVED	5.1600	41.7000	PCI/G	Oct 9,1991	Sep 9,1991	10
IRON	1530.0000	24000.0000 E*	MG/KG	Nov 27,1989	Sep 12,1991	24
LEAD	1.9000	29.5000	MG/KG	Sep 26,1989	Sep 9,1991	22
LITHIUM	0.8100	12.7000 B	MG/KG	Nov 27,1989	Sep 9,1991	10
MAGNESIUM	196.0000	5260.0000	MG/KG	Nov 27,1989	Oct 9,1991	25
MANGANESE	4.9000	958.0000	MG/KG	Nov 27,1989	Oct 10,1989	24
MERCURY	0.0700	0.2400	MG/KG	Nov 27,1989	Nov 13,1989	12
METHYLENE CHLORIDE	2.0000 J	12000.0000 B	UG/KG	Sep 9,1991	Nov 17,1989	13
MOLYBDENUM	1.4000 B	8.4000 B	MG/KG	Sep 12,1991	Sep 12,1991	2
NICKEL	4.0000 B	35.3000	MG/KG	Sep 12,1991	Sep 12,1991	23
NITRATE/NITRITE (HISTORI	1.0000	2.6000	MG/KG	Oct 31,1989	Nov 13,1989	12
PETROLEUM HYDROCARBONS, T	36.4000	36.4000	MG/KG	Sep 9,1991	Sep 9,1991	2
PLUTONIUM-239	-0.0050	2.8640	PCI/G	Nov 27,1989	Nov 13,1989	10
PLUTONIUM-239/240	0.0022	2.8600	PCI/G	Oct 9,1991	Nov 13,1989	12
POTASSIUM	155.0000	2050.0000	MG/KG	Nov 27,1989	Sep 26,1989	16
RADIUM-226	0.0000	1.7000	PCI/G	Sep 12,1991	Nov 27,1989	30
RADIUM-228	0.0000	3.1000	PCI/G	Sep 12,1991	Nov 27,1989	23
SELENIUM	0.1800	0.3300 B	MG/KG	Sep 26,1989	Sep 9,1991	4
SILICON	286.0000	286.0000	MG/KG	Sep 9,1991	Sep 9,1991	2
SODIUM	16.7000	1390.0000	MG/KG	Nov 27,1989	Sep 26,1989	14
STRONTIUM	8.4000 B	383.0000	MG/KG	Sep 12,1991	Oct 9,1991	16
STRONTIUM-89,90	0.1300	1.1300	PCI/G	Sep 12,1991	Sep 26,1989	10
STRONTIUM-90	-0.3100	0.5900	PCI/G	Nov 13,1989	Nov 1,1989	10
SULFIDE	4.0000	4.0000	MG/KG	Nov 1,1989	Nov 1,1989	2
TETRACHLOROETHENE	2.0000 J	2.0000 J	UG/KG	Nov 26,1991	Nov 26,1991	2
THALLIUM	0.2200 B	0.4700 B	MG/KG	Sep 12,1991	Sep 12,1991	7
TIN	8.1000 J	22.4000 J	MG/KG	Nov 27,1989	Nov 13,1989	8
TOLUENE	1.0000 J	260.0000 E	UG/KG	Sep 26,1989	Sep 12,1991	12
URANIUM-233,-234	0.1400	1.7900	PCI/G	Nov 17,1989	Sep 9,1991	18
URANIUM-235	-0.1700	0.1800	PCI/G	Sep 26,1989	Nov 1,1989	24
URANIUM-238	0.0800	2.4600	PCI/G	Nov 27,1989	Sep 9,1991	17
VANADIUM	5.3000	49.3000	MG/KG	Nov 27,1989	Sep 9,1991	24
ZINC	2.8000	155.0000	MG/KG	Nov 27,1989	Nov 13,1989	24
pH	7.2000	9.1000	PH	Nov 10,1989	Sep 26,1989	20

Table B-6

FY 93 Operable Unit 2 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1,2-TETRACHLOROETHANE	0.1000 DF	100.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	44
1,1,1-TRICHLOROETHANE	0.1000 DF	2892.0000	UG/L	Mar 18,1992	Jul 2,1987	131
1,1,2,2-TETRACHLOROETHANE	0.1000 DF	180.0000	UG/L	Mar 18,1992	Mar 16,1992	46
1,1,2-TRICHLOROETHANE	0.1000	100.0000 DF	UG/L	Mar 17,1992	Mar 16,1992	45
1,1-DICHLOROETHANE	0.2000	660.0000	UG/L	Jul 9,1992	Aug 28,1992	67
1,1-DICHLOROETHENE	0.1000 J	1044.0000	UG/L	May 5,1993	Nov 5,1987	120
1,1-DICHLOROPROPENE	0.1000 DF	1000.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	41
1,2,3-TRICHLOROBENZENE	0.1000 J	100.0000 DF	UG/L	May 6,1993	Mar 16,1992	46
1,2,3-TRICHLOROPROPANE	0.1000 DF	100.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	40
1,2,4-TRICHLOROBENZENE	0.1000 DF	200.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	38
1,2-DIBROMOETHANE	1.0000 DF	500.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	40
1,2-DICHLOROBENZENE	0.1000	100.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	38
1,2-DICHLOROETHANE	0.1000	400.0000	UG/L	Feb 26,1992	May 21,1987	64
1,2-DICHLOROETHENE	0.5000 J	390.0000 E	UG/L	Sep 3,1992	Nov 21,1990	59
1,2-DICHLOROPROPANE	0.2000 DF	200.0000 E	UG/L	Mar 16,1992	Mar 16,1992	44
1,3-DICHLOROBENZENE	0.1700	100.0000 DF	UG/L	May 18,1992	Mar 16,1992	40
1,3-DICHLOROPROPANE	0.2000 DF	100.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	40
1,4-DICHLOROBENZENE	0.2000 DF	100.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	38
2-BUTANONE	4.0000 J	1500.0000 D	UG/L	Aug 27,1986	Nov 21,1990	22
2-HEXANONE	5.0000 J	975.0000	UG/L	Aug 31,1993	Mar 9,1988	8
4-METHYL-2-PENTANONE	1.0000 J	18.0000	UG/L	Sep 19,1990	Nov 4,1987	13
ACETONE	1.0000 J	15000.0000 BD	UG/L	Oct 19,1992	May 20,1993	69
ALKALINITY AS CACO3	0.0000	410.0000	MG/L	Mar 8,1991	Jun 10,1992	28
ALUMINUM	0.0128 B	1460.0000	MG/L	Feb 27,1992	Oct 21,1992	259
AMERICIUM-241	-0.4610 J	46.5400 X	PCI/L	Apr 16,1991	May 20,1992	203
ANTIMONY	0.0080 J	2.0600 E	MG/L	Oct 22,1987	Nov 23,1991	162
ARSENIC	0.0007	0.0226 S	MG/L	Sep 8,1992	Mar 21,1993	203
BARIUM	0.0001	11.3000	MG/L	Sep 26,1986	Oct 21,1992	272
BENZENE	0.1000 J	200.0000 DF	UG/L	May 14,1992	Mar 16,1992	72
BENZENE, 1,2,4-TRIMETHYL	0.1000	100.0000 DF	UG/L	Mar 17,1992	Mar 16,1992	46
BENZENE, 1,3,5-TRIMETHYL-	0.0900 J	100.0000 DF	UG/L	Mar 17,1992	Mar 16,1992	44
BENZOIC ACID	56.0000	56.0000	UG/L	Feb 12,1992	Feb 12,1992	2
BERYLLIUM	0.0000	0.1140	MG/L	Sep 26,1986	Oct 21,1992	148
BICARBONATE	16.1000	821.0000	MG/L	Oct 31,1988	May 8,1989	73
BICARBONATE AS CACO3	1.0000	1300.0000	MG/L	Feb 25,1992	Jun 8,1992	287
BIS(2-ETHYLHEXYL)PHTHALAT	2.0000 J	17.0000	UG/L	Sep 22,1986	Mar 16,1992	34
BROMOBENZENE	0.1000	200.0000 DF	UG/L	Aug 31,1992	Mar 16,1992	42
BROMOCHLOROMETHANE	0.6300	710.0000	UG/L	Dec 19,1991	Mar 16,1992	44
BROMODICHLOROMETHANE	0.1500 J	540.0000 J	UG/L	Mar 13,1992	Aug 17,1992	70
BROMOFORM	0.9000 J	500.0000 DF	UG/L	Dec 14,1992	Mar 16,1992	42
BROMOMETHANE	1.0000 J	1000.0000 DF	UG/L	Aug 31,1992	Mar 16,1992	44
CADMIUM	0.0003 J	0.1090	MG/L	Jul 24,1987	Feb 25,1992	165
CALCIUM	0.0500	700.0000	MG/L	Nov 18,1991	Oct 21,1992	283
CARBON DISULFIDE	0.5000 J	12.0000	UG/L	Sep 9,1992	Sep 19,1990	18
CARBON TETRACHLORIDE	0.1000	100000.0000 D	UG/L	Sep 2,1992	May 20,1993	194
CARBONATE	2.0000	505.0000	MG/L	May 21,1992	Oct 12,1987	68
CARBONATE AS CACO3	0.0000	78.0000	MG/L	Mar 19,1991	Aug 15,1991	115
CESIUM	0.0300 B	0.4000 B	MG/L	Jan 21,1993	Sep 6,1990	46
CESIUM RADIOACTIVE UNKN I	-0.2000	0.2200	PCI/L	Nov 30,1989	Feb 21,1990	18
CESIUM-134	0.0000	1.4890 J	PCI/L	Mar 21,1993	Jun 2,1993	18
CESIUM-137	-4.8600 J	1.7990	PCI/L	Mar 11,1992	Oct 21,1992	168
CHLORIDE	0.2000	3010.0000	MG/L	Nov 18,1992	Aug 28,1992	256
CHLOROBENZENE	0.2000 DF	100.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	52
CHLOROETHANE	0.3400 J	500.0000 DF	UG/L	May 18,1992	Mar 16,1992	40
CHLOROFORM	0.1000	64000.0000 E	UG/L	Oct 28,1992	Mar 19,1993	211
CHLOROMETHANE	0.2900 J	500.0000 DF	UG/L	May 13,1992	Mar 16,1992	42
CHROMIUM	0.0020 B	1.5400	MG/L	Feb 27,1992	Oct 21,1992	220
COBALT	0.0026	0.6510	MG/L	Sep 9,1992	Oct 21,1992	166
COPPER	0.0011 B	1.3100	MG/L	Feb 28,1992	Oct 21,1992	241
CUMENE	0.2000 DF	200.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	38

Table B-6

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
CYANIDE	0.0010 B	2.9500 B	MG/L	May 15,1992	Mar 21,1993	202
DI-n-BUTYL PHTHALATE	1.0000 J	21.0000	UG/L	Aug 26,1986	Sep 22,1986	16
DIBROMOCHLOROMETHANE	0.4000 DF	200.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	40
DIBROMOMETHANE	1.0000 DF	1700.0000	UG/L	Mar 16,1992	Mar 16,1992	40
DICHLORODIFLUOROMETHANE	0.5800	500.0000 DF	UG/L	Mar 17,1992	Mar 16,1992	40
DIETHYL PHTHALATE	2.0000 J	310.0000	UG/L	May 14,1993	Feb 12,1992	28
ETHYLBENZENE	0.2000	200.0000 DF	UG/L	Sep 9,1992	Mar 16,1992	52
FLUORIDE	0.1500	5.5000	MG/L	May 19,1993	Jun 10,1992	335
GROSS ALPHA	-0.0827 J	60.0000 C	PCI/L	Sep 18,1992	Mar 24,1993	211
GROSS ALPHA - DISSOLVED	-0.0289 J	83.4000	PCI/L	Apr 15,1991	Jun 14,1990	151
GROSS ALPHA - SUSPENDED	-6.0000	371.0000	PCI/L	Jul 28,1987	May 26,1987	71
GROSS BETA	-19.0000	1000.0000	PCI/L	Jul 2,1987	Aug 27,1986	215
GROSS BETA - DISSOLVED	0.5090 J	80.0000	PCI/L	Mar 8,1991	Jun 25,1990	151
GROSS BETA - SUSPENDED	1.7000	35.2000	PCI/L	Jan 23,1990	Dec 12,1989	32
HEPTACHLOR EPOXIDE	0.0001 X	0.0650 X	MG/L	Dec 5,1991	Dec 5,1991	4
HEXACHLOROBUTADIENE	0.1000 J	100.0000 DF	UG/L	Jul 27,1992	Mar 16,1992	52
HEXACHLOROETHANE	4.0000 J	4.0000 J	UG/L	Mar 12,1993	Mar 12,1993	2
HYDROCYANIC ACID	0.0370	0.0370	MG/L	Jul 31,1992	Jul 31,1992	2
IRON	0.0026 B	2020.0000	MG/L	Feb 18,1992	Nov 23,1991	262
LEAD	0.0008	0.6750	MG/L	Jun 11,1992	Oct 21,1992	220
LITHIUM	0.0020 B	0.8420	MG/L	Mar 18,1993	Oct 21,1992	253
MAGNESIUM	0.0119	302.0000	MG/L	Sep 26,1986	Oct 21,1992	278
MANGANESE	0.0006	24.0000	MG/L	Sep 26,1986	Oct 21,1992	264
MERCURY	0.0001 J	0.0130	MG/L	Oct 20,1987	Jul 23,1987	99
METHYLENE CHLORIDE	0.1000	35000.0000 B	UG/L	Feb 23,1993	Aug 28,1992	209
MOLYBDENUM	0.0022 B	0.1920	MG/L	Aug 9,1990	Aug 27,1986	165
N-NITROSODIPHENYLAMINE	8.0000 JB	21.0000 B	UG/L	Sep 8,1986	Aug 26,1986	16
NAPHTHALENE	0.1500 J	200.0000 DF	UG/L	May 8,1992	Mar 16,1992	81
NICKEL	0.0020 B	1.6200	MG/L	Feb 14,1992	Oct 21,1992	213
NITRATE	1.9200	10.4100	MG/L	Sep 18,1990	Sep 19,1990	16
NITRATE/NITRITE	0.1000	36.0000	MG/L	Mar 18,1993	May 13,1993	179
NITRATE/NITRITE (HISTORI	0.0200	444.0000	MG/L	Aug 25,1988	Sep 3,1992	249
NITRITE	0.0100	0.4100	MG/L	Nov 6,1990	Mar 8,1991	8
ORTHOPHOSPHATE	0.0100	1.8000	MG/L	May 5,1993	Aug 26,1986	116
ORTHOPHOSPHATE (HISTORICA	0.0100	0.8000	MG/L	Jun 24,1992	Sep 24,1992	186
PENTACHLOROPHENOL	4.0000 J	4.0000 J	UG/L	Sep 22,1986	Sep 22,1986	2
PHOSPHORUS	0.0854	0.7600	MG/L	Nov 5,1990	Sep 18,1990	44
PLUTONIUM-238	-0.0014 J	0.0064 J	PCI/L	Nov 3,1990	Nov 5,1990	32
PLUTONIUM-239	0.0030	0.0300	PCI/L	Feb 8,1990	Dec 13,1989	24
PLUTONIUM-239/240	-0.5000	1001.0000	PCI/L	Jul 24,1987	Feb 19,1990	209
POTASSIUM	0.0017	181.0000	MG/L	Sep 26,1986	Oct 21,1992	282
PROPANE, 1,2-DIBROMO-3-CH	2.7000	2000.0000 DF	UG/L	May 22,1992	Mar 16,1992	42
RADIUM-226	-0.0490	3.3950	PCI/L	Aug 14,1990	Apr 22,1991	157
RADIUM-228	1.2000	5.0000	PCI/L	Nov 17,1992	Nov 9,1992	54
SELENIUM	0.0010 B	0.2200 B	MG/L	Aug 16,1991	May 10,1989	204
SILICA, DISSOLVED (HISTOR	1.2000	59.0000	MG/L	Apr 22,1991	Nov 5,1990	152
SILICON	0.6730 B	196.0000	MG/L	Sep 9,1991	Nov 9,1992	206
SILVER	0.0020 B	0.1280	MG/L	Dec 16,1991	May 4,1988	124
SODIUM	0.0134	537.0000	MG/L	Sep 26,1986	May 21,1992	271
SODIUM FLUORIDE	0.7000	0.7000	MG/L	Nov 20,1990	Nov 20,1990	2
SODIUM SULFATE	47.0000	47.0000	MG/L	Nov 20,1990	Nov 20,1990	2
SOLIDS, NONVOLATILE SUSPE	25.0000	25.0000	MG/L	Jun 7,1990	Jun 7,1990	2
STRONTIUM	0.0003	8.9200	MG/L	Sep 26,1986	Jun 7,1990	274
STRONTIUM-89,90	-0.3000	9.2000	PCI/L	Mar 5,1990	Mar 17,1987	191
STRONTIUM-90	-0.0919	0.7700	PCI/L	Jun 8,1990	Dec 12,1989	36
STYRENE	0.1000 DF	100.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	64
SULFATE	1.8300	1200.0000	MG/L	Apr 18,1988	Apr 1,1992	249
TETRACHLOROETHENE	0.0500 J	528000.0000	UG/L	Mar 18,1992	May 22,1987	222
THALLIUM	0.0009	0.0189	MG/L	Aug 20,1992	May 21,1993	80
TIN	0.0101 B	0.6420	MG/L	Nov 27,1990	Jun 23,1992	130

Table B-6

FY 93 Operable Unit 2 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
TOLUENE	0.1000	250.0000 B	UG/L	Sep 3,1992	May 20,1992	140
TOTAL DISSOLVED SOLIDS	8.0000	30000.0000	MG/L	Nov 20,1990	Mar 24,1993	254
TOTAL ORGANIC CARBON	2.0000	2.1000	MG/L	Jun 8,1993	Jun 14,1993	6
TOTAL RADIOCESIUM	-0.2000	2.6000 B	PCI/L	Nov 20,1989	May 7,1993	86
TOTAL SUSPENDED SOLIDS	4.0000	45000.0000	MG/L	Nov 15,1990	Mar 4,1993	237
TOTAL XYLENES	0.1000 J	250.0000 BD	UG/L	Aug 7,1989	Mar 8,1991	24
TRICHLOROETHENE	0.0700 JB	221860.0000	UG/L	Mar 17,1992	May 4,1988	207
TRICHLOROFLUOROMETHANE	0.2000	500.0000 DF	UG/L	Aug 31,1992	Mar 16,1992	48
TRITIUM	-300.0000	3455.0000	PCI/L	Nov 2,1989	Oct 22,1992	235
URANIUM-233,-234	-0.0400	36.4200	PCI/L	Aug 25,1986	Jun 22,1992	226
URANIUM-235	-0.0739 J	1.8000 B	PCI/L	Apr 19,1991	Jun 23,1993	230
URANIUM-238	-0.0700	75.7300	PCI/L	Aug 18,1989	Mar 16,1992	224
VANADIUM	0.0011 B	3.1400	MG/L	Mar 12,1992	Oct 21,1992	227
VINYL CHLORIDE	0.1000 J	200.0000 DF	UG/L	Mar 12,1992	Mar 16,1992	44
ZINC	0.0013 B	5.2900	MG/L	Feb 25,1992	Oct 21,1992	286
cis-1,2-DICHLOROETHENE	0.1000 J	2300.0000 D	UG/L	Mar 1,1993	Nov 17,1992	89
cis-1,3-DICHLOROPROPENE	0.1000 DF	1700.0000	UG/L	Mar 18,1992	Mar 16,1992	42
m+p XYLENE	0.1600 J	16.0000 J	UG/L	May 21,1992	May 7,1992	10
m-XYLENE	0.2000	200.0000 DF	UG/L	May 14,1992	Mar 16,1992	42
n-BUTYLBENZENE	0.1000 J	250.0000 B	UG/L	Jul 28,1992	May 20,1992	46
n-PROPYLBENZENE	0.2000 DF	200.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	38
o-CHLOROTOLUENE	0.3300	200.0000 DF	UG/L	May 18,1992	Mar 16,1992	40
o-XYLENE	0.1600 J	200.0000 DF	UG/L	May 21,1992	Mar 16,1992	44
p-CHLOROTOLUENE	0.3000	200.0000 DF	UG/L	May 18,1992	Mar 16,1992	40
p-CYMENE	0.1200 J	200.0000 DF	UG/L	Mar 17,1992	Mar 16,1992	48
p-XYLENE	0.2000	0.2000	UG/L	Aug 28,1992	Aug 28,1992	2
pH	5.9000	9.9000	PH	Feb 26,1990	Dec 13,1989	102
sec-BUTYLBENZENE	0.2400	370.0000 B	UG/L	May 14,1992	May 20,1992	72
sec-DICHLOROPROPANE	0.5000 DF	500.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	40
tert-BUTYLBENZENE	0.4000 DF	200.0000 DF	UG/L	Mar 16,1992	Mar 16,1992	44
trans-1,2-DICHLOROETHENE	0.1000	140.0000 J	UG/L	Mar 12,1992	Sep 9,1991	83
trans-1,3-DICHLOROPROPENE	0.1000 DF	100.0000 DF	UG/L	Mar 18,1992	Mar 16,1992	42

Table B-7

FY 93 Operable Unit 2 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
% SOLIDS	61.7000	61.7000	UNKN	Nov 5,1991	Nov 5,1991	2
2-BUTANONE	19.0000	19.0000	UG/KG	Nov 5,1991	Nov 5,1991	2
ACETONE	71.0000	71.0000	UG/KG	Nov 5,1991	Nov 5,1991	2
ALUMINUM	16600.0000	16600.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
AMERICIUM-241	0.0200	0.0200	PCI/G	Nov 5,1991	Nov 5,1991	2
AROCLOR-1254	0.0700 J	0.0840 J	MG/KG	Nov 5,1991	Nov 5,1991	2
ARSENIC	4.4000	4.4000	MG/KG	Nov 5,1991	Nov 5,1991	2
BARIUM	143.0000	143.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
BERYLLIUM	0.8600	0.8600	MG/KG	Nov 5,1991	Nov 5,1991	2
BIS(2-ETHYLHEXYL)PHTHALAT	1400.0000	1400.0000	UG/KG	Nov 5,1991	Nov 5,1991	2
CALCIUM	11000.0000	11000.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
CESIUM-134	0.1105	0.1105	PCI/G	Nov 5,1991	Nov 5,1991	2
CESIUM-137	0.0789	0.0789	PCI/G	Nov 5,1991	Nov 5,1991	2
CHROMIUM	15.5000	15.5000	MG/KG	Nov 5,1991	Nov 5,1991	2
COBALT	10.1000	10.1000	MG/KG	Nov 5,1991	Nov 5,1991	2
COPPER	16.9000	16.9000	MG/KG	Nov 5,1991	Nov 5,1991	2
DI-n-BUTYL PHTHALATE	65.0000 J	65.0000 J	UG/KG	Nov 5,1991	Nov 5,1991	2
DI-n-OCTYL PHTHALATE	210.0000 J	210.0000 J	UG/KG	Nov 5,1991	Nov 5,1991	2
FLUORANTHENE	70.0000 J	70.0000 J	UG/KG	Nov 5,1991	Nov 5,1991	2
IRON	20400.0000	20400.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
LEAD	21.4000	21.4000	MG/KG	Nov 5,1991	Nov 5,1991	2
LITHIUM	13.8000	13.8000	MG/KG	Nov 5,1991	Nov 5,1991	2
MAGNESIUM	4520.0000	4520.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
MANGANESE	285.0000	285.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
METHYLENE CHLORIDE	14.0000	14.0000	UG/KG	Nov 5,1991	Nov 5,1991	2
MOLYBDENUM	5.2000	5.2000	MG/KG	Nov 5,1991	Nov 5,1991	2
NICKEL	17.6000	17.6000	MG/KG	Nov 5,1991	Nov 5,1991	2
NITRATE/NITRITE (HISTORI	1.8000	1.8000	MG/KG	Nov 5,1991	Nov 5,1991	4
PLUTONIUM-239/240	0.0300	0.0300	PCI/G	Nov 5,1991	Nov 5,1991	2
POTASSIUM	2330.0000	2330.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
PYRENE	87.0000 J	87.0000 J	UG/KG	Nov 5,1991	Nov 5,1991	2
SELENIUM	0.4100	0.4100	MG/KG	Nov 5,1991	Nov 5,1991	2
SILICON	242.0000	242.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
SODIUM	128.0000	128.0000	MG/KG	Nov 5,1991	Nov 5,1991	2
STRONTIUM	52.5000	52.5000	MG/KG	Nov 5,1991	Nov 5,1991	2
STRONTIUM-89,90	0.2000	0.2000	PCI/G	Nov 5,1991	Nov 5,1991	2
TIN	13.1000	13.1000	MG/KG	Nov 5,1991	Nov 5,1991	2
URANIUM-233,-234	0.3100	0.3100	PCI/G	Nov 5,1991	Nov 5,1991	2
URANIUM-235	0.0000	0.0000	PCI/G	Nov 5,1991	Nov 5,1991	2
URANIUM-238	0.3800	0.3800	PCI/G	Nov 5,1991	Nov 5,1991	2
VANADIUM	38.9000	38.9000	MG/KG	Nov 5,1991	Nov 5,1991	2
ZINC	77.1000	77.1000	MG/KG	Nov 5,1991	Nov 5,1991	2
pH	8.0000	8.0000	PH	Nov 5,1991	Nov 5,1991	4

Table B-8

FY 93 Operable Unit 2 Analytical Data
Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	1.0000 J	9.0000	UG/L	Jun 27,1988	Jun 22,1988	10
1,1-DICHLOROETHANE	1.0000 J	1.0000 J	UG/L	Jun 22,1988	Jun 22,1988	2
1,1-DICHLOROETHENE	1.0000 J	140.0000	UG/L	Jun 25,1990	Jul 21,1987	12
1,2-DICHLOROETHENE	3.0000 J	360.0000	UG/L	Jul 23,1990	Jun 25,1990	10
2-BUTANONE	6.0000 BJ	6.0000 BJ	UG/L	Jul 23,1990	Jul 23,1990	2
4-METHYL-2-PENTANONE	1.0000 J	1.0000 J	UG/L	Jun 20,1989	Jun 20,1989	2
ACETONE	1.0000 J	96.0000	UG/L	May 17,1990	Mar 26,1992	21
ALKALINITY AS CACO3	42.0000	305.7000	MG/L	Aug 7,1991	Jul 23,1990	6
ALUMINUM	0.0007	169.0000	MG/L	May 23,1989	Mar 23,1989	44
AMERICIUM-241	0.0000	33.0000	PCI/L	Mar 23,1989	Jun 28,1989	26
AMMONIA	2.5000	2.5000	MG/L	Sep 7,1990	Sep 7,1990	2
ANTIMONY	0.0130 B	0.1330	MG/L	Jul 23,1990	Sep 20,1989	20
AROCLOR-1254	0.0027	0.0200	MG/L	May 3,1991	May 3,1991	6
ARSENIC	0.0010	0.0448	MG/L	Mar 21,1991	Mar 23,1989	30
ATRAZINE	0.0007	0.0007	MG/L	Jun 18,1990	Jun 18,1990	2
BARIUM	0.0002	4.2300	MG/L	May 23,1989	Mar 23,1989	51
BENZENE	2.0000 J	42.0000 J	UG/L	Dec 6,1989	Jul 23,1990	4
BERYLLIUM	0.0004	0.0251	MG/L	Jul 15,1992	Apr 5,1989	21
BICARBONATE	42.0000	1900.0000	MG/L	Aug 7,1991	Feb 13,1990	26
BICARBONATE AS CACO3	43.6000	450.0000	MG/L	Jul 15,1992	Jul 23,1990	28
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	2.0000 J	UG/L	Mar 23,1989	May 26,1989	4
CADMIUM	0.0020	0.0241	MG/L	Jul 23,1991	Mar 23,1989	17
CALCIUM	8.8800	903.0000	MG/L	Aug 24,1992	Mar 23,1989	61
CARBON DISULFIDE	2.0000 J	11.0000	UG/L	Apr 5,1989	May 17,1990	12
CARBON TETRACHLORIDE	1.0000 J	1005.0000	UG/L	Jun 28,1989	Jul 21,1987	22
CARBONATE	0.0000	5.0000	MG/L	Mar 25,1992	Apr 5,1989	6
CARBONATE AS CACO3	0.0000	2.0000	MG/L	Jul 24,1990	Jun 3,1991	12
CESIUM	0.0500	1.1100	MG/L	May 17,1991	Mar 23,1989	16
CESIUM RADIOACTIVE UNKN I	0.0600	0.0600	PCI/L	Dec 6,1989	Dec 6,1989	2
CESIUM-137	-2.0000	4.1600	PCI/L	Sep 7,1989	Jun 18,1990	24
CHLORIDE	1.4000	1170.0000	MG/L	Jul 7,1988	May 16,1991	31
CHLORIDE (HISTORICAL CASN	3.0000	5.4900	MG/L	Aug 26,1992	Jul 15,1992	6
CHLOROBENZENE	2.0000 J	2.0000 J	UG/L	Dec 6,1989	Dec 6,1989	2
CHLOROFORM	2.0000 J	84.0000	UG/L	Jun 28,1989	Jul 21,1987	17
CHROMIUM	0.0048	0.1720	MG/L	Jul 23,1991	Mar 23,1989	30
COBALT	0.0021	0.2240	MG/L	Jul 23,1991	Mar 23,1989	19
COPPER	0.0023	0.2130	MG/L	Mar 26,1992	Mar 23,1989	29
CYANIDE	0.0028	1.0000	MG/L	Oct 12,1989	Jul 24,1987	26
DISSOLVED ORGANIC CARBON	5.0000	8.0000	MG/L	Mar 25,1992	Mar 25,1992	14
ETHYLBENZENE	1.0000 J	1.0000 J	UG/L	Dec 6,1989	Dec 6,1989	2
FLUORIDE	0.1900	1.1000	MG/L	Jul 23,1991	May 16,1991	24
GROSS ALPHA	-0.0881 J	23.0000	PCI/L	Oct 2,1992	Apr 18,1991	4
GROSS ALPHA - DISSOLVED	0.0000	120.8000	PCI/L	Mar 25,1992	Jul 23,1990	23
GROSS ALPHA - SUSPENDED	-0.9989	350.0000	PCI/L	Apr 15,1991	Jun 28,1989	24
GROSS BETA	-4.0000	100.0000	PCI/L	Mar 23,1989	Jul 13,1989	26
GROSS BETA - DISSOLVED	1.3100 J	37.1600	PCI/L	Jun 24,1991	Mar 26,1992	23
GROSS BETA - SUSPENDED	1.9890	55.3500	PCI/L	May 17,1991	Nov 8,1990	8
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	Jul 21,1987	Jul 24,1987	16
IRON	0.0129	142.0000	MG/L	Jul 30,1991	Mar 23,1989	43
LEAD	0.0013 B	0.6560	MG/L	Jul 23,1990	Mar 23,1989	36
LITHIUM	0.0030	0.1800	MG/L	Mar 25,1992	Aug 16,1989	30
MAGNESIUM	1.2300	65.3000	MG/L	Jul 23,1991	Feb 13,1990	60
MANGANESE	0.0003	10.7000	MG/L	Apr 5,1989	Mar 23,1989	58
MERCURY	0.0001	0.0009	MG/L	Oct 2,1992	Jun 15,1989	17
METHYLENE CHLORIDE	1.0000 BJ	18.0000 BJ	UG/L	Jul 24,1990	Jul 23,1990	25
MOLYBDENUM	0.0024 B	0.1140	MG/L	Jul 23,1990	Mar 23,1989	21
NEPTUNIUM-237	-0.5300	-0.0700	PCI/L	May 16,1991	Apr 18,1991	4
NICKEL	0.0033	0.2730	MG/L	Oct 2,1992	Mar 23,1989	25
NITRATE/NITRITE (HISTORI	0.0200	24.0000	MG/L	Nov 15,1990	Jun 27,1989	51
NITRITE	0.0200	0.5600	MG/L	Nov 7,1990	Aug 19,1991	8

Table B-8

FY 93 Operable Unit 2 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
OIL AND GREASE	0.3000	345.0000	MG/L	Jul 24,1990	Jul 11,1988	26
ORTHOPHOSPHATE	0.0300	0.7000	MG/L	Jun 3,1991	Nov 15,1990	14
ORTHOPHOSPHATE (HISTORICA	0.0200	0.1600	MG/L	Jul 23,1990	Nov 7,1990	10
PHOSPHORUS	0.0580	1.8000	MG/L	Jul 24,1991	Jul 23,1990	26
PLUTONIUM-236	0.0000	0.0020	PCI/L	Mar 25,1992	Mar 26,1992	12
PLUTONIUM-238	0.0090	0.0850	PCI/L	Mar 25,1992	Mar 25,1992	12
PLUTONIUM-239	0.0140	21.8900	PCI/L	Jan 18,1990	Jan 17,1990	10
PLUTONIUM-239/240	0.0000	60.0000	PCI/L	Aug 2,1989	May 25,1989	29
POTASSIUM	0.5470 J	53.3000	MG/L	Oct 3,1989	Sep 7,1990	36
RADIUM-226	0.0500	6.2000	PCI/L	Apr 25,1990	Mar 23,1989	26
RADIUM-228	4.1000	7.9000	PCI/L	Jun 28,1989	Mar 23,1989	8
SELENIUM	0.0010 B	0.0134	MG/L	Jul 24,1990	Jun 27,1989	19
SILICA, DISSOLVED (HISTOR	1.0000	20.0000	MG/L	Jun 3,1991	Nov 15,1990	12
SILICON	0.4980	63.3000	MG/L	Oct 2,1992	Nov 8,1990	25
SILVER	0.0020 B	0.0199	MG/L	Jul 23,1990	Jul 23,1990	26
SODIUM	0.0030	721.0000	MG/L	Aug 15,1989	May 16,1991	60
SODIUM FLUORIDE	0.4800	0.7900	MG/L	Jul 30,1991	Jul 24,1991	4
SODIUM SULFATE	64.5000	140.0000	MG/L	Jul 30,1991	Jul 24,1991	4
SOLIDS, NONVOLATILE SUSPE	11.0000	181.0000	MG/L	Jul 30,1991	May 16,1991	8
SPECIFIC CONDUCTIVITY	513.0000	1080.0000	US	Jul 7,1988	Jun 22,1988	18
STRONTIUM	0.0284	2.3500	MG/L	Aug 24,1992	Feb 13,1990	58
STRONTIUM-89	-0.0800	0.7400	PCI/L	Apr 18,1991	May 16,1991	4
STRONTIUM-89,90	-0.5000	4.2700	PCI/L	Mar 23,1989	Jun 18,1990	29
STRONTIUM-90	0.0054	1.7200	PCI/L	Mar 22,1990	Feb 13,1990	10
SULFATE	1.0000	228.0000	MG/L	Jul 21,1987	Jul 6,1988	28
SULFATE (HISTORICAL CASNO	6.0000	27.5000	MG/L	Aug 26,1992	Jul 15,1992	6
TETRACHLOROETHENE	1.0000 J	65.0000	UG/L	Jun 15,1989	Jul 21,1987	23
THALLIUM	0.0011 B	0.0100	MG/L	Oct 19,1989	Feb 23,1990	6
TIN	0.0097	0.3120	MG/L	Oct 2,1992	Nov 7,1989	24
TOLUENE	1.0000 J	18.0000 J	UG/L	Jun 22,1988	Jul 23,1990	10
TOTAL ALKALINITY	48.0000	68.0000	MG/L	Nov 7,1990	Nov 8,1990	2
TOTAL DISSOLVED SOLIDS	34.0000	2910.0000	MG/L	Feb 23,1990	May 16,1991	32
TOTAL ORGANIC CARBON	6.0000	13.0000	MG/L	Mar 26,1992	Mar 25,1992	14
TOTAL RADIOCESIUM	-0.2100	0.0400	PCI/L	Dec 15,1989	Nov 9,1989	4
TOTAL SUSPENDED SOLIDS	2.0000	26000.0000	MG/L	Jul 21,1987	Mar 23,1989	31
TOTAL XYLENES	40.0000 J	40.0000 J	UG/L	Jul 23,1990	Jul 23,1990	2
TRICHLOROETHENE	1.0000 J	2500.0000	UG/L	Jul 24,1990	Jun 22,1988	21
TRITIUM	-180.0000	1100.0000	PCI/L	Oct 19,1989	Jul 6,1988	29
URANIUM-233,-234	0.0000	19.9800	PCI/L	Jun 15,1989	Jan 17,1990	26
URANIUM-234	0.5900	1.5000	PCI/L	May 16,1991	Nov 15,1990	4
URANIUM-235	-0.0100	0.7000	PCI/L	Apr 26,1990	Jun 20,1989	29
URANIUM-238	0.1000	15.0000	PCI/L	Jun 15,1989	Jan 17,1990	27
VANADIUM	0.0024 B	0.6700	MG/L	Jun 28,1989	Sep 7,1990	25
VINYL CHLORIDE	2.0000 J	2.0000 J	UG/L	Jun 22,1988	Jun 22,1988	2
ZINC	0.0003	7.2100	MG/L	Apr 5,1989	Jan 16,1990	44
pH	7.0000	73.0000	MG/L	Sep 20,1989	May 21,1990	35
trans-1,2-DICHLOROETHENE	2.0000 J	120.0000	UG/L	Jun 23,1988	Jun 22,1988	14

Table B-9

FY 93 Operable Unit 4 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
2-BUTANONE	12.0000 J	12.0000 J	UG/KG	Nov 18,1987	Nov 18,1987	2
ACETONE	17.0000	140.0000 B	UG/KG	Apr 15,1993	Mar 16,1993	9
ALUMINUM	6.9500	37700.0000	MG/KG	Oct 21,1987	Mar 16,1993	28
AMERICIUM-241	-0.0600	1.2000	PCI/G	Nov 12,1987	Oct 30,1987	24
ANTIMONY	2.1517	8.2519	MG/KG	Oct 26,1987	Nov 18,1987	12
ARSENIC	0.0064	64.0000	MG/KG	Oct 21,1987	Nov 13,1987	28
BARIUM	0.1240	919.3092	MG/KG	Oct 21,1987	Nov 2,1987	28
BERYLLIUM	2.1000	3.3841	MG/KG	Mar 16,1993	Nov 2,1987	6
BIS(2-ETHYLHEXYL)PHTHALAT	45.0000 J	830.0000	UG/KG	Mar 19,1993	Oct 21,1987	4
CADMIUM	0.0017	83.6809	MG/KG	Oct 21,1987	Nov 5,1987	24
CALCIUM	2.1600	177000.0000	MG/KG	Oct 21,1987	Mar 18,1993	28
CESIUM-134	-0.0070 J	0.0103 J	PCI/G	Apr 21,1993	Apr 21,1993	4
CESIUM-137	-0.0138 J	0.0267 J	PCI/G	Apr 15,1993	Apr 21,1993	6
CHLOROFORM	5.0000 J	18.0000 J	UG/KG	Oct 26,1987	Oct 29,1987	6
CHROMIUM	0.0090	780.5003	MG/KG	Oct 21,1987	Nov 5,1987	28
COBALT	2.3000 B	33.8000	MG/KG	Mar 18,1993	Mar 31,1993	20
COPPER	0.0105	58.4803	MG/KG	Oct 21,1987	Nov 5,1987	28
CYANIDE	0.1900 B	43.0000	MG/KG	Apr 15,1993	Mar 19,1993	12
DI-n-BUTYL PHTHALATE	44.0000 J	52.0000 J	UG/KG	Oct 21,1987	Mar 18,1993	6
DI-n-OCTYL PHTHALATE	93.0000 BJ	93.0000 BJ	UG/KG	Mar 31,1993	Mar 31,1993	2
GROSS ALPHA	8.4120	49.0000	PCI/G	Apr 21,1993	Mar 16,1993	15
GROSS ALPHA - SUSPENDED	11.0000	57.0000	PCI/G	Oct 29,1987	Oct 30,1987	13
GROSS BETA	7.1000	52.0000	PCI/G	Oct 29,1987	Mar 16,1993	27
IRON	12.7000	24200.0000	MG/KG	Oct 21,1987	Mar 16,1993	28
LEAD	0.0064	37.0000	MG/KG	Oct 21,1987	Nov 3,1987	30
LITHIUM	2.6000 B	30.9000	MG/KG	Mar 30,1993	Mar 18,1993	14
MAGNESIUM	1.8500	5217.1704	MG/KG	Oct 21,1987	Nov 18,1987	28
MANGANESE	0.5580	802.1201	MG/KG	Oct 21,1987	Nov 5,1987	28
MERCURY	0.0001	0.2700	MG/KG	Oct 21,1987	Apr 21,1993	14
METHYLENE CHLORIDE	2.0000 J	69.0000	UG/KG	Mar 18,1993	Mar 16,1993	8
MOLYBDENUM	6.0000 B	13.9329	MG/KG	Mar 19,1993	Oct 26,1987	4
N-NITROSODIPHENYLAMINE	83.0000 J	83.0000 J	UG/KG	Oct 21,1987	Oct 21,1987	2
NICKEL	0.0092	514.0565	MG/KG	Oct 21,1987	Nov 13,1987	24
NITRATE/NITRITE	0.7100	6100.0000	MG/KG	Apr 21,1993	Mar 19,1993	14
NITRATE/NITRITE (HISTORI	2.0000	1480.0000	MG/KG	Nov 2,1987	Nov 5,1987	12
PHENOL	59.0000 J	59.0000 J	UG/KG	Mar 19,1993	Mar 19,1993	2
PLUTONIUM-239/240	-0.0600	2.2000	PCI/G	Nov 3,1987	Nov 12,1987	22
POTASSIUM	1.5300	6770.0000	MG/KG	Oct 21,1987	Mar 18,1993	31
RADIUM-226	0.3700 J	1.9000	PCI/G	Mar 19,1993	Mar 18,1993	10
RADIUM-228	0.9559 X	3.0000	PCI/G	Apr 15,1993	Mar 19,1993	10
SELENIUM	0.6300 B	1.3000	MG/KG	Mar 19,1993	Nov 5,1987	4
SILICON	360.0000	9450.0000	MG/KG	Mar 18,1993	Apr 15,1993	15
SODIUM	390.0000 B	5990.0000	MG/KG	Mar 16,1993	Mar 18,1993	12
STRONTIUM	3.6000 B	250.7720	MG/KG	Mar 19,1993	Nov 18,1987	26
STRONTIUM-89,90	-0.2000	0.7400 J	PCI/G	Nov 19,1987	Mar 16,1993	27
SULFIDE	18.4000	18.6000	MG/KG	Apr 21,1993	Mar 19,1993	4
TETRACHLOROETHENE	10.0000 J	23.0000 J	UG/KG	Oct 30,1987	Nov 3,1987	2
THALLIUM	5.2903	5.7409	MG/KG	Oct 30,1987	Nov 13,1987	4
TIN	24.5000 B	34.4000 B	MG/KG	Mar 30,1993	Mar 16,1993	4
TOLUENE	18.0000	1100.0000	UG/KG	Apr 15,1993	Dec 15,1992	14
TRICHLOROETHENE	9.0000 JB	9.0000 JB	UG/KG	Oct 21,1987	Oct 21,1987	2
TRITIUM	0.5800	3.3000	PCI/G	Nov 3,1987	Nov 5,1987	29
URANIUM-233,-234	0.2600	21.0000 B	PCI/G	Oct 29,1987	Mar 19,1993	27
URANIUM-235	0.0080 J	0.8700 B	PCI/G	Apr 20,1993	Mar 19,1993	14
URANIUM-238	0.1900	11.0000 B	PCI/G	Oct 29,1987	Mar 19,1993	27
VANADIUM	0.0183	72.2000	MG/KG	Oct 21,1987	Mar 16,1993	28
ZINC	0.0336	114.4193	MG/KG	Oct 21,1987	Nov 19,1987	28
pH	4.7600	9.0000	PH	Oct 26,1987	Nov 18,1987	12

Table B-10

FY 93 Operable Unit 4 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	2.0000 J	1400.0000	UG/L	May 31,1990	Mar 24,1987	4
1,1,2-TRICHLOROETHANE	0.7000 J	5.0000 J	UG/L	Oct 7,1992	Sep 9,1988	2
1,1-DICHLOROETHANE	0.3000 J	10.0000	UG/L	Oct 7,1992	Oct 12,1990	8
1,1-DICHLOROETHENE	1.0000 J	9.0000	UG/L	Oct 7,1992	Jun 6,1990	4
1,2-DICHLOROETHANE	3.0000 J	8000.0000	UG/L	Jan 20,1992	Jun 24,1987	5
1,2-DICHLOROETHENE	6.0000	200.0000	UG/L	Jul 14,1992	Nov 9,1990	7
2-BUTANONE	2.0000 J	110.0000 BD	UG/L	May 31,1990	Jan 9,1991	6
ACETONE	2.0000 J	970.0000 BDJ	UG/L	Oct 7,1992	Aug 17,1990	26
ALUMINUM	0.0002	356.0000	MG/L	Sep 19,1986	Nov 9,1989	33
AMERICIUM-241	-0.0600	5.2894	PCI/L	Nov 7,1986	Apr 23,1993	29
ANTIMONY	0.0001	76.0000	MG/L	Sep 9,1986	Nov 9,1989	25
ARSENIC	0.0010 B	0.0154	MG/L	Feb 4,1993	Mar 6,1989	26
BARIUM	0.0002 B	0.8670	MG/L	Mar 6,1989	Jul 21,1992	38
BENZENE	0.1000	75.0000 J	UG/L	Aug 3,1993	Oct 7,1992	6
BERYLLIUM	0.0012 B	0.0041	MG/L	Oct 30,1990	Feb 10,1993	10
BICARBONATE	5.0000	640.0000	MG/L	Jan 30,1990	Mar 5,1990	30
BICARBONATE AS CACO3	38.0000	650.0000	MG/L	Oct 7,1991	Apr 14,1992	48
BIS(2-ETHYLHEXYL)PHTHALAT	3.0000 J	4.0000 BJ	UG/L	Sep 9,1986	Jun 16,1993	4
BORON	0.1460	0.1460	MG/L	Aug 14,1990	Aug 14,1990	2
BROMOMETHANE	7.0000 J	7.0000 J	UG/L	Sep 28,1989	Sep 28,1989	2
CADMIUM	0.0003 J	0.0598	MG/L	Aug 28,1987	Oct 10,1991	23
CALCIUM	0.0570	713000.0000	MG/L	Sep 9,1986	Nov 9,1989	42
CARBON DISULFIDE	0.3000 J	6.0000	UG/L	Oct 7,1992	Oct 9,1992	8
CARBON TETRACHLORIDE	29.0000	21000.0000 D	UG/L	Apr 7,1993	Mar 26,1991	6
CARBONATE	4.0000	24.0000	MG/L	Jul 8,1992	Sep 19,1989	6
CARBONATE AS CACO3	0.0000	12.0000	MG/L	Oct 30,1990	Feb 27,1992	26
CESIUM	0.0209 B	0.4000 B	MG/L	Jan 9,1991	Oct 12,1990	14
CESIUM RADIOACTIVE UNKN I	-0.0300	0.1000	PCI/L	Feb 19,1990	Feb 13,1990	6
CESIUM-134	-1.2400 J	1.1200	PCI/L	Apr 7,1993	Apr 23,1993	6
CESIUM-137	-0.6170 J	3.5870	PCI/L	Oct 10,1991	May 29,1991	24
CHLORIDE	4.3400	800.0000	MG/L	Sep 14,1989	Mar 5,1990	34
CHLOROFORM	0.2000	730.0000	UG/L	Jun 15,1993	Aug 6,1991	22
CHLOROMETHANE	4.0000 J	4.0000 J	UG/L	Sep 28,1989	Sep 28,1989	2
CHROMIUM	0.0024 B	1.1000	MG/L	Mar 5,1992	Apr 13,1992	28
COBALT	0.0033 B	0.0697	MG/L	Feb 4,1993	Apr 13,1992	22
COPPER	0.0023	30.5000	MG/L	Sep 11,1992	Nov 9,1989	41
CYANIDE	0.0010 B	1.0000	MG/L	Apr 15,1992	Sep 8,1987	24
DIBROMOCHLOROMETHANE	5.0000 J	5.0000 J	UG/L	Sep 9,1988	Sep 9,1988	2
ETHYLBENZENE	3.0000 J	28.0000 J	UG/L	May 8,1990	Oct 7,1992	4
FLUORIDE	0.4000	4.6000	MG/L	Apr 10,1992	Dec 12,1990	43
GROSS ALPHA	0.0000	440.0000	PCI/L	Apr 23,1993	Jun 16,1993	21
GROSS ALPHA - DISSOLVED	-0.0851 J	337.6000	PCI/L	Mar 26,1991	Nov 13,1990	32
GROSS ALPHA - SUSPENDED	-8.0000	2000.0000	PCI/L	Dec 6,1988	Jun 24,1987	25
GROSS BETA	-5.0000	940.0000	PCI/L	May 8,1988	Sep 7,1988	28
GROSS BETA - DISSOLVED	1.8130 J	270.7000	PCI/L	Jun 10,1991	Nov 13,1990	34
GROSS BETA - SUSPENDED	-2.6900	62.6000	PCI/L	May 14,1990	Sep 28,1989	8
IRON	0.0005	113.0000	MG/L	Sep 19,1986	Nov 9,1989	33
LEAD	0.0010 J	0.0433	MG/L	Mar 16,1988	Oct 3,1991	26
LITHIUM	0.0150 B	862.0000	MG/L	Mar 5,1990	Nov 9,1989	37
MAGNESIUM	0.0092	210000.0000	MG/L	Sep 9,1986	Nov 9,1989	39
MANGANESE	0.0000	52.5000	MG/L	Sep 9,1986	Nov 9,1989	37
MERCURY	0.0000	0.0007	MG/L	Sep 19,1986	Sep 9,1986	23
METHYLENE CHLORIDE	0.3000	110.0000 DJ	UG/L	Aug 2,1993	Aug 17,1990	27
MOLYBDENUM	0.0021 B	0.1200 B	MG/L	Aug 17,1990	Jan 27,1992	26
NICKEL	0.0026 B	0.6650	MG/L	Mar 5,1992	Jan 27,1992	37
NITRATE	0.2000	1450.0000	MG/L	Aug 31,1990	Oct 17,1990	10
NITRATE/NITRITE	0.2300	1700.0000	MG/L	Jul 22,1993	Feb 10,1993	22
NITRATE/NITRITE (HISTORI	0.0200	9640.0000	MG/L	Mar 6,1989	Sep 19,1986	28
NITRITE	0.0200	1.9800	MG/L	Aug 15,1990	Oct 17,1990	8
ORTHOPHOSPHATE	0.0100	0.2700	MG/L	Mar 26,1991	May 14,1990	20

Table B-10

FY 93 Operable Unit 4 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
ORTHOPHOSPHATE (HISTORICA	0.0100	0.2000	MG/L	Oct 11,1991	Aug 31,1990	23
PHOSPHORUS	0.0200	1.2100	MG/L	Oct 24,1990	Jul 26,1990	28
PLUTONIUM-238	-0.0005 J	0.0074 J	PCI/L	Aug 15,1990	Jul 27,1990	8
PLUTONIUM-239	0.0100	0.0100	PCI/L	Feb 7,1990	Feb 7,1990	2
PLUTONIUM-239/240	-0.3200	4.8200	PCI/L	Aug 28,1987	Apr 7,1993	27
POTASSIUM	0.0040	34300.0000	MG/L	Sep 9,1986	Nov 9,1989	51
RADIUM-226	0.2080 J	6.0300	PCI/L	Oct 17,1990	May 8,1990	28
RADIUM-228	5.3440	10.1800	PCI/L	Oct 17,1990	Jul 31,1990	2
SELENIUM	0.0000	0.4550	MG/L	Sep 19,1986	Sep 15,1989	38
SILICA, DISSOLVED (HISTOR	2.7000	37.8000	MG/L	Oct 7,1991	Oct 17,1990	26
SILICON	2.8200 B	80.1000	MG/L	Aug 31,1990	Apr 13,1992	26
SILVER	0.0028 B	0.0432	MG/L	Oct 24,1990	Jul 31,1990	30
SODIUM	0.0997	370000.0000	MG/L	Sep 9,1986	Nov 9,1989	41
SODIUM FLUORIDE	0.8000	2.8000	MG/L	Aug 31,1990	Aug 14,1990	4
SODIUM SULFATE	28.0000	77.0000	MG/L	Aug 14,1990	Aug 31,1990	4
STRONTIUM	0.0003	6400.0000	MG/L	Sep 9,1986	Nov 9,1989	40
STRONTIUM-89,90	-0.2000	10.0000	PCI/L	Nov 15,1989	Jun 15,1993	29
STRONTIUM-90	0.1000	2.0000	PCI/L	Feb 7,1990	Aug 14,1990	8
STYRENE	0.3000 J	0.3000 J	UG/L	Oct 7,1992	Oct 7,1992	2
SULFATE	15.0000	1100.0000	MG/L	Mar 6,1989	Apr 22,1993	30
TETRACHLOROETHENE	0.2000	16.0000	UG/L	Jun 15,1993	Jun 24,1987	24
THALLIUM	0.0005	0.0021	MG/L	Sep 19,1986	Aug 14,1990	6
TIN	0.0109 B	206.0000	MG/L	Jun 6,1991	Nov 9,1989	24
TOLUENE	0.8000 J	380.0000	UG/L	Oct 6,1992	Oct 7,1992	12
TOTAL DISSOLVED SOLIDS	120.0000	20000.0000	MG/L	May 31,1991	Sep 19,1986	37
TOTAL RADIOCESIUM	-0.0800	5.7000 B	PCI/L	Nov 15,1989	Jun 16,1993	12
TOTAL SUSPENDED SOLIDS	4.0000	3200.0000	MG/L	Oct 24,1990	Jul 30,1993	30
TOTAL XYLENES	0.6000 J	330.0000	UG/L	Oct 6,1992	Oct 7,1992	6
TRICHLOROETHENE	0.3000	8600.0000 D	UG/L	Jun 15,1993	Mar 26,1991	24
TRITIUM	-180.0000 J	12000.0000	PCI/L	Apr 10,1992	Jun 24,1987	35
URANIUM-233,-234	0.1970	1000.0000	PCI/L	Feb 19,1990	Jun 24,1987	32
URANIUM-235	-0.1000	47.0000	PCI/L	Sep 23,1987	Jun 24,1987	34
URANIUM-238	-0.0298 J	750.0000	PCI/L	Apr 14,1992	Jun 24,1987	30
VANADIUM	0.0013 B	0.1180	MG/L	Mar 5,1992	May 8,1990	24
VINYL CHLORIDE	1.0000 J	3.0000 J	UG/L	May 31,1990	Aug 17,1990	5
ZINC	0.0034 B	82.1000	MG/L	Apr 13,1992	Nov 9,1989	48
cis-1,2-DICHLOROETHENE	0.1000 J	0.4000	UG/L	Jun 15,1993	Aug 3,1993	4
pH	6.9000	11.1000	PH	Sep 28,1989	Sep 19,1989	37
trans-1,2-DICHLOROETHENE	4.0000	36.0000	UG/L	Apr 15,1987	Sep 9,1986	23

Table B-11

FY 93 Operable Unit 4 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,2-DICHLOROETHANE	1.0000 J	1.0000 J	UG/L	Jul 8,1988	Jul 8,1988	2
1,2-DICHLOROETHENE	2.0000 J	5.0000 J	UG/L	Jun 6,1989	Jan 26,1990	2
2-BUTANONE	2.0000 J	2.0000 J	UG/L	Jun 7,1989	Jun 7,1989	2
2-HEXANONE	1.0000 JB	1.0000 JB	UG/L	Jul 11,1989	Jul 11,1989	2
ACETONE	3.0000 JB	970.0000 B	UG/L	May 8,1990	Aug 8,1989	6
ALKALINITY AS CACO3	341.0000	341.0000	MG/L	Jun 26,1990	Jun 26,1990	2
ALUMINUM	0.0005	64.1000	MG/L	May 9,1989	Aug 8,1989	14
AMERICIUM-241	-0.0100	90.0000	PCI/L	Apr 12,1989	Jun 6,1989	14
ANTIMONY	0.0226 B	0.1600	MG/L	Jun 18,1991	Sep 11,1990	8
ARSENIC	0.0010 J	0.0272	MG/L	Sep 12,1989	May 11,1989	15
BARIUM	0.0002	1.8900	MG/L	May 9,1989	May 11,1989	14
BERYLLIUM	0.0005 J	0.0574	MG/L	May 9,1989	May 11,1989	8
BICARBONATE	130.0000	1000.0000	MG/L	Oct 17,1989	Aug 8,1989	9
BICARBONATE AS CACO3	110.0000	590.0000	MG/L	May 30,1991	Dec 18,1990	3
BIS(2-ETHYLHEXYL)PHTHALAT	2.0000 J	17.0000	UG/L	May 9,1989	Apr 12,1989	4
BUTYL BENZYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Apr 12,1989	Apr 12,1989	2
CADMIUM	0.0026 BN	0.1710	MG/L	Mar 19,1990	Sep 11,1990	10
CALCIUM	11.1000	1760.0000	MG/L	Apr 22,1991	May 9,1989	16
CARBON DISULFIDE	2.0000 J	13.0000 J	UG/L	Nov 14,1989	Sep 12,1989	4
CARBONATE	5.0000	5.0000	MG/L	Apr 12,1989	Apr 13,1989	6
CARBONATE AS CACO3	0.0000	12.0000	MG/L	Sep 11,1990	Aug 20,1991	3
CESIUM	0.0001	1.5000	MG/L	Aug 8,1989	May 9,1989	8
CESIUM RADIOACTIVE UNKN I	-0.1100	0.1800	PCI/L	Mar 21,1990	Mar 19,1990	8
CESIUM-137	-2.7000	5.6000	PCI/L	Apr 18,1990	May 8,1990	15
CHLORIDE	10.0000	960.0000	MG/L	Jul 11,1988	Nov 14,1989	9
CHLOROBENZENE	2.0000 J	2.0000 J	UG/L	Mar 26,1991	Mar 26,1991	2
CHLOROFORM	1.0000 J	4.0000 J	UG/L	Nov 15,1989	Feb 26,1990	5
CHROMIUM	0.0026	0.2400	MG/L	May 9,1989	May 11,1989	8
COBALT	0.0039 B	0.2190	MG/L	Jun 18,1991	Sep 11,1990	8
COPPER	0.0002	0.2050	MG/L	Aug 8,1989	Sep 10,1991	12
CYANIDE	0.0075 N	0.2110	MG/L	Oct 8,1990	Apr 22,1991	14
CYANIDE, FREE	0.0550	0.0550	MG/L	Sep 10,1991	Sep 10,1991	2
DI-n-BUTYL PHTHALATE	1.0000 J	1.0000 J	UG/L	Apr 12,1989	Apr 12,1989	2
DISSOLVED ORGANIC CARBON	14.0000	18.0000	MG/L	Mar 26,1991	Sep 10,1991	2
FLUORIDE	0.4000	1.1000	MG/L	Dec 18,1990	Apr 22,1991	2
GROSS ALPHA	270.0000	270.0000	PCI/L	Apr 22,1991	Apr 22,1991	2
GROSS ALPHA - DISSOLVED	58.2200	1200.0000	PCI/L	May 30,1991	Oct 8,1990	5
GROSS ALPHA - SUSPENDED	8.6000	2169.0000	PCI/L	Oct 17,1989	Jan 25,1990	12
GROSS BETA	13.7000	3800.0000	PCI/L	Oct 17,1989	May 9,1989	12
GROSS BETA - DISSOLVED	7.3760 X	1600.0000	PCI/L	Jul 12,1990	Oct 8,1990	4
GROSS BETA - SUSPENDED	19.6900	2747.5000	PCI/L	May 8,1990	Oct 16,1989	6
IRON	0.0006	756.0000	MG/L	Aug 8,1989	Feb 26,1990	14
LEAD	0.0010 B	0.0408	MG/L	May 30,1991	Feb 22,1990	15
LITHIUM	0.0001	9.4500	MG/L	Aug 8,1989	Nov 14,1989	10
MAGNESIUM	2.4300 B	283.0000	MG/L	Apr 22,1991	May 9,1989	16
MANGANESE	0.0005	4.7300	MG/L	May 9,1989	Sep 11,1990	14
MERCURY	0.0002	0.0023	MG/L	May 9,1989	Apr 12,1989	9
METHYLENE CHLORIDE	1.0000 JB	7.0000 B	UG/L	Feb 26,1990	Mar 19,1990	13
MOLYBDENUM	0.0001	0.1670	MG/L	May 9,1989	May 11,1989	6
NEPTUNIUM-237	-0.0800	0.1000	PCI/L	Apr 22,1991	Mar 26,1991	2
NICKEL	0.0001	0.3380	MG/L	Aug 8,1989	Sep 11,1990	10
NITRATE/NITRITE (HISTORI	0.7000	9900.0000	MG/L	Mar 26,1991	Nov 14,1989	11
NITRITE	0.0200	2.0000	MG/L	Aug 16,1990	Jul 16,1991	3
OIL AND GREASE	0.3000	665.0000	MG/L	Sep 11,1990	Jul 8,1988	7
ORTHOPHOSPHATE	0.0500	0.2300	MG/L	Aug 16,1990	Apr 22,1991	3
ORTHOPHOSPHATE (HISTORICA	0.0280	0.1400	MG/L	Sep 10,1991	Apr 22,1991	2
PHOSPHORUS	0.0500	0.3750	MG/L	Aug 16,1990	Sep 10,1991	2
PLUTONIUM-238	0.0039 J	0.0310 X	PCI/L	Jul 12,1990	Jul 12,1990	4
PLUTONIUM-239	0.0420	31.0000	PCI/L	Jan 25,1990	May 9,1989	6
PLUTONIUM-239/240	-0.0100	120.0000	PCI/L	May 9,1989	Jun 6,1989	14
POTASSIUM	6.0000	4140.0000	MG/L	Apr 17,1990	May 9,1989	16
RADIUM-226	0.0962 J	20.0000	PCI/L	May 30,1991	Aug 8,1989	9
RADIUM-228	2.7000	52.0000	PCI/L	May 11,1989	Aug 8,1989	6

Table B-11

FY 93 Operable Unit 4 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
SELENIUM	0.0012 B	0.0270	MG/L	Sep 10,1991	May 9,1989	14
SILICA, DISSOLVED (HISTOR	1.3000	4.1000	MG/L	Apr 22,1991	Dec 18,1990	2
SILICON	0.7810 B	5.3800	MG/L	Mar 26,1991	Mar 26,1991	8
SILVER	0.0024 B	0.1110	MG/L	Jun 18,1991	Apr 18,1990	8
SODIUM	76.3000	9090.0000	MG/L	Feb 26,1990	May 9,1989	17
SODIUM FLUORIDE	0.4000	0.4000	MG/L	Dec 18,1990	Dec 18,1990	2
SODIUM SULFATE	430.0000	430.0000	MG/L	Dec 18,1990	Dec 18,1990	2
SPECIFIC CONDUCTIVITY	1000.0000	1630.0000	US	Jul 8,1988	Jul 11,1988	6
STRONTIUM	0.0174	8.0400	MG/L	Aug 8,1989	Nov 14,1989	16
STRONTIUM-89	0.0280	2781.0000	PCI/L	Apr 22,1991	May 8,1990	8
STRONTIUM-89,90	-0.2000	3.2000	PCI/L	Jun 6,1989	Jul 11,1989	17
STRONTIUM-90	-0.1731	2.7000	PCI/L	Jun 21,1990	May 8,1990	14
SULFATE	21.0000	1400.0000	MG/L	May 30,1991	Nov 14,1989	10
TETRACHLOROETHENE	1.0000 J	6.0000	UG/L	Nov 15,1989	Mar 19,1990	4
THALLIUM	0.0010 BWN	0.0024 J	MG/L	Apr 22,1991	Sep 12,1989	6
TIN	0.0002	0.4580	MG/L	May 9,1989	May 9,1989	6
TOLUENE	1.0000 J	2.0000 J	UG/L	Mar 26,1991	Jul 11,1989	4
TOTAL DISSOLVED SOLIDS	440.0000	46000.0000	MG/L	Oct 17,1989	Feb 26,1990	8
TOTAL ORGANIC CARBON	14.0000	18.0000	MG/L	Mar 26,1991	Oct 8,1990	4
TOTAL RADIOCESIUM	0.0000	0.1900	PCI/L	Nov 14,1989	Dec 18,1989	4
TOTAL SUSPENDED SOLIDS	5.0000	10000.0000	MG/L	May 30,1991	Aug 8,1989	8
TRICHLOROETHENE	1.0000 J	4.0000 J	UG/L	Jul 11,1989	Mar 19,1990	3
TRITIUM	-400.0000	23000.0000	PCI/L	Sep 13,1989	May 9,1989	9
URANIUM-233,-234	0.2000	1500.0000	PCI/L	May 11,1989	Nov 14,1989	15
URANIUM-234	190.0000	780.0000	PCI/L	Apr 22,1991	Mar 26,1991	2
URANIUM-235	0.1000	72.8700	PCI/L	May 11,1989	Jan 25,1990	21
URANIUM-238	0.4000	1211.0000	PCI/L	May 11,1989	Jun 21,1990	15
VANADIUM	0.0037 B	0.6770	MG/L	Aug 20,1991	May 11,1989	8
ZINC	0.0002	45.4000	MG/L	May 9,1989	Sep 13,1989	14
pH	4.6000	8.3000	PH	Feb 26,1990	Sep 13,1989	10

Table B-12

FY 93 Operable Unit 5 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,3-DICHLOROBENZENE	180.0000 J	180.0000 J	UG/KG	Aug 26,1991	Aug 26,1991	2
1,4-DICHLOROBENZENE	110.0000 J	110.0000 J	UG/KG	Aug 26,1991	Aug 26,1991	2
2-BUTANONE	2.0000 J	69.0000	UG/KG	Aug 8,1991	Dec 15,1992	12
2-METHYLNAPHTHALENE	96.0000 J	230.0000 J	UG/KG	Dec 18,1992	Dec 21,1992	4
ACENAPHTHENE	92.0000 J	680.0000	UG/KG	Dec 18,1992	Dec 21,1992	4
ACETONE	1.0000 J	82.0000	UG/KG	Oct 16,1991	Dec 12,1991	35
ALUMINUM	3040.0000 *	29000.0000	MG/KG	Aug 5,1991	Dec 17,1991	66
AMERICIUM-241	-0.0430	0.0625	PCI/G	Oct 15,1991	Oct 10,1991	69
ANTHRACENE	140.0000 J	940.0000	UG/KG	Dec 18,1992	Dec 18,1992	6
ANTIMONY	2.6000 BN	27.4000 N	MG/KG	Aug 13,1991	Aug 23,1991	39
AROCLOR-1232	0.2100 XK	0.5800 XK	MG/KG	Dec 7,1992	Dec 3,1992	4
AROCLOR-1254	0.2400	0.8700	MG/KG	Dec 21,1992	Dec 18,1992	4
AROCLOR-1260	0.4500	1.3000	MG/KG	Dec 18,1992	Dec 18,1992	2
ARSENIC	1.2000 BN	9.4000	MG/KG	Dec 7,1992	Dec 21,1992	70
BARIUM	34.6000	636.0000	MG/KG	Dec 12,1991	Aug 9,1991	65
BENZO(a)ANTHRACENE	44.0000 J	1300.0000	UG/KG	Dec 8,1992	Dec 18,1992	8
BENZO(a)PYRENE	47.0000 J	1300.0000 B	UG/KG	Dec 8,1992	Dec 18,1992	6
BENZO(b)FLUORANTHENE	81.0000 J	1500.0000 B	UG/KG	Dec 8,1992	Dec 18,1992	8
BENZO(ghi)PERYLENE	190.0000 J	680.0000	UG/KG	Dec 18,1992	Dec 18,1992	4
BENZO(k)FLUORANTHENE	120.0000 J	670.0000	UG/KG	Dec 18,1992	Dec 18,1992	4
BENZOIC ACID	110.0000 J	480.0000 J	UG/KG	Dec 14,1992	Dec 4,1992	4
BERYLLIUM	0.2800 B	2.0000	MG/KG	Aug 13,1991	Aug 20,1991	65
BICARBONATE AS CACO3	310.0000	310.0000	MG/L	Dec 3,1991	Dec 3,1991	2
BIS(2-ETHYLHEXYL)PHTHALAT	61.0000 J	290.0000 J	UG/KG	Dec 8,1992	Aug 15,1991	8
CADMIUM	0.2900 B	2.1000	MG/KG	Aug 9,1991	Aug 5,1991	19
CALCIUM	1170.0000	40500.0000	MG/KG	Aug 5,1991	Aug 8,1991	65
CESIUM	0.8600 B	29.8000 B	MG/KG	Dec 11,1991	Aug 20,1991	32
CESIUM-134	0.0000	0.0000	PCI/G	Oct 15,1991	Oct 16,1991	16
CESIUM-137	-0.0660 J	0.1759	PCI/G	Aug 7,1991	Aug 14,1991	100
CHLORIDE	76.0000	76.0000	MG/L	Dec 3,1991	Dec 3,1991	2
CHROMIUM	4.4000	56.8000	MG/KG	Oct 10,1991	Dec 17,1991	66
CHRYSENE	52.0000 J	1400.0000	UG/KG	Dec 8,1992	Dec 18,1992	8
COBALT	1.9000 B	13.0000	MG/KG	Aug 15,1991	Aug 21,1991	65
COPPER	6.1000	99.2000	MG/KG	Dec 3,1992	Dec 17,1991	64
DI-n-BUTYL PHTHALATE	88.0000 J	630.0000 J	UG/KG	Aug 20,1991	Aug 16,1991	10
DIBENZO(a,h)ANTHRACENE	53.0000 J	250.0000 J	UG/KG	Dec 18,1992	Dec 18,1992	6
DIBENZOFURAN	150.0000 J	290.0000 J	UG/KG	Dec 18,1992	Dec 21,1992	4
FLUORANTHENE	75.0000 J	3300.0000 B	UG/KG	Dec 8,1992	Dec 18,1992	10
FLUORENE	86.0000 J	610.0000	UG/KG	Dec 18,1992	Dec 21,1992	4
FLUORIDE	1.5000	1.5000	MG/L	Dec 3,1991	Dec 3,1991	2
GROSS ALPHA	8.1000	38.0000	PCI/G	Dec 3,1992	Dec 9,1992	22
GROSS ALPHA - DISSOLVED	0.7108 J	125.7000	PCI/G	Aug 8,1991	Aug 26,1991	55
GROSS BETA	13.9500	40.0000	PCI/G	Aug 8,1991	Dec 11,1992	21
GROSS BETA - DISSOLVED	6.3200	54.1000	PCI/G	Oct 15,1991	Aug 16,1991	58
INDENO(1,2,3-cd)PYRENE	180.0000 J	930.0000	UG/KG	Dec 18,1992	Dec 18,1992	4
IRON	1980.0000	33700.0000	MG/KG	Aug 7,1991	Dec 12,1991	67
LEAD	2.9000	99.5000	MG/KG	Dec 15,1992	Dec 18,1992	65
LITHIUM	1.4000 B	26.7000	MG/KG	Dec 7,1992	Dec 11,1992	57
MAGNESIUM	622.0000 B	7030.0000	MG/KG	Aug 5,1991	Aug 5,1991	65
MANGANESE	16.9000	1540.0000	MG/KG	Aug 19,1991	Dec 15,1992	65
MERCURY	0.0900 B	0.7600	MG/KG	Dec 12,1991	Dec 18,1992	24
METHYLENE CHLORIDE	1.0000 J	51.0000	UG/KG	Dec 3,1992	Oct 15,1991	51
MOLYBDENUM	0.7200 B	3.2000 B	MG/KG	Aug 15,1991	Aug 20,1991	46
NAPHTHALENE	280.0000 J	820.0000	UG/KG	Dec 18,1992	Dec 21,1992	4
NICKEL	5.0000 B	28.5000	MG/KG	Dec 3,1992	Dec 17,1991	64
NITRATE/NITRITE (HISTORI	0.0800	0.0800	MG/L	Dec 3,1991	Dec 3,1991	2
PENTACHLOROPHENOL	160.0000 J	160.0000 J	UG/KG	Dec 3,1992	Dec 3,1992	2
PETROLEUM HYDROCARBONS, T	21.0000	62.0000	MG/KG	Aug 16,1991	Aug 20,1991	4
PHENANTHRENE	270.0000 J	3500.0000 B	UG/KG	Dec 7,1992	Dec 18,1992	8
PHENOL	53.0000 J	140.0000 J	UG/KG	Dec 18,1992	Dec 18,1992	6

Table B-12

FY 93 Operable Unit 5 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
PLUTONIUM-239/240	-0.0030	0.7360	PCI/G	Aug 26,1991	Oct 10,1991	65
POTASSIUM	457.0000 B	3240.0000	MG/KG	Aug 13,1991	Oct 10,1991	65
PYRENE	73.0000 J	2500.0000	UG/KG	Dec 8,1992	Dec 18,1992	12
RADIUM-226	0.6722	2.0900	PCI/G	Aug 13,1991	Aug 19,1991	38
RADIUM-228	0.0000	2.7900	PCI/G	Aug 23,1991	Aug 20,1991	38
SELENIUM	0.2100 BN	1.8000 N	MG/KG	Aug 5,1991	Aug 5,1991	39
SILICON	23.7000	589.0000	MG/KG	Dec 11,1991	Dec 17,1991	4
SILVER	0.5200 B	11.3000	MG/KG	Aug 15,1991	Dec 18,1992	19
SODIUM	42.0000 B	993.0000 B	MG/KG	Dec 3,1992	Aug 8,1991	62
STRONTIUM	9.1000 B	158.0000	MG/KG	Dec 3,1992	Aug 8,1991	64
STRONTIUM-89,90	-0.0144 J	6.5400	PCI/G	Aug 5,1991	Aug 26,1991	38
SULFATE	120.0000	120.0000	MG/L	Dec 3,1991	Dec 3,1991	2
TETRACHLOROETHENE	2.0000 J	9.0000	UG/KG	Dec 3,1992	Dec 18,1992	8
THALLIUM	0.2200 B	0.4900 B	MG/KG	Oct 10,1991	Dec 17,1991	28
TIN	6.5000 B	29.1000 B	MG/KG	Aug 7,1991	Aug 5,1991	10
TOLUENE	1.0000 J	490.0000 E	UG/KG	Dec 15,1992	Oct 15,1991	75
TOTAL DISSOLVED SOLIDS	620.0000	620.0000	MG/L	Dec 3,1991	Dec 3,1991	2
TOTAL ORGANIC CARBON	0.0700 X	9.0000	MG/L	Oct 15,1991	Dec 3,1991	6
TRICHLOROETHENE	2.0000 J	3.0000 J	UG/KG	Dec 9,1992	Aug 20,1991	8
URANIUM-233,-234	0.0000	4.2600	PCI/G	Oct 15,1991	Aug 16,1991	59
URANIUM-235	-0.5740	0.4840	PCI/G	Oct 15,1991	Oct 15,1991	58
URANIUM-238	0.2150	26.6300	PCI/G	Oct 15,1991	Aug 16,1991	60
VANADIUM	11.1000 B	56.1000	MG/KG	Aug 9,1991	Dec 17,1991	65
ZINC	11.8000	284.0000	MG/KG	Dec 15,1992	Dec 18,1992	65
alpha-BHC	0.0150	0.0150	MG/KG	Dec 18,1992	Dec 18,1992	2
pH	7.0500	8.2000	PH	Oct 15,1991	Aug 26,1991	34

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	0.9000	220.0000 E	UG/L	Mar 10,1993	Aug 7,1992	19
1,1,2-TRICHLOROETHANE	0.3000	1.0000 J	UG/L	May 11,1992	Jun 10,1989	6
1,1-DICHLOROETHANE	1.0000 J	7.0000	UG/L	Aug 7,1992	Feb 2,1990	2
1,1-DICHLOROETHENE	0.3000	190.0000	UG/L	Dec 14,1992	Aug 7,1992	21
1,2,3-TRICHLOROBENZENE	0.2000	0.2000	UG/L	Apr 28,1993	Apr 28,1993	2
1,2-DICHLOROETHANE	18.0000	32.0000	UG/L	Aug 7,1992	May 20,1987	4
1,2-DICHLOROETHENE	0.7000 J	3.0000 J	UG/L	Aug 7,1992	Feb 22,1990	6
1,2-DICHLOROPROPANE	0.3500	0.3500	UG/L	May 8,1992	May 8,1992	2
2-BUTANONE	3.0000 BJ	6.0000 J	UG/L	Sep 22,1986	Oct 16,1986	6
2-HEXANONE	43.0000	43.0000	UG/L	Jul 17,1990	Jul 17,1990	2
4,4'-DDT	0.0000 I	0.0018 I	MG/L	Sep 22,1992	Sep 22,1992	4
4-METHYL-2-PENTANONE	1.0000 J	25.0000	UG/L	Sep 19,1991	Sep 11,1990	4
ACENAPHTHENE	4.0000 J	5.0000 J	UG/L	Jun 24,1993	Aug 11,1993	2
ACETONE	1.0000 JB	630.0000 J	UG/L	Jun 13,1990	Oct 22,1992	70
ALKALINITY AS CACO3	0.0000	490.0000	MG/L	Mar 8,1991	Jun 11,1992	16
ALUMINUM	0.0077 B	357.0000	MG/L	Jun 2,1992	Jun 18,1993	133
AMERICIUM-241	-0.4000	2.5000	PCI/L	Jul 30,1987	Jul 9,1987	121
ANTIMONY	0.0001	0.2080	MG/L	Sep 19,1986	Oct 8,1986	70
ARSENIC	0.0007	0.0400	MG/L	Sep 22,1992	Jan 22,1988	87
BARIUM	0.0126 B	3.0400	MG/L	May 10,1991	Jun 24,1993	148
BENZENE	0.1000 J	3.0000 J	UG/L	Sep 16,1992	Jul 17,1990	18
BENZO(a)ANTHRACENE	4.0000 J	4.0000 J	UG/L	Apr 26,1993	Apr 26,1993	2
BERYLLIUM	0.0000	0.0294	MG/L	Sep 19,1986	Jun 18,1993	60
BICARBONATE	8.8000	640.0000	MG/L	Nov 25,1986	Jun 6,1989	63
BICARBONATE AS CACO3	42.0000	1100.0000	MG/L	Feb 13,1992	Sep 16,1991	165
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	43.0000	UG/L	Sep 22,1992	Mar 20,1992	12
BROMODICHLOROMETHANE	0.1700 J	59.0000 J	UG/L	Dec 16,1991	Oct 22,1992	8
BROMOFORM	2.0000 J	2.0000 J	UG/L	Dec 14,1992	Dec 14,1992	2
CADMIUM	0.0003 J	0.0138	MG/L	Jul 6,1987	Jun 12,1989	81
CALCIUM	0.0931	416.0000	MG/L	Sep 19,1986	Jul 13,1993	149
CARBON DISULFIDE	0.2000 J	21.0000	UG/L	Oct 22,1992	Feb 13,1992	30
CARBON TETRACHLORIDE	0.1000 J	2600.0000	UG/L	Mar 10,1993	Oct 22,1992	45
CARBONATE	4.0000	510.0000	MG/L	Mar 22,1993	Oct 8,1986	21
CARBONATE AS CACO3	0.0000	28.0000	MG/L	Jan 9,1991	Dec 15,1991	93
CESIUM	0.0200 J	0.3000 B	MG/L	Oct 25,1988	Aug 31,1990	38
CESIUM RADIOACTIVE UNKN I	-0.2000	0.2600	PCI/L	Nov 21,1989	Mar 20,1990	18
CESIUM-134	0.0000	0.9700	PCI/L	Mar 22,1993	Apr 26,1993	10
CESIUM-137	-2.7000	3.1000	PCI/L	May 10,1990	May 20,1987	79
CHEMICAL OXYGEN DEMAND	10.0000	10.0000	MG/L	Jul 13,1993	Jul 13,1993	2
CHLORIDE	2.4000	838.0000	MG/L	Aug 15,1990	Feb 15,1988	146
CHLOROBENZENE	1.0000 J	1.0000 J	UG/L	Aug 13,1992	Aug 13,1992	2
CHLOROETHANE	4.0000 J	4.0000 J	UG/L	Aug 7,1992	Aug 7,1992	2
CHLOROFORM	0.1100	200.0000 J	UG/L	Feb 14,1992	Oct 22,1992	39
CHROMIUM	0.0023 B	5.0200 *	MG/L	Feb 27,1992	Aug 13,1992	99
CHRYSENE	4.0000 J	4.0000 J	UG/L	Apr 26,1993	Apr 26,1993	2
COBALT	0.0023 B	0.1610	MG/L	Aug 22,1991	Jun 18,1993	57
COPPER	0.0011 B	0.8350	MG/L	Feb 17,1992	Aug 8,1988	125
CYANIDE	0.0015 B	1.0000	MG/L	Aug 29,1990	May 11,1987	96
CYANIDES (SOLUBLE SALTS A	0.0200	0.0200	MG/L	Jul 24,1990	Jul 24,1990	2
DI-n-BUTYL PHTHALATE	1.0000 J	4.0000 BJ	UG/L	Sep 22,1986	Oct 16,1986	8
DIBROMOMETHANE	2.7000	2.7000	UG/L	May 11,1992	May 11,1992	2
DICHLORODIFLUOROMETHANE	0.8100 J	2.8200	UG/L	Nov 25,1991	Nov 25,1991	4
DIETHYL PHTHALATE	2.0000 J	6.0000 J	UG/L	Nov 11,1991	Aug 13,1993	6
ENDOSULFAN SULFATE	0.0000 I	0.0000 I	MG/L	Sep 22,1992	Sep 22,1992	2
ETHYLBENZENE	0.5000	1.0000 BJ	UG/L	Sep 16,1992	Sep 18,1990	4
FLUORANTHENE	3.0000 J	4.0000 J	UG/L	Aug 11,1993	Jun 24,1993	2
FLUORENE	3.0000 J	4.0000 J	UG/L	Jun 24,1993	Aug 11,1993	2
FLUORIDE	0.1400	4.2000	MG/L	Oct 22,1992	Aug 19,1991	182
GROSS ALPHA	0.0000	58.1100	PCI/L	Apr 26,1993	Apr 26,1993	80
GROSS ALPHA - DISSOLVED	-1.3900 J	217.4000	PCI/L	Mar 14,1991	Oct 9,1990	96

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
GROSS ALPHA - SUSPENDED	-0.4000	811.0000	PCI/L	May 10,1990	Jun 16,1987	59
GROSS BETA	-8.0000	286.0000	PCI/L	Apr 29,1987	Jul 9,1987	85
GROSS BETA - DISSOLVED	0.6865 J	157.4000	PCI/L	Mar 23,1992	Oct 9,1990	97
GROSS BETA - SUSPENDED	-2.6100	30.9000	PCI/L	May 10,1990	Jan 31,1990	28
HEXAVALENT CHROMIUM	1.0000	160.0000	MG/L	May 20,1987	Oct 2,1986	6
HYDROCYANIC ACID	0.0350	0.0350	MG/L	Aug 6,1992	Aug 6,1992	2
IRON	0.0001	418.0000	MG/L	Sep 19,1986	Jun 18,1993	136
LEAD	0.0000	0.2400	MG/L	May 26,1989	Jun 24,1993	118
LITHIUM	0.0010 B	0.3060	MG/L	Feb 22,1992	Jun 18,1993	132
MAGNESIUM	0.0242	135.7172	MG/L	Sep 19,1986	Feb 29,1988	149
MANGANESE	0.0001	5.4800	MG/L	Sep 19,1986	Jun 24,1993	143
MERCURY	0.0000	0.0060	MG/L	Sep 19,1986	Jul 16,1987	56
METHYLENE CHLORIDE	0.2000	370.0000 B	UG/L	Aug 18,1993	May 11,1992	101
MOLYBDENUM	0.0023 B	0.4660	MG/L	Feb 19,1992	May 12,1992	87
N-NITROSODIPHENYLAMINE	8.0000 J	12.0000 B	UG/L	Sep 22,1986	Sep 19,1986	4
NAPHTHALENE	0.2100	13.0000	UG/L	Dec 6,1991	Jun 24,1993	10
NICKEL	0.0021 B	3.1500	MG/L	Feb 13,1992	Jul 25,1989	126
NITRATE	0.3100	2.6000	MG/L	Oct 17,1990	Mar 6,1991	8
NITRATE/NITRITE	0.0400	35.0000	MG/L	Mar 10,1993	Aug 18,1993	84
NITRATE/NITRITE (HISTORI	0.0120	55.0000	MG/L	Jul 19,1989	Sep 22,1986	139
NITRITE	0.0200	0.0200	MG/L	Oct 11,1990	Oct 5,1990	6
OIL AND GREASE	-95.0000	6.7000	MG/L	Jun 16,1987	May 29,1987	8
ORTHOPHOSPHATE	0.0100	1.2000	MG/L	May 14,1993	Jul 17,1990	53
ORTHOPHOSPHATE (HISTORICA	0.0100	0.1000	MG/L	Jun 9,1992	Aug 22,1991	89
PHENANTHRENE	5.0000 J	6.0000 J	UG/L	Aug 11,1993	Jun 24,1993	2
PHOSPHORUS	0.0200	0.8420 B	MG/L	Oct 17,1990	Jul 26,1990	38
PLUTONIUM-238	-0.0006 J	0.0359 X	PCI/L	Oct 17,1990	Jul 20,1990	38
PLUTONIUM-239	0.0000	0.0180	PCI/L	Aug 17,1989	Feb 7,1990	20
PLUTONIUM-239/240	-0.8000	2.1000	PCI/L	Jul 14,1987	May 11,1987	104
POTASSIUM	0.0018	54.8000	MG/L	Sep 19,1986	Oct 8,1986	148
PYRENE	2.0000 J	3.0000 J	UG/L	Aug 11,1993	Jun 24,1993	4
RADIUM-226	-0.2000	1.0000	PCI/L	Jul 27,1989	Jun 12,1989	82
RADIUM-228	0.2100	8.6000	PCI/L	Mar 22,1993	Nov 12,1992	18
SELENIUM	0.0000	450.0000	MG/L	Sep 19,1986	Feb 1,1989	119
SILICA, DISSOLVED (HISTOR	3.1000	43.9000	MG/L	Feb 11,1992	Oct 17,1990	88
SILICON	2.0000	354.0000	MG/L	Jul 26,1990	Jun 24,1993	92
SILVER	0.0020 B	0.0294	MG/L	Nov 14,1991	Mar 8,1991	67
SODIUM	0.0983	405.0172	MG/L	Sep 19,1986	Apr 21,1988	151
SODIUM FLUORIDE	0.5200	0.5200	MG/L	Mar 13,1991	Mar 13,1991	2
SODIUM SULFATE	107.0000	107.0000	MG/L	Mar 13,1991	Mar 13,1991	2
STRONTIUM	0.0004 B	4.9549	MG/L	Oct 19,1989	Feb 29,1988	145
STRONTIUM-89	31.0000	53.0000	PCI/L	May 10,1990	May 10,1990	2
STRONTIUM-89,90	-0.4000	15.4800	PCI/L	May 26,1989	Mar 23,1992	81
STRONTIUM-90	-0.2900	1.2220	PCI/L	Feb 7,1990	Jun 7,1990	30
STYRENE	0.0800 J	3.0000 J	UG/L	May 8,1992	Oct 16,1986	10
SULFATE	0.1000	2300.0000	MG/L	Feb 7,1990	Apr 30,1993	134
TETRACHLOROETHENE	0.1000	590.0000	UG/L	Aug 14,1992	Oct 22,1992	71
THALLIUM	0.0009	0.0160	MG/L	Aug 11,1992	Oct 8,1986	40
TIN	0.0103 B	0.3000	MG/L	Nov 8,1990	Jun 24,1993	52
TOLUENE	0.1400	31.0000	UG/L	Nov 25,1991	Jan 29,1993	32
TOTAL DISSOLVED SOLIDS	83.0000	7000.0000	MG/L	Feb 27,1992	Jun 24,1993	147
TOTAL ORGANIC CARBON	1.3100	4.2000	MG/L	Jul 12,1993	Jul 13,1993	4
TOTAL ORGANIC HALIDES	0.0280	92.0000	MG/L	Dec 16,1992	Apr 8,1993	20
TOTAL RADIOCESIUM	-0.1500	7.0000	PCI/L	Nov 30,1989	May 20,1993	28
TOTAL SUSPENDED SOLIDS	4.0000	12000.0000	MG/L	Apr 30,1992	Jun 18,1993	135
TOTAL XYLENES	0.3000 J	1.0000 J	UG/L	Oct 22,1992	Mar 17,1993	4
TRICHLOROETHENE	0.0800 JB	9500.0000	UG/L	Mar 20,1992	Oct 22,1992	68
TRICHLOROFLUOROMETHANE	0.3000	0.3600 J	UG/L	Apr 30,1993	May 11,1992	4
TRITIUM	-358.0000 J	1442.0000	PCI/L	Feb 11,1992	Mar 22,1991	138
URANIUM-233,-234	-0.2000	33.1000	PCI/L	Jul 9,1987	May 8,1992	116

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
URANIUM-235	-0.0285 J	7.5000	PCI/L	Mar 17,1993	Apr 29,1987	122
URANIUM-238	-0.3000	25.3000	PCI/L	Jul 9,1987	Jul 30,1987	118
VANADIUM	0.0013 B	0.6740	MG/L	Jun 5,1992	Jun 18,1993	101
VINYL ACETATE	8.0000 J	8.0000 J	UG/L	Jul 17,1990	Jul 17,1990	2
ZINC	0.0000	2.7730	MG/L	Sep 19,1986	Aug 8,1988	154
cis-1,2-DICHLOROETHENE	0.1700	2.0000	UG/L	Feb 14,1992	Oct 22,1992	6
m-XYLENE	0.2000	0.2000	UG/L	Sep 16,1992	Sep 16,1992	2
n-BUTYLBENZENE	0.5700	0.5700	UG/L	May 11,1992	May 11,1992	2
o-XYLENE	0.2000 J	0.2000 J	UG/L	Sep 16,1992	Sep 16,1992	2
p-CYMENE	0.2000	2.0000	UG/L	Jun 10,1993	Sep 16,1992	2
p-XYLENE	0.2000	0.2000	UG/L	Sep 16,1992	Sep 16,1992	2
pH	3.9000	9.9000	PH	Dec 12,1989	Oct 19,1989	90
sec-BUTYLBENZENE	0.3800 B	0.9900 B	UG/L	May 14,1992	May 11,1992	8
tert-BUTYLBENZENE	1.4000 B	1.4000 B	UG/L	May 11,1992	May 11,1992	2
trans-1,2-DICHLOROETHENE	4.0000	4.0000	UG/L	Apr 29,1987	May 11,1987	40
trans-1,3-DICHLOROPROPENE	0.5000 J	0.5000 J	UG/L	Aug 6,1992	Aug 6,1992	2

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FY 93 Operable Unit 5 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
% MOISTURE	26.0000	78.0000	%MOIST	Nov 14,1990	Nov 14,1990	12
% SOLIDS	67.0000	67.0000	UNKN	Nov 6,1991	Nov 6,1991	2
1,1,1-TRICHLOROETHANE	1.0000 J	3.0000 J	UG/KG	Nov 1,1990	Nov 1,1990	6
2-BUTANONE	3.0000 J	37000.0000 B	UG/KG	Apr 2,1992	Jul 21,1989	36
4,4'-DDT	0.0055 J	0.0100 J	MG/KG	Mar 14,1991	Jun 1,1990	4
4-METHYL-2-PENTANONE	3.0000 J	3.0000 J	UG/KG	Apr 9,1992	Apr 9,1992	2
4-METHYLPHENOL	83.0000 J	2600.0000	UG/KG	Jul 20,1992	May 30,1990	23
ACETONE	9.0000 B	56000.0000 B	UG/KG	Aug 13,1986	Aug 30,1989	41
ALDRIN	0.0000 I	0.0000 I	MG/KG	Aug 28,1991	Aug 28,1991	4
ALKALINITY AS CACO3	26.0000	70000.0000	MG/KG	Aug 5,1991	Aug 21,1991	28
ALUMINUM	549.0000	28500.0000	MG/KG	Feb 23,1989	Jul 22,1989	67
AMERICIUM-241	-0.0100	0.6500	PCI/G	Feb 23,1989	Aug 30,1989	70
ANTIMONY	2.5000 BN	69.7000	MG/KG	Aug 5,1991	Jul 22,1989	18
AROCLOR-1254	0.0260 J	450.0000	UG/L	Aug 28,1991	Mar 12,1991	16
ARSENIC	0.0300	49.2000	MG/KG	Aug 20,1986	Aug 23,1990	63
BARIUM	12.8000 B	706.0000	MG/KG	Nov 14,1990	Aug 23,1990	67
BENZENE	6000.0000 J	11000.0000 J	UG/KG	Aug 30,1989	Jul 21,1989	2
BENZO(a)ANTHRACENE	53.0000 J	120.0000 J	UG/KG	Aug 28,1991	Mar 27,1991	7
BENZO(a)PYRENE	57.0000 J	110.0000 J	UG/KG	Aug 28,1991	Sep 4,1991	5
BENZO(b)FLUORANTHENE	84.0000 J	210.0000 J	UG/KG	Aug 28,1991	Mar 27,1991	9
BENZO(k)FLUORANTHENE	68.0000 J	110.0000 J	UG/KG	Nov 13,1990	Apr 8,1992	8
BENZOIC ACID	190.0000 J	3300.0000 J	UG/KG	Nov 9,1992	Aug 21,1990	18
BERYLLIUM	0.2600 B	15.5000	MG/KG	Nov 1,1990	Mar 6,1989	63
BICARBONATE AS CACO3	10.0000	5340.0000	MG/KG	Nov 1,1990	Apr 8,1992	24
BIS(2-ETHYLHEXYL)PHTHALAT	49.0000 J	130000.0000 J	UG/KG	Aug 21,1991	Jul 22,1989	43
BUTYL BENZYL PHTHALATE	57.0000 J	57.0000 J	UG/KG	Jan 22,1992	Jan 22,1992	2
CADMIUM	0.6900 J	2.8000 B	MG/KG	Oct 26,1989	Nov 5,1992	35
CALCIUM	27.0000	75000.0000	MG/KG	Aug 20,1986	Jul 9,1992	67
CARBON DISULFIDE	6.0000 J	25.0000	UG/KG	Mar 13,1989	Aug 20,1986	4
CARBONATE	0.0000	324.0000	MG/KG	Apr 8,1992	Apr 1,1992	14
CESIUM	0.6800 B	15.8000	MG/KG	Apr 1,1992	Aug 27,1992	20
CESIUM-134	0.0098	0.2000	PCI/G	Nov 18,1991	Aug 28,1991	28
CESIUM-137	0.0000	2.3000	PCI/G	May 29,1990	May 6,1991	49
CHLORIDE	13.0000	43.0000	MG/KG	Aug 13,1986	Aug 13,1986	6
CHLOROFORM	3.0000 J	18.0000	UG/KG	Aug 27,1990	Mar 6,1989	4
CHLOROMETHANE	18.0000	77.0000 J	UG/KG	Mar 9,1989	May 29,1990	4
CHROMIUM	2.1000 *	64.0000	MG/KG	Nov 14,1990	Aug 20,1986	69
CHRYSENE	63.0000 J	190.0000 J	UG/KG	Nov 5,1991	Apr 8,1992	9
COBALT	1.6000 B	20.3000	MG/KG	Nov 5,1992	Mar 14,1991	60
COPPER	2.4000	178.0000	MG/KG	Aug 13,1986	Aug 23,1990	73
DI-n-BUTYL PHTHALATE	39.0000 JB	160000.0000 JB	UG/KG	Aug 28,1991	Aug 30,1989	22
ENDOSULFAN I	0.0000 I	0.0000 I	MG/KG	Aug 28,1991	Aug 28,1991	4
ETHYLBENZENE	1.0000 J	16.0000	UG/KG	Nov 14,1990	May 13,1991	8
FLUORANTHENE	41.0000 J	380.0000 J	UG/KG	Mar 7,1989	Apr 8,1992	17
GROSS ALPHA	8.4000	59.0000	PCI/G	Nov 5,1992	Nov 9,1992	40
GROSS ALPHA - DISSOLVED	0.0000	71.4000	PCI/G	Aug 21,1991	May 31,1990	30
GROSS ALPHA - SUSPENDED	3.2400	77.0000	PCI/G	May 21,1991	Mar 8,1989	40
GROSS BETA	11.0000	46.0000	PCI/G	Aug 13,1986	Nov 9,1992	59
GROSS BETA - DISSOLVED	4.9500	49.8000	PCI/G	Aug 21,1991	May 31,1990	31
GROSS BETA - SUSPENDED	3.6700	37.0700	PCI/G	May 20,1991	May 6,1991	32
HEPTACHLOR	0.0000 I	0.0035 J	MG/KG	Aug 28,1991	May 30,1990	6
HEPTACHLOR EPOXIDE	0.0000 I	0.0000 I	MG/KG	Aug 28,1991	Aug 28,1991	4
IRON	2250.0000	112000.0000 E*	MG/KG	Feb 23,1989	Aug 23,1990	64
LEAD	1.9000	80.3000 *	MG/KG	Aug 30,1989	Aug 23,1990	69
LITHIUM	1.7000	958.0000	MG/KG	Nov 14,1990	Jul 22,1989	69
MAGNESIUM	62.0000	17000.0000	MG/KG	Aug 20,1986	Mar 9,1989	67
MANGANESE	34.9000	1740.0000 E*	MG/KG	Oct 30,1989	Aug 23,1990	67
MERCURY	0.0400	3.8000	MG/KG	Nov 13,1990	Nov 5,1992	34
METHYLENE CHLORIDE	1.0000 J	190000.0000 B	UG/KG	Aug 21,1990	Jul 22,1989	40
MOLYBDENUM	0.6100	177.0000	MG/KG	Aug 27,1992	Jul 22,1989	40
N-NITROSODIPHENYLAMINE	180.0000 JB	280000.0000 J	UG/KG	Aug 13,1986	Aug 30,1989	10
NICKEL	1.6000 B	33.0000	MG/KG	Aug 27,1990	Nov 6,1991	62
NITRATE/NITRITE	0.7000	4.9000	MG/KG	Nov 10,1992	Mar 3,1993	14

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FY 93 Operable Unit 5 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
NITRATE/NITRITE (HISTORI	0.6110	63.8000	MG/KG	Apr 9,1992	May 6,1991	60
NITRITE	0.3000	3.1000	MG/KG	Aug 27,1990	Aug 23,1990	8
OIL AND GREASE	1700.0000	68000.0000	MG/KG	Mar 6,1989	Mar 13,1989	16
PHENANTHRENE	66.0000 J	190.0000 J	UG/KG	Sep 4,1991	Apr 8,1992	10
PHENOL	150.0000 J	660.0000 J	UG/KG	Nov 10,1992	Aug 21,1990	8
PHOSPHORUS	319.0000	655.0000	MG/KG	Nov 1,1990	Nov 1,1990	20
PLUTONIUM-238	0.0001 J	0.0156 J	PCI/G	Aug 27,1990	Aug 20,1990	24
PLUTONIUM-239	0.0000	3.9000	PCI/G	Mar 6,1989	Aug 30,1989	10
PLUTONIUM-239/240	0.0000	17.0600	PCI/G	Aug 20,1986	Nov 5,1991	62
POTASSIUM	256.0000 B*	67000.0000	MG/KG	Nov 14,1990	Aug 13,1986	67
PYRENE	41.0000 J	310.0000 J	UG/KG	Mar 7,1989	Apr 8,1992	17
RADIUM-226	0.2359 J	5.1000	PCI/G	Aug 23,1990	May 13,1991	44
RADIUM-228	0.7142 X	8.1000	PCI/G	Aug 23,1990	May 13,1991	42
SELENIUM	0.0800	21.3000	MG/KG	Aug 20,1986	Mar 13,1989	44
SILICON	83.8000	7100.0000	MG/KG	Nov 5,1991	Mar 11,1991	33
SILVER	1.6000	49.1000	MG/KG	Aug 27,1992	Mar 8,1989	16
SODIUM	23.3000 B	1100.0000 B	MG/KG	Nov 9,1992	Mar 3,1993	64
STRONTIUM	2.8000	1230.0000	MG/KG	Nov 14,1990	Jul 22,1989	72
STRONTIUM-89,90	-0.6000	4.8800	PCI/G	Feb 23,1989	Nov 18,1991	37
STRONTIUM-90	-0.4000	0.4000	PCI/G	Mar 6,1989	Jul 22,1989	11
STYRENE	2.0000 J	2.0000 J	UG/KG	Nov 14,1990	Nov 14,1990	2
SULFATE	31.0000	295.0000	MG/KG	Aug 20,1986	Aug 13,1986	6
THALLIUM	0.2500 B	13.0000	MG/KG	Aug 20,1990	Aug 13,1986	24
TIN	4.8000	1080.0000	MG/KG	Nov 13,1990	Mar 13,1989	43
TOLUENE	1.0000 J	20000.0000	UG/KG	Nov 1,1990	Jul 21,1989	42
TOTAL ORGANIC CARBON	11000.0000	29000.0000	MG/KG	Nov 10,1992	Nov 9,1992	26
TOTAL XYLENES	5.0000	5.0000	UG/KG	Aug 28,1991	Aug 28,1991	4
TRICHLOROETHENE	1.0000 J	23.0000 J	UG/KG	Aug 20,1986	Nov 18,1991	12
URANIUM-233,-234	0.0900	6.0000	PCI/G	May 6,1991	Nov 5,1992	63
URANIUM-235	-0.0031 J	0.2600 J	PCI/G	Aug 20,1990	Nov 5,1992	69
URANIUM-238	0.0810	6.4000 B	PCI/G	May 6,1991	Nov 5,1992	64
VANADIUM	3.5000 B	68.7000	MG/KG	Nov 14,1990	Jul 21,1989	69
ZINC	9.3000	681.0000 E	MG/KG	Feb 23,1989	Nov 5,1992	69
alpha-BHC	0.0047 J	0.0047 J	MG/KG	Mar 27,1991	Mar 27,1991	2
alpha-CHLORDANE	0.0000 I	0.0000 I	MG/KG	Aug 28,1991	Aug 28,1991	4
beta-BHC	0.0000 I	0.0015	MG/KG	Aug 28,1991	Aug 13,1986	6
delta-BHC	0.0000 I	0.0035 J	MG/KG	Aug 28,1991	Mar 14,1991	6
gamma-BHC (LINDANE)	0.0044 J	0.0044 J	MG/KG	Nov 4,1991	Nov 4,1991	2
gamma-CHLORDANE	0.0000 I	0.0000 I	MG/KG	Aug 28,1991	Aug 28,1991	4
pH	6.5000	8.6000	PH	Mar 7,1989	Mar 6,1989	62

Table B-15

FY 93 Operable Unit 5 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	0.8300	7.0000	UG/L	Mar 30,1990	Apr 12,1990	13
1,1,2,2-TETRACHLOROETHANE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
1,1,2-TRICHLOROETHANE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
1,1-DICHLOROETHANE	1.0000 J	4.0000 J	UG/L	Apr 10,1990	Aug 21,1989	8
1,1-DICHLOROETHENE	2.0000 J	7.0000 J	UG/L	Aug 25,1989	Aug 21,1989	10
1,2,4-TRICHLOROBENZENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
1,2-DICHLOROETHANE	1.0000 J	14.0000	UG/L	Apr 10,1990	Aug 7,1991	13
1,2-DICHLOROETHENE	1.0000 J	4.0000 J	UG/L	Aug 23,1990	Aug 21,1989	6
1,2-DICHLOROPROPANE	1.0000 J	3.0000 J	UG/L	Apr 10,1990	Apr 11,1990	6
1,4-DICHLOROBENZENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
2,4-DINITROTOLUENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
2-BUTANONE	3.0000 JB	27.0000	UG/L	Jan 11,1990	Dec 15,1989	18
2-HEXANONE	1.0000 J	3.0000 JB	UG/L	Oct 16,1990	Jul 12,1989	8
2-METHYLPHENOL	24.0000	24.0000	UG/L	Aug 21,1986	Aug 21,1986	2
4,4'-DDT	0.0009 X	0.0009 X	MG/L	Oct 3,1990	Oct 3,1990	2
4-CHLORO-3-METHYLPHENOL	1.0000 J	1.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
4-METHYL-2-PENTANONE	1.0000 JB	31.0000 B	UG/L	Apr 10,1990	Dec 20,1989	6
ACENAPHTHENE	5.0000 J	5.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
ACETONE	1.0000 BJ	210.0000	UG/L	Jul 18,1990	Nov 7,1991	78
ALDRIN	0.0003 X	0.0003 X	MG/L	Oct 3,1990	Oct 3,1990	2
ALKALINITY AS CACO3	64.0000	265.0000	MG/L	Aug 12,1991	Jun 11,1991	17
ALUMINUM	0.0002	293.0000	MG/L	Oct 20,1989	Jun 16,1989	172
AMERICIUM-241	-1.8000	15.0000	PCI/L	May 2,1991	Mar 8,1991	140
AMMONIA	0.0150	4.5000	MG/L	May 18,1990	May 7,1990	12
ANTIMONY	0.0074 B	0.6430	MG/L	Nov 28,1990	Feb 6,1990	72
ARSENIC	0.0007	1.0300	MG/L	Sep 17,1991	Jun 16,1989	120
ATRAZINE	0.0001	0.1900	MG/L	May 3,1990	May 15,1990	9
BARIUM	0.0001 B	7.0700	MG/L	Oct 20,1989	Jan 9,1990	161
BENZENE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
BENZO(a)ANTHRACENE	2.0000 J	2.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZO(a)PYRENE	3.0000 J	3.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZO(b)FLUORANTHENE	3.0000 J	3.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZO(k)FLUORANTHENE	4.0000 J	4.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZOIC ACID	2.0000 J	8.0000 J	UG/L	Mar 11,1990	Aug 21,1986	6
BENZYL ALCOHOL	3.0000 J	4.0000 J	UG/L	Oct 17,1991	Oct 23,1990	4
BERYLLIUM	0.0002 J	0.1100	MG/L	Mar 23,1990	Aug 18,1986	79
BICARBONATE	5.0000	4100.0000	MG/L	May 24,1989	Aug 10,1989	69
BICARBONATE AS CACO3	12.0000	1110.0000	MG/L	Dec 7,1990	Nov 1,1990	109
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	220.0000 E	UG/L	Oct 9,1991	Oct 11,1989	45
BROMODICHLOROMETHANE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
BUTYL BENZYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
CADMIUM	0.0010	0.0690	MG/L	Jun 20,1991	Mar 1,1989	89
CALCIUM	0.0298	803.0000	MG/L	Nov 15,1990	Jun 16,1989	196
CARBON DISULFIDE	1.0000 J	8.0000 B	UG/L	Apr 11,1990	Jul 20,198	20
CARBON TETRACHLORIDE	1.0000 J	29.0000	UG/L	Dec 6,1990	Apr 3,1991	18
CARBONATE	4.0000	85.2000	MG/L	Nov 4,1992	Jul 20,1992	31
CARBONATE AS CACO3	0.0000	30.2000	MG/L	Aug 23,1990	Mar 19,1991	119
CESIUM	0.0059 B	2.5300	MG/L	Jan 9,1991	Mar 1,1989	101
CESIUM RADIOACTIVE UNKN I	-0.3000	0.2300	PCI/L	Feb 20,1990	Feb 21,1990	28
CESIUM-137	-8.0000	12.0000	PCI/L	Apr 4,1990	Mar 1,1989	89
CHLORIDE	0.0500	530.0000	MG/L	Jul 20,1989	Nov 8,1989	109
CHLORIDE (HISTORICAL CASN	8.1400	36.1000	MG/L	Jul 27,1992	Jul 20,1992	24
CHLOROBENZENE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
CHLOROFORM	1.0000 J	31.0000	UG/L	Jun 27,1989	Apr 3,1991	13
CHLOROMETHANE	1.0000 J	6.0000 J	UG/L	May 22,1990	May 29,1990	6
CHROMIUM	0.0020	0.2750	MG/L	Jul 10,1991	Jun 16,1989	101
CHRYSENE	2.0000 J	2.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
COBALT	0.0013	0.4890	MG/L	Oct 13,1992	Jun 16,1989	70
COPPER	0.0020 B	0.6070	MG/L	Sep 12,1990	Jun 16,1989	132
CURIUM-244	0.0015	0.1100	PCI/L	May 6,1991	May 7,1991	10

Table B-15

FY 93 Operable Unit 5 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
CYANIDE	0.0010	1.0000	MG/L	May 26,1987	Jul 29,1987	72
DI-n-BUTYL PHTHALATE	1.0000 J	50.0000 J	UG/L	Oct 12,1989	Oct 11,1989	22
DI-n-OCTYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
DIELDRIN	0.0009 X	0.0009 X	MG/L	Oct 3,1990	Oct 3,1990	2
DIETHYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Oct 2,1990	Oct 2,1990	2
DISSOLVED ORGANIC CARBON	1.0000	44.1000	MG/L	Sep 18,1991	Mar 8,1991	76
ENDRIN	0.0009 X	0.0010 X	MG/L	Oct 3,1990	Oct 3,1990	2
ETHYLBENZENE	1.0000 J	5.0000	UG/L	Apr 10,1990	Sep 25,1989	8
FLUORIDE	0.1500	2.7000	MG/L	Oct 26,1992	Oct 23,1990	132
GROSS ALPHA	-0.2300	8.3000	PCI/L	May 2,1991	Mar 24,1993	68
GROSS ALPHA - DISSOLVED	-0.4070 J	40.1000	PCI/L	Jul 10,1991	Jun 4,1990	96
GROSS ALPHA - SUSPENDED	-4.0000	440.0000	PCI/L	Aug 11,1989	Jun 16,1989	85
GROSS BETA	-10.0000	420.0000	PCI/L	May 13,1991	Jun 16,1989	99
GROSS BETA - DISSOLVED	0.0000	46.4200	PCI/L	Apr 2,1992	Mar 26,1992	93
GROSS BETA - SUSPENDED	-4.4500	56.6400	PCI/L	Apr 5,1990	Apr 12,1990	84
HARDNESS (as CaCO3)	151.0000	190.0000	MG/L	May 22,1990	May 10,1990	2
HEPTACHLOR	0.0003 X	0.0003 X	MG/L	Oct 3,1990	Oct 3,1990	2
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	Jul 22,1987	Jul 30,1987	20
IRON	0.0001	3220.0000	MG/L	Aug 22,1989	Jun 16,1989	180
LEAD	0.0001	0.9500	MG/L	Jan 9,1990	Jan 9,1990	138
LITHIUM	0.0001 J	0.1400 J	MG/L	Aug 21,1989	Jan 9,1990	163
MAGNESIUM	0.0237	99.4000	MG/L	Nov 15,1990	Jul 21,1989	204
MANGANESE	0.0002	27.7000	MG/L	Oct 19,1989	Jun 16,1989	184
MERCURY	0.0001 B	3.9700	MG/L	Oct 4,1990	Jun 28,1988	127
METHYLENE CHLORIDE	0.2800	68.0000	UG/L	Mar 30,1990	Jan 18,1990	84
MOLYBDENUM	0.0020 B	0.3000	MG/L	Sep 13,1990	Aug 20,1986	103
N-NITROSO-DI-n-PROPYLAMIN	5.0000 J	5.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
N-NITROSODIPHENYLAMINE	1.0000 J	200.0000	UG/L	Apr 11,1990	Aug 18,1986	20
NEPTUNIUM-237	-0.4700	0.4600	PCI/L	May 3,1991	May 3,1991	56
NICKEL	0.0028	0.8200	MG/L	Oct 13,1992	Jul 22,1987	92
NITRATE	0.2500	310.0000	MG/L	Oct 2,1990	Mar 30,1990	18
NITRATE/NITRITE	0.1000	1.0000	MG/L	Dec 17,1992	Dec 17,1992	6
NITRATE/NITRITE (HISTORI	0.0200	3500.0000	MG/L	Nov 8,1990	Nov 8,1989	104
NITRITE	0.0100	0.2000	MG/L	May 17,1991	Jun 25,1991	27
OIL AND GREASE	0.2000	36.1000	MG/L	Jan 9,1991	Aug 8,1991	98
ORTHOPHOSPHATE	0.0100	3.4000	MG/L	Nov 15,1990	Aug 2,1990	68
ORTHOPHOSPHATE (HISTORICA	0.0100	0.4700	MG/L	Sep 12,1990	Aug 10,1992	56
PENTACHLOROPHENOL	5.0000 J	5.0000 J	UG/L	Mar 29,1993	Mar 29,1993	2
PHENOL	1.0000 J	15.0000	UG/L	Aug 2,1989	Aug 3,1989	6
PHOSPHORUS	0.0100	4.8500	MG/L	Aug 16,1990	Oct 4,1990	138
PLUTONIUM-236	-0.0044	0.0490	PCI/L	Apr 15,1992	Apr 6,1992	34
PLUTONIUM-238	-0.0160 J	0.0340	PCI/L	Apr 15,1992	Apr 7,1992	58
PLUTONIUM-239	-0.0300	6.1500	PCI/L	May 9,1991	Dec 5,1990	72
PLUTONIUM-239/240	-0.0690	4.4000	PCI/L	Mar 24,1993	Jul 14,1989	141
POTASSIUM	0.0700	82.3000	MG/L	Jun 12,1991	Dec 8,1989	161
PYRENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
RADIUM-226	-0.2000	30.0000	PCI/L	Mar 30,1989	Jun 16,1989	75
RADIUM-228	-1.1000	36.0000	PCI/L	Jul 14,1989	Aug 10,1989	32
SELENIUM	0.0007	0.0485	MG/L	Mar 31,1992	Mar 26,1992	115
SILICA, DISSOLVED (HISTOR	1.5000	60.0000	MG/L	Nov 27,1990	Nov 7,1990	58
SILICON	0.3480	11500.0000	MG/L	Oct 8,1992	Jun 13,1991	167
SILVER	0.0000	0.1480	MG/L	Jul 7,1988	Mar 1,1989	98
SIMAZINE	0.0004	0.0008	MG/L	Mar 30,1990	Oct 6,1989	6
SODIUM	0.2100	551.0000	MG/L	Jun 12,1991	Mar 14,1990	196
SODIUM FLUORIDE	0.3300	0.7000	MG/L	Nov 18,1991	Dec 7,1990	38
SODIUM SULFATE	8.3000	53.0000	MG/L	Sep 12,1991	Dec 6,1990	36
SOLIDS, NONVOLATILE SUSPE	5.0000	326.0000	MG/L	May 8,1991	Oct 17,1991	61
SPECIFIC CONDUCTIVITY	115.0000	825.0000	US	Jun 21,1988	Jul 7,1988	44
STRONTIUM	0.0002	42.8000 E	MG/L	Dec 8,1989	Mar 15,1990	210
STRONTIUM-89	-0.3900	4149.0000	PCI/L	May 3,1991	Apr 3,1990	56

Table B-15

FY 93 Operable Unit 5 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
STRONTIUM-89,90	-0.6000	6.6530	PCI/L	Mar 21,1989	Apr 8,1992	93
STRONTIUM-90	-0.3000	33.3400	PCI/L	May 17,1989	Oct 4,1990	79
STYRENE	1.0000 J	1.0000 J	UG/L	Apr 11,1990	Apr 11,1990	2
SULFATE	1.0000	720.0000	MG/L	Jul 30,1987	Nov 8,1989	114
SULFATE (HISTORICAL CASNO	14.3000	43.3000	MG/L	Jul 10,1992	Jul 28,1992	27
SULFIDE	1.0000	39.0000	MG/L	Dec 10,1990	Dec 10,1990	30
TETRACHLOROETHENE	0.3400	13.0000	UG/L	Mar 30,1990	Apr 12,1990	20
THALLIUM	0.0010 BWN	0.0062 I	MG/L	Aug 22,1990	Oct 14,1991	35
THORIUM-230	-0.1700	0.8900 J	PCI/L	May 6,1991	May 27,1992	10
THORIUM-232	0.0000	1.0000	PCI/L	May 6,1991	May 27,1992	10
TIN	0.0001	0.9690	MG/L	Jul 18,1989	Mar 1,1989	85
TOLUENE	1.0000 J	15.0000 B	UG/L	Nov 8,1990	Dec 14,1989	39
TOTAL ALKALINITY	87.0000	219.0000	MG/L	Sep 19,1990	Nov 15,1990	6
TOTAL DISSOLVED SOLIDS	18.0000	21000.0000	MG/L	Nov 20,1989	Nov 8,1989	118
TOTAL ORGANIC CARBON	1.0000	44.0000	MG/L	Apr 9,1991	Sep 17,1991	71
TOTAL RADIOCESIUM	-0.1800	2.2000	PCI/L	Mar 29,1993	Sep 26,1991	50
TOTAL SUSPENDED SOLIDS	1.0000	46000.0000	MG/L	Jul 22,1987	Aug 10,1989	112
TOTAL XYLENES	1.0000 J	6.0000	UG/L	Apr 10,1990	May 3,1990	14
TOXAPHENE	0.0010 I	0.0010 I	MG/L	May 24,1989	May 24,1989	2
TRICHLOROETHENE	1.0000 J	42.0000	UG/L	Mar 14,1990	Nov 10,1987	24
TRITIUM	-6930.0000	3600.0000	PCI/L	Nov 20,1989	Oct 23,1990	98
URANIUM-233,-234	-0.1200	14.5340	PCI/L	Nov 20,1989	Apr 8,1992	125
URANIUM-234	0.0160	13.0000	PCI/L	May 2,1991	Dec 6,1990	66
URANIUM-235	-0.2000	5.6860	PCI/L	Sep 19,1989	Apr 8,1992	155
URANIUM-238	-0.1000	74.0000	PCI/L	Mar 1,1989	Mar 14,1990	119
VANADIUM	0.0020	1.6500	MG/L	Jun 20,1991	Jun 16,1989	104
VINYL ACETATE	1.0000 J	2.0000 J	UG/L	Jun 22,1989	Jun 21,1989	4
VINYL CHLORIDE	7.0000 J	7.0000 J	UG/L	Aug 21,1989	Aug 21,1989	2
ZINC	0.0001	2.6800	MG/L	Oct 20,1989	Jun 16,1989	179
beta-BHC	0.0000 J	0.0002 J	MG/L	Oct 3,1991	Oct 17,1991	8
cis-1,3-DICHLOROPROPENE	1.0000 J	1.0000 J	UG/L	Apr 10,1990	Apr 10,1990	4
delta-BHC	0.0000 J	0.0000 J	MG/L	Oct 3,1991	Oct 3,1991	2
gamma-BHC (LINDANE)	0.0004 X	0.0005 X	MG/L	Oct 3,1990	Oct 3,1990	2
o-XYLENE	1.0000 J	1.0000 J	UG/L	Mar 29,1990	Mar 29,1990	10
pH	5.4000	8.8000	PH	Nov 17,1989	May 16,1989	99

Table B-16

FY 93 Operable Unit 6 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	2.0000 J	19.0000	UG/KG	Feb 3,1993	Feb 22,1993	4
1,1-DICHLOROETHANE	4.0000 J	18.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
1,4-DICHLOROBENZENE	64.0000 J	64.0000 J	UG/KG	Jan 25,1993	Jan 25,1993	2
2-BUTANONE	1.0000 J	3700.0000	UG/KG	Jan 20,1993	Dec 17,1992	60
2-CHLOROPHENOL	44.0000 J	55.0000 J	UG/KG	Jan 27,1993	Jan 27,1993	2
2-HEXANONE	15.0000	43.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
2-METHYLNAPHTHALENE	88.0000 J	88.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
2-METHYLPHENOL	1800.0000	1800.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
4-METHYL-2-PENTANONE	1.0000 J	360.0000 E	UG/KG	Dec 2,1992	Feb 22,1993	10
4-METHYLPHENOL	95.0000 J	1700.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
ACENAPHTHENE	44.0000 J	300.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	5
ACETONE	4.0000 J	5100.0000	UG/KG	Sep 18,1991	Dec 18,1992	50
ALUMINUM	769.9017	24100.0000	MG/KG	Nov 6,1987	Dec 11,1992	252
AMERICIUM-241	-0.0600	0.5900	PCI/G	Nov 12,1987	Nov 9,1987	246
ANTHRACENE	45.0000 J	410.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
ANTIMONY	2.1678	22.3000	MG/KG	Nov 11,1987	Oct 29,1992	38
AROCLOR-1254	0.8700	0.9400	MG/KG	Feb 22,1993	Feb 4,1993	4
ARSENIC	0.4600 B	13.6000	MG/KG	Oct 29,1992	Jan 15,1993	255
BARIUM	15.3381	2970.0000	MG/KG	Nov 6,1987	Dec 10,1992	252
BENZENE	1.0000 J	3.0000 J	UG/KG	Jan 4,1993	Feb 22,1993	4
BENZO(a)ANTHRACENE	48.0000 J	840.0000	UG/KG	Feb 3,1993	Feb 22,1993	8
BENZO(a)PYRENE	38.0000 J	710.0000	UG/KG	Jan 27,1993	Feb 22,1993	10
BENZO(b)FLUORANTHENE	57.0000 J	1100.0000	UG/KG	Jan 25,1993	Feb 22,1993	12
BENZO(ghi)PERYLENE	74.0000 J	320.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
BENZO(k)FLUORANTHENE	43.0000 J	350.0000	UG/KG	Feb 22,1993	Feb 22,1993	8
BENZOIC ACID	85.0000 BJ	2600.0000 J	UG/KG	Jan 25,1993	Feb 22,1993	24
BERYLLIUM	0.2200 B	11.4445	MG/KG	Apr 30,1992	Nov 9,1987	151
BIS(2-CHLOROISOPROPYL)ETH	530.0000 J	530.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
BIS(2-ETHYLHEXYL)PHTHALAT	40.0000 J	9800.0000	UG/KG	Jan 28,1993	Feb 22,1993	23
BUTYL BENZYL PHTHALATE	860.0000	860.0000	UG/KG	Feb 3,1993	Feb 3,1993	2
CADMIUM	0.5600	100.6616	MG/KG	Feb 4,1993	Nov 10,1987	48
CALCIUM	447.0000 B	203000.0000	MG/KG	Nov 19,1992	Dec 8,1992	252
CARBON DISULFIDE	3.0000 J	3.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
CESIUM	0.6500 B	7.5000 B	MG/KG	Dec 8,1992	Jan 26,1993	104
CESIUM-137	-0.0344 J	0.2386	PCI/G	Feb 4,1993	Feb 4,1993	28
CHLOROBENZENE	74.0000	74.0000	UG/KG	Dec 4,1992	Dec 4,1992	2
CHLOROETHANE	8.0000 J	8.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
CHLOROFORM	2.0000 J	10.0000 J	UG/KG	Dec 2,1992	Nov 2,1987	4
CHROMIUM	1.4000 B	611.9934	MG/KG	Dec 14,1992	Nov 5,1987	257
CHRYSENE	43.0000 J	920.0000	UG/KG	Feb 3,1993	Feb 22,1993	10
COBALT	1.6000 B	21.4000	MG/KG	Jan 13,1993	Dec 2,1992	248
COPPER	2.7000 B	71.6000	MG/KG	Nov 4,1992	Sep 18,1991	254
CYANIDE	4.1000	19.0000 E	MG/KG	Nov 2,1987	Nov 4,1987	4
DI-n-BUTYL PHTHALATE	53.0000 BJ	340.0000 JB	UG/KG	Mar 31,1993	Feb 22,1993	4
DI-n-OCTYL PHTHALATE	580.0000 J	2000.0000 B	UG/KG	Feb 22,1993	Mar 31,1993	4
DIBENZOFURAN	120.0000 J	120.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
DIETHYL PHTHALATE	230.0000 J	300.0000 J	UG/KG	Feb 22,1993	Jan 27,1993	4
ETHYLBENZENE	8.0000	37.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
FLUORANTHENE	70.0000 J	1700.0000	UG/KG	Feb 4,1993	Feb 22,1993	24
FLUORENE	44.0000 J	250.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
GROSS ALPHA	1.2400	68.3000	PCI/G	Dec 15,1992	Dec 18,1992	174
GROSS ALPHA - DISSOLVED	10.9000	42.3000	PCI/G	Nov 18,1992	Sep 18,1991	16
GROSS ALPHA - SUSPENDED	0.1470	143.0000	PCI/G	Oct 29,1992	Oct 29,1992	74
GROSS BETA	3.3090 J	40.8000	PCI/G	Nov 18,1992	Feb 26,1993	241
GROSS BETA - DISSOLVED	0.0000	32.9000	PCI/G	Oct 8,1991	Sep 18,1991	16
GROSS BETA - SUSPENDED	6.1000 J	39.0000	PCI/G	Nov 20,1992	Apr 30,1992	12
INDENO(1,2,3-cd)PYRENE	72.0000 J	290.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	6
IRON	594.1016	56500.0000	MG/KG	Nov 6,1987	Feb 26,1993	252
LEAD	0.4900 B	84.9000	MG/KG	Oct 30,1992	Dec 2,1992	254
LITHIUM	1.9000 B	100.0000	MG/KG	Nov 17,1992	Nov 12,1987	91
MAGNESIUM	259.3886	6420.0000	MG/KG	Nov 6,1987	Sep 18,1991	252

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FY 93 Operable Unit 6 Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
MANGANESE	3.8863	1160.0000	MG/KG	Nov 6,1987	Feb 26,1993	252
MERCURY	0.0600 B	0.9300	MG/KG	Oct 28,1992	Feb 4,1993	85
METHYLENE CHLORIDE	2.0000 J	54.0000 B	UG/KG	Oct 8,1991	Jan 14,1993	31
MOLYBDENUM	1.3000	27.9000 B	MG/KG	Feb 22,1993	Dec 8,1992	12
MONOCROTOPHOS	0.9800	0.9800	MG/KG	Feb 22,1993	Feb 22,1993	2
NAPHTHALENE	170.0000 J	170.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
NICKEL	3.1000	542.9685	MG/KG	Feb 4,1993	Nov 12,1987	214
NITRATE	1.8100	14.5000	MG/KG	Feb 4,1993	Feb 8,1993	16
NITRATE/NITRITE	0.4400	20000.0000	MG/KG	Mar 31,1993	Feb 4,1993	10
NITRATE/NITRITE (HISTORI	2.0000	329.0000	MG/KG	Nov 12,1987	Nov 2,1987	18
PENTACHLOROPHENOL	660.0000 J	660.0000 J	UG/KG	Jan 25,1993	Jan 25,1993	2
PHENANTHRENE	45.0000 J	1700.0000	UG/KG	Jan 25,1993	Feb 22,1993	16
PHENOL	55.0000 J	330.0000 J	UG/KG	Jan 27,1993	Feb 22,1993	4
PLUTONIUM-238	0.0050 J	0.0060 J	PCI/G	Dec 10,1992	Dec 10,1992	4
PLUTONIUM-239/240	-0.0600	3.5000	PCI/G	Nov 4,1987	Nov 9,1987	254
POTASSIUM	371.0000 B	3600.0000	MG/KG	Sep 19,1991	Nov 9,1987	212
PYRENE	51.0000 J	2200.0000	UG/KG	Jan 25,1993	Feb 22,1993	24
RADIUM-226	0.5100	1.6070 X	PCI/G	Sep 18,1991	Feb 26,1993	16
RADIUM-228	0.9200	2.1000	PCI/G	Sep 18,1991	Sep 18,1991	16
SELENIUM	0.2600 B	1.9000	MG/KG	Dec 17,1992	Feb 4,1993	45
SILICON	57.6000	2010.0000	MG/KG	Feb 24,1992	Jan 12,1993	14
SILVER	0.8100	5.5219	MG/KG	Feb 26,1993	Nov 9,1987	10
SODIUM	42.5000 B	1464.3807	MG/KG	Nov 17,1992	Nov 2,1987	220
STRONTIUM	8.6000 B	506.0000	MG/KG	Nov 19,1992	Dec 17,1992	252
STRONTIUM-89,90	-0.6000	1.4700	PCI/G	Nov 9,1987	Feb 22,1993	33
STYRENE	1.0000 J	13.0000	UG/KG	Dec 10,1992	Feb 22,1993	4
SULFIDE	15.0000	16.0000	MG/KG	Mar 31,1993	Mar 31,1993	2
TETRACHLOROETHENE	4.0000 J	4.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
THALLIUM	0.2100 B	5.4271	MG/KG	Oct 8,1991	Nov 9,1987	81
TIN	4.3000	57.8000	MG/KG	Feb 3,1993	Jan 28,1993	22
TOLUENE	1.0000 J	3400.0000 E	UG/KG	Dec 7,1992	Feb 22,1993	169
TOTAL ORGANIC CARBON	244.0000	21000.0000	MG/KG	Nov 18,1992	Feb 4,1993	114
TOTAL XYLENES	2.0000 J	110.0000	UG/KG	Feb 3,1993	Feb 22,1993	6
TRICHLOROETHENE	6.0000	21.0000	UG/KG	Dec 7,1992	Dec 2,1992	10
TRITIUM	-0.1660	0.8800	PCI/G	Dec 17,1992	Nov 4,1987	30
URANIUM-233,-234	0.0210 BJ	971.0000	PCI/G	Dec 8,1992	Nov 16,1992	264
URANIUM-235	-0.0188	0.1600	PCI/G	Dec 15,1992	Dec 7,1992	226
URANIUM-238	0.2790	141.0000	PCI/G	Nov 19,1992	Nov 11,1992	260
VANADIUM	2.1000 B	62.3000	MG/KG	Nov 9,1992	Dec 11,1992	254
ZINC	7.2000	706.0000	MG/KG	Nov 4,1992	Dec 2,1992	252
pH	6.2000	10.2000	PH	Nov 4,1987	Feb 26,1993	21

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	1.0000 BJ	32.0000	UG/L	Jul 30,1990	Mar 17,1987	25
1,1,2-TRICHLOROETHANE	0.4000 J	6.0000	UG/L	Oct 13,1992	Aug 4,1987	4
1,1-DICHLOROETHANE	0.5000 J	64.0000 D	UG/L	Oct 6,1992	Apr 29,1991	19
1,1-DICHLOROETHENE	0.2000	48.0000	UG/L	Apr 21,1993	Mar 17,1987	7
1,2-DICHLOROETHANE	1.0000 J	18.0000	UG/L	Sep 12,1986	Jun 25,1987	5
1,2-DICHLOROETHENE	1.0000 J	1600.0000	UG/L	Jul 7,1992	Mar 17,1987	16
2,4-DIMETHYLPHENOL	7.0000 J	7.0000 J	UG/L	May 28,1993	May 28,1993	2
2-BUTANONE	1.0000 J	1300.0000	UG/L	Oct 30,1990	May 28,1993	19
2-CHLORONAPHTHALENE	5.0000 J	5.0000 J	UG/L	May 28,1993	May 28,1993	2
2-HEXANONE	2.0000 J	72.0000	UG/L	Jul 29,1993	Apr 27,1993	6
2-METHYLPHENOL	10.0000	14.0000	UG/L	Jul 29,1993	May 28,1993	2
4,4'-DDT	0.0530	0.0530	MG/L	Sep 3,1986	Sep 3,1986	2
4-METHYL-2-PENTANONE	1.0000 J	1200.0000 E	UG/L	Apr 29,1991	Apr 27,1993	16
4-METHYLPHENOL	31.0000	2100.0000 E	UG/L	Mar 31,1993	May 28,1993	3
ACENAPHTHENE	2.0000 J	3.0000 J	UG/L	Mar 31,1993	Apr 27,1993	2
ACETONE	1.0000 BJ	990.0000	UG/L	Sep 18,1986	May 28,1993	111
ALDRIN	0.0530	0.0530	MG/L	Sep 3,1986	Sep 3,1986	2
ALKALINITY AS CACO3	190.5000	426.5600	MG/L	Sep 14,1990	Oct 15,1990	12
ALUMINUM	0.0000	456.0000 *	MG/L	Sep 22,1988	Feb 1,1993	175
AMERICIUM-241	-0.4400	3.2000	PCI/L	Nov 13,1986	Mar 17,1993	147
AMMONIA	0.0520	0.4100	MG/L	Oct 6,1992	Oct 13,1992	12
ANTIMONY	0.0000	0.6610	MG/L	Sep 22,1988	Aug 2,1991	114
ARSENIC	0.0009 B	3.0000 J	MG/L	Aug 7,1990	Feb 22,1989	128
BARIUM	0.0001	5.0600	MG/L	Sep 22,1988	Feb 1,1993	188
BENZENE	0.0800 J	4.0000 J	UG/L	Oct 6,1992	Mar 31,1993	35
BENZENE, 1,2,4-TRIMETHYL	0.2000 J	0.2000 J	UG/L	Oct 9,1992	Oct 9,1992	2
BENZOIC ACID	61.0000	1900.0000 D	UG/L	May 28,1993	May 28,1993	2
BERYLLIUM	0.0007 J	0.0320	MG/L	Sep 27,1989	Feb 1,1993	67
BICARBONATE	21.4000	4370.0000	MG/L	Apr 13,1987	May 10,1989	121
BICARBONATE AS CACO3	38.0000	2000.0000	MG/L	Aug 13,1993	Apr 27,1993	175
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 JB	16.0000 B	UG/L	Sep 10,1986	Sep 11,1986	18
BORON	0.0445	0.2180	MG/L	Mar 12,1991	Mar 12,1991	12
BROMODICHLOROMETHANE	1.0000 J	1.0000 J	UG/L	Feb 9,1993	Feb 9,1993	2
BROMOFORM	1.0000 J	1.0000 J	UG/L	Feb 20,1990	Mar 9,1990	4
BROMOMETHANE	2.0000 J	10.0000 J	UG/L	Feb 9,1993	Sep 8,1988	6
CADMIUM	0.0004 J	0.6060	MG/L	Jul 30,1987	Feb 13,1992	121
CALCIUM	0.0951	2380.0000	MG/L	Sep 18,1986	Jan 31,1992	188
CARBON DISULFIDE	0.4000 J	45.0000	UG/L	Oct 13,1992	Oct 13,1992	42
CARBON TETRACHLORIDE	1.0000 J	14.0000	UG/L	Aug 6,1992	Aug 19,1986	21
CARBONATE	2.0000	450.0000	MG/L	Jul 30,1992	Nov 13,1986	20
CARBONATE AS CACO3	0.0000	52.0000	MG/L	Mar 14,1991	Jul 11,1991	128
CESIUM	0.0500 B	0.4000 B	MG/L	Aug 4,1993	Oct 12,1990	36
CESIUM RADIOACTIVE UNKN I	-0.2100	0.0800	PCI/L	Mar 15,1990	Mar 20,1990	18
CESIUM-134	-0.3330 J	.5200	PCI/L	Apr 14,1993	Apr 23,1993	22
CESIUM-137	-1.7800 J	5.3000	PCI/L	Aug 15,1990	May 10,1990	119
CHEMICAL OXYGEN DEMAND	4.8000	45.0000	MG/L	Oct 14,1992	Apr 12,1993	39
CHLORIDE	-0.7600	1500.0000	MG/L	Apr 8,1993	Feb 20,1992	169
CHLOROBENZENE	1.0000 J	2.0000 J	UG/L	Aug 22,1990	Feb 28,1990	4
CHLOROETHANE	2.0000 J	83.0000	UG/L	Feb 9,1993	Mar 31,1993	8
CHLOROFORM	0.1000 J	340.0000	UG/L	Oct 13,1992	Jun 2,1987	52
CHLOROMETHANE	0.2500 J	10.0000 J	UG/L	May 14,1992	Sep 8,1988	6
CHROMIUM	0.0025 B	0.7370 E	MG/L	Feb 20,1992	Feb 14,1992	137
COBALT	0.0020 B	0.4160 E	MG/L	Jul 16,1991	Feb 14,1992	93
COPPER	0.0012 B	6.4300	MG/L	Jan 20,1992	Feb 1,1993	168
CYANIDE	0.0010 B	1.0000	MG/L	Aug 6,1993	Apr 6,1987	119
DI-n-BUTYL PHTHALATE	1.0000 J	8.0000 JB	UG/L	Sep 18,1986	Sep 10,1986	16
DIELDRIN	0.0460	0.0460	MG/L	Sep 3,1986	Sep 3,1986	2
DIETHYL PHTHALATE	2.0000 J	51.0000 DJ	UG/L	Aug 13,1993	May 28,1993	7
ENDRIN	0.0700	0.0700	MG/L	Sep 3,1986	Sep 3,1986	2
ETHYLBENZENE	0.2000 J	23.0000	UG/L	Oct 13,1992	Apr 27,1993	25

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
FLUORENE	2.0000 J	2.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
FLUORIDE	0.1600	7.0000	MG/L	Oct 20,1992	Mar 31,1993	220
GROSS ALPHA	-0.7390 J	280.0000	PCI/L	Jul 17,1992	Apr 21,1993	98
GROSS ALPHA - DISSOLVED	-1.3400 J	593.3000	PCI/L	Apr 29,1991	Oct 9,1990	156
GROSS ALPHA - SUSPENDED	-80.0000	663.0000	PCI/L	Dec 2,1988	Aug 6,1987	123
GROSS BETA	-11.0000	347.0000	PCI/L	Apr 16,1987	Aug 6,1987	124
GROSS BETA - DISSOLVED	-2.2000	268.3000	PCI/L	Jun 13,1990	Oct 9,1990	151
GROSS BETA - SUSPENDED	1.4300	75.9200	PCI/L	May 11,1990	Jun 6,1990	42
HEPTACHLOR	0.0640	0.0640	MG/L	Sep 3,1986	Sep 3,1986	2
IRON	0.0020 B	1590.0000	MG/L	Jan 20,1992	Feb 13,1992	177
LEAD	0.0000	3.6600	MG/L	Jun 25,1987	Feb 13,1992	148
LITHIUM	0.0026 B	2.6400	MG/L	Jan 16,1992	Jul 23,1993	150
MAGNESIUM	0.0292	788.0000	MG/L	Sep 18,1986	Aug 22,1990	183
MANGANESE	0.0000	13.5000 E	MG/L	Sep 18,1986	Feb 14,1992	181
MERCURY	0.0000	0.0015	MG/L	Jun 25,1987	Mar 22,1993	58
METHYLENE CHLORIDE	0.2000	170.0000 J	UG/L	Apr 21,1993	Aug 29,1989	149
MOLYBDENUM	0.0020 B	0.3000	MG/L	Apr 24,1991	Aug 19,1986	121
N-NITROSO-DI-n-PROPYLAMIN	200.0000 D	200.0000 D	UG/L	May 28,1993	May 28,1993	2
N-NITROSODIPHENYLAMINE	3.0000 BJ	162.0000 B	UG/L	Sep 12,1986	Sep 10,1986	22
NAPHTHALENE	13.0000	31.0000	UG/L	Mar 31,1993	Jul 29,1993	2
NICKEL	0.0023 B	1.5500	MG/L	Feb 20,1992	Jan 24,1990	147
NITRATE	0.1000	596.0000	MG/L	Jul 30,1990	Mar 4,1991	24
NITRATE/NITRITE	0.0200	3400.0000	MG/L	Dec 11,1992	Jul 22,1993	99
NITRATE/NITRITE (HISTORI	0.0200	8260.0000	MG/L	Jul 30,1987	Oct 9,1992	180
NITRITE	0.0200	2.2000	MG/L	Sep 25,1990	Jun 6,1990	16
OIL AND GREASE	0.8000	5.0000	MG/L	Jun 20,1991	Nov 14,1990	7
ORTHOPHOSPHATE	0.0100	2.3000	MG/L	Jun 22,1993	Aug 25,1986	78
ORTHOPHOSPHATE (HISTORICA	0.0100	0.3000	MG/L	Sep 12,1991	Jul 15,1992	104
PENTACHLOROPHENOL	2.0000 J	4.0000 J	UG/L	Sep 11,1986	May 28,1993	4
PHENANTHRENE	2.0000 J	2.0000 J	UG/L	Apr 27,1993	Mar 31,1993	4
PHENOL	16.0000	130.0000	UG/L	Mar 31,1993	Jun 16,1993	2
PHOSPHORUS	0.0100	0.7180 B	MG/L	Aug 15,1990	Oct 24,1990	42
PLUTONIUM-238	-0.0029 J	0.0126	PCI/L	Jul 30,1990	Nov 1,1990	38
PLUTONIUM-239	0.0010	0.0420	PCI/L	Nov 1,1989	Aug 30,1989	24
PLUTONIUM-239/240	-3.2000	7.5630	PCI/L	Jul 28,1987	Sep 15,1992	151
POTASSIUM	0.0063	7050.0000	MG/L	Sep 18,1986	Feb 22,1989	195
RADIUM-226	0.0355 J	8.8000 B	PCI/L	Jul 17,1990	Apr 21,1993	110
RADIUM-228	1.2000	14.3400	PCI/L	Nov 9,1992	Jan 31,1992	19
SELENIUM	0.0009 J	45.0000	MG/L	Aug 31,1989	Feb 27,1989	173
SILICA, DISSOLVED (HISTOR	1.1000	35.0000	MG/L	Feb 6,1992	Oct 24,1990	134
SILICON	2.4200	288.0000	MG/L	Apr 23,1992	Feb 1,1993	109
SILVER	0.0020 B	3.0400	MG/L	Oct 8,1991	Feb 1,1993	96
SODIUM	0.0760	4447.3764	MG/L	Aug 26,1986	Dec 17,1987	188
SODIUM FLUORIDE	0.4300	1.9000	MG/L	Mar 12,1991	Mar 12,1991	12
SODIUM SULFATE	24.0000	524.0000	MG/L	Aug 10,1990	Mar 12,1991	12
SOLIDS, NONVOLATILE SUSPE	29.0000	29.0000	MG/L	Mar 12,1991	Mar 12,1991	2
STRONTIUM	0.0014	25.7000	MG/L	Sep 18,1986	Jun 13,1991	187
STRONTIUM-89	16.0000	4870.0000	PCI/L	May 10,1990	May 17,1990	4
STRONTIUM-89,90	-0.4000	13.8300	PCI/L	Dec 5,1989	Jun 13,1991	137
STRONTIUM-90	-0.1726	4.1000	PCI/L	Mar 20,1990	Mar 15,1990	40
STYRENE	0.1100	0.1100	UG/L	Mar 17,1992	Mar 17,1992	2
SULFATE	1.7000	19000.0000	MG/L	Mar 31,1993	Jul 17,1991	163
SULFIDE	5.0000	16.0000	MG/L	Jul 29,1993	Apr 27,1993	2
TETRACHLOROETHENE	0.1000	380.0000 D	UG/L	May 4,1993	Feb 9,1993	52
THALLIUM	0.0010 B	0.2900	MG/L	Mar 14,1991	Sep 10,1986	60
TIN	0.0101 B	0.7670	MG/L	Apr 22,1991	Aug 2,1991	88
TOLUENE	0.1300 J	1200.0000 E	UG/L	Apr 1,1992	Jun 16,1993	66
TOTAL DISSOLVED SOLIDS	80.0000	33000.0000	MG/L	Feb 13,1992	Oct 6,1992	166
TOTAL ORGANIC CARBON	1.1000	22.0000	MG/L	Oct 5,1992	Aug 5,1993	41
TOTAL RADIOCESIUM	-0.1000	1.7000 B	PCI/L	Nov 8,1989	May 6,1993	26

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
TOTAL SUSPENDED SOLIDS	4.0000	47000.0000	MG/L	Apr 28,1992	Feb 14,1992	152
TOTAL XYLENES	0.2000 J	120.0000	UG/L	Oct 6,1992	Apr 27,1993	34
TRICHLOROETHENE	0.1000	400.0000 D	UG/L	Apr 21,1993	Feb 9,1993	68
TRITIUM	-460.0000	15020.0000	PCI/L	Nov 14,1989	Sep 19,1989	187
URANIUM-233,-234	-0.2000	115.1600	PCI/L	Jul 30,1987	May 24,1990	158
URANIUM-235	-0.0511 J	3.6000	PCI/L	Apr 23,1991	May 6,1987	167
URANIUM-238	-0.9000	75.0000	PCI/L	Aug 5,1987	May 6,1987	160
VANADIUM	0.0021 B	0.7540 N*	MG/L	Sep 21,1990	Feb 1,1993	130
VINYL ACETATE	1.0000 J	5.0000 J	UG/L	Oct 6,1992	Dec 18,1990	4
VINYL CHLORIDE	2.0000 J	930.0000	UG/L	Jul 10,1991	Jan 3,1989	10
ZINC	0.0000	686.0000	MG/L	Sep 18,1986	Feb 13,1992	193
cis-1,2-DICHLOROETHENE	0.5000	0.7000	UG/L	Oct 9,1992	Apr 21,1993	6
gamma-BHC (LINDANE)	0.0860	0.0860	MG/L	Sep 3,1986	Sep 3,1986	2
m-XYLENE	0.1000 J	0.1000 J	UG/L	Oct 9,1992	Oct 9,1992	2
p-CYMENE	0.1300 J	0.1300 J	UG/L	May 14,1992	May 14,1992	2
p-XYLENE	0.1000 J	0.1000 J	UG/L	Oct 9,1992	Oct 9,1992	2
pH	6.4000	9.4000	PH	Nov 9,1989	Mar 19,1990	139
trans-1,2-DICHLOROETHENE	2.0000 J	1600.0000	UG/L	Aug 19,1986	Mar 17,1987	66

Table B-18

FY 93 Operable Unit 6 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
% MOISTURE	13.0000	37.0000	%MOIST	Sep 18,1990	Sep 19,1990	14
1,1-DICHLOROETHENE	5.0000 J	5.0000 J	UG/KG	Aug 13,1986	Aug 13,1986	2
1,2,4-TRICHLOROBENZENE	130.0000 J	130.0000 J	UG/KG	Nov 16,1992	Nov 16,1992	2
2,4-DICHLOROPHENOL	140.0000 J	140.0000 J	UG/KG	Nov 16,1992	Nov 16,1992	2
2-BUTANONE	1.0000 JB	13000.0000 JB	UG/KG	Aug 10,1989	Jul 13,1989	94
2-METHYLNAPHTHALENE	58.0000 J	1700.0000	UG/KG	May 8,1991	May 29,1991	10
4,4'-DDT	0.0029 J	0.0049 J	MG/KG	Dec 4,1991	Dec 4,1991	7
4-METHYL-2-PENTANONE	6.0000 J	2000.0000 J	UG/KG	Oct 29,1992	Aug 15,1989	4
4-METHYLPHENOL	990.0000 J	130000.0000 J	UG/KG	May 29,1991	Aug 15,1989	6
4-NITROANILINE	5300.0000 J	5300.0000 J	UG/KG	Mar 25,1991	Mar 25,1991	2
ACENAPHTHENE	56.0000 J	9200.0000	UG/KG	Aug 20,1991	May 29,1991	18
ACENAPHTHYLENE	50.0000 J	440.0000 J	UG/KG	Aug 20,1991	May 29,1991	2
ACETONE	4.0000 JB	110000.0000 B	UG/KG	Jul 18,1989	Aug 30,1989	71
ALDRIN	0.0540	0.0540	MG/KG	Nov 12,1992	Nov 12,1992	2
ALKALINITY AS CACO3	15.8000	11000.0000	MG/KG	Dec 3,1990	May 29,1991	21
ALUMINUM	9.7000	27800.0000	MG/KG	Aug 19,1986	Aug 29,1989	163
AMERICIUM-241	0.0014 J	389.4000	PCI/G	Mar 4,1992	Nov 16,1992	139
ANTHRACENE	37.0000 J	15000.0000	UG/KG	Dec 9,1991	May 29,1991	31
ANTIMONY	1.6000	68.5000	MG/KG	Aug 13,1986	Oct 28,1992	36
AROCLOR-1254	0.0500 J	67.0000	MG/KG	May 29,1991	Mar 25,1991	61
AROCLOR-1260	0.8200	0.8600	MG/KG	Oct 28,1992	Oct 27,1992	4
ARSENIC	0.1000	10.6000	MG/KG	Aug 19,1986	Jul 17,1989	159
BARIUM	24.9000	373.0000	MG/KG	Aug 27,1991	Jul 19,1989	163
BENZENE	3.0000 J	3.0000 J	UG/KG	Oct 15,1992	Aug 13,1986	4
BENZO(a)ANTHRACENE	49.0000 J	71000.0000 J	UG/KG	Aug 13,1991	Aug 15,1989	65
BENZO(a)PYRENE	75.0000 J	71000.0000 J	UG/KG	Nov 12,1992	Aug 15,1989	67
BENZO(b)FLUORANTHENE	54.0000 J	89000.0000 J	UG/KG	Oct 28,1992	Aug 15,1989	69
BENZO(ghi)PERYLENE	64.0000 J	26000.0000	UG/KG	May 29,1991	May 29,1991	26
BENZO(k)FLUORANTHENE	37.0000 J	79000.0000 J	UG/KG	Mar 26,1991	Aug 15,1989	55
BENZOIC ACID	44.0000 J	1300.0000 J	UG/KG	Dec 3,1990	Aug 29,1989	24
BERYLLIUM	0.2000	15.2000	MG/KG	Dec 3,1991	Nov 16,1992	61
BICARBONATE AS CACO3	270.0000	3500.0000	MG/KG	Dec 18,1990	Dec 17,1990	8
BIS(2-ETHYLHEXYL)PHTHALAT	36.0000 J	3700000.0000	UG/KG	Aug 26,1991	Jul 13,1989	141
BUTYL BENZYL PHTHALATE	66.0000 J	2300.0000	UG/KG	Oct 28,1992	May 29,1991	6
CADMIUM	0.7500	19.5000	MG/KG	Dec 3,1990	Aug 28,1989	58
CALCIUM	710.0000	95700.0000	MG/KG	Aug 19,1986	Jul 18,1989	164
CARBON DISULFIDE	1.0000 J	6000.0000 J	UG/KG	Dec 3,1990	Aug 30,1989	12
CARBONATE	0.0000	130.0000	MG/KG	Mar 4,1992	Dec 18,1990	6
CESIUM	1.4000 B	118.0000 B	MG/KG	Oct 26,1992	Aug 30,1990	80
CESIUM-134	0.0327	0.1673	PCI/G	Aug 13,1991	Sep 3,1991	18
CESIUM-137	0.0034 J	2.8100	PCI/G	Feb 26,1992	Nov 18,1992	144
CHLORIDE	12.0000	155.0000	MG/KG	Aug 19,1986	Aug 13,1986	14
CHLOROBENZENE	4.0000 J	4.0000 J	UG/KG	Aug 13,1986	Aug 13,1986	2
CHLOROFORM	5.0000 J	5.0000 J	UG/KG	Aug 30,1990	Aug 30,1990	2
CHLOROMETHANE	3000.0000 J	3000.0000 J	UG/KG	Jul 17,1989	Jul 17,1989	2
CHROMIUM	2.2000	96.1000	MG/KG	Feb 26,1992	Nov 16,1992	163
CHRYSENE	51.0000 J	100000.0000 J	UG/KG	Aug 13,1991	Aug 15,1989	82
COBALT	2.2000 B	15.5000 B	MG/KG	Dec 18,1990	Oct 21,1992	132
COPPER	5.6000	177.0000	MG/KG	Aug 12,1986	Jul 13,1989	163
CYANIDE	0.0050	1.0000	MG/KG	Aug 19,1986	Aug 12,1986	4
DI-n-BUTYL PHTHALATE	20.0000 J	290000.0000 JB	UG/KG	Aug 13,1986	Aug 29,1989	54
DI-n-OCTYL PHTHALATE	66.0000 J	2000.0000	UG/KG	Oct 29,1992	Aug 28,1989	20
DIBENZO(a,h)ANTHRACENE	150.0000 J	9100.0000	UG/KG	Nov 16,1992	May 29,1991	7
DIBENZOFURAN	97.0000 J	4100.0000	UG/KG	Nov 16,1992	May 29,1991	10
ENDOSULFAN I	0.0016 J	0.0016 J	MG/KG	Aug 29,1989	Aug 29,1989	2
ETHYLBENZENE	10000.0000 J	10000.0000 J	UG/KG	Jul 13,1989	Jul 13,1989	2
FLUORANTHENE	45.0000 J	300000.0000 J	UG/KG	Sep 18,1990	Jul 13,1989	106
FLUORENE	160.0000 J	8900.0000	UG/KG	Aug 12,1986	May 29,1991	10
GROSS ALPHA	11.2800	172.1000	PCI/G	Oct 14,1992	Oct 27,1992	74
GROSS ALPHA - DISSOLVED	0.0000	1735.0000	PCI/G	Aug 27,1991	Nov 16,1992	29
GROSS ALPHA - SUSPENDED	3.9400	4000.0000	PCI/G	May 29,1991	Aug 29,1989	74
GROSS BETA	3.0000	39.3900	PCI/G	Jul 17,1989	Oct 28,1992	115
GROSS BETA - DISSOLVED	6.4500	240.4000	PCI/G	Aug 26,1991	Mar 26,1991	30

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FY 93 Operable Unit 6 Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
GROSS BETA - SUSPENDED	3.2800	40.2000	PCI/G	May 21,1991	Nov 18,1992	36
HEPTACHLOR	0.0390	0.0400	MG/KG	Nov 16,1992	Nov 16,1992	2
INDENO(1,2,3-cd)PYRENE	60.0000 J	22000.0000	UG/KG	May 29,1991	May 29,1991	30
IRON	5620.0000	35000.0000	MG/KG	Dec 18,1990	Aug 29,1989	165
LEAD	4.7000	155.0000	MG/KG	Dec 3,1991	Nov 16,1992	163
LITHIUM	1.8000	16.6000 B	MG/KG	Feb 26,1992	Oct 21,1992	77
MAGNESIUM	250.0000	7400.0000	MG/KG	Aug 19,1986	Jul 19,1989	159
MANGANESE	10.5000	1700.0000	MG/KG	Jul 17,1989	Mar 19,1991	163
MERCURY	0.0400	1.5000	MG/KG	Dec 3,1990	Nov 16,1992	79
METHYLENE CHLORIDE	1.0000 J	160000.0000 B	UG/KG	Aug 12,1986	Jul 19,1989	66
MOLYBDENUM	1.6000	11.0000	MG/KG	Jul 10,1992	Aug 19,1986	20
N-NITROSODIPHENYLAMINE	59.0000 J	58000.0000 J	UG/KG	Aug 15,1989	Aug 15,1989	24
NAPHTHALENE	120.0000 J	4400.0000	UG/KG	May 8,1991	May 29,1991	7
NICKEL	2.6000	58.1000	MG/KG	Dec 18,1990	Nov 16,1992	121
NITRATE	0.1590	10.0000	MG/KG	Nov 18,1992	Dec 3,1990	12
NITRATE/NITRITE (HISTORI	0.6380	183.0000	MG/KG	Mar 4,1992	Mar 26,1991	40
NITRITE	0.3000	0.5000	MG/KG	Aug 29,1990	Aug 29,1990	4
PENTACHLOROPHENOL	320.0000 J	320.0000 J	UG/KG	Aug 12,1986	Aug 12,1986	2
PHENANTHRENE	71.0000 J	88000.0000 J	UG/KG	May 21,1991	Aug 15,1989	78
PHENOL	110.0000 J	280.0000 J	UG/KG	Nov 18,1992	Nov 16,1992	4
PHOSPHORUS	198.0000	348.0000	MG/KG	Dec 18,1990	Dec 17,1990	8
PLUTONIUM-238	0.0000 J	0.0039 J	PCI/G	Sep 17,1990	Aug 30,1990	6
PLUTONIUM-239	0.0800	760.0000	PCI/G	Jul 11,1989	Aug 29,1989	24
PLUTONIUM-239/240	0.0000	1174.0000	PCI/G	Aug 12,1986	Nov 16,1992	134
POLONIUM-210	0.7820	2.1700	PCI/G	Sep 15,1992	Sep 15,1992	2
POTASSIUM	402.0000	42700.0000	MG/KG	Aug 27,1991	Aug 13,1986	130
PYRENE	50.0000 J	150000.0000 J	UG/KG	Aug 13,1986	Aug 15,1989	96
RADIUM-226	0.0100	2.5000	PCI/G	Aug 30,1990	May 29,1991	161
RADIUM-228	0.8000	2.7600	PCI/G	May 8,1991	Nov 18,1992	155
SELENIUM	0.1300	2.4500	MG/KG	Aug 19,1986	Sep 15,1992	28
SILICON	64.9000	1710.0000	MG/KG	Mar 4,1992	Mar 25,1991	18
SILVER	0.7100 B	420.0000	MG/KG	Sep 17,1990	Jul 13,1989	62
SODIUM	38.1000	950.0000 B	MG/KG	Aug 26,1991	Sep 17,1990	120
STRONTIUM	5.5000	307.0000	MG/KG	Aug 27,1991	Nov 18,1992	143
STRONTIUM-89,90	0.0106 J	2.5270	PCI/G	Feb 26,1992	Dec 3,1990	122
STRONTIUM-90	-0.5000	1.6000	PCI/G	Jul 11,1989	Jul 18,1989	28
SULFATE	33.0000	744.0000	MG/KG	Aug 12,1986	Aug 12,1986	12
SULFIDE	3.0000	23.0000	MG/KG	Jul 11,1989	Aug 29,1989	6
THALLIUM	0.3100	90.0000	MG/KG	Aug 26,1991	Aug 12,1986	44
TIN	2.2000	63.7000	MG/KG	Sep 15,1992	Aug 29,1989	27
TOLUENE	2.0000 J	500000.0000	UG/KG	Sep 17,1990	Aug 15,1989	122
TOTAL ORGANIC CARBON	3020.0000	54400.0000 G	MG/KG	Oct 28,1992	Nov 18,1992	100
TRICHLOROETHENE	4.0000 J	12.0000 J	UG/KG	Aug 13,1986	Nov 18,1992	4
TRITIUM	-0.0670	1.0900	PCI/G	Nov 18,1992	Nov 15,1992	30
URANIUM-233,-234	0.0000	25.2200	PCI/G	Aug 15,1989	Nov 16,1992	162
URANIUM-235	-0.0060 J	1.3020	PCI/G	Oct 20,1992	Nov 16,1992	171
URANIUM-238	0.0940	43.0900	PCI/G	May 8,1991	Nov 16,1992	165
VANADIUM	6.7000	81.1000	MG/KG	Aug 27,1991	Aug 29,1989	161
ZINC	29.1000	1270.0000	MG/KG	Dec 9,1991	Nov 16,1992	162
beta-BHC	0.0110 XZ	0.0130	MG/KG	Dec 3,1990	Jul 13,1989	4
delta-BHC	0.0016 J	0.0016 J	MG/KG	Mar 19,1991	Mar 19,1991	2
gamma-BHC (LINDANE)	0.0250	0.0250	MG/KG	Oct 26,1992	Oct 26,1992	2
pH	6.8000	9.6000	PH	Mar 19,1991	Dec 18,1990	66

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FY 93 Operable Unit 6 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	0.2400	42.0000	UG/L	Mar 30,1990	Mar 20,1989	97
1,1,2,2-TETRACHLOROETHANE	1.0000 J	3.0000 J	UG/L	Apr 10,1990	Jul 23,1990	12
1,1,2-TRICHLOROETHANE	1.0000 J	24.0000	UG/L	Apr 10,1990	May 6,1991	10
1,1-DICHLOROETHANE	0.6000 J	50.0000	UG/L	Apr 22,1992	Dec 19,1989	67
1,1-DICHLOROETHENE	0.7100	160.0000 D	UG/L	Mar 30,1990	Sep 25,1990	65
1,2,4-TRICHLOROBENZENE	0.1100	4.0000 J	UG/L	Jul 15,1991	Oct 24,1989	4
1,2-DICHLOROETHANE	1.0000 J	23.0000	UG/L	Jul 8,1988	Mar 26,1991	46
1,2-DICHLOROETHENE	1.0000 J	460.0000 E	UG/L	Aug 23,1990	Sep 11,1990	84
1,2-DICHLOROPROPANE	1.0000 J	3.0000 J	UG/L	Apr 10,1990	Apr 11,1990	12
1,4-DICHLOROBENZENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
2,4-DIMETHYLPHENOL	2.0000 J	3.0000 J	UG/L	Oct 9,1989	Oct 9,1991	10
2,4-DINITROTOLUENE	4.0000 J	4.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
2-BUTANONE	1.0000 J	76.0000	UG/L	Dec 5,1990	Jan 12,1990	98
2-HEXANONE	1.0000 J	12.0000	UG/L	Sep 3,1991	Jul 29,1992	44
2-METHYLNAPHTHALENE	8.0000 J	29.0000	UG/L	Feb 26,1993	Oct 4,1990	4
2-METHYLPHENOL	24.0000	24.0000	UG/L	Aug 21,1986	Aug 21,1986	2
4,4'-DDT	0.0000 J	0.0009 X	MG/L	Oct 21,1991	Oct 3,1990	8
4-CHLORO-3-METHYLPHENOL	1.0000 J	1.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
4-METHYL-2-PENTANONE	1.0000 JB	87.0000 J	UG/L	May 2,1990	Mar 23,1990	52
4-METHYLPHENOL	2.0000 J	43.0000 J	UG/L	Jan 25,1993	Mar 22,1989	8
ACENAPHTHENE	1.0000 J	5.0000 J	UG/L	Oct 9,1989	Oct 24,1989	6
ACENAPHTHYLENE	10.0000 J	10.0000 J	UG/L	Mar 22,1989	Mar 22,1989	4
ACETONE	1.0000 JB	970.0000 B	UG/L	Apr 12,1990	Aug 8,1989	366
ALDRIN	0.0000 J	0.0003 X	MG/L	Apr 8,1991	Oct 3,1990	8
ALKALINITY AS CACO3	10.0000	341.0000	MG/L	Nov 20,1990	Jun 26,1990	87
ALUMINUM	0.0002	442.0000 N	MG/L	Aug 22,1989	May 17,1993	915
AMERICIUM-241	-1.8000	90.0000	PCI/L	May 2,1991	Jun 6,1989	741
AMMONIA	0.0150	14.0000	MG/L	May 18,1990	Nov 20,1990	102
ANTHRACENE	2.0000 J	2.0000 J	UG/L	May 11,1989	May 11,1989	2
ANTIMONY	0.0073 B	1.8000 B	MG/L	Oct 1,1990	Mar 26,1991	350
AROCLOR-1254	0.0001 J	0.0240	MG/L	Oct 16,1990	Oct 17,1991	26
ARSENIC	0.0007	1.0300	MG/L	Aug 2,1991	Jun 16,1989	572
ATRAZINE	0.0001	2.7200	MG/L	Sep 13,1990	May 15,1990	41
BARIUM	0.0001 B	7.0700	MG/L	Oct 23,1989	Jan 9,1990	895
BENZENE	1.0000 J	150.0000 D	UG/L	Jun 26,1989	Sep 25,1990	82
BENZO(a)ANTHRACENE	1.0000 J	2.0000 J	UG/L	May 11,1989	Aug 18,1986	4
BENZO(a)PYRENE	3.0000 J	3.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZO(b)FLUORANTHENE	3.0000 J	3.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZO(k)FLUORANTHENE	4.0000 J	4.0000 J	UG/L	Aug 18,1986	Aug 18,1986	2
BENZOIC ACID	2.0000 J	8.0000 J	UG/L	Mar 11,1990	Oct 23,1990	26
BENZYL ALCOHOL	2.0000 J	4.0000 J	UG/L	Oct 9,1989	Oct 23,1990	8
BERYLLIUM	0.0002 J	0.1700	MG/L	Mar 17,1990	Aug 19,1986	309
BICARBONATE	5.0000	4100.0000	MG/L	May 24,1989	Aug 10,1989	346
BICARBONATE AS CACO3	1.0000	1110.0000	MG/L	May 17,1993	Nov 1,1990	663
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 JB	1000.0000	UG/L	Oct 18,1989	Oct 9,1989	218
BROMOCHLOROMETHANE	6.5000	6.5000	UG/L	Sep 25,1992	Sep 25,1992	4
BROMODICHLOROMETHANE	0.6000 J	4.0000 J	UG/L	Aug 12,1992	Feb 10,1992	17
BROMOFORM	1.0000 J	2.0000 J	UG/L	Jul 10,1989	Mar 19,1991	8
BUTYL BENZYL PHTHALATE	1.0000 J	3.0000 J	UG/L	Mar 22,1989	Jul 11,1989	14
CADMIUM	0.0010	0.4000	MG/L	Sep 26,1991	Mar 26,1991	393
CALCIUM	0.0115	1760.0000	MG/L	Oct 2,1989	May 9,1989	1028
CARBON DISULFIDE	1.0000 J	19.0000	UG/L	May 7,1991	Jul 5,1989	70
CARBON TETRACHLORIDE	0.2800	1005.0000	UG/L	Mar 30,1990	Jul 21,1987	127
CARBONATE	0.0000	480.0000	MG/L	Feb 26,1992	Jan 26,1990	233
CARBONATE AS CACO3	0.0000	76.5000	MG/L	Sep 24,1990	May 7,1991	375
CESIUM	0.0001	2.5300	MG/L	Aug 8,1989	Mar 1,1989	403
CESIUM RADIOACTIVE UNKN I	-0.3000	0.2300	PCI/L	Feb 20,1990	Feb 21,1990	104
CESIUM-134	1.0400	1.0400	PCI/L	Jun 17,1992	Jun 17,1992	2
CESIUM-137	-8.0000	12.0000	PCI/L	Apr 4,1990	Mar 1,1989	451
CHLORIDE	0.0500	1200.0000	MG/L	Jul 20,1989	Dec 17,1990	687
CHLORIDE (HISTORICAL CASN	1.7700	140.0000	MG/L	Jun 22,1992	Aug 26,1992	104
CHLOROBENZENE	1.0000 J	180.0000 D	UG/L	Jun 26,1989	Sep 25,1990	30
CHLOROETHANE	2.0000 J	62.0000	UG/L	Nov 26,1990	Mar 24,1993	12
CHLOROFORM	0.2800	84.0000	UG/L	Jun 6,1991	Jul 21,1987	200
CHLOROMETHANE	1.0000 J	130.0000	UG/L	May 22,1990	Jun 17,1991	30

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Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
CHROMIUM	0.0020	0.4340	MG/L	Jul 10,1991	May 17,1993	431
CHRYSENE	1.0000 J	2.0000 J	UG/L	May 11,1989	Aug 18,1986	8
COBALT	0.0013	0.4890	MG/L	Sep 3,1992	Jun 16,1989	400
COPPER	0.0002	0.6230	MG/L	Aug 8,1989	May 17,1993	557
CURIUM-244	-0.0021	0.0280	PCI/L	May 21,1991	May 2,1991	17
CYANIDE	0.0010	1.0000	MG/L	May 26,1987	Jul 22,1987	286
CYANIDE, FREE	0.0250	0.0550	MG/L	Sep 10,1991	Sep 10,1991	6
CYANIDES (SOLUBLE SALTS A	0.0260	0.0260	MG/L	Sep 4,1991	Sep 4,1991	2
DI-n-BUTYL PHTHALATE	0.9000 J	50.0000 J	UG/L	Jul 10,1990	Oct 11,1989	147
DI-n-OCTYL PHTHALATE	1.0000 J	24.0000 B	UG/L	Jul 11,1989	Aug 23,1989	44
DIBENZOFURAN	1.0000 J	2.0000 J	UG/L	Jan 25,1993	Mar 24,1993	16
DIBROMOCHLOROMETHANE	1.0000 J	1.0000 J	UG/L	Sep 10,1991	Sep 10,1991	4
DICAMBA	0.0003	0.0021	MG/L	Apr 30,1990	May 24,1990	12
DICHLOROPROP	0.0018	0.0018	MG/L	Mar 30,1990	Mar 30,1990	4
DIELDRIN	0.0009 X	0.0009 X	MG/L	Oct 3,1990	Oct 3,1990	2
DIETHYL PHTHALATE	1.0000 J	7.0000 J	UG/L	Apr 3,1991	Oct 8,1991	34
DISSOLVED ORGANIC CARBON	1.0000	44.1000	MG/L	Sep 18,1991	Mar 8,1991	310
ENDOSULFAN I	0.0056 I	0.0056 I	MG/L	Sep 25,1992	Sep 25,1992	4
ENDRIN	0.0009 X	0.0010 X	MG/L	Oct 3,1990	Oct 3,1990	2
ENDRIN KETONE	0.0001 J	0.0001 J	MG/L	Sep 7,1989	Sep 7,1989	4
ETHYLBENZENE	1.0000 J	19.0000	UG/L	Sep 24,1990	Oct 4,1990	28
FLUORANTHENE	2.0000 J	2.0000 J	UG/L	May 11,1989	May 11,1989	2
FLUORENE	1.0000 J	3.0000 J	UG/L	May 19,1989	Mar 24,1993	12
FLUORIDE	0.1000	7.7000	MG/L	May 17,1993	Aug 15,1990	532
GROSS ALPHA	-0.5390 J	410.0000	PCI/L	May 5,1993	Sep 10,1991	360
GROSS ALPHA - DISSOLVED	-1.1400 J	1200.0000	PCI/L	Jul 29,1991	Oct 8,1990	346
GROSS ALPHA - SUSPENDED	-9.0000	2169.0000	PCI/L	May 26,1987	Jan 25,1990	359
GROSS BETA	-10.0000	3800.0000	PCI/L	May 13,1991	May 9,1989	612
GROSS BETA - DISSOLVED	-0.6757	1600.0000	PCI/L	Mar 19,1992	Oct 8,1990	420
GROSS BETA - SUSPENDED	-6.7200	2747.5000	PCI/L	Apr 3,1990	Oct 16,1989	249
HARDNESS (as CaCO3)	151.0000	190.0000	MG/L	May 22,1990	May 10,1990	6
HARDNESS, TOTAL	48.0000	800.0000	MG/L	May 17,1993	May 17,1993	38
HEPTACHLOR	0.0000 I	0.0003 X	MG/L	Oct 9,1991	Oct 3,1990	20
HEPTACHLOR EPOXIDE	0.0001 I	0.0001 I	MG/L	Oct 7,1991	Oct 7,1991	4
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	May 26,1987	Jul 22,1987	52
IRON	0.0001	3220.0000	MG/L	Aug 2,1989	Jun 16,1989	945
ISOPHORONE	1.0000 J	1.0000 J	UG/L	Apr 11,1989	Apr 11,1989	4
LEAD	0.0001	0.9500	MG/L	Jan 9,1990	Jan 9,1990	768
LITHIUM	0.0001 J	83.9000	MG/L	Aug 21,1989	Jul 5,1989	798
MAGNESIUM	0.0100	8720.0000	MG/L	Mar 16,1990	Jun 28,1989	1015
MANGANESE	0.0002	27.7000	MG/L	Oct 19,1989	Jun 16,1989	971
MERCURY	0.0001 B	40591.0000	MG/L	Nov 13,1990	Mar 25,1991	506
METHOXYCHLOR	0.0001 J	0.0003 J	MG/L	Jun 26,1989	Jul 7,1989	8
METHYLENE CHLORIDE	0.2100	340.0000	UG/L	Apr 3,1990	Aug 15,1986	396
MOLYBDENUM	0.0001	0.6800	MG/L	May 9,1989	Aug 7,1986	561
N-NITROSO-DI-n-PROPYLAMIN	5.0000 J	5.0000 J	UG/L	Oct 24,1989	Oct 24,1989	2
N-NITROSODIPHENYLAMINE	1.0000 J	300.0000	UG/L	Oct 3,1989	Aug 14,1986	86
NAPHTHALENE	1.0000 J	26.0000	UG/L	Oct 28,1991	Oct 4,1990	12
NEPTUNIUM-237	-0.5300	0.5400	PCI/L	May 16,1991	May 3,1991	185
NICKEL	0.0001	0.8200	MG/L	May 9,1989	Jul 22,1987	479
NITRATE	0.2000	1185.7200	MG/L	Feb 26,1993	Oct 9,1990	196
NITRATE/NITRITE	0.0400	4.1200	MG/L	Mar 1,1993	Apr 6,1993	74
NITRATE/NITRITE (HISTORI	0.0200	9900.0000	MG/L	Oct 29,1990	Nov 14,1989	495
NITRITE	0.0100	2.4000	MG/L	Nov 15,1990	Oct 8,1991	161
OIL AND GREASE	0.0000	665.0000	MG/L	Sep 18,1990	Jul 8,1988	360
ORTHOPHOSPHATE	0.0100	3.4000	MG/L	May 21,1991	Aug 2,1990	256
ORTHOPHOSPHATE (HISTORICA	0.0100	0.4700	MG/L	Nov 6,1990	Aug 10,1992	267
PENTACHLOROPHENOL	5.0000 J	20.0000 J	UG/L	Mar 29,1993	Apr 11,1991	6
PHENANTHRENE	2.0000 J	6.0000 J	UG/L	Oct 9,1989	Mar 24,1993	8
PHENOL	1.0000 J	39.0000	UG/L	Jul 31,1989	Jul 10,1989	60
PHOSPHORUS	0.0100	4.8500	MG/L	Nov 5,1990	Oct 4,1990	473
PLUTONIUM-236	-0.1140	0.0490	PCI/L	Jun 4,1992	Apr 6,1992	118
PLUTONIUM-238	-0.0190 J	0.5000	PCI/L	Jun 4,1992	Jul 21,1992	182
PLUTONIUM-239	-0.0300	31.0000	PCI/L	May 9,1991	May 9,1989	252
PLUTONIUM-239/240	-0.0690	120.0000	PCI/L	Mar 24,1993	Jun 6,1989	763

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Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
POTASSIUM	0.0700	4140.0000	MG/L	Jun 12,1991	May 9,1989	902
PROPAZINE	0.0001	0.0001	MG/L	Nov 20,1990	Nov 20,1990	2
PYRENE	2.0000 J	4.0000 J	UG/L	May 11,1989	Oct 24,1989	4
RADIUM 226 AND 228	0.1300	0.1300	PCI/L	Mar 21,1990	Mar 21,1990	4
RADIUM-226	-0.2000	30.0000	PCI/L	Aug 22,1989	Jun 16,1989	285
RADIUM-228	-1.1000	52.0000	PCI/L	Jul 14,1989	Aug 8,1989	95
SELENIUM	0.0008	0.5500	MG/L	Jun 8,1992	Jun 20,1989	462
SILICA	1.0000	5.3000	MG/L	May 17,1993	May 17,1993	16
SILICA, DISSOLVED (HISTOR	0.5000	120.0000	MG/L	Jul 24,1990	Jul 23,1990	187
SILICON	0.1270	11500.0000	MG/L	Sep 23,1992	Jun 13,1991	776
SILVER	0.0000	0.7400 B	MG/L	Jul 7,1988	Mar 26,1991	347
SIMAZINE	0.0001	0.3300	MG/L	May 22,1990	May 15,1990	30
SIMETRYN	0.0006	0.0006	MG/L	Apr 19,1990	Apr 19,1990	4
SODIUM	0.0028	1500000.0000	MG/L	Dec 18,1989	Apr 12,1989	1020
SODIUM FLUORIDE	0.0600	2.6000	MG/L	May 22,1991	Dec 18,1990	106
SODIUM SULFATE	5.5000	430.0000	MG/L	Jul 30,1991	Dec 18,1990	106
SOLIDS, NONVOLATILE SUSPE	5.0000	830.0000	MG/L	May 5,1990	Apr 11,1991	223
SPECIFIC CONDUCTIVITY	115.0000	3880.0000	UMHOS/CM	Jun 21,1988	Dec 9,1992	150
STRONTIUM	0.0002	295.0000	MG/L	Dec 8,1989	Dec 18,1989	997
STRONTIUM-89	-0.7400	20567.0000	PCI/L	May 3,1991	Apr 2,1990	164
STRONTIUM-89,90	-0.6000	10.0000 B	PCI/L	Mar 21,1989	May 17,1993	528
STRONTIUM-90	-0.3000	33.3400	PCI/L	Aug 10,1989	Oct 4,1990	283
STYRENE	1.0000 J	2.0000 J	UG/L	Apr 11,1990	Apr 19,1990	6
SULFATE	0.4600	1900.0000	MG/L	Feb 26,1993	Jul 7,1989	719
SULFATE (HISTORICAL CASNO	6.0000	64.7000	MG/L	Aug 26,1992	Jul 2,1992	111
SULFIDE	1.0000	39.0000	MG/L	Aug 25,1989	Dec 10,1990	160
TETRACHLOROETHENE	0.3400	280.0000	UG/L	Mar 30,1990	Jul 12,1989	150
THALLIUM	0.0009 B	1.1300 J	MG/L	Nov 6,1990	Dec 18,1989	170
THORIUM-230	-0.2500	0.5600 BJ	PCI/L	May 3,1991	Jun 3,1992	26
THORIUM-232	0.0100	0.9100 J	PCI/L	Mar 24,1990	May 14,1992	18
TIN	0.0001	0.9690	MG/L	Jul 7,1989	Mar 1,1989	350
TOLUENE	0.4900	170.0000 D	UG/L	Sep 25,1992	Sep 25,1990	138
TOTAL ALKALINITY	48.0000	219.0000	MG/L	Nov 7,1990	Nov 15,1990	36
TOTAL DISSOLVED SOLIDS	5.0000	46000.0000	MG/L	Jun 21,1989	Feb 26,1990	776
TOTAL ORGANIC CARBON	1.0000	51.0000	MG/L	Apr 4,1991	Aug 15,1991	306
TOTAL RADIOCESIUM	-0.4000	9.0000	PCI/L	Nov 14,1989	May 17,1993	182
TOTAL SUSPENDED SOLIDS	1.0000	46000.0000	MG/L	Jul 22,1987	Aug 10,1989	560
TOTAL XYLENES	1.0000 J	40.0000 J	UG/L	Jun 4,1990	Jul 23,1990	58
TOXAPHENE	0.0010 I	0.0010 I	MG/L	May 24,1989	May 24,1989	2
TRICHLOROETHENE	0.0400	2500.0000	UG/L	May 16,1991	Jun 22,1988	289
TRITIUM	-6930.0000	23000.0000	PCI/L	Nov 20,1989	May 9,1989	563
URANIUM-232	0.0000	0.0000	PCI/L	Aug 27,1992	Aug 27,1992	2
URANIUM-233,-234	-0.1700	1500.0000	PCI/L	Oct 2,1989	Nov 14,1989	688
URANIUM-234	-0.0600	780.0000	PCI/L	May 6,1991	Mar 26,1991	200
URANIUM-235	-0.2500	72.8700	PCI/L	May 6,1991	Jan 25,1990	798
URANIUM-236	1.9700	1.9700	PCI/L	Mar 24,1990	Mar 24,1990	4
URANIUM-238	-0.1000	700.0000	PCI/L	Mar 1,1989	Nov 14,1989	707
VANADIUM	0.0020	1.6500	MG/L	Jul 22,1991	Jun 16,1989	575
VINYL ACETATE	1.0000 JB	80.0000	UG/L	Jun 26,1989	Feb 13,1990	24
VINYL CHLORIDE	1.0000 J	37.0000	UG/L	Feb 9,1993	Aug 26,1992	27
ZINC	0.0001	45.4000	MG/L	Aug 2,1989	Sep 13,1989	908
alpha-BHC	0.0000 I	0.0004 I	MG/L	Oct 9,1991	Jan 25,1993	14
alpha-CHLORDANE	0.0000 I	0.0026 I	MG/L	Oct 7,1991	Apr 8,1991	6
beta-BHC	0.0000 I	0.0002 J	MG/L	Oct 9,1991	Oct 17,1991	40
cis-1,2-DICHLOROETHENE	0.3200	0.3200	UG/L	Sep 25,1992	Sep 25,1992	4
cis-1,3-DICHLOROPROPENE	1.0000 J	3.0000 J	UG/L	Apr 10,1990	Apr 19,1990	10
delta-BHC	0.0000 I	0.0002 I	MG/L	Oct 9,1991	Jan 25,1993	12
gamma-BHC (LINDANE)	0.0000 I	0.0005 X	MG/L	Oct 9,1991	Oct 3,1990	18
gamma-CHLORDANE	0.0000 I	0.0000 I	MG/L	Oct 7,1991	Oct 7,1991	4
o-XYLENE	1.0000 J	8.0000	UG/L	Mar 29,1990	Jun 5,1990	14
pH	1.4000	84.0000	PH	Jun 29,1989	May 7,1990	469
sec-DICHLOROPROPANE	2.8000	2.8000	UG/L	Oct 9,1991	Oct 9,1991	2
trans-1,2-DICHLOROETHENE	2.0000 J	120.0000	UG/L	Jun 23,1988	Jun 22,1988	24

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Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	6.0000	19.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
1,1-DICHLOROETHANE	4.0000 J	18.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
1,2-DICHLOROETHENE	4.0000 J	4.0000 J	UG/KG	Feb 12,1993	Feb 12,1993	2
2,4-DICHLOROPHENOL	440.0000 J	440.0000 J	UG/KG	Feb 12,1993	Feb 12,1993	2
2-BUTANONE	3.0000 J	2000.0000	UG/KG	Nov 30,1992	Feb 22,1993	16
2-HEXANONE	15.0000	43.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
2-METHYLNAPHTHALENE	65.0000 J	88.0000 J	UG/KG	Feb 8,1993	Feb 22,1993	4
2-METHYLPHENOL	96.0000 J	1800.0000	UG/KG	Mar 1,1993	Feb 22,1993	4
4-METHYL-2-PENTANONE	1.0000 J	360.0000 E	UG/KG	Dec 2,1992	Feb 22,1993	4
4-METHYLPHENOL	61.0000 J	9300.0000	UG/KG	Feb 8,1993	Feb 12,1993	8
ACENAPHTHENE	42.0000 J	440.0000	UG/KG	Mar 1,1993	Feb 8,1993	11
ACETONE	12.0000 B	2100.0000 B	UG/KG	Feb 23,1993	Feb 22,1993	10
ALUMINUM	2580.0000	22000.0000	MG/KG	Dec 7,1992	Feb 22,1993	21
AMERICIUM-241	-0.0018	0.1610	PCI/G	Feb 23,1993	Feb 22,1993	16
ANTHRACENE	44.0000 J	620.0000	UG/KG	Feb 8,1993	Feb 8,1993	10
ANTIMONY	4.0000	13.9000 B	MG/KG	Feb 8,1993	Dec 8,1992	12
AROCLOR-1242	0.0000 E	1.3000	MG/KG	Feb 8,1993	Feb 8,1993	4
AROCLOR-1254	0.0180 J	0.8700	MG/KG	Feb 25,1993	Feb 22,1993	8
ARSENIC	0.4600	21.1000	MG/KG	Feb 8,1993	Feb 12,1993	21
BARIUM	30.7000 B	551.0000	MG/KG	Dec 7,1992	Dec 2,1992	20
BENZENE	3.0000 J	3.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
BENZO(a)ANTHRACENE	41.0000 J	1100.0000	UG/KG	Mar 1,1993	Feb 8,1993	11
BENZO(a)PYRENE	94.0000 J	990.0000	UG/KG	Feb 22,1993	Feb 8,1993	10
BENZO(b)FLUORANTHENE	64.0000 J	1500.0000	UG/KG	Feb 22,1993	Feb 8,1993	10
BENZO(ghi)PERYLENE	49.0000 J	320.0000 J	UG/KG	Feb 8,1993	Feb 22,1993	10
BENZO(k)FLUORANTHENE	43.0000 J	520.0000	UG/KG	Feb 22,1993	Feb 8,1993	10
BENZOIC ACID	230.0000 J	3400.0000 J	UG/KG	Feb 8,1993	Feb 12,1993	8
BERYLLIUM	0.3600 B	1.5000	MG/KG	Dec 7,1992	Feb 25,1993	18
BIS(2-CHLOROISOPROPYL)ETH	530.0000 J	530.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
BIS(2-ETHYLHEXYL)PHTHALAT	42.0000 J	9800.0000	UG/KG	Feb 8,1993	Feb 22,1993	9
BUTYL BENZYL PHTHALATE	74.0000 J	1100.0000	UG/KG	Mar 1,1993	Feb 12,1993	4
CADMIUM	0.6300	1.2000	MG/KG	Feb 23,1993	Mar 2,1993	6
CALCIUM	1800.0000	72400.0000 B	MG/KG	Mar 1,1993	Dec 2,1992	20
CARBON DISULFIDE	2.0000 J	3.0000 J	UG/KG	Mar 1,1993	Feb 22,1993	4
CESIUM	0.6500 B	2.4000 B	MG/KG	Dec 8,1992	Dec 7,1992	6
CESIUM-137	-0.0415 J	0.5730	PCI/G	Feb 12,1993	Mar 1,1993	10
CHLOROBENZENE	3.0000 J	3.0000 J	UG/KG	Mar 1,1993	Mar 1,1993	2
CHLOROETHANE	8.0000 J	8.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
CHLOROFORM	2.0000 J	2.0000 J	UG/KG	Dec 2,1992	Dec 2,1992	2
CHROMIUM	4.4000	130.0000	MG/KG	Dec 7,1992	Dec 8,1992	20
CHRYSENE	48.0000 J	1000.0000	UG/KG	Feb 12,1993	Feb 8,1993	11
COBALT	1.4000	23.4000	MG/KG	Feb 25,1993	Feb 23,1993	23
COPPER	3.3000	52.1000	MG/KG	Feb 25,1993	Dec 8,1992	20
DI-n-BUTYL PHTHALATE	44.0000 J	4600.0000	UG/KG	Feb 8,1993	Feb 8,1993	6
DI-n-OCTYL PHTHALATE	130.0000 J	580.0000 J	UG/KG	Feb 12,1993	Feb 22,1993	4
DIBENZO(a,h)ANTHRACENE	92.0000 J	100.0000 J	UG/KG	Feb 8,1993	Feb 12,1993	4
DIBENZOFURAN	39.0000 J	170.0000 J	UG/KG	Feb 8,1993	Feb 8,1993	6
DIETHYL PHTHALATE	36.0000 J	3100.0000	UG/KG	Mar 1,1993	Mar 1,1993	6
DIMETHYL PHTHALATE	140.0000 J	2100.0000	UG/KG	Feb 12,1993	Feb 12,1993	2
ETHYLBENZENE	5.0000	390.0000	UG/KG	Mar 1,1993	Feb 12,1993	6
FLUORANTHENE	46.0000 J	2800.0000	UG/KG	Mar 1,1993	Feb 8,1993	10
FLUORENE	44.0000 J	320.0000 J	UG/KG	Feb 22,1993	Feb 8,1993	8
GROSS ALPHA	5.9000	20.3000	PCI/G	Nov 30,1992	Mar 2,1993	20
GROSS BETA	16.3000	40.8000	PCI/G	Feb 23,1993	Feb 26,1993	21
HEXACHLOROBENZENE	160.0000 J	1300.0000	UG/KG	Feb 12,1993	Feb 12,1993	2
INDENO(1,2,3-cd)PYRENE	60.0000 J	340.0000 J	UG/KG	Feb 8,1993	Feb 8,1993	10
IRON	3900.0000	56500.0000	MG/KG	Feb 23,1993	Feb 26,1993	20
LEAD	4.7000	30.5000	MG/KG	Dec 8,1992	Feb 8,1993	20
LITHIUM	2.6000	10.9000	MG/KG	Feb 25,1993	Feb 22,1993	10
MAGNESIUM	1080.0000	4730.0000	MG/KG	Mar 1,1993	Feb 8,1993	20

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Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
MANGANESE	10.7000	1160.0000	MG/KG	Feb 23,1993	Feb 26,1993	20
MERCURY	0.0600 B	0.3000	MG/KG	Dec 2,1992	Feb 26,1993	12
METHYLENE CHLORIDE	2.0000 JB	21.0000	UG/KG	Feb 23,1993	Feb 12,1993	13
MOLYBDENUM	1.3000	27.9000 B	MG/KG	Feb 22,1993	Dec 8,1992	9
MONOCROTOPHOS	0.9800	0.9800	MG/KG	Feb 22,1993	Feb 22,1993	2
NAPHTHALENE	46.0000 J	300.0000 J	UG/KG	Feb 12,1993	Feb 12,1993	7
NICKEL	4.0000	30.3000	MG/KG	Feb 26,1993	Feb 25,1993	18
NITRATE	1.0000	2.0000	MG/KG	Feb 23,1993	Feb 23,1993	2
NITRATE/NITRITE	1.0000	2.0000	MG/KG	Feb 23,1993	Feb 23,1993	2
PHENANTHRENE	40.0000 J	2500.0000	UG/KG	Mar 1,1993	Feb 8,1993	10
PHENOL	190.0000 J	510.0000	UG/KG	Feb 22,1993	Feb 8,1993	4
PLUTONIUM-239/240	-0.0079	0.4340	PCI/G	Feb 23,1993	Feb 22,1993	20
POTASSIUM	510.0000	2050.0000	MG/KG	Feb 23,1993	Feb 25,1993	18
PYRENE	52.0000 J	2800.0000	UG/KG	Feb 8,1993	Feb 8,1993	10
RADIUM-226	0.5253 X	1.7000	PCI/G	Feb 25,1993	Feb 23,1993	10
RADIUM-228	0.9402	2.0810	PCI/G	Feb 8,1993	Feb 8,1993	10
SELENIUM	0.3100	5.8000	MG/KG	Feb 8,1993	Feb 23,1993	12
SILICON	39.4000	883.0000	MG/KG	Feb 12,1993	Feb 8,1993	10
SILVER	0.8100	2.9000	MG/KG	Feb 26,1993	Feb 8,1993	8
SODIUM	48.5000	688.0000	MG/KG	Mar 1,1993	Feb 8,1993	18
STRONTIUM	14.2000	153.0000	MG/KG	Feb 22,1993	Dec 2,1992	20
STRONTIUM-89,90	-0.0430	2.0100	PCI/G	Mar 1,1993	Feb 23,1993	10
STYRENE	4.0000 J	90.0000	UG/KG	Feb 22,1993	Feb 12,1993	6
TETRACHLOROETHENE	4.0000 J	8.0000 J	UG/KG	Feb 22,1993	Feb 12,1993	4
THALLIUM	0.3800	0.8200	MG/KG	Feb 8,1993	Mar 3,1993	4
TIN	3.6000	19.7000 B	MG/KG	Feb 12,1993	Dec 8,1992	10
TOLUENE	1.0000 J	7800.0000	UG/KG	Dec 2,1992	Feb 8,1993	26
TOTAL ORGANIC CARBON	600.0000 X	32000.0000 X	MG/KG	Feb 26,1993	Feb 23,1993	8
TOTAL XYLENES	3.0000 J	1400.0000 E	UG/KG	Mar 1,1993	Feb 12,1993	6
TRICHLOROETHENE	4.0000 J	21.0000	UG/KG	Mar 1,1993	Dec 2,1992	12
URANIUM-233,-234	0.3900	2.1810	PCI/G	Nov 30,1992	Feb 26,1993	20
URANIUM-235	-0.0170 J	0.1300 J	PCI/G	Feb 25,1993	Dec 2,1992	18
URANIUM-238	0.3600	1.9200	PCI/G	Dec 2,1992	Feb 23,1993	21
VANADIUM	6.3000	78.1000	MG/KG	Feb 25,1993	Feb 25,1993	20
ZINC	11.1000	195.0000	MG/KG	Feb 25,1993	Feb 8,1993	20
pH	6.6000	10.3000	PH	Feb 25,1993	Mar 2,1993	10

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	1.0000 J	450.0000 E	UG/L	Mar 13,1991	Jun 15,1993	32
1,1,2,2-TETRACHLOROETHANE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 20,1989	2
1,1,2-TRICHLOROETHANE	0.4000 J	5.0000 J	UG/L	Oct 13,1992	Sep 20,1989	4
1,1-DICHLOROETHANE	0.5000 J	22.0000 DJ	UG/L	Oct 6,1992	Feb 9,1993	32
1,1-DICHLOROETHENE	1.0000 J	100.0000	UG/L	Oct 6,1992	Mar 26,1993	17
1,2-DICHLOROETHANE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 25,1989	4
1,2-DICHLOROETHENE	1.0000 J	130.0000 D	UG/L	Jul 7,1992	Feb 9,1993	29
1,2-DICHLOROPROPANE	1.0000 J	6.0000	UG/L	Nov 1,1990	Oct 13,1989	12
1,4-DICHLOROBENZENE	6.0000 J	9.0000 J	UG/L	May 27,1993	Jun 16,1993	2
2,4,5-TRICHLOROPHENOL	3.0000 J	3.0000 J	UG/L	May 27,1993	May 27,1993	2
2,4-DIMETHYLPHENOL	7.0000 J	8.0000 J	UG/L	May 28,1993	Jun 16,1993	5
2-BUTANONE	1.0000 J	1300.0000	UG/L	Mar 13,1989	May 28,1993	15
2-CHLORONAPHTHALENE	5.0000 J	5.0000 J	UG/L	May 28,1993	May 28,1993	2
2-HEXANONE	1.0000 BJ	100.0000 J	UG/L	Mar 5,1991	Oct 13,1989	8
2-METHYLNAPHTHALENE	1.0000 J	1.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
2-METHYLPHENOL	3.0000 J	14.0000	UG/L	May 27,1993	May 28,1993	4
4-METHYL-2-PENTANONE	2.0000 J	1200.0000 E	UG/L	Mar 5,1991	Apr 27,1993	14
4-METHYLPHENOL	6.0000 J	2100.0000 E	UG/L	May 27,1993	May 28,1993	9
4-NITROPHENOL	61.0000 DJ	61.0000 DJ	UG/L	Apr 27,1993	Apr 27,1993	2
ACENAPHTHENE	2.0000 J	3.0000 J	UG/L	Mar 31,1993	Apr 27,1993	2
ACETONE	1.0000 J	990.0000	UG/L	Oct 20,1992	May 28,1993	53
ALDRIN	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
ALKALINITY AS CACO3	45.1000	3151.0000	MG/L	Jul 23,1990	Mar 5,1991	6
ALUMINUM	0.0110 B	456.0000 *	MG/L	Jul 23,1992	Feb 1,1993	99
AMERICIUM-241	-0.4400	0.2206	PCI/L	Nov 13,1986	May 27,1993	84
AMMONIA	0.0560	284.0000	MG/L	Feb 1,1993	Sep 22,1992	22
ANTIMONY	0.0072 B	0.0956	MG/L	Apr 18,1991	Oct 17,1991	47
AROCLOR-1016	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1221	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1232	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1242	0.0000 E	0.0110	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1248	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
ARSENIC	0.0008	0.0707	MG/L	Oct 6,1992	May 28,1993	67
BARIUM	0.0094 B	5.0600	MG/L	Jul 29,1993	Feb 1,1993	99
BENZENE	0.1000 J	24.0000	UG/L	Oct 5,1992	Jul 26,1993	38
BENZOIC ACID	6.0000 J	2900.0000 E	UG/L	Apr 26,1993	Mar 29,1993	8
BERYLLIUM	0.0008	0.0320	MG/L	Oct 15,1992	Feb 1,1993	48
BICARBONATE	8.0000	920.0000	MG/L	Jan 26,1988	Jan 31,1990	46
BICARBONATE AS CACO3	13.0000	2000.0000	MG/L	Apr 5,1991	Apr 27,1993	72
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	44.0000	UG/L	Mar 31,1993	Mar 29,1993	24
BORON	0.0311	0.1020	MG/L	Mar 12,1991	Mar 12,1991	10
BROMODICHLOROMETHANE	1.0000 J	5.0000 J	UG/L	Feb 9,1993	Sep 20,1989	4
BROMOFORM	1.0000 J	5.0000 J	UG/L	Feb 20,1990	Sep 20,1989	9
BROMOMETHANE	1.0000 J	10.0000 J	UG/L	Feb 9,1993	Sep 20,1989	
CADMIUM	0.0004 J	0.0190	MG/L	Aug 12,1987	Feb 1,1993	56
CALCIUM	11.7000	566.0000 E	MG/L	Jul 21,1992	Apr 27,1993	100
CARBON DISULFIDE	0.1000 J	6.0000 DJ	UG/L	Oct 6,1992	Apr 12,1993	10
CARBON TETRACHLORIDE	1.0000 J	13.0000	UG/L	Oct 6,1992	Apr 27,1992	23
CARBONATE	4.0000	450.0000	MG/L	Jul 24,1992	Nov 13,1986	14
CARBONATE AS CACO3	0.0000	52.0000	MG/L	Jul 16,1991	Jul 11,1991	66
CESIUM	0.0600 B	0.2000 B	MG/L	Feb 21,1992	Nov 2,1990	10
CESIUM RADIOACTIVE UNKN I	-0.1000	0.0700	PCI/L	Nov 27,1989	Feb 19,1990	10
CESIUM-134	-0.7370 J	1.7600	PCI/L	Apr 8,1993	Apr 15,1993	32
CESIUM-137	-1.7000	3.3000	PCI/L	May 8,1990	May 8,1990	59
CHEMICAL OXYGEN DEMAND	0.8700	45.0000	MG/L	Oct 6,1992	Apr 12,1993	40
CHLORIDE	-0.7600	872.0000	MG/L	Apr 8,1993	Apr 13,1987	72
CHLOROBENZENE	0.3000 J	5.0000 J	UG/L	Oct 6,1992	Sep 20,1989	12
CHLOROETHANE	2.0000 J	83.0000	UG/L	Feb 9,1993	Mar 31,1993	16
CHLOROFORM	0.4000 J	30.0000 D	UG/L	Apr 27,1993	Feb 9,1993	24
CHLOROMETHANE	6.0000 DJ	6.0000 DJ	UG/L	Feb 9,1993	Feb 9,1993	2

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
CHROMIUM	0.0029	0.5800 N*	MG/L	Oct 14,1992	Feb 1,1993	83
COBALT	0.0022 B	0.2280	MG/L	Jul 16,1991	Feb 1,1993	61
COPPER	0.0018 B	7.1400	MG/L	Feb 20,1992	Oct 24,1991	100
CYANIDE	0.0010 B	3.8000	MG/L	Aug 6,1993	Jun 15,1987	60
DI-n-BUTYL PHTHALATE	2.0000 J	5.0000 J	UG/L	May 28,1993	Apr 28,1993	12
DIBROMOCHLOROMETHANE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 20,1989	2
DIETHYL PHTHALATE	2.0000 BJ	51.0000 DJ	UG/L	Jun 21,1993	May 28,1993	14
ETHYLBENZENE	0.3000 J	110.0000	UG/L	Oct 13,1992	Apr 27,1993	22
FLUORENE	2.0000 J	2.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
FLUORIDE	0.1000	8.6000	MG/L	Apr 19,1991	Mar 29,1993	133
GROSS ALPHA	-0.3630 J	19.3900	PCI/L	Apr 28,1992	Oct 13,1992	56
GROSS ALPHA - DISSOLVED	-0.1930 J	37.7400	PCI/L	Apr 19,1991	Apr 30,1991	56
GROSS ALPHA - SUSPENDED	-1.8800	249.0000	PCI/L	May 8,1990	Jun 15,1987	44
GROSS BETA	-9.0000	220.0000	PCI/L	Jan 22,1988	Oct 31,1986	64
GROSS BETA - DISSOLVED	-0.2000	19.0000 C	PCI/L	Jun 14,1990	Oct 6,1992	51
GROSS BETA - SUSPENDED	-5.7100	29.4000	PCI/L	May 8,1990	Jan 31,1990	18
HEPTACHLOR	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
IRON	0.0033 B	656.0000	MG/L	Feb 18,1992	Feb 1,1993	101
LEAD	0.0010 B	0.2630 S	MG/L	Jul 12,1991	Apr 26,1993	97
LITHIUM	0.0021 BE	0.2660	MG/L	Nov 1,1990	Feb 1,1993	62
MAGNESIUM	0.0972 B	118.0000	MG/L	Feb 1,1990	Feb 1,1993	99
MANGANESE	0.0015 B	11.3000	MG/L	Jul 16,1991	Sep 16,1988	99
MERCURY	0.0002	0.0015	MG/L	Sep 23,1988	Jun 16,1993	44
METHYLENE CHLORIDE	0.4000 J	58.0000	UG/L	Oct 20,1992	Mar 31,1993	51
MOLYBDENUM	0.0021 B	0.4350	MG/L	Jan 16,1992	Jul 29,1993	64
N-NITROSO-DI-n-PROPYLAMIN	200.0000 D	200.0000 D	UG/L	May 28,1993	May 28,1993	2
N-NITROSODIPHENYLAMINE	46.0000 B	46.0000 B	UG/L	Aug 19,1986	Aug 19,1986	2
NAPHTHALENE	2.0000 J	31.0000	UG/L	Jul 29,1993	Jul 29,1993	9
NICKEL	0.0021 B	1.0700	MG/L	Jan 16,1992	Feb 1,1993	84
NITRATE	0.2000	7.1300	MG/L	Jul 27,1993	Mar 5,1991	32
NITRATE/NITRITE	0.0600	7.6000	MG/L	Apr 8,1993	Aug 11,1993	45
NITRATE/NITRITE (HISTORI	0.0200	23.0000	MG/L	Jun 18,1991	Aug 19,1986	64
NITRITE	0.0200	0.0460	MG/L	Sep 13,1990	May 30,1990	14
ORTHOPHOSPHATE	0.0100	0.2300	MG/L	Aug 6,1993	Aug 28,1990	27
ORTHOPHOSPHATE (HISTORICA	0.0100	0.0990	MG/L	Apr 27,1992	Oct 6,1992	49
PENTACHLOROPHENOL	4.0000 J	62.0000 DJ	UG/L	May 28,1993	Apr 27,1993	4
PHENANTHRENE	2.0000 J	2.0000 J	UG/L	Apr 27,1993	Mar 29,1993	6
PHENOL	2.0000 J	130.0000	UG/L	Mar 31,1993	Jun 16,1993	4
PHOSPHORUS	0.0220	100.0000 B	MG/L	Aug 7,1990	Nov 15,1990	26
PLUTONIUM-238	0.0000 J	0.0191	PCI/L	Sep 21,1990	Nov 1,1990	22
PLUTONIUM-239	0.0050	0.0450	PCI/L	Feb 14,1990	Mar 14,1990	12
PLUTONIUM-239/240	-1.0000	0.7991	PCI/L	Nov 13,1986	May 27,1993	83
POTASSIUM	0.1120 B	48.7000	MG/L	Apr 23,1991	May 28,1993	100
RADIUM-226	0.0355 J	2.1660	PCI/L	Jul 17,1990	Jul 10,1991	39
RADIUM-228	2.9000	3.2000	PCI/L	Feb 2,1993	Oct 6,1992	4
SELENIUM	0.0010 BW	0.1400	MG/L	Sep 21,1990	Sep 19,1989	54
SILICA, DISSOLVED (HISTOR	2.5000	61.0000	MG/L	Feb 19,1992	Nov 20,1990	56
SILICON	2.2700	288.0000	MG/L	Sep 22,1992	Feb 1,1993	66
SILVER	0.0021 B	3.0400	MG/L	Aug 28,1990	Feb 1,1993	49
SODIUM	5.6000	1230.0000	MG/L	Apr 15,1993	May 25,1993	107
SODIUM FLUORIDE	0.1800	1.6000	MG/L	Mar 12,1991	Mar 12,1991	10
SODIUM SULFATE	27.4000	64.0000	MG/L	Mar 12,1991	Mar 12,1991	10
SOLIDS, NONVOLATILE SUSPE	23.0000	23.0000	MG/L	Mar 13,1991	Mar 13,1991	2
STRONTIUM	0.0657 B	81.7000 B	MG/L	Jul 21,1992	Nov 15,1990	103
STRONTIUM-89	29.0000	3376.0000	PCI/L	May 8,1990	May 17,1990	4
STRONTIUM-89,90	-0.1100 J	9.3000	PCI/L	Mar 4,1991	May 14,1987	65
STRONTIUM-90	-0.0800	1.0000	PCI/L	Jan 31,1990	May 17,1990	22
STYRENE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 20,1989	2
SULFATE	1.7000	780.0000	MG/L	Mar 31,1993	Apr 20,1993	75
SULFIDE	2.0000	16.0000	MG/L	May 28,1993	Apr 27,1993	24

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FY 93 Operable Unit 7 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
TETRACHLOROETHENE	0.4000 J	380.0000 D	UG/L	Oct 6,1992	Feb 9,1993	57
THALLIUM	0.0010 BN	0.0015 B	MG/L	Apr 18,1991	May 22,1990	16
TIN	0.0103 B	0.4250 *	MG/L	Sep 13,1990	Oct 11,1990	50
TOLUENE	0.4000 J	1200.0000 E	UG/L	Oct 6,1992	Jun 16,1993	32
TOTAL DISSOLVED SOLIDS	17.0000	3700.0000	MG/L	Aug 19,1986	Apr 27,1993	83
TOTAL ORGANIC CARBON	1.0000	22.0000	MG/L	Aug 13,1993	Aug 5,1993	40
TOTAL RADIOCESIUM	0.0000	5.9000	PCI/L	Oct 26,1989	Jun 21,1993	22
TOTAL SUSPENDED SOLIDS	4.0000	17000.0000	MG/L	Apr 27,1992	Feb 1,1993	70
TOTAL XYLENES	0.4000 J	270.0000	UG/L	Oct 6,1992	Apr 27,1993	23
TRICHLOROETHENE	1.0000 J	1000.0000	UG/L	Feb 9,1993	May 14,1987	45
TRITIUM	-261.0000 J	3500.0000	PCI/L	Mar 5,1991	Apr 27,1993	74
URANIUM-233,-234	-0.1000	32.8900	PCI/L	Mar 5,1990	Mar 9,1990	74
URANIUM-235	-0.2000	2.6000	PCI/L	Aug 12,1987	Aug 10,1987	79
URANIUM-238	-0.3000	21.1100	PCI/L	Nov 13,1986	Mar 9,1990	69
VANADIUM	0.0018 B	0.7540 N*	MG/L	Apr 23,1992	Feb 1,1993	73
VINYL CHLORIDE	2.0000 J	37.0000	UG/L	Jul 10,1991	Nov 6,1989	14
ZINC	0.0030 B	8.0000	MG/L	Jun 1,1990	Feb 1,1993	99
alpha-BHC	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
beta-BHC	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
cis-1,3-DICHLOROPROPENE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 20,1989	2
delta-BHC	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
gamma-BHC (LINDANE)	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
m+p CRESOL	7.0000 J	7.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
pH	6.2000	8.8000	PH	Feb 1,1990	Jan 31,1990	70
trans-1,2-DICHLOROETHENE	4.0000	4.0000	UG/L	Apr 13,1987	May 14,1987	6
trans-1,3-DICHLOROPROPENE	5.0000 J	5.0000 J	UG/L	Sep 20,1989	Sep 20,1989	2

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FY 93 Operable Unit 7 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1-DICHLOROETHANE	2.0000 J	12.0000	UG/L	Feb 13,1990	Apr 6,1989	2
1,2-DICHLOROETHENE	2.0000 J	14.0000	UG/L	Feb 13,1990	Mar 23,1990	2
2,4-DIMETHYLPHENOL	2.0000 J	3.0000 J	UG/L	Oct 9,1989	Oct 9,1991	5
2-BUTANONE	6.0000 J	76.0000	UG/L	May 2,1991	Jan 12,1990	3
2-HEXANONE	1.0000 JB	10.0000	UG/L	Jul 6,1990	Mar 23,1990	2
2-METHYLNAPHTHALENE	8.0000 J	29.0000	UG/L	Feb 26,1993	Oct 4,1990	2
4-METHYL-2-PENTANONE	2.0000 J	87.0000 J	UG/L	May 19,1989	Mar 23,1990	3
4-METHYLPHENOL	2.0000 J	28.0000	UG/L	Jan 25,1993	Oct 9,1989	2
ACENAPHTHENE	1.0000 J	4.0000 J	UG/L	Oct 9,1989	Mar 24,1993	2
ACETONE	9.0000 J	220.0000	UG/L	Dec 3,1990	Mar 23,1990	2
ALUMINUM	0.0210	26.9000	MG/L	Sep 25,1991	Feb 13,1990	8
AMERICIUM-241	-0.0004 J	0.1900	PCI/L	Jul 29,1991	May 2,1991	2
ANTIMONY	0.0150	0.0727	MG/L	Oct 9,1991	May 3,1990	2
ARSENIC	0.0008	0.0046 BWN	MG/L	Dec 17,1992	Dec 3,1990	3
BARIUM	0.0007	1.5500	MG/L	Aug 2,1989	Feb 13,1990	8
BENZENE	1.0000 J	2.0000 J	UG/L	Jul 6,1990	Aug 28,1991	15
BENZOIC ACID	6.0000 J	6.0000 J	UG/L	Oct 9,1989	Oct 9,1989	2
BENZYL ALCOHOL	2.0000 J	2.0000 J	UG/L	Oct 9,1989	Oct 9,1989	2
BERYLLIUM	0.0010	0.0058	MG/L	Feb 26,1993	Apr 6,1989	3
BICARBONATE	74.0000	1000.0000	MG/L	Apr 6,1989	Feb 13,1990	2
BICARBONATE AS CACO3	43.0000	705.0000	MG/L	Aug 31,1992	Dec 17,1992	7
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	5.0000 J	UG/L	Oct 9,1989	May 19,1989	2
CADMIUM	0.0034 J	0.0076	MG/L	Mar 23,1990	Feb 13,1990	2
CALCIUM	18.7000	212.0000	MG/L	Aug 31,1992	Feb 13,1990	8
CARBON DISULFIDE	6.0000	6.0000	UG/L	Feb 13,1990	Feb 13,1990	2
CARBONATE	5.0000	5.0000	MG/L	Apr 6,1989	Apr 6,1989	2
CARBONATE AS CACO3	0.0000	0.0000	MG/L	Sep 6,1990	Aug 2,1990	4
CESIUM	0.0049 J	0.1000	MG/L	Jun 20,1989	Sep 25,1991	2
CESIUM-137	-1.7000	0.9300	PCI/L	May 3,1990	May 2,1991	2
CHLORIDE	1.8000	120.0000	MG/L	Sep 6,1990	May 19,1989	2
CHLORIDE (HISTORICAL CASN	5.1400	5.1400	MG/L	Aug 31,1992	Aug 31,1992	4
CHLOROETHANE	7.0000 J	62.0000	UG/L	Jun 16,1988	Mar 24,1993	3
CHLOROMETHANE	3.0000 J	7.0000 J	UG/L	Jun 20,1989	Dec 17,1992	2
CHROMIUM	0.0031	0.0296	MG/L	Jan 25,1993	Feb 13,1990	2
COBALT	0.0036	0.0191 B	MG/L	Sep 25,1991	Aug 2,1990	2
COPPER	0.0020	0.0949	MG/L	Oct 9,1991	Feb 13,1990	6
CYANIDE	0.0368	0.0368	MG/L	Jul 6,1990	Jul 6,1990	2
DI-n-BUTYL PHTHALATE	1.0000 J	1.0000 J	UG/L	Oct 9,1989	Oct 9,1989	2
DIBENZOFURAN	1.0000 J	2.0000 J	UG/L	Feb 26,1993	Mar 24,1993	8
DIETHYL PHTHALATE	1.0000 J	4.0000 J	UG/L	Apr 3,1991	Oct 9,1989	3
DISSOLVED ORGANIC CARBON	14.0000	27.0000	MG/L	Sep 25,1991	Apr 3,1991	2
ETHYLBENZENE	1.0000 J	19.0000	UG/L	Feb 13,1990	Oct 4,1990	2
FLUORENE	1.0000 J	3.0000 J	UG/L	May 19,1989	Oct 9,1991	6
FLUORIDE	0.3900	0.6300	MG/L	Aug 28,1991	Nov 13,1990	6
GROSS ALPHA	0.8918 J	6.6390	PCI/L	Jan 25,1993	Feb 26,1993	2
GROSS ALPHA - DISSOLVED	-1.1400 J	8.7000	PCI/L	Jul 29,1991	Jun 5,1990	2
GROSS ALPHA - SUSPENDED	0.0000	40.0000	PCI/L	Jun 16,1988	May 19,1989	2
GROSS BETA	2.6000 J	36.0000	PCI/L	Aug 31,1992	May 19,1989	6
GROSS BETA - DISSOLVED	0.5469 J	13.9000	PCI/L	Jul 6,1990	Apr 20,1990	3
GROSS BETA - SUSPENDED	3.7530	17.3500	PCI/L	Sep 6,1990	May 3,1990	2
HEPTACHLOR	0.0000 I	0.0000 I	MG/L	Oct 9,1991	Jan 25,1993	8
IRON	0.0430	155.0000	MG/L	Aug 31,1992	Feb 13,1990	8
LEAD	0.0004 B	0.0373	MG/L	Oct 4,1990	Jun 20,1989	8
LITHIUM	0.0056	0.1110	MG/L	Aug 31,1992	Mar 23,1990	9
MAGNESIUM	3.8700	49.0000	MG/L	Aug 31,1992	Feb 13,1990	8
MANGANESE	0.0022	2.4900	MG/L	Aug 31,1992	Feb 13,1990	8
MERCURY	0.0003	0.0022	MG/L	Feb 13,1990	Jun 16,1988	5
METHYLENE CHLORIDE	2.0000 J	190.0000 B	UG/L	Dec 3,1990	Feb 13,1990	3
MOLYBDENUM	0.0043	0.0285 B	MG/L	Aug 31,1992	Aug 2,1990	7
NAPHTHALENE	6.0000 J	26.0000	UG/L	Oct 9,1989	Oct 4,1990	2

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FY 93 Operable Unit 7 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
NEPTUNIUM-237	-0.0200	0.3100	PCI/L	May 2,1991	Apr 3,1991	2
NICKEL	0.0114 B	0.0310	MG/L	Oct 9,1989	Aug 28,1991	3
NITRATE/NITRITE (HISTORI	0.0600	0.8700	MG/L	Apr 6,1989	May 2,1991	3
NITRITE	0.0250	0.0630	MG/L	Jun 19,1991	May 2,1991	3
OIL AND GREASE	0.3000	42.1000	MG/L	Sep 6,1990	Oct 9,1991	3
ORTHOPHOSPHATE	0.0200	0.1500	MG/L	Dec 3,1990	Sep 6,1990	2
ORTHOPHOSPHATE (HISTORICA	0.0990	0.0990	MG/L	May 2,1991	May 2,1991	4
PHENANTHRENE	2.0000 J	6.0000 J	UG/L	Apr 6,1989	Mar 24,1993	4
PHENOL	2.0000 J	2.0000 J	UG/L	May 19,1989	May 19,1989	2
PHOSPHORUS	0.0950	1.3800	MG/L	Oct 9,1991	Oct 4,1990	5
PLUTONIUM-238	-0.0005 J	0.0022 J	PCI/L	Aug 2,1990	Jul 6,1990	2
PLUTONIUM-239	0.0000	0.0090	PCI/L	Jul 7,1989	Feb 13,1990	2
PLUTONIUM-239/240	-0.0011 J	0.1660	PCI/L	Jan 25,1993	Jun 16,1988	2
POTASSIUM	1.5500	11.7000	MG/L	Aug 31,1992	Feb 13,1990	9
RADIUM-226	0.3000	6.6000	PCI/L	Jul 7,1989	Jun 20,1989	2
RADIUM-228	0.8600	5.4000	PCI/L	Nov 13,1990	Jun 20,1989	3
SELENIUM	0.0014	0.0070 W	MG/L	Feb 26,1993	Aug 2,1990	2
SILICA, DISSOLVED (HISTOR	7.4000	43.0000	MG/L	Aug 2,1990	Nov 13,1990	2
SILICON	1.4600	44.0000	MG/L	Aug 31,1992	Oct 4,1990	8
SILVER	0.0025	0.0167	MG/L	Aug 31,1992	Sep 6,1990	6
SODIUM	8.1200	116.0000	MG/L	Aug 31,1992	Mar 23,1990	8
SOLIDS, NONVOLATILE SUSPE	10.0000	199.0000	MG/L	Jun 19,1991	May 2,1991	2
SPECIFIC CONDUCTIVITY	1125.0000	1125.0000	US	Jun 16,1988	Jun 16,1988	2
STRONTIUM	0.1220	1.3700	MG/L	Aug 31,1992	Feb 13,1990	8
STRONTIUM-89	0.4100	1850.0000	PCI/L	May 2,1991	May 3,1990	2
STRONTIUM-89,90	0.5000	4.0600	PCI/L	May 19,1989	Feb 26,1993	3
STRONTIUM-90	0.3000	1.1800	PCI/L	Jul 7,1989	Nov 7,1989	2
SULFATE	0.4600	29.6000	MG/L	Feb 26,1993	May 2,1991	3
SULFATE (HISTORICAL CASNO	27.7000	27.7000	MG/L	Aug 31,1992	Aug 31,1992	4
TETRACHLOROETHENE	1.0000 J	2.0000 J	UG/L	May 19,1989	Apr 6,1989	4
THALLIUM	0.0024 J	0.0024 J	MG/L	May 19,1989	May 19,1989	2
TIN	0.0001	0.3060	MG/L	Jul 7,1989	Oct 4,1990	2
TOLUENE	2.0000 J	88.0000	UG/L	Jun 16,1988	Jun 5,1990	2
TOTAL DISSOLVED SOLIDS	90.0000	1300.0000	MG/L	Aug 31,1992	Aug 2,1989	6
TOTAL ORGANIC CARBON	19.0000	24.5000	MG/L	Oct 9,1991	Apr 3,1991	3
TOTAL RADIOCESIUM	-0.0600	0.7800 J	PCI/L	Dec 5,1989	Mar 24,1993	2
TOTAL SUSPENDED SOLIDS	5.0000	2900.0000	MG/L	Apr 6,1989	Feb 13,1990	6
TOTAL XYLENES	1.0000 J	25.0000 J	UG/L	Feb 13,1990	Mar 23,1990	2
TRICHLOROETHENE	1.0000 J	12.0000	UG/L	Aug 2,1989	Oct 9,1989	6
TRITIUM	-630.0000	1500.0000	PCI/L	Oct 9,1989	Sep 25,1991	2
URANIUM-233,-234	-0.0238 J	5.5000	PCI/L	Jan 25,1993	Jul 7,1989	6
URANIUM-234	0.1700	3.5000	PCI/L	May 2,1991	Dec 3,1990	2
URANIUM-235	-0.0120 J	0.3100 J	PCI/L	Dec 17,1992	Aug 31,1992	6
URANIUM-238	0.0094 J	10.0000	PCI/L	Jun 19,1991	Jul 7,1989	6
VANADIUM	0.0027	0.2110	MG/L	Oct 9,1991	Feb 13,1990	4
VINYL ACETATE	49.0000	49.0000	UG/L	Feb 13,1990	Feb 13,1990	2
VINYL CHLORIDE	2.0000 J	30.0000 J	UG/L	Aug 2,1989	Apr 6,1989	2
ZINC	0.0270	16.0000	MG/L	Aug 31,1992	Feb 13,1990	8
alpha-BHC	0.0000 I	0.0004 I	MG/L	Oct 9,1991	Jan 25,1993	4
beta-BHC	0.0000 I	0.0000 I	MG/L	Oct 9,1991	Oct 9,1991	8
delta-BHC	0.0000 I	0.0002 I	MG/L	Oct 9,1991	Jan 25,1993	4
gamma-BHC (LINDANE)	0.0000 I	0.0000 I	MG/L	Jan 25,1993	Oct 9,1991	8
o-XYLENE	5.0000	8.0000	UG/L	Jul 6,1990	Jun 5,1990	2
pH	6.4000	7.6000	PH	Aug 2,1989	Apr 6,1989	2

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Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
ACETONE	5.0000 J	89.0000	UG/KG	May 4,1988	May 3,1988	14
GROSS ALPHA - SUSPENDED	3.0000	39.0000	PCI/G	May 5,1988	May 3,1988	26
GROSS BETA	11.0000	38.0000	PCI/G	May 3,1988	May 4,1988	25
LEAD	0.0100	26.0000	MG/KG	May 3,1988	May 4,1988	29
MERCURY	0.1000	0.4600	MG/KG	May 5,1988	May 3,1988	24
NITRATE/NITRITE (HISTORI	30.0000	420.0000	MG/KG	May 3,1988	May 5,1988	36
PLUTONIUM-239/240	0.0000	0.5900	PCI/G	May 4,1988	May 3,1988	31
TETRACHLOROETHENE	2.0000 J	3.0000 J	UG/KG	May 4,1988	May 3,1988	4
TOTAL ORGANIC CARBON	100.0000	1800.0000	MG/KG	May 4,1988	May 5,1988	29
TRICHLOROETHENE	3.0000 J	23.0000	UG/KG	May 4,1988	May 5,1988	8
URANIUM-233,-234	0.5900	1.6000	PCI/G	May 5,1988	May 4,1988	25
URANIUM-238	0.6500	1.4000	PCI/G	May 3,1988	May 5,1988	28

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FY 93 Operable Unit 11 Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,2-DICHLOROETHANE	3.0000 J	3.0000 J	UG/L	Jun 13,1990	Jun 13,1990	2
2-BUTANONE	2.0000 J	19.0000 B	UG/L	Mar 1,1990	Oct 9,1990	8
2-HEXANONE	2.0000 BJ	6.0000 BJ	UG/L	Mar 5,1991	Mar 6,1991	8
4-METHYL-2-PENTANONE	1.0000 J	5.0000 J	UG/L	Mar 9,1991	Mar 6,1991	10
ACETONE	2.0000 BJ	31.0000 B	UG/L	Aug 29,1990	Mar 5,1991	24
ALKALINITY AS CACO3	0.0000	185.4000	MG/L	Mar 6,1991	Sep 14,1990	12
ALUMINUM	0.0095 B	208.0000 N	MG/L	Aug 24,1990	Feb 11,1992	43
AMERICIUM-241	-0.4000	0.4000	PCI/L	Aug 14,1987	Sep 17,1987	39
ANTIMONY	0.0077 B	0.0480 B	MG/L	Nov 30,1990	Aug 13,1991	24
ARSENIC	0.0008	0.0085 J	MG/L	Oct 6,1992	Mar 20,1989	30
BARIUM	0.0095 J	1.0400	MG/L	Jun 14,1989	Feb 11,1992	40
BENZENE	0.1000 J	7.0000	UG/L	Oct 13,1992	Nov 30,1990	10
BERYLLIUM	0.0009	0.0400	MG/L	Oct 22,1992	Aug 19,1986	19
BICARBONATE	7.0000	210.0000	MG/L	Nov 24,1986	Nov 14,1989	38
BICARBONATE AS CACO3	12.0000	180.0000	MG/L	Feb 5,1992	Oct 26,1990	40
BIS(2-ETHYLHEXYL)PHTHALAT	2.0000 J	3.0000 J	UG/L	Aug 13,1986	Aug 18,1986	8
BUTYL BENZYL PHTHALATE	2.0000 J	2.0000 J	UG/L	Oct 31,1986	Oct 31,1986	2
CADMIUM	0.0005 J	0.0263	MG/L	Dec 10,1987	Sep 12,1990	34
CALCIUM	2.0800	62.2000	MG/L	Sep 30,1988	Feb 11,1992	37
CARBON DISULFIDE	3.0000 J	4.0000 J	UG/L	Apr 20,1992	Mar 6,1991	4
CARBON TETRACHLORIDE	2.0000 J	8.0000	UG/L	Jun 13,1990	Jan 7,1988	6
CARBONATE	2.0000	45.0000	MG/L	Apr 22,1993	Nov 24,1986	5
CARBONATE AS CACO3	0.0000	56.0000	MG/L	Sep 10,1990	Apr 30,1992	34
CESIUM	0.0400 B	0.2000 B	MG/L	Jul 29,1991	Dec 10,1990	16
CESIUM RADIOACTIVE UNKN I	0.0000	0.0400	PCI/L	Mar 2,1990	Mar 19,1990	10
CESIUM-134	-0.8000 J	1.5200	PCI/L	Apr 12,1993	Apr 14,1993	20
CESIUM-137	-0.9370 J	2.5000	PCI/L	Nov 12,1991	Aug 29,1990	28
CHLORIDE	0.7210	55.0000	MG/L	Jan 27,1993	Aug 13,1986	30
CHLOROFORM	1.0000 BJ	1.0000 BJ	UG/L	Apr 30,1992	Apr 30,1992	4
CHROMIUM	0.0027	0.2080	MG/L	Oct 8,1992	Feb 11,1992	36
COBALT	0.0032 B	0.0680	MG/L	Jan 27,1992	Feb 11,1992	30
COPPER	0.0010	0.1910	MG/L	Jan 30,1992	Feb 11,1992	38
CYANIDE	0.0020 B	1.0000	MG/L	Aug 9,1991	Aug 14,1987	46
DI-n-BUTYL PHTHALATE	2.0000 BJ	5.0000 BJ	UG/L	Nov 24,1986	Oct 31,1986	4
DIETHYL PHTHALATE	26.0000	26.0000	UG/L	Sep 22,1992	Sep 22,1992	2
ETHYLBENZENE	16.0000	16.0000	UG/L	Dec 13,1989	Dec 13,1989	2
FLUORIDE	0.1000	2.5000	MG/L	May 14,1992	Jul 14,1992	40
GROSS ALPHA	0.0000	14.8800	PCI/L	Apr 15,1993	Oct 12,1992	26
GROSS ALPHA - DISSOLVED	-0.2460 J	29.7000	PCI/L	Oct 25,1990	Jun 13,1990	31
GROSS ALPHA - SUSPENDED	-7.0000	620.0000	PCI/L	Apr 8,1987	Dec 14,1987	28
GROSS BETA	-14.0000	1200.0000	PCI/L	Mar 25,1988	Nov 24,1986	28
GROSS BETA - DISSOLVED	-0.0359 J	17.3000	PCI/L	Apr 29,1992	Jun 13,1990	32
GROSS BETA - SUSPENDED	0.7000	10.5000	PCI/L	Oct 11,1989	Oct 12,1989	14
IRON	0.0057	198.0000	MG/L	Oct 8,1992	Feb 11,1992	41
LEAD	0.0010 B	0.1030	MG/L	Apr 29,1992	Sep 12,1990	51
LITHIUM	0.0014 B	0.1340	MG/L	Nov 7,1991	Feb 11,1992	29
MAGNESIUM	0.9380	37.0000	MG/L	May 31,1988	Feb 11,1992	39
MANGANESE	0.0010 B	2.7100	MG/L	Oct 26,1990	Feb 11,1992	38
MERCURY	0.0001 B	0.0012	MG/L	Oct 24,1990	Aug 13,1986	29
METHYLENE CHLORIDE	0.3000	27.0000	UG/L	Apr 20,1993	Mar 29,1988	30
MOLYBDENUM	0.0023 B	0.0327	MG/L	Dec 13,1990	Apr 8,1987	27
N-NITROSODIPHENYLAMINE	1.0000 J	12.0000 B	UG/L	Oct 31,1986	Aug 18,1986	6
NICKEL	0.0021 B	0.1550	MG/L	Jan 31,1992	Feb 11,1992	34
NITRATE	0.4600	4.0900	MG/L	Mar 5,1991	Oct 26,1990	14
NITRATE/NITRITE	0.0500	5.1000	MG/L	Apr 22,1993	Jul 21,1993	25
NITRATE/NITRITE (HISTORI	0.0200	32.4000	MG/L	May 31,1988	Aug 13,1986	43
NITRITE	0.0400	0.2700	MG/L	Sep 7,1990	Jun 20,1990	8
ORTHOPHOSPHATE	0.0100	1.3000	MG/L	Apr 13,1993	Aug 29,1990	26
ORTHOPHOSPHATE (HISTORICA	0.0100	0.0300	MG/L	Apr 30,1992	Aug 12,1991	40
PHOSPHORUS	0.0100	0.6300 B	MG/L	Oct 24,1990	Sep 4,1990	26

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
PLUTONIUM-238	-0.0014 J	0.0056 J	PCI/L	Sep 10,1990	Oct 26,1990	14
PLUTONIUM-239	0.0060	0.0070	PCI/L	Oct 31,1989	Dec 13,1989	4
PLUTONIUM-239/240	-3.2000	1.1000	PCI/L	Aug 25,1987	Sep 17,1987	28
POTASSIUM	0.2920 B	25.2000	MG/L	Mar 12,1992	Feb 11,1992	42
RADIUM-226	0.0764 J	0.5500	PCI/L	Oct 26,1990	Jun 13,1990	16
RADIUM-228	1.1000	6.5000	PCI/L	Jan 27,1993	Feb 3,1993	6
SELENIUM	0.0010 BW	0.0050	MG/L	Aug 24,1990	Dec 14,1987	41
SILICA, DISSOLVED (HISTOR	0.0500	50.0000	MG/L	Dec 3,1990	Oct 26,1990	43
SILICON	3.6600	51.0000	MG/L	Oct 16,1992	Apr 17,1992	27
SILVER	0.0022 B	0.0120	MG/L	Nov 14,1991	Mar 5,1991	25
SODIUM	2.9816	78.1000	MG/L	Jun 18,1987	Sep 10,1990	39
SODIUM FLUORIDE	0.3000	0.3000	MG/L	Sep 4,1990	Sep 4,1990	2
SODIUM SULFATE	5.9000	5.9000	MG/L	Sep 4,1990	Sep 4,1990	2
SOLIDS, NONVOLATILE SUSPE	780.0000	780.0000	MG/L	Jun 8,1990	Jun 8,1990	2
STRONTIUM	0.0391	1.1170 B	MG/L	Mar 24,1988	Mar 19,1990	37
STRONTIUM-89,90	-0.2130 J	4.6900	PCI/L	Jan 25,1993	May 12,1987	29
STRONTIUM-90	-0.1180	0.9100	PCI/L	Aug 24,1990	Dec 13,1989	20
SULFATE	2.0000	1340.0000	MG/L	Nov 30,1990	Dec 14,1987	31
TETRACHLOROETHENE	0.3000 J	3.0000 J	UG/L	Oct 13,1992	Mar 9,1991	4
THALLIUM	0.0010 B	0.0140	MG/L	Jul 28,1992	Aug 13,1986	12
TIN	0.0090 B	0.1420 B	MG/L	Oct 9,1990	Jun 18,1991	29
TOLUENE	0.2000 J	6.0000	UG/L	Oct 13,1992	Oct 16,1992	12
TOTAL DISSOLVED SOLIDS	0.2010	1100.0000	MG/L	Oct 25,1990	Mar 1,1990	33
TOTAL RADIOCESIUM	0.2000	0.8600	PCI/L	Nov 14,1989	Jan 26,1993	6
TOTAL SUSPENDED SOLIDS	5.0000	4200.0000	MG/L	Jun 18,1991	Aug 29,1990	31
TOTAL XYLENES	0.3000 J	50.0000	UG/L	Oct 13,1992	Dec 13,1989	8
TRICHLOROETHENE	1.0000 J	73.0000	UG/L	Mar 20,1990	Mar 9,1991	12
TRITIUM	-256.0000 J	2218.0000	PCI/L	Mar 5,1991	Aug 25,1987	35
URANIUM-233,-234	-0.0176 J	12.0000	PCI/L	Apr 11,1991	Nov 24,1986	29
URANIUM-235	-0.2000	0.6000	PCI/L	Sep 27,1988	Aug 25,1987	32
URANIUM-238	-0.3000	12.0000	PCI/L	Sep 17,1987	Nov 24,1986	30
VANADIUM	0.0010 B	0.3490	MG/L	Jan 31,1992	Feb 11,1992	39
ZINC	0.0021	1.8396	MG/L	Oct 16,1992	Mar 24,1988	48
pH	6.5000	9.4000	PH	Dec 7,1989	Feb 26,1990	41
trans-1,2-DICHLOROETHENE	4.0000	5.0000	UG/L	Apr 8,1987	Aug 14,1987	16

Table B-25

FY 93 Operable Unit 11 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,2,4-TRICHLOROBENZENE	0.1100	0.1100	UG/L	Jul 15,1991	Jul 15,1991	2
ACETONE	2.0000 J	5.0000 JB	UG/L	Apr 9,1990	Jun 9,1989	5
ALUMINUM	0.0170	2.0800	MG/L	Jun 10,1991	Mar 22,1990	7
AMERICIUM-241	-0.0050	0.0230	PCI/L	Apr 25,1991	Jul 15,1991	6
AMMONIA	0.4400	0.4400	MG/L	Oct 9,1991	Oct 9,1991	4
ANTIMONY	0.0120	0.0140 B	MG/L	Jun 10,1991	Apr 9,1990	4
ARSENIC	0.0062	0.0078	MG/L	Jun 10,1991	Jun 10,1991	2
BARIUM	0.0089	0.1300	MG/L	May 16,1991	Jun 10,1991	7
BERYLLIUM	0.0007	0.0008	MG/L	Aug 14,1991	Apr 25,1991	2
BICARBONATE	30.0000	130.0000	MG/L	Mar 22,1990	Jun 9,1989	5
BICARBONATE AS CACO3	11.3000	115.0000	MG/L	Jul 15,1991	Jun 10,1991	4
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	3.0000 J	UG/L	Oct 9,1991	Jun 6,1991	3
CADMIUM	0.0011	0.0041	MG/L	Jun 6,1991	Apr 25,1991	2
CALCIUM	4.3000	26.0000	MG/L	Aug 22,1986	Jun 10,1991	7
CARBON DISULFIDE	4.0000 BJ	4.0000 BJ	UG/L	Aug 22,1986	Aug 22,1986	2
CESIUM	0.0500 B	0.0600	MG/L	Mar 22,1990	Sep 4,1991	10
CESIUM-137	-2.4000	6.0000	PCI/L	May 3,1990	May 3,1990	6
CHLORIDE	0.8000	10.0000	MG/L	Aug 22,1986	May 3,1990	6
CHLOROFORM	0.2900	0.2900	UG/L	Jun 6,1991	Jun 6,1991	2
CHROMIUM	0.0031	0.0043 B	MG/L	Jun 10,1991	Mar 22,1990	4
COBALT	0.0028 B	0.0110	MG/L	Apr 9,1990	Jun 10,1991	6
COPPER	0.0050	0.0270	MG/L	May 16,1991	Jun 10,1991	6
CURIUM-244	0.0020	0.0120 J	PCI/L	Apr 25,1991	Oct 9,1991	2
DISSOLVED ORGANIC CARBON	2.0000	4.0000	MG/L	Aug 14,1991	Oct 9,1991	5
FLUORIDE	0.1300	0.3700	MG/L	Jul 15,1991	Jun 10,1991	5
GROSS ALPHA - DISSOLVED	0.9400 J	1.1480 J	PCI/L	Sep 4,1991	Jun 10,1991	6
GROSS ALPHA - SUSPENDED	-1.0540	3.0800	PCI/L	Apr 25,1991	Apr 9,1990	6
GROSS BETA	0.0000	8.0000	PCI/L	Aug 22,1986	Jun 9,1989	6
GROSS BETA - DISSOLVED	6.8000	12.5300	PCI/L	Aug 14,1991	Jun 10,1991	6
GROSS BETA - SUSPENDED	-0.5200	15.9000	PCI/L	Apr 9,1990	May 16,1991	6
HEPTACHLOR	0.0000 J	0.0000 J	MG/L	Sep 4,1991	Sep 4,1991	2
IRON	0.0240	3.9000	MG/L	Jun 6,1991	Jun 10,1991	6
LEAD	0.0009	0.0060	MG/L	Aug 14,1991	Jun 10,1991	6
LITHIUM	0.0012	0.0037	MG/L	Sep 4,1991	Oct 9,1991	5
MAGNESIUM	1.2000	7.0000	MG/L	Sep 4,1991	Jun 10,1991	8
MANGANESE	0.0018	0.8300	MG/L	Sep 4,1991	Jun 10,1991	6
MERCURY	0.0002	0.0004	MG/L	Apr 9,1990	Mar 22,1990	6
METHYLENE CHLORIDE	1.0000 JB	19.0000 B	UG/L	May 3,1990	Oct 9,1991	7
MOLYBDENUM	0.0030	0.0033	MG/L	Jun 10,1991	Jun 6,1991	4
N-NITROSODIPHENYLAMINE	6.0000 BJ	6.0000 BJ	UG/L	Aug 22,1986	Aug 22,1986	2
NICKEL	0.0048	0.0104 B	MG/L	Jun 10,1991	Mar 22,1990	4
NITRATE/NITRITE (HISTORI	0.1100	0.1100	MG/L	Jun 6,1991	Jun 6,1991	2
OIL AND GREASE	6.2000	6.2000	MG/L	Sep 4,1991	Sep 4,1991	2
ORTHOPHOSPHATE	0.0870	0.0870	MG/L	Jun 10,1991	Jun 10,1991	2
ORTHOPHOSPHATE (HISTORICA	0.0870	0.0870	MG/L	Jun 10,1991	Jun 10,1991	2
PHOSPHORUS	0.2100	0.2100	MG/L	Jun 10,1991	Jun 10,1991	2
PLUTONIUM-239/240	-0.0300	0.0100	PCI/L	Aug 22,1986	Jun 9,1989	7
POTASSIUM	0.4500	13.0000	MG/L	Sep 4,1991	Jun 10,1991	6
SELENIUM	0.0028 BN	0.0028 BN	MG/L	Apr 9,1990	Apr 9,1990	2
SILICON	2.7900	6310.0000	MG/L	Sep 4,1991	Jun 10,1991	6
SILVER	0.0034 B	0.0044 B	MG/L	Mar 22,1990	Mar 22,1990	4
SODIUM	1.6000	29.7000	MG/L	Sep 4,1991	May 3,1990	8
SOLIDS, NONVOLATILE SUSPE	6.0000	12.0000	MG/L	Jun 6,1991	Jun 10,1991	4
STRONTIUM	0.0252	0.1800	MG/L	Apr 25,1991	Jun 10,1991	6
STRONTIUM-89	56.0000	6073.0000	PCI/L	Apr 9,1990	Apr 9,1990	4
STRONTIUM-89,90	0.2800 J	1.4380	PCI/L	Oct 9,1991	Jun 10,1991	5
STRONTIUM-90	0.0730	17.0000	PCI/L	May 16,1991	May 3,1990	6
SULFATE	5.0000	26.0000	MG/L	May 3,1990	Apr 9,1990	8
THALLIUM	0.0015	0.0015	MG/L	May 16,1991	May 16,1991	2
THORIUM-230	0.0470 J	0.0710 J	PCI/L	Oct 9,1991	Sep 4,1991	2

Table B-25

FY 93 Operable Unit 11 Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
TOLUENE	1.0000 J	1.0000 J	UG/L	Mar 22,1990	Mar 22,1990	2
TOTAL DISSOLVED SOLIDS	15.0000	254.0000	MG/L	Aug 22,1986	Aug 14,1991	8
TOTAL ORGANIC CARBON	3.0000	5.0000	MG/L	Oct 9,1991	Jul 15,1991	3
TOTAL SUSPENDED SOLIDS	4.0000	12.0000	MG/L	Jun 9,1989	Jun 10,1991	2
TRICHLOROETHENE	0.0400	0.0400	UG/L	Jun 6,1991	May 16,1991	4
TRITIUM	-63.7000 J	1451.0000	PCI/L	Apr 25,1991	Jun 6,1991	9
URANIUM-233,-234	0.0000	0.5400	PCI/L	Jun 9,1989	Aug 22,1986	7
URANIUM-235	0.0000	0.2000 J	PCI/L	May 16,1991	Oct 9,1991	10
URANIUM-238	0.0000	0.5900 J	PCI/L	Mar 22,1990	Oct 9,1991	7
VANADIUM	0.0021	0.0049 B	MG/L	Oct 9,1991	Mar 22,1990	4
ZINC	0.0041	0.1180 *	MG/L	May 16,1991	Apr 9,1990	7
pH	6.8000	7.3000	PH	Mar 22,1990	May 3,1990	5
sec-DICHLOROPROPANE	2.8000	2.8000	UG/L	Oct 9,1991	Oct 9,1991	2

Table B-26

FY 93 Industrial Area Operable Units Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	6.0000	19.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
1,1,2,2-TETRACHLOROETHANE	1.0000 J	1.0000 J	UG/KG	Apr 24,1992	Apr 24,1992	10
1,1-DICHLOROETHANE	4.0000 J	18.0000	UG/KG	Feb 22,1993	Feb 22,1993	2
1,2-DICHLOROETHENE	4.0000 J	4.0000 J	UG/KG	May 26,1992	May 26,1992	12
1,4-DICHLOROBENZENE	84.0000 J	84.0000 BJ	UG/KG	Jan 25,1993	Sep 11,1991	12
2,4-DICHLOROPHENOL	440.0000 J	440.0000 J	UG/KG	Feb 12,1993	Feb 12,1993	2
2,4-DIMETHYLPHENOL	89.0000 J	89.0000 J	UG/KG	Oct 7,1991	Oct 7,1991	2
2,4-DINITROTOLUENE	73.0000	73.0000	UG/KG	Dec 14,1991	Dec 14,1991	2
2-BUTANONE	1.0000 J	2200.0000 E	UG/KG	Jan 20,1993	Dec 15,1992	154
2-CHLOROPHENOL	44.0000 J	55.0000 J	UG/KG	Jan 27,1993	Jan 27,1993	8
2-HEXANONE	4.0000 J	43.0000	UG/KG	May 13,1992	Feb 22,1993	8
2-METHYLNAPHTHALENE	65.0000 J	1200.0000 DJ	UG/KG	Feb 8,1993	Oct 7,1991	8
2-METHYLPHENOL	86.0000 J	1800.0000	UG/KG	Mar 1,1993	Feb 22,1993	4
4-CHLORO-3-METHYLPHENOL	72.0000	72.0000	UG/KG	Dec 14,1991	Dec 14,1991	2
4-METHYL-2-PENTANONE	1.0000 J	360.0000 E	UG/KG	Aug 31,1989	Feb 22,1993	92
4-METHYLPHENOL	61.0000 J	9300.0000	UG/KG	Feb 8,1993	Feb 12,1993	10
ACENAPHTHENE	42.0000 J	3600.0000 D	UG/KG	Mar 1,1993	Oct 7,1991	23
ACETONE	2.0000 J	26000.0000	UG/KG	Aug 31,1989	Aug 23,1989	490
ALUMINUM	6.9500	37700.0000	MG/KG	Oct 21,1987	Mar 16,1993	845
AMERICIUM-241	-0.0600	3.1950	PCI/G	Nov 12,1987	Oct 2,1991	699
ANTHRACENE	44.0000 J	4800.0000 D	UG/KG	Feb 8,1993	Oct 7,1991	14
ANTIMONY	2.1517	23.4000 N	MG/KG	Oct 26,1987	Oct 16,1991	168
AROCLOR-1242	0.0000 E	1.3000	MG/KG	Feb 8,1993	Feb 8,1993	4
AROCLOR-1248	7.2000	7.2000	MG/KG	Sep 10,1991	Sep 10,1991	2
AROCLOR-1254	0.0180 J	5.2000	MG/KG	Feb 25,1993	Sep 10,1991	18
ARSENIC	0.0064	64.0000	MG/KG	Oct 21,1987	Nov 13,1987	848
BARIUM	0.1240	2970.0000	MG/KG	Oct 21,1987	Dec 10,1992	844
BENZENE	1.0000 J	3.0000 J	UG/KG	Aug 24,1989	Feb 22,1993	14
BENZO(a)ANTHRACENE	41.0000 J	7300.0000 D	UG/KG	Mar 1,1993	Oct 7,1991	31
BENZO(a)PYRENE	38.0000 J	6000.0000 D	UG/KG	Jan 27,1993	Oct 7,1991	42
BENZO(b)FLUORANTHENE	57.0000 J	5200.0000 D	UG/KG	Jan 25,1993	Oct 7,1991	50
BENZO(ghi)PERYLENE	49.0000 J	3700.0000	UG/KG	Feb 8,1993	Oct 7,1991	12
BENZO(k)FLUORANTHENE	43.0000 J	6100.0000 D	UG/KG	Feb 22,1993	Oct 7,1991	34
BENZOIC ACID	85.0000 BJ	3400.0000 J	UG/KG	Jan 25,1993	Feb 12,1993	94
BERYLLIUM	0.2100 J	11.4445	MG/KG	Aug 25,1989	Nov 9,1987	452
BIS(2-CHLOROISOPROPYL)ETH	530.0000 J	530.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
BIS(2-ETHYLHEXYL)PHTHALAT	40.0000 J	9800.0000	UG/KG	Jan 28,1993	Feb 22,1993	109
BUTYL BENZYL PHTHALATE	74.0000 J	1100.0000	UG/KG	Mar 1,1993	Feb 12,1993	4
CADMIUM	0.0017	100.6616	MG/KG	Oct 21,1987	Nov 10,1987	299
CALCIUM	2.1600	220000.0000	MG/KG	Oct 21,1987	Apr 6,1992	844
CARBON DISULFIDE	1.0000 J	19000.0000	UG/KG	Aug 31,1989	Aug 23,1989	66
CARBON TETRACHLORIDE	18.0000	18.0000	UG/KG	Sep 24,1991	Sep 24,1991	2
CESIUM	0.6500 B	16.1000 B	MG/KG	Dec 8,1992	Oct 16,1991	138
CESIUM-134	-0.0070 J	0.0103 J	PCI/G	Apr 21,1993	Apr 21,1993	26
CESIUM-137	-0.0553 J	0.5730	PCI/G	Sep 27,1991	Mar 1,1993	270
CHLOROBENZENE	3.0000 J	74.0000	UG/KG	Mar 1,1993	Dec 4,1992	4
CHLOROETHANE	8.0000 J	8.0000 J	UG/KG	Feb 22,1993	Feb 22,1993	2
CHLOROFORM	2.0000 BDJ	18.0000 J	UG/KG	May 15,1992	Oct 29,1987	62
CHROMIUM	0.0090	780.5003	MG/KG	Oct 21,1987	Nov 5,1987	854
CHRYSENE	48.0000 J	7100.0000 D	UG/KG	Feb 12,1993	Oct 7,1991	37
COBALT	1.4000	70.0000	MG/KG	Feb 25,1993	Aug 31,1989	657
COPPER	0.0105	97.6000	MG/KG	Oct 21,1987	May 13,1992	845
CYANIDE	0.1900 B	43.0000	MG/KG	Apr 15,1993	Mar 19,1993	60
DI-n-BUTYL PHTHALATE	44.0000 J	4600.0000	UG/KG	Oct 21,1987	Feb 8,1993	50
DI-n-OCTYL PHTHALATE	93.0000 BJ	2000.0000 B	UG/KG	Mar 31,1993	Mar 31,1993	22
DIBENZO(a,h)ANTHRACENE	92.0000 J	1700.0000	UG/KG	Feb 8,1993	Oct 7,1991	6
DIBENZOFURAN	39.0000 J	1700.0000	UG/KG	Feb 8,1993	Oct 7,1991	10
DIETHYL PHTHALATE	36.0000 J	3100.0000	UG/KG	Mar 1,1993	Mar 1,1993	16
DIMETHYL PHTHALATE	140.0000 J	2100.0000	UG/KG	Feb 12,1993	Feb 12,1993	2
ETHYLBENZENE	5.0000	390.0000	UG/KG	Mar 1,1993	Feb 12,1993	6
FLUORANTHENE	46.0000 J	15000.0000 E	UG/KG	Mar 1,1993	Oct 7,1991	94
FLUORENE	44.0000 J	3100.0000	UG/KG	Feb 22,1993	Oct 7,1991	12
GROSS ALPHA	1.2400	49.0000	PCI/G	Dec 15,1992	Mar 16,1993	414

Table B-26

FY 93 Industrial Area Operable Units Analytical Data

Soils

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
GROSS ALPHA - DISSOLVED	4.0940	68.1000	PCI/G	Oct 10,1991	Aug 29,1991	93
GROSS ALPHA - SUSPENDED	0.1470	143.0000	PCI/G	Oct 29,1992	Oct 29,1992	210
GROSS BETA	3.3090 J	52.0000	PCI/G	Nov 18,1992	Mar 16,1993	571
GROSS BETA - DISSOLVED	10.9000	48.6000	PCI/G	Sep 19,1991	Aug 29,1991	101
GROSS BETA - SUSPENDED	6.1000 J	39.0000	PCI/G	Nov 20,1992	Mar 31,1992	54
HEXACHLOROBENZENE	160.0000 J	1300.0000	UG/KG	Feb 12,1993	Feb 12,1993	2
INDENO(1,2,3-cd)PYRENE	60.0000 J	3800.0000	UG/KG	Feb 8,1993	Oct 7,1991	26
IRON	12.7000	56500.0000	MG/KG	Oct 21,1987	Feb 26,1993	844
LEAD	0.0084	84.9000	MG/KG	Oct 21,1987	Dec 2,1992	861
LITHIUM	1.4000 B	100.0000	MG/KG	Aug 29,1991	Nov 12,1987	413
MAGNESIUM	1.8500	6420.0000	MG/KG	Oct 21,1987	Sep 18,1991	850
MANGANESE	0.5580	1500.0000 N*	MG/KG	Oct 21,1987	Sep 19,1991	844
MERCURY	0.0001	4.5000	MG/KG	Oct 21,1987	Aug 25,1989	309
METHYLENE CHLORIDE	1.0000 J	16000.0000 B	UG/KG	Aug 28,1989	Aug 23,1989	338
MOLYBDENUM	0.7400 B	27.9000 B	MG/KG	Oct 10,1991	Dec 8,1992	100
MONOCROTOPHOS	0.9800	0.9800	MG/KG	Feb 22,1993	Feb 22,1993	2
N-NITROSODIPHENYLAMINE	83.0000 J	83.0000 J	UG/KG	Oct 21,1987	Oct 21,1987	8
NAPHTHALENE	46.0000 J	4500.0000 D	UG/KG	Feb 12,1993	Oct 7,1991	8
NICKEL	0.0092	542.9685	MG/KG	Oct 21,1987	Nov 12,1987	745
NITRATE	0.2640	14.5000	MG/KG	Feb 8,1993	Feb 8,1993	46
NITRATE/NITRITE	0.4400	6100.0000	MG/KG	Mar 31,1993	Mar 19,1993	80
NITRATE/NITRITE (HISTORI	1.1000	1480.0000	MG/KG	Aug 24,1989	Nov 5,1987	378
PENTACHLOROPHENOL	660.0000 J	660.0000 J	UG/KG	Jan 25,1993	Jan 25,1993	8
PETROLEUM HYDROCARBONS, T	34.9000	1700.0000	MG/KG	Sep 10,1991	Oct 2,1991	12
PHENANTHRENE	40.0000 J	16000.0000 D	UG/KG	Mar 1,1993	Oct 7,1991	60
PHENOL	55.0000 J	510.0000	UG/KG	Jan 27,1993	Feb 8,1993	20
PLUTONIUM-238	0.0050 J	0.0060 J	PCI/G	Dec 10,1992	Dec 10,1992	4
PLUTONIUM-239	0.0020	0.0400	PCI/G	Nov 7,1989	Nov 7,1989	12
PLUTONIUM-239/240	-0.0600	31.6100	PCI/G	Nov 4,1987	Oct 2,1991	735
POTASSIUM	1.5300	6770.0000	MG/KG	Oct 21,1987	Mar 18,1993	782
PYRENE	51.0000 J	14000.0000 E	UG/KG	Jan 25,1993	Oct 7,1991	98
RADIUM-226	0.0000	1.8000	PCI/G	Sep 6,1991	Mar 18,1993	159
RADIUM-228	0.0000	3.0000	PCI/G	Sep 5,1991	Mar 19,1993	159
SELENIUM	0.2200 BN	5.8000	MG/KG	Aug 28,1991	Feb 23,1993	139
SILICON	39.4000	9450.0000	MG/KG	Feb 12,1993	Apr 15,1993	126
SILVER	0.4700 B	5.5219	MG/KG	Sep 27,1991	Nov 9,1987	84
SODIUM	42.5000 B	5990.0000	MG/KG	Nov 17,1992	Mar 18,1993	658
STRONTIUM	7.1000 B	420.0000	MG/KG	Mar 27,1992	Dec 16,1992	687
STRONTIUM-89,90	-0.6000	2.0100	PCI/G	Nov 9,1987	Feb 23,1993	275
STRONTIUM-90	-0.1300	0.7100	PCI/G	Dec 1,1989	Nov 7,1989	16
STYRENE	1.0000 J	80.0000	UG/KG	Dec 10,1992	Feb 12,1993	8
SULFIDE	2.0000	18.6000	MG/KG	Aug 28,1989	Mar 19,1993	48
TETRACHLOROETHENE	1.0000 J	23.0000 J	UG/KG	Aug 29,1991	Nov 3,1987	44
THALLIUM	0.2100 BW	5.7409	MG/KG	May 15,1992	Nov 13,1987	250
TIN	3.6000	392.0000	MG/KG	Feb 12,1993	Sep 24,1991	168
TOLUENE	1.0000 J	7800.0000	UG/KG	Aug 24,1989	Feb 8,1993	533
TOTAL ORGANIC CARBON	0.4000 X	32000.0000 X	MG/KG	Oct 25,1991	Feb 23,1993	142
TOTAL XYLENES	1.0000 J	1400.0000 E	UG/KG	Aug 29,1989	Feb 12,1993	29
TRICHLOROETHENE	1.0000 J	21.0000	UG/KG	Sep 19,1991	Dec 2,1992	40
TRITIUM	0.0330	3.3000	PCI/G	Feb 4,1993	Nov 5,1987	216
URANIUM-233,-234	0.0210 BJ	971.0000	PCI/G	Dec 8,1992	Nov 16,1992	699
URANIUM-235	-0.0188	0.8700 B	PCI/G	Dec 15,1992	Mar 19,1993	584
URANIUM-238	0.0320	141.0000	PCI/G	Oct 16,1991	Nov 11,1992	699
VANADIUM	0.0183	78.1000	MG/KG	Oct 21,1987	Feb 25,1993	846
VINYL ACETATE	1.0000 J	1.0000 J	UG/KG	Aug 24,1989	Aug 24,1989	10
ZINC	0.0336	706.0000	MG/KG	Oct 21,1987	Dec 2,1992	844
pH	4.7600	10.3000	PH	Oct 26,1987	Mar 2,1993	413

Table B-27

FY 93 Industrial Area Operable Units Analytical Data

Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1,2-TETRACHLOROETHANE	0.4000	5.0000 DF	UG/L	Apr 29,1993	Feb 26,1992	4
1,1,1-TRICHLOROETHANE	0.3000	30250.0000	UG/L	Apr 28,1993	Oct 20,1987	149
1,1,2,2-TETRACHLOROETHANE	0.9700	5.0000 J	UG/L	May 14,1992	Sep 20,1989	8
1,1,2-TRICHLOROETHANE	0.1100	14740.0000	UG/L	May 14,1992	Apr 14,1988	36
1,1-DICHLOROETHANE	0.3000 J	500.0000	UG/L	Oct 7,1992	Oct 17,1988	170
1,1-DICHLOROETHENE	0.2000	48000.0000	UG/L	Apr 21,1993	May 21,1987	165
1,1-DICHLOROPROPENE	5.0000 DF	5.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
1,2,3-TRICHLOROBENZENE	0.2800	5.0000 DF	UG/L	Mar 17,1992	Feb 26,1992	8
1,2,3-TRICHLOROPROPANE	5.0000 DF	5.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
1,2,4-TRICHLOROBENZENE	0.2800	7.0000 BD	UG/L	Mar 17,1992	Jul 30,1992	14
1,2-DIBROMOETHANE	25.0000 DF	25.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
1,2-DICHLOROBENZENE	5.0000 DF	5.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
1,2-DICHLOROETHANE	0.1000	16000.0000	UG/L	Feb 26,1992	May 21,1987	66
1,2-DICHLOROETHENE	0.7000 J	12000.0000 D	UG/L	Oct 13,1992	May 14,1991	123
1,2-DICHLOROPROPANE	1.0000 J	6.0000	UG/L	Jan 9,1991	Oct 13,1989	41
1,3-DICHLOROBENZENE	1.0000 J	7.0000 D	UG/L	May 4,1993	Jul 30,1992	18
1,3-DICHLOROPROPANE	5.0000 DF	5.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
1,4-DICHLOROBENZENE	0.2000	9.0000 J	UG/L	Nov 9,1992	Jun 16,1993	16
2,4,5-TRICHLOROPHENOL	3.0000 J	3.0000 J	UG/L	May 27,1993	May 27,1993	2
2,4-DIMETHYLPHENOL	7.0000 J	8.0000 J	UG/L	May 28,1993	Jun 16,1993	5
2,6-DINITROTOLUENE	2.0000 J	2.0000 J	UG/L	Nov 12,1991	Nov 12,1991	2
2-BUTANONE	1.0000 J	1300.0000	UG/L	Mar 13,1989	May 28,1993	103
2-CHLORONAPHTHALENE	5.0000 J	5.0000 J	UG/L	May 28,1993	May 28,1993	2
2-HEXANONE	1.0000 BJ	100.0000 J	UG/L	Mar 5,1991	Oct 13,1989	20
2-METHYLNAPHTHALENE	1.0000 J	1.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
2-METHYLPHENOL	3.0000 J	14.0000	UG/L	May 27,1993	May 28,1993	4
4,4'-DDT	0.0530	0.0530	MG/L	Sep 3,1986	Sep 3,1986	8
4-METHYL-2-PENTANONE	1.0000 J	1200.0000 E	UG/L	Apr 29,1991	Apr 27,1993	32
4-METHYLPHENOL	6.0000 J	2100.0000 E	UG/L	May 27,1993	May 28,1993	9
4-NITROPHENOL	61.0000 DJ	61.0000 DJ	UG/L	Apr 27,1993	Apr 27,1993	2
ACENAPHTHENE	2.0000 J	3.0000 J	UG/L	Mar 31,1993	Apr 27,1993	2
ACETONE	1.0000 J	1700.0000 D	UG/L	Oct 6,1992	Dec 6,1991	556
ALDRIN	0.0000 I	0.0530	MG/L	Mar 31,1993	Sep 3,1986	10
ALKALINITY AS CACO3	0.0000	3151.0000	MG/L	Mar 7,1991	Mar 5,1991	28
ALUMINUM	0.0000	456.0000 *	MG/L	Sep 22,1988	Feb 1,1993	819
AMERICIUM-241	-0.4400	5.2894	PCI/L	Nov 13,1986	Apr 23,1993	733
AMMONIA	0.0520	284.0000	MG/L	Oct 6,1992	Sep 22,1992	28
ANTIMONY	0.0000	76.0000	MG/L	Sep 22,1988	Nov 9,1988	522
AROCLOR-1016	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1221	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1232	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1242	0.0000 E	0.0110	MG/L	Mar 31,1993	Mar 31,1993	2
AROCLOR-1248	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
ARSENIC	0.000E	0.4000	MG/L	Oct 14,199?	Mar 18,1987	658
BARIUM	0.0001	5.0600	MG/L	Sep 22,1988	Feb 1,1993	861
BENZENE	0.0800 J	75.0000 J	UG/L	Oct 6,1992	Oct 7,1992	193
BENZENE, 1,2,4-TRIMETHYL	0.1000	5.0000 DF	UG/L	Mar 17,1992	Feb 26,1992	8
BENZENE, 1,3,5-TRIMETHYL-	0.0900 J	5.0000 DF	UG/L	Mar 17,1992	Feb 26,1992	6
BENZOIC ACID	6.0000 J	2900.0000 E	UG/L	Apr 26,1993	Mar 29,1993	20
BERYLLIUM	0.0003 B	0.0320	MG/L	Jun 12,1989	Feb 1,1993	317
BICARBONATE	2.3300	4370.0000	MG/L	Aug 21,1987	May 10,1989	615
BICARBONATE AS CACO3	13.0000	2000.0000	MG/L	Apr 5,1991	Apr 27,1993	1054
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 JB	44.0000	UG/L	Sep 10,1986	Mar 29,1993	84
BORON	0.0311	0.1460	MG/L	Mar 12,1991	Aug 14,1990	24
BROMOBENZENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
BROMOCHLOROMETHANE	0.6300	25.0000 DF	UG/L	Dec 19,1991	Feb 26,1992	4
BROMODICHLOROMETHANE	0.2000 J	20.0000	UG/L	Oct 7,1992	Oct 28,1992	26
BROMOFORM	0.9000 J	25.0000 DF	UG/L	Oct 7,1992	Feb 26,1992	14
BROMOMETHANE	1.0000 J	50.0000 DF	UG/L	Oct 26,1989	Feb 26,1992	52
CADMIUM	0.0003 J	0.6060	MG/L	Aug 28,1987	Feb 13,1992	522

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
CALCIUM	0.0570	713000.0000	MG/L	Sep 9,1986	Nov 9,1989	917
CARBON DISULFIDE	0.1000 J	46.0000	UG/L	Oct 6,1992	Oct 13,1992	214
CARBON TETRACHLORIDE	0.2000	28000.0000	UG/L	Feb 26,1992	May 21,1987	243
CARBONATE	2.0000	450.0000	MG/L	Jul 31,1992	Nov 13,1986	114
CARBONATE AS CACO3	0.0000	78.0000	MG/L	Oct 30,1990	Aug 15,1991	540
CESIUM	0.0209 B	0.4000 B	MG/L	Jan 9,1991	Oct 12,1990	228
CESIUM RADIOACTIVE UNKN I	-0.2100	0.1000	PCI/L	Mar 15,1990	Nov 29,1989	82
CESIUM-134	-1.2400 J	1.7600	PCI/L	Apr 7,1993	Apr 15,1993	104
CESIUM-137	-1.7800 J	5.3000	PCI/L	Aug 15,1990	May 10,1990	557
CHEMICAL OXYGEN DEMAND	0.8700	45.0000	MG/L	Oct 6,1992	Apr 12,1993	53
CHLORIDE	-0.7800	1200.0000	MG/L	Apr 8,1993	Jan 31,1992	789
CHLOROBENZENE	0.3000 J	5.0000 J	UG/L	Oct 6,1992	Sep 20,1989	20
CHLOROETHANE	2.0000 BJ	83.0000	UG/L	Dec 13,1990	Mar 31,1993	36
CHLOROFORM	0.0800 J	730.0000	UG/L	Oct 13,1992	Aug 6,1991	343
CHLOROMETHANE	0.2500 J	25.0000 DF	UG/L	May 14,1992	Feb 26,1992	32
CHROMIUM	0.0023 B	1.1000	MG/L	Feb 18,1992	Apr 13,1992	617
COBALT	0.0022 B	0.2280	MG/L	Aug 6,1991	Feb 1,1993	428
COPPER	0.0011 B	30.5000	MG/L	Jan 22,1992	Nov 9,1989	859
CUMENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
CYANIDE	0.0010 B	3.8000	MG/L	Apr 15,1992	Jun 15,1987	607
CYANIDES (SOLUBLE SALTS A	0.0100	0.0400	MG/L	Dec 4,1990	Jul 25,1990	12
DI-n-BUTYL PHTHALATE	1.0000 J	8.0000 JB	UG/L	Sep 18,1986	Sep 10,1986	66
DIBROMOCHLOROMETHANE	5.0000 J	10.0000 DF	UG/L	Sep 9,1988	Feb 26,1992	12
DIBROMOMETHANE	25.0000 DF	25.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
DICHLORODIFLUOROMETHANE	0.5800	25.0000 DF	UG/L	Mar 17,1992	Feb 26,1992	8
DIELDRIN	0.0460	0.0460	MG/L	Sep 3,1986	Sep 3,1986	8
DIETHYL PHTHALATE	2.0000 BJ	51.0000 DJ	UG/L	Jun 21,1993	May 28,1993	24
ENDRIN	0.0700	0.0700	MG/L	Sep 3,1986	Sep 3,1986	8
ETHYLBENZENE	0.3000 J	500.0000 J	UG/L	Oct 13,1992	Oct 17,1988	99
FLUORENE	2.0000 J	2.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
FLUORIDE	0.1000	8.6000	MG/L	May 19,1993	Mar 29,1993	1140
GROSS ALPHA	-0.3630 J	440.0000	PCI/L	Apr 28,1992	Jun 16,1993	477
GROSS ALPHA - DISSOLVED	-5.9200 J	337.6000	PCI/L	Dec 12,1990	Nov 13,1990	723
GROSS ALPHA - SUSPENDED	-80.0000	2000.0000	PCI/L	Dec 2,1988	Jun 24,1987	539
GROSS BETA	-14.0000	940.0000	PCI/L	Jul 28,1987	Sep 7,1988	623
GROSS BETA - DISSOLVED	-0.2000	270.7000	PCI/L	Jun 14,1990	Nov 13,1990	710
GROSS BETA - SUSPENDED	-5.7100	75.9200	PCI/L	May 8,1990	Jun 6,1990	172
HEPTACHLOR	0.0000 I	0.0640	MG/L	Mar 31,1993	Sep 3,1986	10
HEPTACHLOR EPOXIDE	0.0001 X	0.0001 X	MG/L	Nov 12,1991	Nov 12,1991	2
HEXACHLOROBUTADIENE	0.1700 B	5.0000 DF	UG/L	May 13,1992	Feb 26,1992	10
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	Jun 12,1987	Jun 12,1987	2
HYDROCYANIC ACID	0.0370	0.1100	MG/L	Jul 31,1992	Aug 6,1992	4
IRON	0.0005	1590.0000	MG/L	Sep 19,1986	Feb 13,1992	801
LEAD	0.0000	3.6600	MG/L	Jun 25,1987	Feb 13,1992	722
LITHIUM	0.0011 B	862.0000	MG/L	Apr 23,1992	Nov 9,1989	703
MAGNESIUM	0.0082	21000.0000	MG/L	Sep 9,1986	Nov 9,1989	921
MANGANESE	0.0000	52.5000	MG/L	Sep 9,1986	Nov 9,1989	857
MERCURY	0.0000	0.0023	MG/L	Jun 25,1987	Aug 29,1986	442
METHYLENE CHLORIDE	0.1000	620.0000 B	UG/L	May 6,1993	Feb 1,1990	674
MOLYBDENUM	0.0021 B	0.4350	MG/L	Aug 17,1990	Jul 29,1993	574
N-NITROSO-DI-n-PROPYLAMIN	200.0000 D	200.0000 D	UG/L	May 28,1993	May 28,1993	2
N-NITROSODIPHENYLAMINE	3.0000 BJ	162.0000 B	UG/L	Sep 10,1986	Sep 10,1986	58
NAPHTHALENE	0.3600 B	31.0000	UG/L	May 13,1992	Jul 29,1993	19
NICKEL	0.0020 B	4.9500	MG/L	Feb 14,1992	Nov 18,1991	740
NITRATE	0.0200	1450.0000	MG/L	Jun 2,1993	Oct 17,1990	154
NITRATE/NITRITE	0.0200	3400.0000	MG/L	Dec 11,1992	Jul 22,1993	536
NITRATE/NITRITE (HISTORI	0.0120	9640.0000	MG/L	Sep 28,1989	Sep 19,1986	786
NITRITE	0.0200	2.2000	MG/L	Sep 25,1990	Jun 6,1990	96
OIL AND GREASE	1.0000	32.0000	MG/L	Sep 25,1989	Jun 12,1987	6
ORTHOPHOSPHATE	0.0100	4.4000	MG/L	Mar 26,1991	Sep 6,1986	414

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
ORTHOPHOSPHATE (HISTORICA	0.0100	0.9200	MG/L	Oct 15,1991	May 14,1991	637
PENTACHLOROPHENOL	4.0000 J	62.0000 DJ	UG/L	May 28,1993	Apr 27,1993	4
PHENANTHRENE	2.0000 J	2.0000 J	UG/L	Mar 29,1993	Mar 29,1993	6
PHENOL	2.0000 J	130.0000	UG/L	Mar 31,1993	Jun 16,1993	4
PHOSPHORUS	0.0120	100.0000 B	MG/L	Jul 30,1990	Nov 15,1990	296
PLUTONIUM-238	-0.0029 J	0.0454	PCI/L	Jul 30,1990	Nov 8,1990	202
PLUTONIUM-239	0.0000	0.1920	PCI/L	Aug 18,1989	Oct 31,1989	108
PLUTONIUM-239/240	-3.2000	8.5000	PCI/L	Jul 28,1987	Sep 15,1987	794
POTASSIUM	0.0040	34300.0000	MG/L	Sep 9,1986	Nov 9,1989	927
PROPANE, 1,2-DIBROMO-3-CH	100.0000 DF	100.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
RADIUM-226	0.0000	8.8000 B	PCI/L	Aug 23,1989	Apr 21,1993	500
RADIUM-228	1.2000	14.3400	PCI/L	Nov 9,1992	Jan 31,1992	81
SELENIUM	0.0000	45.0000	MG/L	Sep 19,1986	Feb 27,1989	724
SILICA, DISSOLVED (HISTOR	1.6000	61.0000	MG/L	Feb 13,1992	Nov 20,1990	619
SILICON	2.2700	288.0000	MG/L	Sep 22,1992	Feb 1,1993	578
SILVER	0.0020 B	3.0400	MG/L	Apr 17,1992	Feb 1,1993	452
SODIUM	0.0997	370000.0000	MG/L	Sep 9,1986	Nov 9,1989	904
SODIUM FLUORIDE	0.1800	2.8000	MG/L	Mar 12,1991	Aug 14,1990	32
SODIUM SULFATE	24.0000	524.0000	MG/L	Aug 10,1990	Mar 12,1991	32
SOLIDS, NONVOLATILE SUSPE	23.0000	1000.0000	MG/L	Mar 13,1991	Jun 8,1990	8
STRONTIUM	0.0003	6400.0000	MG/L	Sep 9,1986	Nov 9,1989	893
STRONTIUM-89	16.0000	3376.0000	PCI/L	May 10,1990	May 17,1990	6
STRONTIUM-89,90	-0.3000	13.8300	PCI/L	Jun 12,1989	Jun 13,1991	673
STRONTIUM-90	-0.0908	4.1000	PCI/L	Feb 28,1990	Mar 15,1990	196
STYRENE	0.3000 J	9.0000	UG/L	Oct 7,1992	Jan 3,1989	16
SULFATE	0.1000 J	7490.0000	MG/L	Sep 13,1988	May 10,1990	812
SULFIDE	2.0000	29.0000	MG/L	May 28,1993	Apr 23,1993	30
TETRACHLOROETHENE	0.0700	528000.0000	UG/L	Dec 11,1991	May 22,1987	567
THALLIUM	0.0005	0.2900	MG/L	Sep 19,1986	Sep 10,1986	193
TIN	0.0101 B	206.0000	MG/L	Apr 22,1991	Nov 9,1989	443
TOLUENE	0.1100	1200.0000 E	UG/L	Dec 14,1991	Jun 16,1993	307
TOTAL DISSOLVED SOLIDS	17.0000	33000.0000	MG/L	Aug 19,1986	Oct 6,1992	854
TOTAL ORGANIC CARBON	1.0000	22.0000	MG/L	Aug 13,1993	Aug 5,1993	60
TOTAL RADIOCESIUM	-0.2000	5.9000	PCI/L	Nov 20,1989	Jun 21,1993	162
TOTAL SUSPENDED SOLIDS	1.0000	24000.0000	MG/L	Jun 10,1989	Jul 30,1992	754
TOTAL XYLENES	0.2000 J	330.0000	UG/L	Oct 6,1992	Oct 7,1992	174
TRICHLOROETHENE	0.0700 JB	72000.0000	UG/L	Mar 17,1992	May 21,1987	568
TRICHLOROFLUOROMETHANE	0.4000	25.0000 DF	UG/L	Apr 29,1993	Feb 26,1992	10
TRITIUM	-510.0000	15020.0000	PCI/L	Sep 27,1989	Sep 19,1989	887
URANIUM-233,-234	-0.1000	1000.0000	PCI/L	Mar 5,1990	Jun 24,1987	754
URANIUM-235	-0.2000	47.0000	PCI/L	Aug 12,1987	Jun 24,1987	805
URANIUM-238	-0.4000	750.0000	PCI/L	Aug 7,1987	Jun 24,1987	747
VANADIUM	0.0012 B	0.7540 N*	MG/L	Feb 27,1992	Feb 1,1993	648
VINYL ACETATE	1.0000 J	39.0000 J	UG/L	Oct 6,1992	Aug 23,1989	30
VINYL CHLORIDE	1.0000 J	930.0000	UG/L	May 31,1990	Jan 3,1989	90
ZINC	0.0000	686.0000	MG/L	Sep 18,1986	Feb 13,1992	949
alpha-BHC	0.0000 I	0.0001	MG/L	Mar 31,1993	Nov 11,1991	6
beta-BHC	0.0000 I	0.0001 X	MG/L	Mar 31,1993	Feb 17,1992	4
cis-1,2-DICHLOROETHENE	0.1000 J	280.0000 E	UG/L	Jun 15,1993	Mar 2,1993	42
cis-1,3-DICHLOROPROPENE	1.0000 J	5.0000 J	UG/L	Oct 11,1990	Sep 20,1989	14
delta-BHC	0.0000 I	0.0000 I	MG/L	Mar 31,1993	Mar 31,1993	2
gamma-BHC (LINDANE)	0.0000 I	0.0860	MG/L	Mar 31,1993	Sep 3,1986	10
m+p CRESOL	7.0000 J	7.0000 J	UG/L	Mar 31,1993	Mar 31,1993	2
m+p XYLENE	0.2000	0.2000	UG/L	Dec 16,1991	Dec 16,1991	2
m-XYLENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
n-BUTYLBENZENE	0.1000 J	10.0000 DF	UG/L	Jul 30,1992	Feb 26,1992	16
n-PROPYLBENZENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
o-CHLOROTOLUENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
o-XYLENE	10.0000 DF	10.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
p-CHLOROTOLUENE	0.6000	10.0000 DF	UG/L	Feb 10,1992	Feb 26,1992	4

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Ground Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
p-CYMENE	0.1200 J	10.0000 DF	UG/L	Mar 17,1992	Feb 26,1992	20
pH	6.2000	11.1000	PH	Feb 1,1990	Sep 19,1989	721
sec-BUTYLBENZENE	0.7500 B	11.0000 B	UG/L	May 15,1992	May 15,1992	8
sec-DICHLOROPROPANE	25.0000 DF	25.0000 DF	UG/L	Feb 26,1992	Feb 26,1992	2
tert-BUTYLBENZENE	4.0000	10.0000 DF	UG/L	Feb 10,1992	Feb 26,1992	4
trans-1,2-DICHLOROETHENE	0.1500	1600.0000	UG/L	May 14,1992	Mar 17,1987	331
trans-1,3-DICHLOROPROPENE	5.0000 J	5.0000 J	UG/L	Sep 14,1988	Sep 14,1988	16

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FY 93 Industrial Area Operable Units Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
% MOISTURE	13.0000	44.0000	%MOIST	Sep 18,1990	Dec 3,1990	49
2-BUTANONE	12.0000	350.0000	UG/KG	Aug 13,1986	Sep 4,1991	22
2-METHYLNAPHTHALENE	58.0000 J	1700.0000	UG/KG	May 8,1991	May 29,1991	21
4,4'-DDT	0.0029 J	0.0950 XZ	MG/KG	Dec 4,1991	Dec 3,1990	22
4-METHYLPHENOL	350.0000 J	990.0000 J	UG/KG	Mar 21,1991	May 29,1991	8
4-NITROANILINE	5300.0000 J	5300.0000 J	UG/KG	Mar 25,1991	Mar 25,1991	6
ACENAPHTHENE	56.0000 J	9200.0000	UG/KG	Sep 3,1991	May 29,1991	34
ACENAPHTHYLENE	50.0000 J	440.0000 J	UG/KG	Aug 20,1991	May 29,1991	8
ACETONE	5.0000 BJ	1400.0000 B	UG/KG	Sep 20,1990	Sep 4,1991	35
ALKALINITY AS CACO3	440.0000	11000.0000	MG/KG	Sep 5,1990	May 29,1991	39
ALUMINUM	1700.0000	33900.0000	MG/KG	Aug 27,1991	Nov 6,1990	49
AMERICIUM-241	0.0000	1.4670	PCI/G	Aug 22,1986	Sep 19,1990	64
ANTHRACENE	68.0000 J	15000.0000	UG/KG	Aug 20,1991	May 29,1991	25
ANTIMONY	4.3000	13.8000 BN	MG/KG	Mar 5,1992	Nov 28,1990	32
AROCLOR-1254	0.0500 J	67.0000	MG/KG	May 29,1991	Mar 25,1991	56
ARSENIC	0.5000	23.7000	MG/KG	Aug 22,1986	Sep 4,1991	52
BARIUM	11.0000	406.0000 B	MG/KG	Aug 22,1986	Nov 6,1990	49
BENZO(a)ANTHRACENE	49.0000 J	21000.0000	UG/KG	Aug 13,1991	May 29,1991	43
BENZO(a)PYRENE	76.0000 J	24000.0000	UG/KG	Feb 27,1992	May 29,1991	38
BENZO(b)FLUORANTHENE	55.0000 J	27000.0000	UG/KG	Mar 26,1991	May 29,1991	40
BENZO(ghi)PERYLENE	64.0000 J	26000.0000	UG/KG	May 29,1991	May 29,1991	24
BENZO(k)FLUORANTHENE	37.0000 J	17000.0000	UG/KG	Mar 26,1991	May 29,1991	41
BENZOIC ACID	98.0000 J	197.0000 J	UG/KG	May 26,1991	Dec 4,1991	8
BERYLLIUM	0.2000	2.5000	MG/KG	Dec 3,1991	Mar 13,1989	41
BICARBONATE AS CACO3	270.0000	3500.0000	MG/KG	Dec 18,1990	Dec 17,1990	22
BIS(2-ETHYLHEXYL)PHTHALAT	40.0000 J	24000.0000 B	UG/KG	Aug 13,1986	May 29,1991	39
BUTYL BENZYL PHTHALATE	540.0000 J	2300.0000	UG/KG	Sep 18,1990	May 29,1991	10
CADMIUM	0.6800 B	3.2000	MG/KG	Sep 18,1990	May 29,1991	45
CALCIUM	1370.0000	132000.0000	MG/KG	Aug 12,1986	Aug 13,1986	52
CARBON DISULFIDE	1.0000 J	2.0000 J	UG/KG	Sep 20,1990	Sep 19,1990	12
CARBON TETRACHLORIDE	52000.0000	52000.0000	UG/KG	Mar 13,1989	Mar 13,1989	10
CARBONATE	119.0000	143.0000	MG/KG	Apr 28,1992	Aug 26,1992	16
CESIUM	1.3000 WN*	700.0000 B	MG/KG	Sep 18,1990	Nov 6,1990	36
CESIUM-134	0.0000	0.1603	PCI/G	Sep 4,1991	Apr 16,1991	36
CESIUM-137	0.0000	0.9130	PCI/G	Mar 13,1989	Dec 3,1990	45
CHLORIDE	11.0000	210.0000	MG/KG	Aug 22,1986	Aug 13,1986	20
CHLOROFORM	6.0000 J	10000.0000	UG/KG	Jun 1,1990	Mar 13,1989	20
CHROMIUM	1.9000	70.1000	MG/KG	Dec 3,1991	May 29,1991	49
CHRYSENE	51.0000 J	25000.0000	UG/KG	Aug 13,1991	May 29,1991	40
COBALT	2.1000	43.3000 B	MG/KG	Dec 3,1991	Nov 6,1990	44
COPPER	0.4200	275.0000	MG/KG	Aug 22,1986	Nov 6,1990	46
DI-n-BUTYL PHTHALATE	39.0000 J	240.0000 BJ	UG/KG	Apr 16,1991	Aug 22,1986	32
DIBENZO(a,h)ANTHRACENE	220.0000 J	9100.0000	UG/KG	Aug 14,1991	May 29,1991	13
DIBENZOFURAN	100.0000 J	4100.0000	UG/KG	Aug 13,1991	May 29,1991	18
ENDOSULFAN I	0.0200 J	0.0200 J	MG/KG	Aug 13,1991	Aug 13,1991	4
ETHYLBENZENE	1.0000 J	1.0000 J	UG/KG	Aug 13,1986	Aug 13,1986	10
FLUORANTHENE	45.0000 J	50000.0000	UG/KG	Sep 18,1990	May 29,1991	42
FLUORENE	94.0000 J	8900.0000	UG/KG	Mar 27,1991	May 29,1991	18
GROSS ALPHA	7.5000	17.1500	PCI/G	Aug 26,1992	Apr 28,1992	12
GROSS ALPHA - DISSOLVED	2.1990 J	93.0000	PCI/G	Mar 21,1991	Mar 5,1992	42
GROSS ALPHA - SUSPENDED	3.9400	24.0000	PCI/G	May 29,1991	Jul 14,1992	46
GROSS BETA	13.0000	28.3300	PCI/G	Aug 13,1986	Mar 5,1992	22
GROSS BETA - DISSOLVED	8.0200	247.1000	PCI/G	Aug 20,1991	Mar 21,1991	44
GROSS BETA - SUSPENDED	3.2800	24.0000	PCI/G	May 21,1991	Jul 14,1992	38
INDENO(1,2,3-cd)PYRENE	60.0000 J	22000.0000	UG/KG	May 29,1991	May 29,1991	34
IRON	5270.0000	98900.0000	MG/KG	Dec 3,1991	Sep 4,1991	54
LEAD	4.4000	59.4000 N	MG/KG	Aug 13,1986	Sep 19,1990	49
LITHIUM	1.8000	19.2000 B	MG/KG	Feb 26,1992	Nov 6,1990	44
MAGNESIUM	612.0000	6290.0000 B	MG/KG	Aug 13,1986	Nov 6,1990	49
MANGANESE	84.2000	3330.0000	MG/KG	Dec 18,1990	Sep 4,1991	49
MERCURY	0.0600	0.7200	MG/KG	Dec 3,1990	Aug 13,1986	33
METHOXYCHLOR	0.0410 J	0.0410 J	MG/KG	May 21,1991	May 21,1991	2
METHYLENE CHLORIDE	1.0000 J	3000.0000 JB	UG/KG	Aug 12,1986	Mar 13,1989	49

Table B-28

FY 93 Industrial Area Operable Units Analytical Data

Sediments

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
MOLYBDENUM	2.2000	33.2000 B	MG/KG	Aug 13,1986	Nov 6,1990	30
N-NITROSODIPHENYLAMINE	170.0000 JB	2000.0000 B	UG/KG	Aug 13,1986	Aug 12,1986	20
NAPHTHALENE	59.0000 J	4400.0000	UG/KG	Sep 3,1991	May 29,1991	27
NICKEL	2.5000	89.2000 B	MG/KG	May 21,1991	Nov 6,1990	42
NITRATE	3.0000	6.0000	MG/KG	Dec.3,1990	Dec 3,1990	12
NITRATE/NITRITE (HISTORI	0.6000	163.0000	MG/KG	Sep 5,1990	Mar 26,1991	36
OIL AND GREASE	1600.0000	1600.0000	MG/KG	Mar 13,1989	Mar 13,1989	10
PHENANTHRENE	53.0000	41000.0000	UG/KG	Mar 5,1992	May 29,1991	38
PHOSPHORUS	198.0000	348.0000	MG/KG	Dec 18,1990	Dec 17,1990	24
PLUTONIUM-238	0.0039 J	0.0039 J	PCI/G	Aug 30,1990	Aug 30,1990	2
PLUTONIUM-239/240	0.0100	1.3000	PCI/G	Aug 22,1986	Dec 3,1991	60
POTASSIUM	321.0000	5180.0000	MG/KG	Dec 3,1991	Aug 13,1986	49
PYRENE	68.0000 J	42000.0000	UG/KG	Dec 4,1991	May 29,1991	39
RADIUM-226	-0.3400	2.5000	PCI/G	Sep 4,1991	May 29,1991	43
RADIUM-228	0.0400	6.5290	PCI/G	Sep 4,1991	Mar 21,1991	42
SELENIUM	0.2500 B	3.5000	MG/KG	Nov 28,1990	Sep 29,1992	32
SILICON	79.2000	2280.0000	MG/KG	Apr 28,1992	Sep 4,1991	36
SILVER	0.7900	15.0000	MG/KG	Dec 3,1991	Mar 13,1989	22
SODIUM	60.3000	1480.0000 B	MG/KG	Aug 27,1991	Nov 6,1990	38
STRONTIUM	5.5000	76.7000	MG/KG	Aug 27,1991	Mar 5,1992	52
STRONTIUM-89,90	-0.1000	1.6400	PCI/G	Mar 13,1989	Sep 4,1991	47
SULFATE	26.0000	289.0000	MG/KG	Aug 22,1986	Aug 12,1986	20
TETRACHLOROETHENE	3.0000 J	39000.0000	UG/KG	Aug 26,1992	Mar 13,1989	20
THALLIUM	0.4500	13.0000	MG/KG	Aug 13,1991	Aug 12,1986	28
TIN	4.5000	404.0000	MG/KG	Dec 3,1991	Mar 13,1989	39
TOLUENE	1.0000 BJ	43.0000	UG/KG	Aug 22,1986	Mar 21,1991	20
TOTAL XYLENES	7.0000 J	7.0000 J	UG/KG	Aug 13,1986	Aug 13,1986	10
TRICHLOROETHENE	1.0000 J	17000.0000	UG/KG	Aug 22,1986	Mar 13,1989	28
URANIUM-233,-234	0.1450	2.4000 B	PCI/G	May 21,1991	Mar 5,1992	54
URANIUM-235	-0.0044 J	0.2000	PCI/G	Sep 18,1990	Mar 13,1989	58
URANIUM-238	0.1310	2.0000	PCI/G	May 21,1991	Mar 5,1992	51
VANADIUM	6.7000	90.4000 B	MG/KG	Aug 27,1991	Nov 6,1990	49
VINYL CHLORIDE	24.0000	57.0000	UG/KG	Mar 21,1991	Mar 21,1991	2
ZINC	23.0000	1150.0000	MG/KG	Aug 22,1986	May 29,1991	46
beta-BHC	0.1900 XZF	0.2200 DXZ	MG/KG	Dec 3,1990	Dec 3,1990	2
delta-BHC	0.0032 J	0.0032 J	MG/KG	Mar 21,1991	Mar 21,1991	2
gamma-BHC (LINDANE)	0.0500 XZF	0.0550 DXZ	MG/KG	Dec 3,1990	Dec 3,1990	2
pH	7.0000	9.6000	PH	May 14,1991	Dec 18,1990	47

Table B-29

FY 93 Industrial Area Operable Units Analytical Data
Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
1,1,1-TRICHLOROETHANE	1.0000 J	42.0000	UG/L	Dec 3,1992	Mar 20,1989	103
1,1,2,2-TETRACHLOROETHANE	1.0000 J	3.0000 J	UG/L	Jan 23,1990	Jul 23,1990	20
1,1,2-TRICHLOROETHANE	2.0000 J	2.0000 DJ	UG/L	Sep 25,1990	Sep 25,1990	16
1,1-DICHLOROETHANE	0.6000 J	50.0000	UG/L	Apr 22,1992	Dec 19,1989	96
1,1-DICHLOROETHENE	1.0000 J	160.0000 D	UG/L	Jun 7,1989	Sep 25,1990	89
1,2-DICHLOROETHANE	1.0000 J	23.0000	UG/L	Jul 8,1988	Mar 26,1991	46
1,2-DICHLOROETHENE	1.0000 J	460.0000 E	UG/L	Oct 16,1990	Sep 11,1990	78
2,4-DIMETHYLPHENOL	2.0000 J	3.0000 J	UG/L	Dec 17,1992	Oct 9,1991	5
2-BUTANONE	2.0000 J	76.0000	UG/L	Jun 7,1989	Jan 12,1990	83
2-HEXANONE	1.0000 J	12.0000	UG/L	Oct 16,1990	Jul 29,1992	38
2-METHYLNAPHTHALENE	8.0000 J	29.0000	UG/L	Feb 26,1993	Oct 4,1990	2
4,4'-DDT	0.0000 J	0.0001 J	MG/L	Oct 21,1991	Apr 11,1989	12
4-METHYL-2-PENTANONE	2.0000 J	87.0000 J	UG/L	Apr 6,1989	Mar 23,1990	25
4-METHYLPHENOL	2.0000 J	43.0000 J	UG/L	Jan 25,1993	Mar 22,1989	4
ACENAPHTHENE	1.0000 J	4.0000 J	UG/L	Oct 9,1989	Mar 24,1993	2
ACENAPHTHYLENE	10.0000 J	10.0000 J	UG/L	Mar 22,1989	Mar 22,1989	2
ACETONE	1.0000 JB	970.0000 B	UG/L	Jul 11,1989	Aug 8,1989	166
ALDRIN	0.0000 J	0.0000 J	MG/L	Apr 8,1991	Apr 8,1991	2
ALKALINITY AS CACO3	36.0000	341.0000	MG/L	Aug 7,1991	Jun 26,1990	70
ALUMINUM	0.0002	120.0000	MG/L	May 10,1989	Jun 3,1991	407
AMERICIUM-241	-0.1400	90.0000	PCI/L	Apr 22,1991	Jun 6,1989	330
AMMONIA	0.0500	6.1000	MG/L	Sep 14,1992	Oct 24,1990	34
ANTHRACENE	2.0000 J	2.0000 J	UG/L	May 11,1989	May 11,1989	8
ANTIMONY	0.0075	1.9000 B	MG/L	Mar 11,1991	Mar 26,1991	208
AROCLOR-1254	0.0001 J	0.0240	MG/L	Oct 16,1990	Oct 17,1991	42
ARSENIC	0.0007	0.0398	MG/L	Sep 17,1991	Jan 25,1990	299
BARIUM	0.0001 B	2.3200	MG/L	Oct 19,1989	Jul 7,1989	419
BENZENE	1.0000 J	150.0000 D	UG/L	Mar 23,1990	Sep 25,1990	89
BENZO(a)ANTHRACENE	1.0000 J	1.0000 J	UG/L	May 11,1989	May 11,1989	8
BENZOIC ACID	4.0000 J	6.0000 J	UG/L	Apr 11,1991	Oct 9,1989	14
BENZYL ALCOHOL	2.0000 J	2.0000 J	UG/L	Oct 9,1989	Oct 9,1989	2
BERYLLIUM	0.0002 J	0.1700	MG/L	Mar 17,1990	Aug 19,1986	217
BICARBONATE	6.0000	1000.0000	MG/L	Nov 15,1989	Aug 8,1989	179
BICARBONATE AS CACO3	17.7000	705.0000	MG/L	Nov 6,1992	Dec 17,1992	271
BIS(2-ETHYLHEXYL)PHTHALAT	1.0000 J	1000.0000	UG/L	May 10,1989	Oct 9,1989	139
BROMOCHLOROMETHANE	6.5000	6.5000	UG/L	Sep 25,1992	Sep 25,1992	2
BROMODICHLOROMETHANE	0.6000 J	4.0000 J	UG/L	Aug 12,1992	Feb 10,1992	24
BUTYL BENZYL PHTHALATE	1.0000 J	2.0000 J	UG/L	Apr 18,1990	Apr 12,1989	16
CADMIUM	0.0011	0.4000	MG/L	May 30,1991	Mar 26,1991	245
CALCIUM	0.0163	1760.0000	MG/L	Apr 22,1991	May 9,1989	475
CARBON DISULFIDE	1.0000 J	19.0000	UG/L	Aug 20,1991	Jul 5,1989	46
CARBON TETRACHLORIDE	1.0000 J	605.0000	UG/L	Oct 10,1990	Jul 21,1987	149
CARBONATE	0.0000	56.4000	MG/L	Feb 26,1992	Sep 14,1992	143
CARBONATE AS CACO3	0.0000	76.5000	MG/L	Jul 17,1990	May 7,1991	262
CESIUM	0.0001	1.5000	MG/L	Aug 8,1989	May 9,1989	211
CESIUM RADIOACTIVE UNKN I	-0.2000	0.2000	PCI/L	Feb 16,1990	Mar 20,1990	124
CESIUM-134	1.0400	1.0400	PCI/L	Jun 17,1992	Jun 17,1992	8
CESIUM-137	-2.8000	5.6000	PCI/L	May 7,1990	May 8,1990	256
CHLORIDE	1.8000	1200.0000	MG/L	Sep 6,1990	Dec 17,1990	282
CHLORIDE (HISTORICAL CASN	3.0000	140.0000	MG/L	Aug 26,1992	Aug 26,1992	54
CHLOROBENZENE	2.0000 J	180.0000 D	UG/L	Mar 26,1991	Sep 25,1990	44
CHLOROETHANE	2.0000 J	62.0000	UG/L	Nov 26,1990	Mar 24,1993	13
CHLOROFORM	0.8000 J	82.0000	UG/L	Dec 3,1992	Mar 20,1989	187
CHLOROMETHANE	2.0000 J	130.0000	UG/L	Jun 4,1990	Jun 17,1991	20
CHROMIUM	0.0022	0.2980	MG/L	Oct 8,1991	Dec 19,1989	247
CHRYSENE	1.0000 J	1.0000 J	UG/L	May 11,1989	May 11,1989	8
COBALT	0.0015	0.2190	MG/L	Oct 21,1992	Sep 11,1990	223
COPPER	0.0002	0.2930	MG/L	May 9,1989	May 11,1989	362
CYANIDE	0.0020 B	1.0000	MG/L	Nov 26,1990	Jul 21,1987	257
CYANIDE, FREE	0.0250	0.0550	MG/L	Sep 10,1991	Sep 10,1991	12

Table B-29

FY 93 Industrial Area Operable Units Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
DI-n-BUTYL PHTHALATE	1.0000 J	5.0000 BJ	UG/L	Apr 12,1989	Apr 11,1991	40
DI-n-OCTYL PHTHALATE	1.0000 J	2.0000 J	UG/L	Oct 10,1989	Apr 11,1989	6
DIBENZOFURAN	1.0000 J	2.0000 J	UG/L	Feb 26,1993	Oct 9,1991	8
DIBROMOCHLOROMETHANE	1.0000 J	1.0000 J	UG/L	Sep 10,1991	Sep 10,1991	4
DIETHYL PHTHALATE	1.0000 J	7.0000 J	UG/L	Mar 24,1993	Oct 8,1991	13
DISSOLVED ORGANIC CARBON	1.8000	32.4000	MG/L	Oct 15,1991	Oct 16,1991	195
ENDOSULFAN I	0.0056 I	0.0056 I	MG/L	Sep 25,1992	Sep 25,1992	2
ETHYLBENZENE	1.0000 J	19.0000	UG/L	Feb 13,1990	Oct 4,1990	12
FLUORANTHENE	2.0000 J	2.0000 J	UG/L	May 11,1989	May 11,1989	8
FLUORENE	1.0000 J	3.0000 J	UG/L	May 19,1989	Mar 24,1993	6
FLUORIDE	0.1300	7.7000	MG/L	Jul 16,1991	Aug 15,1990	284
GROSS ALPHA	-0.5390 J	410.0000	PCI/L	May 5,1993	Sep 10,1991	124
GROSS ALPHA - DISSOLVED	-1.1400 J	1200.0000	PCI/L	Jul 29,1991	Oct 8,1990	218
GROSS ALPHA - SUSPENDED	-9.0000	2169.0000	PCI/L	May 26,1987	Jan 25,1990	247
GROSS BETA	-5.0000	3800.0000	PCI/L	May 26,1987	May 9,1989	262
GROSS BETA - DISSOLVED	-0.1577	1600.0000	PCI/L	Mar 16,1992	Oct 8,1990	222
GROSS BETA - SUSPENDED	-0.9400	2747.5000	PCI/L	Apr 5,1990	Oct 16,1989	149
HEPTACHLOR	0.0000 I	0.0000 I	MG/L	Jan 25,1993	Oct 9,1991	8
HEPTACHLOR EPOXIDE	0.0001 I	0.0001 I	MG/L	Oct 7,1991	Oct 7,1991	6
HEXAVALENT CHROMIUM	1.0000	1.0000	MG/L	Jul 22,1987	Jul 21,1987	40
IRON	0.0001	756.0000	MG/L	Oct 19,1989	Feb 26,1990	406
ISOPHORONE	1.0000 J	1.0000 J	UG/L	Apr 11,1989	Apr 11,1989	4
LEAD	0.0004 B	0.2150	MG/L	Oct 4,1990	May 11,1989	409
LITHIUM	0.0001	83.9000	MG/L	Aug 8,1989	Jul 5,1989	377
MAGNESIUM	0.0100	453.0000	MG/L	Mar 16,1990	Mar 26,1991	476
MANGANESE	0.0005	4.7300	MG/L	May 9,1989	Sep 11,1990	436
MERCURY	0.0001 B	40591.0000	MG/L	Oct 9,1990	Mar 25,1991	243
METHYLENE CHLORIDE	1.0000 JB	240.0000 E	UG/L	Jul 8,1988	Oct 10,1989	229
MOLYBDENUM	0.0001	0.4000	MG/L	May 9,1989	Aug 19,1986	231
N-NITROSODIPHENYLAMINE	1.0000 J	11.0000 B	UG/L	May 11,1989	Aug 19,1986	46
NAPHTHALENE	1.0000 J	26.0000	UG/L	Oct 26,1991	Oct 4,1990	6
NEPTUNIUM-237	-0.4000	0.5100	PCI/L	Apr 16,1991	May 9,1991	162
NICKEL	0.0001	0.3380	MG/L	May 9,1989	Sep 11,1990	262
NITRATE	0.2000	1185.7200	MG/L	Feb 26,1993	Oct 9,1990	70
NITRATE/NITRITE	0.3200	0.3200	MG/L	Dec 17,1992	Dec 17,1992	2
NITRATE/NITRITE (HISTORI	0.0200	9900.0000	MG/L	Oct 29,1990	Nov 14,1989	308
NITRITE	0.0100	2.4000	MG/L	Aug 15,1990	Oct 8,1991	153
OIL AND GREASE	0.0000	665.0000	MG/L	Sep 18,1990	Jul 8,1988	172
ORTHOPHOSPHATE	0.0100	0.8400	MG/L	Aug 20,1991	Jul 31,1990	188
ORTHOPHOSPHATE (HISTORICA	0.0100	0.3300	MG/L	Aug 20,1991	Jul 23,1991	173
PENTACHLOROPHENOL	20.0000 J	20.0000 J	UG/L	Apr 11,1991	Apr 11,1991	2
PHENANTHRENE	2.0000 J	6.0000 J	UG/L	Apr 6,1989	Mar 24,1993	4
PHENOL	2.0000 J	18.0000 J	UG/L	May 19,1989	Mar 22,1989	4
PHOSPHORUS	0.020[illegible]	1.800[illegible]	MG/L	Oct 16,1990	Jul 23,1990	280
PLUTONIUM-236	-0.1140	0.0440	PCI/L	Jun 4,1992	Apr 27,1992	46
PLUTONIUM-238	-0.0190 J	0.0550	PCI/L	Jun 4,1992	May 6,1992	105
PLUTONIUM-239	-0.0020	31.0000	PCI/L	Oct 16,1989	May 9,1989	159
PLUTONIUM-239/240	-0.0300	120.0000	PCI/L	Aug 22,1986	Jun 6,1989	329
POTASSIUM	0.4660 J	4140.0000	MG/L	May 8,1989	May 9,1989	408
PYRENE	2.0000 J	2.0000 J	UG/L	May 11,1989	May 11,1989	8
RADIUM-226	0.0000	20.0000	PCI/L	Apr 11,1989	Aug 8,1989	170
RADIUM-228	0.8600	52.0000	PCI/L	Nov 13,1990	Aug 8,1989	62
SELENIUM	0.0010 B	0.5500	MG/L	Feb 24,1993	Jun 20,1989	279
SILICA, DISSOLVED (HISTOR	1.0000	43.0000	MG/L	Jun 11,1991	Nov 13,1990	148
SILICON	0.2980	89.5000	MG/L	May 7,1991	Aug 26,1992	308
SILVER	0.0020	0.7400 B	MG/L	Aug 20,1992	Mar 26,1991	211
SODIUM	0.0028	1500000.0000	MG/L	Dec 18,1989	Apr 12,1989	474
SODIUM FLUORIDE	0.0600	2.6000	MG/L	May 22,1991	Dec 18,1990	94
SODIUM SULFATE	14.3000	430.0000	MG/L	Jul 29,1991	Dec 18,1990	102
SOLIDS, NONVOLATILE SUSPE	5.0000	830.0000	MG/L	Oct 7,1991	Apr 11,1991	141

Table B-29

FY 93 Industrial Area Operable Units Analytical Data

Surface Water

Compound	Minimum Detected	Maximum Detected	Units	Date Minimum Detected	Date Maximum Detected	# of Samples
SPECIFIC CONDUCTIVITY	126.0000	3880.0000	UMHOS/	Jun 30,1988	Dec 9,1992	120
STRONTIUM	0.0006 B	295.0000	MG/L	Oct 19,1989	Dec 18,1989	475
STRONTIUM-89	-0.6100	9855.0000	PCI/L	Apr 17,1991	May 7,1990	138
STRONTIUM-89,90	-0.4000	9.2500	PCI/L	May 8,1989	Jun 4,1992	286
STRONTIUM-90	-0.3000	8.0000	PCI/L	Aug 3,1989	May 7,1990	219
SULFATE	0.4600	1900.0000	MG/L	Feb 26,1993	Jul 7,1989	312
SULFATE (HISTORICAL CASNO	6.0000	64.7000	MG/L	Aug 26,1992	Jul 2,1992	54
SULFIDE	1.0000	3.0000	MG/L	Apr 11,1991	Nov 26,1990	50
TETRACHLOROETHENE	1.0000 J	280.0000	UG/L	Nov 15,1989	Jul 12,1989	126
THALLIUM	0.0009	1.1300 J	MG/L	Aug 26,1992	Dec 18,1989	141
TIN	0.0001	0.4560	MG/L	May 10,1989	May 9,1989	195
TOLUENE	0.4900	170.0000 D	UG/L	Sep 25,1992	Sep 25,1990	109
TOTAL ALKALINITY	48.0000	130.0000	MG/L	Nov 7,1990	Jul 24,1990	6
TOTAL DISSOLVED SOLIDS	5.0000	46000.0000	MG/L	Jun 21,1989	Feb 26,1990	308
TOTAL ORGANIC CARBON	1.0000	51.0000	MG/L	Feb 9,1993	Aug 15,1991	201
TOTAL RADIOCESIUM	-0.4000	5.4000 B	PCI/L	Nov 14,1989	May 19,1993	94
TOTAL SUSPENDED SOLIDS	1.0000	10000.0000	MG/L	Oct 17,1989	Aug 8,1989	272
TOTAL XYLENES	1.0000 J	25.0000 J	UG/L	Jun 4,1990	Mar 23,1990	26
TRICHLOROETHENE	1.0000 J	380.0000 D	UG/L	Jun 27,1990	Sep 25,1990	206
TRITIUM	-630.0000	23000.0000	PCI/L	Oct 9,1989	May 9,1989	315
URANIUM-233,-234	-0.0238 J	1500.0000	PCI/L	Jan 25,1993	Nov 14,1989	301
URANIUM-234	0.0200	780.0000	PCI/L	Apr 17,1991	Mar 26,1991	181
URANIUM-235	-0.0310 J	72.8700	PCI/L	Oct 21,1992	Jan 25,1990	354
URANIUM-238	0.0010 J	1211.0000	PCI/L	Apr 23,1992	Jun 21,1990	325
VANADIUM	0.0020	0.6770	MG/L	Mar 21,1991	May 11,1989	340
VINYL ACETATE	2.0000 J	80.0000	UG/L	Oct 10,1989	Feb 13,1990	10
VINYL CHLORIDE	1.0000 J	37.0000	UG/L	Feb 9,1993	Aug 26,1992	62
ZINC	0.0002	45.4000	MG/L	May 9,1989	Sep 13,1989	463
alpha-BHC	0.0000 J	0.0004 I	MG/L	Oct 7,1991	Jan 25,1993	36
alpha-CHLORDANE	0.0000 I	0.0026 I	MG/L	Oct 7,1991	Apr 8,1991	8
beta-BHC	0.0000 J	0.0001	MG/L	Oct 17,1991	May 15,1989	28
cis-1,2-DICHLOROETHENE	0.3200	0.3200	UG/L	Sep 25,1992	Sep 25,1992	2
delta-BHC	0.0000 J	0.0002 I	MG/L	Oct 7,1991	Jan 25,1993	12
gamma-BHC (LINDANE)	0.0000 I	0.0000 I	MG/L	Jan 25,1993	Oct 9,1991	8
gamma-CHLORDANE	0.0000 I	0.0000 I	MG/L	Oct 7,1991	Oct 7,1991	6
o-XYLENE	5.0000	8.0000	UG/L	Jul 6,1990	Jun 5,1990	2
pH	4.6000	84.0000	PH	Feb 26,1990	May 7,1990	253
trans-1,2-DICHLOROETHENE	3.0000 J	9.0000	UG/L	Aug 19,1986	Aug 19,1986	14

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)						
												Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Chloride	7647-14-5	A	250,000* (a)					250,000					
Cyanide (Free)	74-90-8	A	200 (h)	200 (h)			200						
Fluoride	10-72-0	A	4,000; 2,000* (a)	4,000 (a)			4,000		2,000				
N as Nitrate		A	10,000 (b)	10,000 (b)			10,000						
N as Nitrate+Nitrite	10-28-6	A	10,000 (b)	10,000 (b)					100,000				
N as Nitrite	7632-00-0	A	1,000 (b)	1,000 (b)			1,000		10,000				
Sulfate	7778-80-5	A	250,000* (a)					250,000					
Sulfide, H2S Undissociated	7783-06-4	A											
Coliform (Fecal)	10-06-0	B	1/100 ml (a)***				1/100 ml						
Ammonia as N	7764-41-7	C											
Dioxin	1746-01-6	D	3.0E-5 (h)	0 (h)		2.20E-07					1.30E-08		
Boron		E							750				
Chlorine, Total Residual	7782-50-5	E											
Sulfur		E											
Dissolved Oxygen	10-88-8	FP											
pH (Standard Units)	10-29-7	FP	6.5-8.5 * (a)					6.5-8.5	6.5-8.5				
Specific Conductance	10-34-4	FP											
Temperature (Degrees Celsius)		FP											
Alkalinity		IN				20,000							
Asbestos		IN	7MF/l (b)	7MF/l (b)									
Total Dissolved Solids (TDS)	10-33-3	IN	500,000* (a)							400,000 (1)			
Total Organic Carbon (TOC)		IN											
Aluminum	7429-90-5	M	50 to 200* (b)						5,000				
Antimony	7440-36-0	M	6 (h)	6 (h)									
Arsenic	7440-38-2	M	50 (a)		50		50		100				
Arsenic III		M											
Arsenic V		M											
Barium	7440-39-3	M	2,000 (e)	2,000 (e)	1,000		1,000						
Beryllium	7440-41-7	M	4 (h)	4 (h)					100				
Cadmium	7440-43-9	M	5 (b)	5 (b)	10		10		10				
Calcium	7440-70-2	M											
Cesium	7440-46-2	M											
Chromium	7440-47-3	M	100 (b)	100 (b)	50		50		100				
Chromium III		M											

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)					Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Chromium VI	7440-47-3	M											
Cobalt	7440-48-4	M							50				
Copper	7440-50-8	M	1,000*/1,300 (f)	1,300 (f)				1,000	200				
Iron	7439-89-6	M	300 * (a)					300	5,000				
Lead	7439-92-1	M	15 (f)	0 (f)	50		50		100				
Lithium	7439-93-2	M							2,500				
Magnesium	7439-95-4	M											
Manganese	7439-96-5	M	50 * (a)					50	200				
Mercury	7439-97-6	M	2 (b)	2 (b)	2		2		10				
Molybdenum	7439-98-7	M											
Nickel	7440-02-0	M	100 (h)	100 (h)					200				
Potassium	7440-09-7	M											
Selenium	7782-49-2	M	50 (b)	50 (b)	10		10		20				
Silver	7440-22-4	M	50 (a)/100*(b)		50		50						
Sodium	7440-23-5	M											
Strontium	7440-24-6	M											
Thallium	7440-28-0	M	2 (h)	0.5 (h)									
Tin	7440-31-5	M											
Titanium	7440-32-6	M											
Tungsten	7440-33-7	M											
Vanadium	7440-62-2	M							100				
Zinc	7440-66-6	M	5,000 * (a)					5,000	2,000				
Aldicarb	116-06-3	P	3 (i)	1 (i)		10							
Aldicarb Sulfone		P	2 (i)	1 (i)									
Aldicarb Sulfoxide		P	4 (i)	1 (i)									
Aldrin	309-00-2	P				0.002					7.40E-05		
Carbofuran	1563-66-2	P	40 (b)	40 (b)		36							
Chloranil	118-75-2	P											
Chlordane	57-74-9	P	2 (b)	0 (b)		0.03					4.60E-04		
Chlorpyrifos	2921-88-2	P											
DDT	50-29-3	P				0.1					2.40E-05		
DDT Metabolite (DDD)	72-54-8	P											
DDT Metabolite (DDE)	72-55-9	P				0.1							
Demeton	8065-48-3	P											
Diazinon	333-41-5	P											
Dieldrin	60-57-1	P				0.002					7.10E-05		
Endosulfan I	959-98-8	P											

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)					Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Endosulfan II	33213-65-9	P											
Endosulfan sulfate	1031-07-8	P											
Endrin	72-20-8	P	2 (h)	2 (h)	0.2	0.2							
Endrin Aldehyde	7421-93-4	P				0.2							
Endrin Ketone	53494-70-5	P											
Guthion (Azinphos methyl)	86-50-0	P											
Heptachlor	76-44-8	P	0.4 (b)	0 (b)		0.003					2.80E-04		
Heptachlor Epoxide	1024-57-3	P	0.2 (b)	0 (b)		0.09							
Hexachlorocyclohexane, Alpha	319-84-6	P				0.006					0.0092		
Hexachlorocyclohexane, Beta	319-85-7	P									0.0163		
Hexachlorocyclohexane (HCH OR BHC)		P											
Hexachlorocyclohexane, Delta	319-86-8	P											
Hexachlorocyclohexane, Technical (Total)	608-73-1	P									0.0123		
Hexachlorocyclohexane, Gamma (Lindane)	58-89-9	P	0.2 (b)	0.2 (b)	4	0.2					0.0186		
Malathion	121-75-5	P											
Methoxychlor	72-43-5	P	40 (b)	40 (b)	100	40							
Mirex	2385-85-5	P											
Oxamyl (Vydate)	23135-22-0	P	200 (h)	200 (h)									
Parathion	298-00-0	P											
Toxaphene	8001-35-2	P	3 (b)	0 (b)	5	0.03							
Vaponite 2		P											
Aroclor 1016	12674-11-2	PP											
Aroclor 1221	11104-28-2	PP											
Aroclor 1232	11141-16-5	PP											
Aroclor 1242	53469-21-9	PP											
Aroclor 1248	12674-29-6	PP											
Aroclor 1254	11097-69-1	PP											
Aroclor 1260	11096-82-5	PP											
PCBs (Total)	1336-36-3	PP	0.5 (b)	0 (b)		0.005					7.90E-05		
2,4,5-TP Silvex	93-72-1	H	50 (b)	50 (b)	10	50							
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	H	70 (b)	70 (b)	100	70							
Acrolein	107-02-8	H											
Atrazine	1912-24-9	H	3 (b)	3 (b)							3		

TABLE B-20 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)					Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Bromacil	314-40-9	H											
Dalapon	75-99-0	H	200 (h)	200 (h)									
Dinoseb	88-85-7	H	7 (h)	7 (h)									
Diquat		H	20 (h)	20 (h)									
Endothall	145-73-3	H	100 (h)	100 (h)									
Glyphosate	1071-83-6	H	700 (h)	700 (h)									
Picloram	1918-02-1	H	500 (h)	500 (h)									
Simazine	122-34-9	H	4 (h)	4 (h)							4		
Americium (total)(pCi/l)	7440-35-9	R										0.05	0.05
Americium 241 (pCi/l)	14596-10-2	R											
Cesium 134 (pCi/l)	13967-70-9	R	(7)			80						80	80
Cesium 137 (pCi/l)	10045-97-3	R	(7)										
Gross Alpha (pCi/l)	10-79-7	R	15 (a)(6)				15(6)					7	11
Gross Beta (pCi/l)	10-81-1	R	50 (a)(2)(7)				(7)					5	19
Plutonium (total)(pCi/l)	7440-07-5	R										0.05	0.05
Plutonium 238+239+240 (pCi/l)		R				15						15	15
Radium 226+228 (pCi/l)		R	5 (a)(7)			5						5	5
Strontium 89+90 (pCi/l)	11-10-9	R	(a)(2)(7)										
Strontium 90 (pCi/l)		R	8 (a)(2)(7)			8						8	8
Thorium 230+232 (pCi/l)		R	(a)(7)			60						60	60
Tritium (pCi/l)	10028-17-8	R	20,000 (a)(2)(7)			20,000						500	500
Uranium 233+234 (pCi/l)	11-08-5	R											
Uranium 235 (pCi/l)	15117-96-1	R											
Uranium 238 (pCi/l)	7440-61-1	R											
Uranium (Total) (pCi/l)	7440-61-1	R										5	10
1,2,4,5-Tetrachlorobenzene	95-94-1	SV				2							
1,2,4-Trichlorobenzene	120-82-1	SV	70 (h)	70 (h)									
1,2-Dichlorobenzene (Ortho)	45-50-1	SV	600 (b)	600 (b)		620							
1,2-Diphenylhydrazine	122-66-7	SV				0.05							
1,3-Dichlorobenzene (Meta)	541-73-1	SV				620							
1,4-Dichlorobenzene (Para)	106-46-7	SV	75 (a)	75 (a)		75							
2,4,5-Trichlorophenol	95-95-4	SV											
2,4,6-Trichlorophenol	88-06-2	SV				2					1.2		
2,4-Dichlorophenol	120-83-2	SV				21							
2,4-Dimethylphenol	105-67-9	SV											
2,4-Dinitrophenol	51-28-2	SV				14							

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
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			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)						
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Table 6 Radionuclides Woman Creek	Table 6 Radionuclides Walnut Creek
2,4-Dinitrotoluene	121-14-2	SV											
2,6-Dinitrotoluene	606-20-2	SV											
2-Chloronaphthalene	91-58-7	SV											
2-Chlorophenol	95-57-8	SV											
2-Methylnaphthalene	91-57-6	SV											
2-Methylphenol	95-48-7	SV											
2-Nitroaniline	88-74-4	SV											
2-Nitrophenol	88-75-5	SV											
3,3'-Dichlorobenzidine	91-94-1	SV											
3-Nitroaniline	99-09-2	SV											
4,6-Dinitro-2-methylphenol	534-52-1	SV											
4-Bromophenyl-phenyl-ether	101-55-3	SV											
4-Chloroaniline	106-47-8	SV											
4-Chlorophenyl-phenyl-ether	7005-72-3	SV											
4-Chloro-3-methylphenol	59-50-7	SV											
4-Methylphenol	106-44-5	SV											
4-Nitroaniline	100-01-6	SV											
4-Nitrophenol	100-02-7	SV											
Acenaphthene	88-32-9	SV											
Anthracene	120-12-7	SV											
Benzidine	92-87-5	SV				2.0E-04					1.20E-04		
Benzoic Acid	65-85-0	SV											
Benzo(a)anthracene	56-55-3	SV											
Benzo(a)pyrene	50-32-8	SV	0.2 (h)	0 (h)									
Benzo(b)fluoranthene	205-99-2	SV											
Benzo(g,h,i)perylene	191-24-2	SV											
Benzo(k)fluoranthene	207-08-9	SV											
Benzyl Alcohol	100-51-6	SV											
bis(2-Chloroethoxy)methane	111-91-1	SV											
bis(Chloroethyl)ether	111-44-4	SV				0.03					3.70E-06		
bis(Chloromethyl) ether													
bis(2-Chloroisopropyl)ether	108-60-1	SV											
bis(2-Ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	117-81-7	SV	6 (h)	0 (h)									
Butadiene	106-99-0	SV											
Butylbenzylphthalate	85-68-7	SV											
Chlorinated Ethers		SV											
Chlorinated Naphthalenes		SV											

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
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			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)						
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Table 6 Radionuclides Woman Creek	Table 6 Radionuclides Walnut Creek
Chloroalkylethers		SV											
Chlorophenol (Total)		SV					1						
Chrysene	218-01-9	SV											
Dibenzofuran	132-64-9	SV											
Dibenz(a,h)anthracene	53-70-3	SV											
Dichlorobenzenes		SV											
Dichlorobenzidine (Total)	91-94-1	SV									0.01		
Diethylphthalate	84-66-2	SV											
Di(2-ethylhexyl)adipate		SV	400 (h)	400 (h)									
Dimethylphthalate	131-11-3	SV											
Di-n-butylphthalate	84-74-2	SV											
Di-n-octylphthalate	117-84-0	SV											
Ethylene Glycol	107-21-1	SV											
Fluoranthene	206-44-0	SV											
Fluorene	86-73-7	SV											
Formaldehyde	500-00-0	SV											
Haloethers		SV											
Hexachlorobenzene	118-74-1	SV	1 (h)	0 (h)		6					7.20E-04		
Hexachlorobutadiene	87-68-3	SV				1					0.45		
Hexachlorocyclopentadiene	77-47-4	SV	50 (h)	50 (h)									
Hexachloroethane	67-72-1	SV									1.9		
Hydrazine	302-01-2	SV											
Indeno(1,2,3-cd)pyrene	193-39-5	SV											
Isophorone	78-59-1	SV				1,050							
Naphthalene	91-20-3	SV											
Nitrobenzene	98-95-3	SV				3.5							
Nitrophenols		SV											
Nitrosamines		SV											
N-Nitrosodibutylamine	924-16-3	SV									0.0064		
N-Nitrosodiethylamine	55-18-5	SV									8.0E-04		
N-Nitrosodimethylamine	62-75-9	SV									0.0014		
N-Nitrosopyrrolidine	930-55-2	SV									0.016		
N-Nitrosodiphenylamine	86-30-6	SV									4.9		
N-Nitroso-di-n-propylamine	621-64-7	SV											
Pentachlorinated Ethanes		SV											
Pentachlorobenzene	608-93-5	SV				6 (6)							
Pentachlorophenol	87-86-5	SV	1 (e)	0 (e)		200							
Phenanthrene	85-01-8	SV											

TABLE B-30 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site-Specific (g)					Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Phenol	108-95-2	SV					1						
Phthalate Esters		SV											
Polynuclear Aromatic Hydrocarbons	10-53-7	SV									0.0028		
Pyrene	129-00-0	SV											
Vinyl Chloride	75-01-4	V	2 (a)	0 (a)		2							
1,1,1-Trichloroethane	71-55-6	V	200 (a)	200 (a)		200							
1,1,2,2-Tetrachloroethane	79-34-5	V									0.17		
1,1,2-Trichloroethane	79-00-5	V	5 (h)	3 (h)		3					0.6		
1,1-Dichloroethane	75-34-3	V											
1,1-Dichloroethene	75-35-4	V	7 (a)	7 (a)		7							
1,2-Dichloroethane	107-06-2	V	5 (a)	0 (a)		0.4							
1,2-Dichloroethene (cis)	156-59-2	V	70 (b)	70 (b)		70							
1,2-Dichloroethene (total)	540-59-0	V											
1,2-Dichloroethene (trans)	156-60-2	V	100 (b)	100 (b)		100							
1,2-Dichloropropane	78-87-5	V	5 (b)	0 (b)		0.56							
1,3-Dichloropropene (cis)	10061-01-5	V											
1,3-Dichloropropene (trans)	10061-02-6	V											
2-Butanone	78-93-3	V											
2-Hexanone	591-78-6	V											
4-Methyl-2-pentanone	108-10-1	V											
Acetone	67-64-1	V											
Acrylonitrile	107-13-1	V									0.058		
Benzene	71-43-2	V	5 (a)	0 (a)		1							
Bromodichloromethane	74-97-2	V	<100** (a)			0.3							
Bromoform	75-25-2	V	<100** (a)			4							
Bromomethane	74-83-9	V											
Carbon Disulfide	75-15-0	V											
Carbon Tetrachloride	56-23-5	V	5 (a)	0 (a)		0.3							
Chlorinated Benzenes		V/SV											
Chlorobenzene	108-90-7	V	100 (b)	100 (b)		100							
Chloroethane	75-00-3	V											
Chloroform	67-66-3	V	<100** (a)			6					0.19		
Chloromethane	74-87-1	V											
Dibromochloromethane	124-48-1	V	<100** (a)			14							
Dichloroethenes		V											
Ethyl Benzene	100-41-4	V	700 (b)	700 (b)		680							
Ethylene Dibromide	106-93-4	V	0.05 (b)	0 (b)									

TABLE B–30 – POTENTIAL CHEMICAL–SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			FEDERAL STANDARDS			STATE STANDARDS CDH WQCC Groundwater Quality Standards (d)							
						Statewide	Site–Specific (g)						
												Table 6 Radionuclides	
Parameter	CAS No.	Type (4)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goal	RCRA Subpart F Limit (c)	Table A (d) (5)	Table 1 Human Health	Table 2 Secondary Drinking	Table 3 Agriculture	Table 4 TDS	Table 5 Chronic	Woman Creek	Walnut Creek
Ethylene Oxide	75–21–8	V											
Halomethanes		V	100 (a)								0.19		
Methylene Chloride	75–09–2	V	5 (h)	0 (h)									
Styrene	100–42–5	V	100 (b)	100 (b)									
Tetrachloroethanes		V											
Tetrachloroethene	127–18–4	V	5 (b)	0 (b)		5					0.8		
Toluene	108–88–3	V	1,000 (b)	1,000 (b)		1,000							
Trichloroethanes		V											
Trichloroethene	79–01–6	V	5 (a)	0 (a)		5							
Vinyl Acetate	108–05–4	V											
Xylenes (total)	1330–20–7	V	10,000 (b)	10,000 (b)									

EXPLANATION OF TABLE AND ENDNOTES

* = secondary maximum contaminant level; TBCs

** = total trihalomethanes: chloroform, bromoform, bromodichloromethane, dibromochloromethane

*** = Positive sample no more than once/month (<40 samples/month)

CDH = Colorado Department of Health
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
EPA = Environmental Protection Agency
NCP = National Contingency Plan
pCi/l = picocuries per liter
PCB = polychlorinated biphenyl
RFP = Rocky Flats Plant
SDWA = Safe Drinking Water Act
SW = Solid Waste
TIC = Tentatively Identified Compound
ug/l = micrograms per liter
WQCC = Water Quality Control Commission
MF/l = million fibers/liter

(1) TDS standard – see Table 4 in (d); standard is 400 mg/l or 1.25 times the background level, whichever is least restrictive
(2) If both strontium–90 and tritium are present, the sum of their annual dose equivalents to bone marrow shall not exceed 4 mrem/yr
(3) MDL for Radium 226 is 0.5; MDL for radium 228 is 1
(4) Type abbreviations are: A=anion; B=bacteria; C=cation; D=dioxin; E=element; FP=field parameter; H=herbicide; IN=inorganic; M=metal; P=pesticide; PP=pesticide/PCB; R=radionuclide; SV=semi–volatile; V=volatile
(5) Where the standard is below (more stringent than) the PQL, the PQL is interpreted to be compliance level
(6) Value for gross alpha excludes uranium

TABLE B–30 – POTENTIAL CHEMICAL–SPECIFIC BENCHMARKS (JANUARY 25, 1994)
GROUNDWATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

(7) Average annual concentration of beta particles and photon reactivity cannot exceed 4 millirem/year dose equivalent

(a) EPA National Primary and Secondary Drinking Water Regulations, 40 CFR 141 and 40 CFR 143 (as of 5/19/90)
(b) EPA National Primary and Secondary Drinking Water Regulations, 40 CFR Parts 141, 142, 143, Final Rule, Effective July 30, 1992 (56 Federal Register 3526; 1/30/1991)
(c) NCP, 40 CFR 300; NCP Preamble 55 FR 8764; CERCLA Compliance with Other Laws Manual, EPA/540/G–89/006, August 1988, 40 CFR 264.94
(d) CDH/Water Quality Control Commission, The Basic Standards for Ground Water, 3.11.0 (5 CCR 1002–8) 1/5/1987 effective 11/30/1991; statewide radioactive standards listed in 3.11. 5(C)(2)
(e) EPA National Primary and Secondary Drinking Water Regulations, 40 CFR Parts 141, 142, 143, Final Rule, Effective January 1, 1993 (56 FR 30266; 7/1/1991)
(f) EPA Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper, 40 CFR 141 and 142 (56 FR 26460; 6/7/91), and 57 FR 28785; (6/29/92) effective 12/7/92; MCLGs effective 11/06/91. Action level in 10% or less of tap samples for small and medium–sized systems.
(g) CDH/Water Quality Control Commission, Classifications and Water Quality Standards for Ground Water, 3.12.0 effective 1/31/94.
(h) EPA National Primary Drinking Water Regulations, 40 CFR 141 and 142, Final Rule, Effective January 17, 1994
(i) EPA National Primary Drinking Water Regulations, 40 CFR 141, Postponement of Final Rule and Reconsideration (57 FR 22178) – no effective date established.

TABLE B–31 – POTENTIAL CHEMICAL–SPECIFIC BENCHMARKS (JANUARY 25, 1994)
FEDERAL SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

Parameter	CAS No.	Type (7)	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level	SDWA Maximum Contaminant Level Goals	SDWA Maximum Contaminant Level Goals	CWA AWQC for Protection of Aquatic Life (c)		CWA AWQC for Protection of Human Health (c)	
							Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Chloride	7647–14–5	A	250,000 *				860,000(g)	230,000(g)		
Cyanide (Free)	74–90–8	A	200 (a)		200 (h)		22	5.2	200	
Flouride	10–72–0	A	4,000; 2,000* (a)		4,000 (a)					
N as Nitrate		A		10,000 (b)		10,000 (b)			10,000	
N as Nitrate+Nitrite	10–28–6	A		10,000 (b)		10,000 (b)				
N as Nitrite	7632–00–0	A		1,000 (b)		1,000 (b)				
Sulfate	7778–80–5	A	250,000* (a)							
Sulfide, H2S Undissociated	7783–06–4	A						2		
Coliform (Fecal)	10–06–0	B	1/100 ml (a)							
Ammonia as N	7764–41–7	C					***			
Dioxin	1746–01–6	D	3.0E–05 (h)		0 (h)		0.01	1.0E–05	1.3E–08	1.4E–08
Boron		E								
Chlorine, Total Residual	7782–50–5	E					19	11		
Sulfur		E								
Dissolved Oxygen	10–63–8	FP					5,000			
pH (Standard Units)	10–29–7	FP	6.5–8.5 * (a)					6.5–9		
Specific Conductance	10–34–4	FP								
Temperature (Degrees Celsius)		FP					SS	SS		
Alkalinity		IN						20,000		
Asbestos		IN		7MF/l (b)		7MF/l (b)				300,000 F/L**
Total Dissolved Solids	10–33–3	IN	500,000* (a)				SS	SS	250,000	
Total Organic Carbon		IN								
Aluminum	7429–90–5	M		50 to 200* (b)			750	87		
Antimony	7440–36–0	M	6 (h)		6 (h)		9,000	1,600	146	45,000
Arsenic	7440–38–2	M	50 (a)						0.0022	0.0175
Arsenic III		M					360	190		
Arsenic V		M					850	48		
Barium	7440–39–3	M	2,000 (e)		2,000 (e)				1,000	
Beryllium	7440–41–7	M	4 (h)		4 (h)		130	5.3	0.0068**	0.117**
Cadmium	7440–43–9	M	10 (a)	5 (b)		5 (b)	3.9 (3)	1.1 (3)	10	
Calcium	7440–70–2	M								
Cesium	7440–46–2	M								

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							Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Chromium	7440-47-3	M	50 (a)	100 (b)		100 (b)				
Chromium III		M					1,700 (3)	210 (3)	170,000	3,433,000
Chromium VI	7440-47-3	M					16	11	50	
Cobalt	7440-48-4	M								
Copper	7440-50-8	M	1,000 * (a)	1,300 (f)		1,300 (f)	18 (3)	12 (3)		
Iron	7439-89-6	M	300 * (a)					1,000	300	
Lead	7439-92-1	M	50 (a)	15 (f)		0 (f)	82 (3)	3.2 (3)	50	
Lithium	7439-93-2	M								
Magnesium	7439-95-4	M								
Manganese	7439-96-5	M	50 * (a)						50	100
Mercury	7439-97-6	M	2 (a)	2 (b)		2 (b)	2.4	0.012	0.144	0.146
Molybdenum	7439-98-7	M								
Nickel	7440-02-0	M	100 (h)		100 (h)		1,400 (3)	160 (3)	13.4	100
Potassium	7440-09-7	M								
Selenium	7782-49-2	M	10 (a)	50 (b)		50 (b)	20 (d)	5 (d)	10	
Silver	7440-22-4	M	50 (a)	100* (b)			4.1 (3)	0.12	50	
Sodium	7440-23-5	M								
Strontium	7440-24-6	M								
Thallium	7440-28-0	M	2 (h)		0.5 (h)		1,400 (1)	40 (1)	13	48
Tin	7440-31-5	M								
Titanium	7440-32-6	M								
Tungsten	7440-33-7	M								
Vanadium	7440-62-2	M								
Zinc	7440-66-6	M	5,000 * (a)				120 (3)	110 (3)		
Aldicarb	116-06-3	P	3 (i)		1 (i)					
Aldicarb Sulfone		P	2 (i)		1 (i)				10	
Aldicarb Sulfoxide		P	4 (i)		1 (i)				100	
Aldrin	309-00-2	P					3		7.40E-05	7.90E-05
Carbofuran	1563-66-2	P		40 (b)		40 (b)				
Chloranil	118-75-2	P								
Chlordane	57-74-9	P		2 (b)		0 (b)	2.4	0.0043	4.60E-04	4.80E-04
Chlorpyrifos	2921-88-2	P					0.063	0.041		
DDT	50-29-3	P					1.1	0.001	2.40E-05	2.40E-05
DDT metabolite (DDD)	72-54-8	P					0.06			
DDT metabolite (DDE)	72-55-9	P					1,050			
Demeton	8065-48-3	P						0.1		

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Diazinon	333-41-5	P								
Dieldrin	60-57-1	P					2.5	0.0019	7.10E-05	7.60E-05
Endosulfan I	959-98-8	P					0.22	0.056	74	159
Endosulfan II	33213-65-9	P								
Endosulfan Sulfate	1031-07-8	P								
Endrin	72-20-8	P	2 (h)		2 (h)		0.18	0.0023	1	
Endrin Aldehyde	7421-93-4	P								
Endrin Ketone	53494-70-5	P								
Guthion (Azinphos methyl)	86-50-0	P						0.01		
Heptachlor	76-44-8	P		0.4 (b)		0 (b)	0.52	0.0038	2.80E-04	2.90E-04
Heptachlor Epoxide	1024-57-3	P		0.2 (b)		0 (b)				
Hexachlorocyclohexane, Alpha	319-84-6	P							0.0092	0.031
Hexachlorocyclohexane, Beta	319-85-7	P							0.0163	0.054
Hexachlorocyclohexane (HCH or BHC)		P					100			
Hexachlorocyclohexane, Delta	319-86-8	P								
Hexachlorocyclohexane, Technical (Total)	608-73-1	P							0.0123	0.0414
Hexachlorocyclohexane, Gamma (Lindane)	58-89-9	P	4 (a)	0.2 (b)		0.2 (b)	2	0.08	0.0186	0.0625
Malathion	121-75-5	P						0.01		
Methoxychlor	72-43-5	P	100 (a)	40 (b)		40 (b)		0.03	100	
Mirex	2385-85-5	P						0.001		
Oxamyl (Vydate)	23135-22-0	P	200 (h)		200 (h)			0.001		
Parathion	298-00-0	P					0.065	0.013		
Toxaphene	8001-35-2	P		3 (b)		0 (b)	0.73	2.0E-04	7.10E-04**	7.30E-04**
Vaponite 2		P								
Aroclor 1016	12674-11-2	PP								
Aroclor 1221	11104-28-2	PP								
Aroclor 1232	11141-16-5	PP								
Aroclor 1242	53469-21-9	PP								
Aroclor 1248	12674-29-6	PP								
Aroclor 1254	11097-69-1	PP								
Aroclor 1260	11096-82-5	PP								
PCBs (Total)	1336-36-3	PP		0.5 (b)		0 (b)	2	0.014	7.90E-05**	7.90E-05**
2,4,5-TP Silvex	93-72-1	H	10 (a)	50 (b)		50 (b)			10	
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	H	100 (a)	70 (b)		70 (b)			100	
Acrolein	107-02-8	H					68(1)	21(1)	320	780

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							Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Atrazine	1912-24-9	H		3 (b)		3 (b)				
Bromacil	314-40-9	H								
Dalapon	75-99-0	H	200 (h)		200 (h)					
Dinoseb	88-85-7	H	7 (h)		7 (h)					
Diquat		H	20 (h)		20 (h)					
Endothall	145-73-3	H	100 (h)		100 (h)					
Glyphosate	1071-83-6	H	700 (h)		700 (h)					
Picloram	1918-02-1	H	500 (h)		500 (h)					
Simazine	122-34-9	H	4 (h)		4 (h)					
Americium (total)(pCi/l)	7440-35-9	R								
Americium 241 (pCi/l)	14596-10-2	R								
Cesium 134 (pCi/l)	13967-70-9	R	(4)							
Cesium 137 (pCi/l)	10045-97-3	R	(4)							
Gross Alpha (pCi/l)	10-79-7	R	15 (a)(8)							
Gross Beta (pCi/l)	10-81-1	R	50 (a)(4)(6)							
Plutonium (total)(pCi/l)	7440-07-5	R								
Plutonium 238+239+240 (pCi/l)		R								
Radium 226+228 (pCi/l)		R	5 (a)(4)							
Strontium 89+90 (pCi/l)	11-10-9	R	(a)(4)(6)							
Strontium 90 (pCi/l)		R	8 (a)(6)							
Thorium 230+232 (pCi/l)		R	(a)(4)							
Tritium (pCi/l)	10028-17-8	R	20,000 (a)(4)(6)							
Uranium 233+234 (pCi/l)	11-08-5	R								
Uranium 235 (pCi/l)	15117-96-1	R								
Uranium 238 (pCi/l)	7440-61-1	R								
Uranium (total) (pCi/l)	7440-61-1	R								
1,2,4,5-Tetrachlorobenzene	95-94-1	SV							38	48
1,2,4-Trichlorobenzene	120-82-1	SV	70 (h)		70 (h)					
1,2-Dichlorobenzene (Ortho)	45-50-1	SV		600 (b)		600 (b)				
1,2-Diphenylhydrazine	122-66-7	SV					270 (1)		0.042	0.56
1,3-Dichlorobenzene (Meta)	541-73-1	SV								
1,4-Dichlorobenzene (Para)	106-46-7	SV	75 (a)		75 (a)					
2,4,5-Trichlorophenol	95-95-4	SV							2,600	
2,4,6-Trichlorophenol	88-06-2	SV						970 (1)	1.2 **	3.6 **
2,4-Dichlorophenol	120-83-2	SV					2,020 (1)	365 (1)	3,090	

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2,4-Dimethylphenol	105-67-9	SV					2,120 (1)			
2,4-Dinitrophenol	51-28-2	SV								
2,4-Dinitrotoluene	121-14-2	SV					330(1)	230(1)	0.11 ••	9.1 ••
2,6-Dinitrotoluene	606-20-2	SV					330 (1)	230 (1)	70	14,300
2-Chloronaphthalene	91-58-7	SV								
2-Chlorophenol	95-57-8	SV					4,380 (1)	2,000 (1)		
2-Methylnaphthalene	91-57-6	SV								
2-Methylphenol	95-48-7	SV								
2-Nitroaniline	88-74-4	SV								
2-Nitrophenol	88-75-5	SV					230(1)	150(1)		
3,3'-Dichlorobenzidine	91-94-1	SV							0.01	0.02
3-Nitroaniline	99-09-2	SV								
4,6-Dinitro-2-methylphenol	534-52-1	SV							13.4	765
4-Bromophenyl-phenyl-ether	101-55-3	SV								
4-Chloroaniline	106-47-8	SV								
4-Chlorophenyl-phenyl-ether	7005-72-3	SV								
4-Chloro-3-methylphenol	59-50-7	SV					30 (1)			
4-Methylphenol	106-44-5	SV								
4-Nitroaniline	100-01-6	SV								
4-Nitrophenol	100-02-7	SV					230 (1)	150 (1)		
Acenaphthene	88-32-9	SV					1,700 (1)	520 (1)		
Anthracene	120-12-7	SV								
Benzidine	92-87-5	SV					2,500		1.20E-04	5.30E-04
Benzoic Acid	65-85-0	SV								
Benzo(a)anthracene	56-55-3	SV								
Benzo(a)pyrene	50-32-8	SV	0.2 (h)		0 (h)					
Benzo(b)fluoranthene	205-99-2	SV								
Benzo(g,h,i)perylene	191-24-2	SV								
Benzo(k)fluoranthene	207-08-9	SV								
Benzyl Alcohol	100-51-6	SV								
bis(2-Chloroethoxy)methane	111-91-1	SV								
bis(2-Chloroethyl)ether	111-44-4	SV							0.03••	1.36 ••
bis(Chloromethyl)ether		SV							0.00376	0.00184
bis(2-Chloroisopropyl)ether	108-60-1	SV							34.7	4,360
bis(2-Ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	117-81-7	SV	6 (h)		0 (h)					
Butadiene	106-99-0	SV								

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							Acute Value	Chronic Value	Water and Fish Ingestion	Fish Consumption Only
Butylbenzylphthalate	85-68-7	SV								
Chlorinated Ethers		SV								
Chlorinated Naphthalenes		SV					1,600 (1)			
Chloroalkylethers		SV					238,000 (1)			
Chlorophenol (Total)		SV								
Chrysene	218-01-9	SV								
Dibenzofuran	132-64-9	SV								
Dibenz(a,h)anthracene	53-70-3	SV								
Dichlorobenzenes		SV					1,120 (1)	763 (1)	400	2,600
Dichlorobenzidine (Total)	91-94-1	SV							0.01	0.02
Diethylphthalate	84-66-2	SV							350,000	1,800,000
Di(2-ethylhexyl)adipate		SV	400 (h)		400 (h)					
Dimethylphthalate	131-11-3	SV							313,000	2,900,000
Di-n-butylphthalate	84-74-2	SV							35,000	154,000
Di-n-octylphthalate	117-84-0	SV								
Ethylene Glycol	107-21-1	SV								
Fluoranthene	206-44-0	SV					3,980 (1)		42	54
Fluorene	86-73-7	SV								
Formaldehyde		SV								
Haloethers		SV					360 (1)	122 (1)		
Hexachlorobenzene	118-74-1	SV	1 (h)		0 (h)				7.2E-04**	7.4E-04**
Hexachlorobutadiene	87-68-3	SV					90 (1)	9.3 (1)	0.45**	50 **
Hexachlorocyclopentadiene	77-47-4	SV	50 (h)		50 (h)		7 (1)	5.2 (1)	206	
Hexachloroethane	67-72-1	SV					980 (1)	540 (1)	1.9	8.74
Hydrazine		SV								
Indeno(1,2,3-cd)pyrene	193-39-5	SV								
Isophorone	78-59-1	SV					117,000 (1)		5,200	520,000
Naphthalene	91-20-3	SV					2,300 (1)	620 (1)		
Nitrobenzene	98-95-3	SV					27,000 (1)		19,800	
Nitrophenols		SV					230 (1)	150 (1)		
Nitrosamines		SV					5,850 (1)			
N-Nitrosodibutylamine	924-16-3	SV							0.0064	0.587
N-Nitrosodiethylamine	55-18-5	SV							8.0E-04	1.24
N-Nitrosodimethylamine	62-75-9	SV							0.0014	16
N-Nitrosopyrrolidine	930-55-2	SV							0.016	91.9
N-Nitrosodiphenylamine	86-30-6	SV							4.9 **	16.1 **
N-Nitroso-di-n-propylamine	621-64-7	SV								

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Pentachlorinated Ethanes		SV					7,240 (1)	1,100 (1)		
Pentachlorobenzene	608-93-5	SV							74	85
Pentachlorophenol	87-86-5	SV		1 (e)		0 (e)	20 ***	13 ***	1,010	
Phenanthrene	85-01-8	SV								
Phenol	108-95-2	SV					10,200 (1)	2,560 (1)	3,500	
Phthalate Esters		SV					940 (1)	3 (1)		
Polynuclear Aromatic Hydrocarbons	10-..3-7	SV							0.0028**	0.0311**
Pyrene	129-00-0	SV								
Vinyl Chloride	75-01-4	V	2 (a)		0 (a)				2 **	525 **
1,1,1-Trichloroethane	71-55-6	V	200 (a)		200 (a)				18,400	1,030,000
1,1,2,2-Tetrachloroethane	79-34-5	V						2,400	0.17**	10.7 **
1,1,2-Trichloroethane	79-00-5	V	5 (h)		3 (h)			9,400	0.6**	41.8 **
1,1-Dichloroethane	75-34-3	V								
1,1-Dichloroethene	75-35-4	V	7 (a)		7 (a)					
1,2-Dichloroethane	107-06-2	V	5 (a)		0 (a)		118,000	20,000	0.94**	243 **
1,2-Dichloroethene (cis)	156-59-2	V		70 (b)		70 (b)				
1,2-Dichloroethene (total)	540-59-0	V								
1,2-Dichloroethene (trans)	156-60-2	V		100 (b)		100 (b)				
1,2-Dichloropropane	78-87-5	V		5 (b)		0 (b)	23,000	5,700		
1,3-Dichloropropene (cis)	10061 -01-5	V					6,060	244 (1)	87	14,100
1,3-Dichloropropene (trans)	10061-02-6	V					6,060	244 (1)	87	14,100
2-Butanone	78-93-3	V								
2-Hexanone	591-78-6	V								
4-Methyl-2-pentanone	108-10-1	V								
Acetone	67-64-1	V								
Acrylonitrile	107-13-1	V					7,550	2,600	0.058	0.65
Benzene	71-43-2	V	5 (a)		0 (a)		5,300		0.66**	40 **
Bromodichloromethane	74-97-2	V	<100 (2)(a)							
Bromoform	75-25-2	V	<100 (2)(a)							
Bromomethane	74-83-9	V								
Carbon Disulfide	75-15-0	V								
Carbon Tetrachloride	56-23-5	V	5 (a)		0 (a)		35,200 (1)		0.4**	6.94 **
Chlorinated Benzenes		V/SV					250 (1)	50 (1)		
Chlorobenzene	108-90-7	V		100 (b)		100 (b)			488	
Chloroethane	75-00-3	V								
Chloroform	67-66-3	V	<100 (2)(a)				28,900 (1)	1,240 (1)	0.19 **	15.7 **

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Chloromethane	74-87-1	V								
Dibromochloromethane	124-48-1	V	<100 (2)(a)							
Dichloroethenes		V					11,600 (1)		0.033**	1.85 **
Ethylbenzene	100-41-4	V		700 (b)		700 (b)	32,000 (1)		1,400	3,280
Ethylene Dibromide	106-93-4	V		0.05 (b)		0 (b)				
Ethylene Oxide	75-21-8	V								
Halomethanes		V	100 (a)				11,000 (1)		0.19**	15.7 **
Methylene Chloride	75-09-2	V	5 (h)		0 (h)					
Styrene	100-42-5	V		100 (b)		100 (b)				
Tetrachloroethanes		V					9,320 (1)			
Tetrachloroethene	127-18-4	V		5 (b)		0 (b)	5,280 (1)	840 (1)	0.80**	8.85 **
Toluene	108-88-3	V		1,000 (b)		1,000 (b)	17,500 (1)		14,300	424,000
Trichloroethanes		V					18,000 (1)			
Trichloroethene	79-01-6	V	5 (a)		0 (a)		45,000 (1)	21,900 (1)	2.7 **	80.7 **
Vinyl Acetate	108-05-4	V								
Xylenes (total)	1330-20-7	V		10,000 (b)		10,000 (b)				

EXPLANATION OF TABLE AND END NOTES

$ = secondary maximum contaminant level, TBCs

** = Human health criteria for carcinogens reported for three risk levels. Value presented is the 10-5 risk level.

*** = Concentration is pH dependent

AWQC = Ambient Water Quality Criteria
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
EPA = Environmental Protection Agency
pCi/l = picocuries per liter
PCB = polychlorinated biphenyl
SDWA = Safe Drinking Water Act
SS = Species Specific
SW = Solid Waste
TIC = Tentatively Identified Compound
ug/l = micrograms per liter
MF/L = million fibers/liter

TABLE B-3[1] – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
FEDERAL SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

(1) Criteria not developed; value presented is lowest observed effects level (LOEL)
(2) Total trihalomethanes: chloroform, bromoform, bromodichloromethane, dibromochloromethane
(3) Hardness dependent criteria, calculated assuming 50mg/l calcium carbonate
(4) Average annual concentration of beta particles and photon radioactivity cannot exceed 4 millirem/year dose equivalent.
(5) Standard is not adequately protective when chloride is associated with potassium, calcium, or magnesium, rather than sodium.
(6) If both strontium-90 and tritium are present, the sum of their annual dose equivalents to bone marrow shall not exceed 4 mrem/yr.
(7) Type abbreviations are: A=anion; B=bacteria; C=cation; D=dioxin; E=element; H=herbicide; IN=inorganic; FP=field parameter; M=metal; P=pesticide; PP=pesticide/PCB; R=radionuclide; SV=semi-volatile; V=volatile
(8) Value for gross alpha excludes uranium

(a) EPA National Primary and Secondary Drinking Water Regulations, as of May 1990, 40 CFR 141 and 40 CFR 143.
(b) EPA National Primary and Secondary Drinking Water Regulations, 40 CFR Parts 141, 142 and 143, Final Rule, effective July 30, 1992 (56 Federal Register 3526; 1/30/1991).
(c) EPA, Quality Criteria for Protection of Aquatic Life, 1986
(d) EPA, National Ambient Water Quality Criteria for Selenium – 1987
(e) EPA National Primary and Secondary Drinking Water Regulations, 40 CFR Parts 141, 142, and 143, Final Rule (56 FR 30266; 7/1/1991) effective 1/1/1993.
(f) EPA Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper, 40 CFR 141 and 142 (56 FR 26460; 6/7/1991) effective 12/7/92. MCLGs effective 11/6/91. Action level in 10% or less of tap samples for small and medium-sized systems.
(g) EPA, National Ambient Water Quality Criteria for Chloride – 1988
(h) EPA National Primary Drinking Water Regulations, 40 CFR 141 and 142, Final Rule, Effective January 17, 1994
(i) EPA National Primary Drinking Water Regulations, 40 CFR 141, Postponement of Final Rule and Reconsideration (57 FR 22178) – no effective date established.

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (5)		Aquatic Life (5)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
Chloride	7647-14-5	A								250,000		250,000	250,000		
Cyanide (Free)	74-90-8	A					5	5	200	200		5	5		
Fluoride	10-72-0	A								2,000					
N as Nitrate		A							100,000	10,000		10,000	10,000		
N as Nitrate+Nitrite	10-28-6	A							100,000	10,000					
N as Nitrite	7632-00-0	A					SS	SS	10,000	1,000		500	1,000		
Sulfate	7778-80-5	A								250,000		250,000	250,000		
Sulfide, H2S Undissociated	7783-06-4	A						2		50		2	2		
Coliform (Fecal)	10-06-0	B								2000/100 ml		2,000/100m	2,000/100m		
Ammonia (as N)	7764-41-7	C					TVS	60		500(ammonia as tot)		TVS	100		
Dioxin	1746-01-6	D	2.2E-07	1.3E-08	0.01	1.0E-05					1.30E-08		1.3E-06		
Boron		E							750			750	750		
Chlorine, Total Residual	7782-50-5	E					19	11				19	11		
Sulfur		E											2		
Dissolved Oxygen	10-88-8	FP					>5,000	>5,000	>3,000	>3,000		5,000	5,000		
pH (Standard Units)	10-29-7	FP					6.5-9.0	6.5-9.0		5.0-9.0		6.5-9	6.5-9		
Specific Conductance	10-34-4	FP													
Temperature (Degrees Celsius)		FP					30 degrees	30 degrees							
Alkalinity		IN													
Asbestos (fibers/L)		IN								30,000					
Total Dissolved Solids	10-33-3	IN													
Total Organic Carbon		IN													
Aluminum	7429-90-5	M					750	87							
Antimony	7440-36-0	M								14					
Arsenic	7440-38-2	M					360	150	100	50		50			
Arsenic III		M													
Arsenic V		M													
Barium	7440-39-3	M								1,000					
Beryllium	7440-41-7	M							100	0.0076			4		
Cadmium	7440-43-9	M					TVS	TVS	10	10		TVS	TVS		
Calcium	7440-70-2	M													
Cesium	7440-46-2	M													
Chromium	7440-47-3	M													
Chromium III		M					TVS	TVS	100	50		50			
Chromium VI	7440-47-3	M					16	11	100	50		TVS16	TVS11		

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
Cobalt	7440-48-4	M													
Copper	7440-50-8	M					TVS	TVS	200	1,000		(23)TVS	(23)TVS		
Iron (DIS)	7439-89-6	M								300			300 (3)		
Iron (TR)	7439-89-6	M						1,000					(13,200) 1000		
Lead	7439-92-1	M					TVS	TVS	100	50		(28)TVS	(28)TVS		
Lithium	7439-93-2	M													
Magnesium	7439-95-4	M													
Manganese (DIS)	7439-96-5	M						1,000		50			(560) 50 (3)		
Manganese (TR)	7439-96-5	M							200				1000		
Mercury	7439-97-6	M					2.4	0.1		2			0.01		
Molybdenum	7439-98-7	M													
Nickel	7440-02-0	M					TVS	TVS	200			TVS	TVS		
Potassium	7440-09-7	M													
Selenium	7782-49-2	M					135	17	20	10			10		
Silver	7440-22-4	M					TVS	TVS		50		TVS	TVS		
Sodium	7440-23-5	M													
Strontium	7440-24-6	M													
Thallium	7440-28-0	M						15		0.012					
Tin	7440-31-5	M													
Titanium	7440-32-6	M													
Tungsten	7440-33-7	M													
Vanadium	7440-62-2	M													
Zinc	7440-66-6	M					TVS	TVS	2,000	5,000		(350) TVS	(350) TVS		
Aldicarb	116-06-3	P	10												
Aldicarb Sulfone		P													
Aldicarb Sulfoxide		P													
Aldrin	309-00-2	P	0.002	1.30E-04	1.5						1.3E-04		7.4E-05		
Carbofuran	1563-66-2	P	36												
Chloranil	118-75-2	P													
Chlordane	57-74-9	P	0.03 (8)	5.80E-04	1.2	0.0043					5.8E-04		4.6E-04		
Chlorpyrifos	2921-88-2	P			0.083	0.041									
DDT	50-29-3	P	0.1	5.90E-04	0.55	0.001					5.9E-04		2.4E-05		
DDT Metabolite (DDD)	72-54-8	P		8.30E-04	0.6										
DDT Metabolite (DDE)	72-55-9	P	0.1	5.90E-04	1,050										
Demeton	8065-48-3	P				0.1					0.1				
Diazinon	333-41-5	P													
Dieldrin	60-57-1	P	0.002	1.40E-04	1.3	0.0019					1.4E-04		7.1E-05		
Endosulfan I	959-98-8	P		0.93	0.11	0.056					0.056				
Endosulfan II	33213-65-9	P													

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
Endosulfan Sulfate	1031-07-8	P		0.93											
Endrin	72-20-8	P	0.2		0.09	0.0023					0.0023				
Endrin Aldehyde	7421-93-4	P	0.2	0.2											
Endrin Ketone	53494-70-5	P													
Guthion (Azinphos methyl)	86-50-0	P				0.01					0.01				
Heptachlor	76-44-8	P	0.008	2.1E-04	0.26	0.0038					2.1E-04		2.8E-04		
Heptachlor Epoxide	1024-57-3	P	0.09	1.0E-04	0.26	0.0038									
Hexachlorocyclohexane, Alpha	319-84-6	P	0.006		0.0039						0.0039		0.0092		
Hexachlorocyclohexane, Beta	319-85-7	P		0.014							0.014		0.0163		
Hexachlorocyclohexane (HCH OR BHC)		P			100										
Hexachlorocyclohexane, Delta	319-86-8	P													
Hexachlorocyclohexane, Technical (Total)	608-73-1	P		0.012							0.012		0.0123		
Hexachlorocyclohexane, Gamma (Lindane)	58-89-9	P	0.2	0.019	1	0.08					0.019		0.0186		
Malathion	121-75-5	P				0.1					0.1				
Methoxychlor	72-43-5	P	40			0.03					0.03				
Mirex	2385-85-5	P				0.001					0.001				
Oxamyl (Vydate)	23135-22-0	P													
Parathion	298-00-0	P									0.4				
Toxaphene	8001-35-2	P	0.03	7.3E-04	0.73	2.0E-04					2.0E-04				
Vaponite 2		P													
Aroclor 1016	12674-11-2	PP													
Aroclor 1221	11104-28-2	PP													
Aroclor 1232	11141-16-5	PP													
Aroclor 1242	53469-21-9	PP													
Aroclor 1248	12674-29-6	PP													
Aroclor 1254	11097-69-1	PP													
Aroclor 1260	11096-82-5	PP													
PCBs (Total)	1336-36-3	PP	0.005	4.4E-05	2	0.014					4.4E-05		7.9E-05		
2,4,5-TP Silvex	93-72-1	H	50												
2,4-D	94-75-7	H	70								70				
Acrolein	107-02-8	H		320	68	21									
Atrazine	1912-24-9	H									3		3		
Bromacil	314-40-9	H													
Dalapon	75-99-0	H													
Dinoseb	88-85-7	H													

TABLE 3-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
Diquat		H													
Endothall	145-73-3	H													
Glyphosate	1071-83-6	H													
Picloram	1918-02-1	H													
Simazine	122-34-9	H									4		4		
Americium (Total)(pCi/l)	7440-35-9	R												0.05	0.05
Americium 241 (pCi/l)	14596-10-2	R													
Cesium 134 (pCi/l)	13967-70-9	R	80 (10)											80 (a)	80 (a)
Cesium 137 (pCi/l)	10045-97-3	R													
Gross Alpha (pCi/l)	10-79-7	R												7	11
Gross Beta (pCi/l)	10-81-1	R												5	19
Plutonium (Total)(pCi/l)	7440-07-5	R												0.05	0.05
Plutonium 238+239+240 (pCi/l)		R	15 (10)											15(a)	15(a)
Radium 226+228 (pCi/l)		R	5 (10)											5(a)	5(a)
Stroatium 89+90 (pCi/l)	11-10-9	R													
Stroatium 90 (pCi/l)		R	8 (10)											8	8
Thorium 230+232 (pCi/l)		R	60 (10)											60(a)	60(a)
Tritium (pCi/l)	10028-17-8	R	20,000 (10)											500	500
Uranium 233+234 (pCi/l)	11-08-5	R													
Uranium 235 (pCi/l)	15117-96-1	R													
Uranium 238 (pCi/l)	7440-61-1	R													
Uranium (Total) (pCi/l)	7440-61-1	R					TVS	TVS						5	10
1,2,4,5-Tetrachlorobenzene	95-94-1	SV	2 (8)												
1,2,4-Trichlorobenzene	120-82-1	SV													
1,2-Dichlorobenzene (Ortho)	45-50-1	SV	620	620											
1,2-Diphenylhydrazine	122-66-7	SV	0.05	0.04	270										
1,3-Dichlorobenzene (Meta)	541-73-1	SV	620	400											
1,4-Dichlorobenzene (Para)	106-46-7	SV	75	75											
2,4,5-Trichlorophenol	95-95-4	SV													
2,4,6-Trichlorophenol	88-06-2	SV	2	2		970					2		1.2		
2,4-Dichlorophenol	120-83-2	SV	21	21	2,020	365									
2,4-Dimethylphenol	105-67-9	SV			2,120										
2,4-Dinitrophenol	51-28-2	SV	14	14											
2,4-Dinitrotoluene	121-14-2	SV		0.11											
2,6-Dinitrotoluene	606-20-2	SV			330	230									
2-Chloronaphthalene	91-58-7	SV													
2-Chlorophenol	95-57-8	SV			4,380	2,000									
2-Methylnaphthalene	91-57-6	SV													

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
2-Methylphenol	95-48-7	SV													
2-Nitroaniline	88-74-4	SV													
2-Nitrophenol	88-75-5	SV													
3-Nitroaniline	99-09-2	SV													
4,6-Dinitro-2-methylphenol	534-52-1	SV		13											
4-Bromophenyl-phenyl-ether	101-55-3	SV													
4-Chloroaniline	106-47-8	SV													
4-Chlorophenyl-phenyl-ether	7005-72-3	SV													
4-Chloro-3-methylphenol	59-50-7	SV			30										
4-Methylphenol	106-44-5	SV													
4-Nitroaniline	100-01-6	SV													
4-Nitrophenol	100-02-7	SV													
Acenaphthene	88-32-9	SV			1,700	520					0.0028				
Anthracene	120-12-7	SV		0.0028											
Benzidine	92-87-5	SV	2.00E-04	1.2E-04(8)	2,500						1.2E-04		1.2E-04		
Benzoic Acid	65-85-0	SV													
Benzo(a)anthracene	56-55-3	SV		0.0028							0.0028				
Benzo(a)pyrene	50-32-8	SV		0.0028							0.0028				
Benzo(b)fluoranthene	205-99-2	SV		0.0028							0.0028				
Benzo(g,h,i)perylene	191-24-2	SV		0.0028							0.0028				
Benzo(k)fluoranthene	207-08-9	SV		0.0028							0.0028				
Benzyl Alcohol	100-51-6	SV													
bis(2-Chloroethoxy)methane	111-91-1	SV													
bis(2-Chloroethyl)ether	111-44-4	SV	0.03 (8)	0.03 (8)							0.03		3.7E-06		
bis(2-Chloromethyl)ether											3.7E-06				
bis(2-Chloroisopropyl)ether	108-60-1	SV		1,400											
bis(2-Ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	117-81-7	SV		1.8 (8)											
Butadiene	106-99-0	SV													
Butylbenzylphthalate	85-68-7	SV		3,000											
Chlorinated Ethers		SV													
Chlorinated Naphthalenes		SV													
Chloroalkylethers		SV													
Chlorophenol (Total)		SV									2000				
Chrysene	218-01-9	SV		0.0028							0.0028				
Dibenzofuran	132-64-9	SV													
Dichlorobenzidine (Total)	91-94-1	SV		0.039							0.039		0.01		
Dibenzo(a,h)anthracene	53-70-3	SV		0.0028							0.0028				
Dichlorobenzenes		SV													
Diethylphthalate	84-66-2	SV		23,000											

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
Di(2-ethylhexyl)adipate		SV													
Dimethylphthalate	131-11-3	SV		313,000											
Di-n-butylphthalate	84-74-2	SV		2,700											
Di-n-octylphthalate	117-84-0	SV													
Ethylene Glycol	107-21-1	SV													
Fluoranthene	206-44-0	SV		42	3,980						42				
Fluorene	86-73-7	SV		0.0028							0.0028				
Formaldehyde	500-00-0	SV													
Haloethers		SV													
Hexachlorobenzene	118-74-1	SV	6	7.2E-04							7.2E-04		7.2E-04		
Hexachlorobutadiene	87-68-3	SV	1	0.45	90	9.3					0.45		0.45		
Hexachlorocyclopentadiene	77-47-4	SV		240	7	5									
Hexachloroethane	67-72-1	SV		1.9	980	540					1.9		1.9		
Hydrazine	302-01-2	SV													
Indeno(1,2,3-cd)pyrene	193-39-5	SV		0.0028							0.0028				
Isophorone	78-59-1	SV	1,050	8.4	117,000										
Naphthalene	91-20-3	SV		0.0028	2,300	620					0.0028				
Nitrobenzene	98-95-3	SV	3.5	3.5	27,000										
Nitrophenols		SV													
Nitrosamines		SV													
N-Nitrosodibutylamine	924-16-3	SV		0.0064							0.0064		0.0064		
N-Nitrosodiethylamine	55-18-5	SV		8.0E-04							8.0E-04		8.0E-04		
N-Nitrosodimethylamine	62-75-9	SV		6.9E-04							6.9E-04		0.0014		
N-Nitrosopyrrolidine	930-55-2	SV		0.016							0.016		0.016		
N-Nitrosodiphenylamine	86-30-6	SV		4.9							4.9		4.9		
N-Nitroso-di-n-propylamine	621-64-7	SV		0.005											
Pentachlorinated Ethanes		SV													
Pentachlorobenzene	608-93-5	SV	6 (8)												
Pentachlorophenol	87-86-5	SV	200		9	5.7									
Phenanthrene	85-01-8	SV		0.0028							0.0028				
Phenol	108-95-2	SV		21,000	10,200	2,560									
Phthalate Esters		SV													
Polynuclear Aromatic Hydrocarbons	10-53-7	SV		0.0028											
Pyrene	129-00-0	SV		0.0028							0.0028				
Vinyl Chloride	75-1-4	V	2	2											
1,1,1-Trichloroethane	71-55-6	V	200	200											
1,1,2,2-Tetrachloroethane	79-34-5	V		0.17		2,400					0.17		0.17		
1,1,2-Trichloroethane	79-00-5	V	3	0.6	9,400						0.6		0.6		
1,1-Dichloroethane	75-34-3	V													

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

			Statewide Standards (a)								South Platte River Basin Stream Standards (b)				
			Human Health Carcinogens/ Noncarcinogens (2) (8)		Aquatic Life (8)		Tables I,II,III (1)					Physical, Biological Inorganic, and Metals		Radionuclides Table 2	
							Aquatic Life (8,10)								
Parameter	CAS No.	Type (5)	Water Supply	Water and fish	Acute Value	Chronic Value	Acute Value (2)	Chronic Value (2)	Agricultural Standard (3,11)	Domestic Water Supply (4,11)	Organics (6,7) Table 1A	Acute(7) Value	Chronic(7) Value	Woman Creek	Walnut Creek
1,1-Dichloroethene	75-35-4	V	7	0.057											
1,2-Dichloroethane	107-06-2	V	0.4	0.4	118,000	20,000									
1,2-Dichloroethene (cis)	156-59-2	V	70												
1,2-Dichloroethene (total)	540-59-0	V													
1,2-Dichloroethene (trans)	156-60-2	V	100												
1,2-Dichloropropane	78-87-5	V	0.56 (8)	0.56	23,000	5,700									
1,3-Dichloropropene (cis)	10061-01-5	V		10	6,060	244									
1,3-Dichloropropene (trans)	10061-02-6	V		10	6,060	244									
2-Butanone	78-93-3	V													
2-Hexanone	591-78-6	V													
4-Methyl-2-pentanone	108-10-1	V													
Acetone	67-64-1	V													
Acrylonitrile	107-13-1	V		0.058	7,500	2,600					0.058		0.058		
Benzene	71-43-2	V	1	1	5,300										
Bromodichloromethane	74-97-2	V	0.3	0.3							0.3				
Bromoform	75-25-2	V	4	4							4				
Bromomethane	74-83-9	V		48											
Carbon Disulfide	75-15-0	V													
Carbon Tetrachloride	56-23-5	V	0.3	0.25	35,200						(18)				
Chlorinated Benzenes		V/SV													
Chlorobenzene	108-90-7	V	100	100											
Chloroethane	75-00-3	V													
Chloroform	67-66-3	V	6	6	28,900	1,240					6		0.19		
Chloromethane	74-87-1	V		5.7											
Dibromochloromethane	124-48-1	V	14	6							6				
Dichloroethenes		V													
Ethylbenzene	100-41-4	V	680	3,100	32,000										
Ethylene Dibromide	106-93-4	V													
Ethylene Oxide	75-21-8	V													
Halomethanes		V											0.19		
Methylene Chloride	75-09-2	V		4.7							4.7				
Styrene	100-42-5	V													
Tetrachloroethanes		V									(76)		0.8		
Tetrachloroethene	127-18-4	V	5	0.8	5,280	840					0.8				
Toluene	108-88-3	V	1,000	1,000	17,500										
Trichloroethanes		V													
Trichloroethene	79-01-6	V	5	2.7	45,000	21,900					(66)				
Vinyl Acetate	108-05-4	V													
Xylenes (Total)	1330-20-7	V													

TABLE B-32 – POTENTIAL CHEMICAL-SPECIFIC BENCHMARKS (JANUARY 25, 1994)
STATEWIDE AND BASIN (CDH/WQCC) SURFACE WATER QUALITY STANDARDS
ALL VALUES ARE REPORTED IN ug/l UNLESS OTHERWISE NOTED

EXPLANATION OF TABLE AND END NOTES

CDH = Colorado Department of Health
DIS = dissolved
EPA = Environmental Protection Agency
pCi/L = picocuries per liter
PCB = polychlorinated biphenyl
SS = species specific
SW = Solid Waste
TIC = Tentatively Identified Compounds
TR = total recoverable
TVS = Table Value Standard (hardness dependent)
ug/L = micrograms per liter
WQCC = Water Quality Control Commission

(1) Table I = physical and biological parameters; Table II = inorganic parameters; Table III = metal parameters
Values in Tables I, II, and III for recreational uses, cold water biota and domestic water supply are not included.
(2) In the absence of specific, numeric standards for non-naturally occurring organics, the narrative standard is interpreted as zero with enforcement based on practical quantification levels (PQLs) as defined by CDH/WQCC or EPA
(3) All are 30-day standards except for nitrate+nitrite, nitrate and cyanide
(4) Ammonia, sulfide, chloride, sulfate, copper, iron, manganese, antimony, beryllium, selenium, thallium and zinc are 30-day standards, all others are 1-day standards
(5) Type abbreviations are: A=anion; B=bacteria; C=cation; IN=inorganic; FP=field parameter; H=herbicide; M=metal; P= pesticide; PP=pesticide/PCB; R=radionuclide; SV=semi-volatile.
(6) Site specific organic standards to segment 4 and 5 of Big Dry Creek; otherwise organic standards in reference (a), 3.1.11.
(7) Numbers in parentheses are temporary modifications to stream standards effective until 4/1/96; for non-naturally occuring organics, the narative standard "free from toxics" (section 3.1.11(1)(d) shall be interpreted and applied in accordance with the provisions of section 3.12 consistently for surface and ground waters.
(8) Where the standard is below (more stringent than) the PQL, the PQL is interpreted to be the compliance level.
(9) These parameters are to be maintained at the lowest practical level; See section 3.1.11 (f) (2) in (a)
(10) Metals for aquatic life use are stated as dissolved unless otherwise specified.
(11) Metals for agricultural and domestic use are stated as total recoverable (TR) unless otherwise specified.

(a) CDH/WQCC, Colorado Water Quality Standards 3.1.0 (5 CCR 1002-8) 1/15/1974; amended 12/6/93.
(b) CDH/WQCC, Classifications and Numeric Standards for S. Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin 3.8.0 (5 CCR 1002-8) 4/6/1981; amended 9/7/93.

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 1 CLP (1) CRQL	Table 2 LL-CLP (2) CRQL	Table 3 & 4 502.2 (3) MDL	Table 5 & 6 524.2 (4) MDL	Table 7 & 8 624 (5) MDL	Table 9 8020A (6) PQL	Table 10 8030A (7) PQL	Table 11&12 8240A (8) PQL
Acetone	67-64-1	10	5						100
Acrolein	107-02-8							0.7	
Acrylonitrile	107-13-1							0.5	
Benzene	71-43-2	10	1	0.01	0.04	4.4	2.00		5
Bromobenzene	108-86-1			0.14	0.03				
Bromochloromethane	74-97-5			0.01	0.04				
Bromodichloromethane	75-27-4	10	1	0.10	0.08	2.2			5
Bromoform	75-25-2	10	1	0.09	0.12	4.7			5
Bromomethane	74-83-9	10	1	0.19	0.11				10
2-Butanone	78-93-3	10	5						100
n-Butylbenzene	104-51-8			0.03	0.11				
sec-Butylbenzene	135-98-8			0.03	0.13				
tert-Butylbenzene	98-06-6			0.06	0.14				
Carbon disulfide	75-15-0	10	1						100
Carbon Tetrachloride	56-23-5	10	1	0.02	0.21	2.8			5
Chlorobenzene	108-90-7	10	1	0.02	0.04	6			5
Chloroethane	75-00-3	10	1	0.13	0.1				10
2-Chloroethylvinyl ether	110-75-8								10
Chloroform	67-66-3	10	1	0.01	0.03	1.6			5
Chloromethane	74-87-3	10	1	0.10	0.13				10
2-Chlorotoluene	95-49-8			0.04	0.04				
4-Chlorotoluene	106-43-4			0.07	0.06				
1,2-Dibromo-3-chloropropane	96-12-8			0.20	0.26				
Dibromochloromethane	124-48-1	10	1	0.05	0.05	3.1			5
1,2-Dibromoethane	106-93-4			0.17	0.06				
Dibromomethane	74-95-3			0.10	0.24				
1,2-Dichlorobenzene	95-50-1			0.04	0.03				
1,3-Dichlorobenzene	541-73-1			0.07	0.12				
1,4-Dichlorobenzene	106-46-7			0.04	0.03				
Dichlorodifluoromethane	75-71-8			0.29	0.1				

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 1 CLP (1) CRQL	Table 2 LL-CLP (2) CRQL	Table 3 & 4 502.2 (3) MDL	Table 5 & 6 524.2 (4) MDL	Table 7 & 8 624 (5) MDL	Table 9 8020A (6) PQL	Table 10 8030A (7) PQL	Table 11&12 8240A (8) PQL
1,1-Dichloroethane	75-34-3	10	1	0.03	0.04	4.7			5
1,2-Dichloroethane	107-06-2	10	1	0.03	0.06	2.8			5
1,1-Dichloroethene	75-35-4	10	1	0.04	0.12	2.8			5
1,2-Dichloroethene (total)	540-59-0	10	1						
1,2-Dichloroethene, cis-	156-59-2			0.05	0.12				
1,2-Dichloroethene, trans-	156-60-5			0.05	0.06	1.6			5
1,2-Dichloropropane	78-87-5	10	1	0.03	0.04	6			5
1,3-Dichloropropane	142-28-9			0.02	0.04				
2,2-Dichloropropane	590-20-7			0.05	0.35				
1,1-Dichloropropene	563-58-6			0.02	0.1				
1,3-Dichloropropene, cis-	10061-01-5	10	1	0.08	ND	5			5
1,3-Dichloropropene, trans-	10061-02-6	10	1	0.10	ND	ND			5
Ethyl Benzene	100-41-4	10	1	0.04	0.06	7.2	2.00		5
Hexachlorobutadiene	87-68-3			0.05	0.11				
2-Hexanone	591-78-6	10	5						50
Isopropylbenzene	98-82-8			0.02	0.15				
4-Isopropyltoluene	99-87-6			0.02	0.12				
4-Methyl-2-pentanone	108-10-1	10	5						50
Methylene Chloride	75-09-2	10	2	0.01	0.03	2.8			5
Naphthalene	91-20-3			0.02	0.04				
n-Propylbenzene	103-65-1			0.03	0.04				
Styrene	100-42-5	10	1	0.01	0.04				5
1,1,2,2-Tetrachloroethane	79-34-5	10	1	0.02	0.04	6.9			5
1,1,1,2-Tetrachloroethane	630-20-6			0.01	0.05				
Tetrachloroethene	127-18-4	10	1	0.02	0.14	4.1			5
Toluene	108-88-3	10	1	0.02	0.11	6	2.00		5
1,2,3-Trichlorobenzene	87-61-6			0.06	0.03				
1,2,4-Trichlorobenzene	120-82-1			0.08	0.04				
1,1,1-Trichloroethane	71-55-6	10	1	0.01	0.08	3.8			5
1,1,2-Trichloroethane	79-00-5	10	1	0.04	0.1	5			5

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 1 CLP (1) CRQL	Table 2 LL-CLP (2) CRQL	Table 3 & 4 502.2 (3) MDL	Table 5 & 6 524.2 (4) MDL	Table 7 & 8 624 (5) MDL	Table 9 8020A (6) PQL	Table 10 8030A (7) PQL	Table 11&12 8240A (8) PQL
Trichloroethene	79-01-6	10	1	0.06	0.19	1.9			5
Trichlorofluoromethane	75-69-4			0.34	0.08				
1,2,3-Trichloropropane	96-18-4			0.02	0.32				
1,2,4-Trimethylbenzene	95-63-6			0.02	0.13				
1,3,5-Trimethylbenzene	108-67-8			0.03	0.05				
Vinyl Acetate	108-05-4								50
Vinyl Chloride	75-01-4	10	1	0.18	0.17				10
Xylenes (Total)	1330-20-7	10	1	0.02	0.13		ND		5

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

Parameter	CAS No.	Table 24 CRQL	Table 25 CRQL	Table 26 CRQL	Table 27 CRQL	Table 28 MDL	Table 29 MDL	Table 30 MDL	Table 31 PQL	Table 32 PQL	Table 33 PQL
Aldrin	309-00-2	0.05	0.05		0.01	0.004	0.004		0.04	0.04	
Ametryn	834-12-8							0.06			
Aroclor-1016	12674-11-2	1		1	0.2	ND	ND				
Aroclor-1221	11104-28-2	2		2	0.4	ND	ND				
Aroclor-1232	11141-16-5	1		1	0.2	ND	ND				
Aroclor-1242	53469-21-9	1		1	0.2	0.065	ND				
Aroclor-1248	12672-29-6	1		1	0.2	ND	ND				
Aroclor-1254	11097-69-1	1		1	0.2	ND	ND				
Aroclor-1260	11096-82-5	1		1	0.2	ND	ND				
Atraton	1610-17-9							ND			
Atrazine	1912-24-9							0.05			
BHC alpha-	319-84-6	0.05	0.05		0.01	0.003	0.003		0.03	0.03	
BHC beta-	319-85-7	0.05	0.05		0.01	0.006	ND		0.06	0.06	
BHC delta-	319-86-8	0.05	0.05		0.01	0.009	0.009		0.09		
BHC gamma- (Lindane)	58-89-9	0.05	0.05		0.01	0.004	ND		0.04	0.04	
Chlordane	57-74-9					0.014	0.014		0.14	0.14	
Chlordane alpha-	5103-71-9	0.05	0.05		0.01						
Chlordane gamma-	5103-74-2	0.05	0.05		0.01						
4,4'-DDD	72-54-8	0.1	0.1		0.02	0.011			0.11		
4,4'-DDE	72-55-9	0.1	0.1		0.02	0.004			0.04		
4,4'-DDT	50-29-3	0.1	0.1		0.02	0.012	0.012		0.12	0.12	
Dieldrin	60-57-1	0.1	0.1		0.02	0.002	0.002		0.02	0.02	
Disulfoton	298-04-4										2
Endosulfan I	959-98-8	0.05	0.05		0.01	0.014			0.14		
Endosulfan II	33213-65-9	0.1	0.1		0.1	0.004			0.04		
Endosulfan sulfate	1031-07-8	0.1	0.1		0.02	0.066			0.66		
Endrin	72-20-8	0.1	0.1		0.02	0.006	0.006		0.06	0.06	
Endrin aldehyde	7421-36-3	0.1	0.1		0.02	0.023	0.023		0.23		
Endrin ketone	53494-70-5	0.1	0.1		0.02						
Heptachlor	76-44-8	0.05	0.05		0.01	0.003	0.003		0.03	0.03	
Heptachlor epoxide	1024-57-3	0.05	0.05		0.01	0.083	0.083		0.83	0.83	
Methoxychlor	72-43-5	0.5	0.5		0.1				1.76	1.76	
Methyl parathion	298-00-0										0.3

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

Parameter	CAS No.	Table 24 CRQL	Table 25 CRQL	Table 26 CRQL	Table 27 CRQL	Table 28 MDL	Table 29 MDL	Table 30 MDL	Table 31 PQL	Table 32 PQL	Table 33 PQL
Phorate	298-02-2										1.5
Prometon	1610-18-0							0.03			
Prometryn	7287-19-6							0.06			
Propazine	139-40-2							0.03			
Secbumeton	26259-45-0							ND			
Simazine	122-34-9							0.06			
Simetryn	1014-70-6							0.07			
Terbuthylazine	5915-41-3							0.03			
Terbutryn	886-50-0							0.05			
Toxaphene	8001-35-2	5	5		1	0.24	0.24		2.4	2.4	

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 14 CLP(1) - CRQL	Table 15 LL-CLP(2) - CRQL	Table 16&17 525.1 (9) - MDL	Table 18,19,20 625 (10) - MDL	Table 21&22 8270A (11) PQL	Table 23 8310 (12) PQL
Acenaphthene	83-32-9	10	5		1.9	10	18.00
Acenaphthylene	208-96-8	10	5	0.100	3.5	10	23.00
Alachlor	15972-60-8			1.000			
Aldrin	309-00-2			0.100	1.9	ND	
Anthracene	120-12-7	10	5	0.040	1.9	10	6.60
Aroclor-1221	11104-28-2				30.0		
Aroclor-1254	11097-69-1				36.0		
Atrazine	1912-24-9			0.100			
Benzidine	92-87-5				44.0		
Benzo(a)anthracene	56-55-3	10	5	0.040	7.8	10	0.13
Benzo(a)pyrene	50-32-8	10	5	0.100	2.5	10	0.23
Benzo(b)fluoranthene	205-99-2	10	5	0.200	4.8	10	0.18
Benzo(g,h,i)perylene	191-24-2	10	5	0.100	4.1	10	0.76
Benzo(k)fluoranthene	207-08-9	10	5	0.200	2.5	10	0.17
Benzoic acid	65-85-0					50	
Benzyl alcohol	100-51-6					20	
BHC beta-	319-85-7				4.2		
BHC delta-	319-86-8				3.1		
BHC gamma- (Lindane)	58-89-9			0.100			
4-Bromophenylether	101-55-3	10	5		1.9	10	
Butylbenzylphthalate	85-68-7	10	5	0.300	2.5	10	
Di-n-butylphthalate	84-74-2	10	5	0.300	2.5	10	
Carbazole	86-74-8	10					
Chlordane alpha-	5103-71-9			0.200			
Chlordane gamma-	5103-74-2			0.100			
4-Chloroaniline	106-47-8	10	5			20	
2-Chlorobiphenyl	2051-60-7			0.100			
2-Chloroethoxymethane bis-	111-91-1	10	5		5.3	10	
2-Chloroethylether bis-	111-44-4	10	5		5.7	10	
4-Chloro-3-methylphenol	59-50-7	10	5		3.0	20	
2-Chloronaphthalene	91-58-7	10	5		1.9	10	
2-Chlorophenol	95-57-8	10	5		3.3	10	
4-Chlorophenylphenylether	7005-72-3	10	5		4.2	10	

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS
WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 14 CLP(1) - CRQL	Table 15 LL-CLP(2) - CRQL	Table 16&17 525.1 (9) - MDL	Table 18,19,20 625 (10) - MDL	Table 21&22 8270A (11) PQL	Table 23 8310 (12) PQL
1-Chloropropane 2,2'oxybis-	108-60-1	10	5			10	
Chrysene	218-01-9	10	5	0.040	2.5	10	1.50
4,4'-DDD	72-54-8				2.8		
4,4'-DDE	72-55-9				5.6		
4,4'-DDT	50-29-3				4.7	ND	
Dibenz(a,h)anthracene	53-70-3	10	5	0.100	2.5	10	0.30
Dibenzofuran	132-64-9	10	5			10	
1,2-Dichlorobenzene	95-50-1	10			1.9	10	
1,3-Dichlorobenzene	541-73-1	10			1.9	10	
1,4-Dichlorobenzene	106-46-7	10			4.4	10	
3,3'-Dichlorobenzidine	91-94-1	10	5		16.5	20	
2,3-Dichlorobiphenyl	16605-91-7			0.100			
2,4-Dichlorophenol	120-83-2	10	5		2.7	10	
Dieldrin	60-57-1				2.5	ND	
Diethylphthalate	84-66-2	10	5	0.800	1.9	10	
2,4-Dimethylphenol	105-67-9	10	5		2.7	10	
Dimethylphthalate	131-11-3	10	5	0.040	1.6	10	
4,6-Dinitro-2-methylphenol	534-52-1	25	20		24.0	50	
2,4-Dinitrophenol	51-28-5	25	20		42.0	50	
2,4-Dinitrotoluene	121-14-2	10	5		5.7	10	
2,6-Dinitrotoluene	606-20-2	10	5		1.9	10	
1,2-Diphenylhydrazine	122-66 7					ND	
Endosulfan sulfate	1031-07-8				5.6		
Endrin	72-20-8			0.500			
2-ethylhexyladipate bis-	103-23-1			0.600			
2-Ethylhexylphthalate bis-	117-81-7	10	5	0.600	2.5	10	
Fluoranthene	206-44-0	10	5		2.2	10	2.10
Fluorene	86-73-7	10	5	0.200	1.9	10	2.10
Heptachlor	76-44-8			0	1.9	ND	
Heptachlor epoxide	1024-57-3			0	2.2	ND	
2,2',3,3',4,4',6-Heptachlorobiphenyl	52663-71-5			0.100			
Hexachlorobenzene	118-74-1	10	5	0.100	1.9	10	
2,2',4,4',5,6'-Hexachlorobiphenyl	60145-22-4			0.100			

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 14 CLP(1) - CRQL	Table 15 LL-CLP(2) - CRQL	Table 16&17 525.1 (9) - MDL	Table 18,19,20 625 (10) - MDL	Table 21&22 8270A (11) PQL	Table 23 8310 (12) PQL
Hexachlorobutadiene	87-68-3	10	5		0.9	10	
Hexachlorocyclopentadiene	77-47-4	10	5	0.030		10	
Hexachloroethane	67-72-1	10	5		1.6	10	
Indeno(1,2,3-cd)pyrene	193-39-5	10	5	0.100	3.7	10	0.43
Isophorone	78-59-1	10	5		2.2	10	
Methoxychlor	72-43-5			0.040		10	
2-Methylnaphthalene	91-57-6	10	5			10	
2-Methylphenol	95-48-7	10	5			10	
4-Methylphenol	106-44-5	10	5			10	
Naphthalene	91-20-3	10	5		1.6	10	18.00
2-Nitroaniline	88-74-4	25	20			50	
3-Nitroaniline	99-09-2	25	20			50	
4-Nitroaniline	100-01-6	25	20			20	
Nitrobenzene	98-95-3	10	5		1.9	10	
4-Nitrophenol	100-02-7	25	20		2.4	50	
2-Nitrophenol	88-75-5	10	5		3.6	10	
Nitroso-diphenylamine N-	86-30-6	10	5		1.9	10	
Nitrosodi-n-propylamine N-	621-64-7	10	5			10	
Nitrosodibutylamine N-	924-16-3					10	
Nitrosodiethylamine N-	55-18-5					20	
Nitrosodimethylamine N-	62-75-9					ND	
Nonachlor trans-	39765-80-5			0.300			
2,2',3,3',4,5',6,6'-Octachlorobiphenyl	40186-71-8			0.200			
Di-n-octylphthalate	117-84-0	10	5		2.5	10	
Pentachlorobenzene	608-93-5					10	
2,2',3',4,6-Pentachlorobiphenyl	60233-25-2			0.100			
Pentachlorophenol	87-86-5	25	20	0.300	3.6	50	
Phenanthrene	85-01-8	10	5	0.010	5.4	10	6.40
Phenol	108-95-2	10	5		1.5	10	
Pyrene	129-00-0	10	5	0.020	1.9	10	2.70
Simazine	122-34-9			0.200			
1,2,4,5-Tetrachlorobenzene	95-94-3					10	
2,2',4,4'-Tetrachlorobiphenyl	2437-79-8			0.100			

TABLE B-33 SUMMARY OF GRRASP ANALYTICAL METHODS WITH DETECTION LIMITS WATER SAMPLES ONLY (ug/L)

PARAMETER	CAS No.	Table 14 CLP(1) - CRQL	Table 15 LL-CLP(2) - CRQL	Table 16&17 525.1 (9) - MDL	Table 18,19,20 625 (10) - MDL	Table 21&22 8270A (11) PQL	Table 23 8310 (12) PQL
Toxaphene	8001-35-2			9.000			
1,2,4-Trichlorobenzene	120-82-1	10	5		1.9	10	
2,4,5-Trichlorobiphenyl	15862-07-4			0.060			
2,4,5-Trichlorophenol	95-95-4	25	20			10	
2,4,6-Trichlorophenol	88-06-2	10	5		2.7	10	

EXPLANATION OF END NOTES AND FOOTNOTES

GRRASP - General Radiochemistry and Routine Analytical Services Protocol
CLP - Contact Laboratory Program, March 1990
CRQL - Contract Required Quantitation Limit
MDL - Method Detection Limit
PQL - Practical Quantitation Limit

(1) Contract Laboratory Program - Contract Required Quantitation Limit - High Limit
(2) Contract Laboratory Program - Contract Required Quantitation Limit - Low Limit
(3) Volatile Organics Regulated and Complete List - EPA Method 502.2
(4) Volatile Organics Regulated and Complete List - EPA Method 524.2
(5) Volatile Organics by EPA Method 624; Regulated and Complete
(6) Aromatic Volatile Organics (BTEX) by EPA SW-846 Method 8020A
(7) Acrolein/Crylonitril by EPA SW-846 Method 8030A
(8) Volatile Organics Regulated and Complete List - EPA SW-846 Method 8240A
(9) Selected Semi-Volatile Organics Regulated and Complete - EPA Method 525.1
(10) Selected Semi-Volatile Organics Regulated and Complete - EPA Method 625
(11) Selected Semi-Volatile Organics Regulated and Complete - EPA SW-846 Method 8270A
(12) Poly Aromatic Hydrocarbons - EPA SW-846 Method 8310

APPENDIX C
1993 ANNUAL UPDATE WORKPLAN FOR THE CONTROL OF RADIONUCLIDE LEVELS IN WATER DISCHARGES FROM THE ROCKY FLATS PLANT

APPENDIX C

1993 ANNUAL UPDATE

WORKPLAN FOR THE CONTROL OF RADIONUCLIDE LEVELS IN WATER DISCHARGES FROM THE ROCKY FLATS PLANT

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i INTRODUCTION

Appendix C is the second annual update to the final *Workplan for the Control of Radionuclide Levels in Water Discharges from the Rocky Flats Plant.* [1] This annual update mirrors the organization of Section 4.0 of the *Workplan*, which described the actual plans and work proposals designed to improve the control of radionuclide levels in discharges of water from the Rocky Flats Plant (RFP). This update describes the accomplishments of the past year in each of the four elements specified in the IAG Statement of Work, Section XII, and outlines current plans for future work, where appropriate. The four elements are:

Workplan Element #1: Control of Release of Radionuclides
Workplan Element #2: Assessment of Water Quality
Workplan Element #3: Analytical Methods
Workplan Element #4: Treatment Evaluations and Proposals

It is important to note that budget restrictions and/or implementation of any proposed regulatory changes (e.g. the Environmental Protection Agency (EPA)-proposed removal of the National Pollutant Discharge Elimination System (NPDES) permit for pond water discharges) could impact future plans and schedules that are described throughout Appendix C.

1.0 WORKPLAN ELEMENT #1: CONTROL OF RELEASE OF RADIONUCLIDES

" DOE will prepare and submit a Workplan designed to control the release of radionuclides as specified herein. The Workplan will require DOE to sample before any offsite discharges from onsite ponds occur." (IAG 1991)

1.1 Improving In-Pond Water Management

The interior Ponds A-1, A-2, B-1 and B-2 are managed as a single unit. Pond levels are controlled by transferring all waters to Pond A-2 for spray evaporation. Spray evaporation operations are conducted in accordance with a draft procedure which describes the following components: assess action level, analyze, transfer, analyze again, spray evaporate. Spray evaporation operations and interior pond water transfers are closely monitored so there will be no erosion or other harm to the environment in, around, or downstream from the ponds. The placement and operation of the spray evaporation systems force the spray directly over the pond area. Spray evaporation operations are conducted during daylight hours and terminated during high winds or precipitation events.

New spray nozzles were installed at both Pond A-2 and the Landfill Pond to increase the efficiency of spray evaporation. The Pond A-2 spray equipment was not used during FY93. Spray evaporation occurred at the Landfill Pond for approximately 130 days in FY93, only during daylight hours. Quarterly samples were taken from each of the interior ponds for a complete chemical screen. Future plans include continued quarterly sampling. A statistical analysis of the sampling data will be used to plan future pond management scenarios.

[1] The final *Workplan for the Control of Radionuclides Levels in Water Discharges from the Rocky Flats Plant,* 21000-WP-125 01.1, was issued in January 1992 and recieved conditional approval from the Colorado Department of Health (CDH) in March 1992. Sections of the *Workplan* were revised and reissued in both April and November of 1992. The *Workplan* received final; approval on March 12, 1993.

1.2 Improving Dam Integrity

The twelve detention dams associated with the Landfill Pond and the A-, B-, and C-series ponds are routinely monitored by RFP operations and surveillance personnel as part of an integrated dam safety program. This program minimizes the risk of dam failure and the accompanying uncontrolled release of potentially contaminated sediments and large quantities of impounded water. Pond pool elevations are recorded three times per week while dam piezometer levels at Dams A-3, A-4, B-1, B-3, B-5, C-2, and the Landfill Dam are generally recorded once per week. The frequency of these readings is increased when either heavy precipitation events or continually high pool levels occur. Additional assurances of dam integrity are provided by periodic inspections of embankments and side slopes, especially for cracking, sloughing, and seepage. Annual inspections of the surface water detention dams are also conducted by the U. S. Army Corps of Engineers together with the State Engineer's Office, and by the Federal Energy Regulatory Commission.

A summary of fiscal year 1993 major accomplishments are as follows:

1. The Dam B-1 Rehabilitation Project is complete. This Project included:
   (1) stabilizing the downstream face of the dam,
   (2) flattening the dam slope, and
   (3) placing rip-rap on the spillway so that a 100-year storm event would not overtop any portion of the dam.

2. A Geotechnical Engineering Report, which provided stability analysis for the A-3, B-1, B-3 and Landfill Dams under various conditions, was completed by Woodward-Clyde in January 1993. The report concluded that all dams were in generally good condition, but recommended the following actions: (a) improve routine maintenance, (b) place new riprap on the upstream slope of Dam A-3, (c) regrade and lower the crest elevation of the Dam B-3 spillway, and (d) repair the outlet works gate of the Landfill Dam. During FY94, these recommendations will be reviewed, prioritized, and scheduled for a phased completion.

3. The U.S. Army Corps of Engineers completed a stability analysis of Dams A-4, B-5 and C-2 in September 1993, which investigated the capability of the dams to safely retain high pools of water for an unspecified period of time. Additional geotechnical evaluations to determine design specifics for recommended dam upgrades to C-2, A-4, and B-5 are planned for FY94. Piezometers, inclinometers, and crest monuments will be installed on the terminal dams.

4. Funding was approved and preliminary design has started for the installation of downstream toe protection (sand rock blankets) on A-1, A-2, B-2, B-3, B-4 and C-1 dams. Scheduled completion is FY94.

5. The Colorado State Engineers Office inspected Dam C-2 in October 1993 to consider reducing the hazard classification to class/level three. In general, the structure is in good condition but the outlet gates should have a through cycle to ensure operable status.

1.3 Weather-Proofing Treatment Facility

A Project Acceptance and Transfer (PAT) was issued in April 1993 to approve the temporary Pond A-4 Shelter for final occupancy. The Pond A-4 Shelter covers the Pond A-4 water treatment operations to provide inclement weather protection for water management operations and workers. The Pond A-4 Shelter is an 8400 ft^2 heated enclosure, complete with generator-powered electric lighting and propane-powered radiant heating to maintain a 45^0F internal environment (see Figure 1.1). Filter vessels,

granulated activated carbon (GAC) tanks, and other ancillary equipment are located inside the Pond A-4 Shelter.

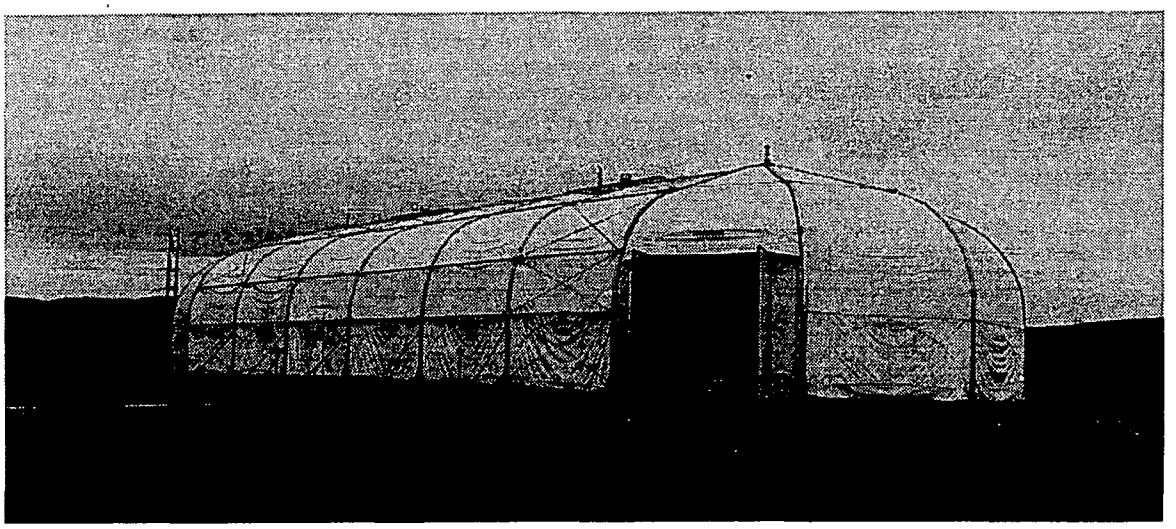

Figure 1.1 - Pond A-4 Shelter.

1.4 Reusing/Recycling Pond C-2 Water

The Pond C-2 Discharge Minimization Project (formerly entitled Pond C-2 Recycle Project) involves the evaluation, design, and construction of a temporary pipeline to transfer Pond C-2 water to the industrial raw water system for reuse in the cooling towers. Past and present water quality data from Pond C-2 show that the water is adequate for this use. A comparison of water consumption by the cooling towers with historic inflow to Pond C-2 indicates this project should be very close to achieving zero discharge in all but unusually high precipitation years. Planning for this project will continue throughout calendar year 1994.

It is important to note that all operations of Pond C-2 regarding the reuse/recycling and emergency transfers are subject to change for compliance with new National Pollutant Discharge Elimination System (NPDES) requirements. The new NPDES permit negotiations between the U. S. Environmental Protection Agency (EPA) and Department of Energy (DOE)/EG&G are currently underway. The Pond C-2 operations are also subject to change with the implementation of the Pond Water Management Interim Measures/Interim Remedial Action (IM/IRA).

Progress of the Pond C-2 Discharge Minimization Project has been temporarily delayed due to concerns that cessation of Pond C-2 discharges would potentially impact downstream threatened and endangered species in the Platte River Basin. DOE and the U. S. Fish and Wildlife Service will begin consultations during FY94 to discuss resolution of these potential impacts. After full concurrence is obtained from the U. S. Fish and Wildlife Service, finalization of the National Environmental Policy Act (NEPA) process should be achieved. The revised engineering design phase for the project would then be initiated, followed by the construction phase.

The Pond C-2 transfer line is an above-ground pipeline that allows transfer of water from Pond C-2 to Pond B-5 or Pond A-4. This pipeline is maintained for water transfers under emergency situations. If an emergency situation should arise from storm flows, such that over-topping the Pond C-2 dam and spillway is imminent, it is deemed preferable for overall public health protection to transfer the water from Pond C-2 to Pond B-5 or Pond A-4 rather than discharge (without analysis) directly to the Broomfield Diversion Ditch or Woman Creek. After an emergency transfer of water has been completed, Pond A-4 would be split sampled with Colorado Department of Health (CDH) and analyzed. Upon review of analytical

results, approval for discharge from Pond A-4 is given by CDH. All water transferred from Pond C-2 to Pond B-5 or Pond A-4 would be sampled during transfer to assess the water quality requirements (including radionuclide standards) as specified by the Colorado Water Quality Control Commission (CWQCC) for normal routine pond discharges. The transfer of water is intended as an emergency option to prevent over-topping of the Pond C-2 dam and spillway and is not a standard operational practice. To date, this pipeline has never been used.

1.5 Sampling and Reporting Requirements

RFP stormwater runoff and treated waste water effluent are collected in downstream holding ponds, and receive sampling and analysis prior to offsite discharge. RFP provides technical water management and water transfer and treatment capabilities to assure timely discharges of RFP pond water in accordance with all applicable standards for the protection of public health and the environment. These include: (1) the National Pollutant Discharge Elimination System (NPDES)[2] permit requirements, (2) the Agreement in Principle (AIP)[3] , and (3) the Interagency Agreement (IAG)[4] The AIP and IAG require cooperative sampling, analysis, and water quality assessment to assure releases are safe and meet applicable standards. RFP continues to coordinate onsite sampling efforts with CDH and other regulatory agencies through appointed representatives, to assure that representative predischarge and compliance samples and results are available. RFP analyzes these split samples to provide confirmatory analyses for regulatory agencies, as needed. The analytical results are shared with regulatory agencies and interested municipalities at monthly public information exchange meetings.

In addition to the existing NPDES discharge points, the current operational configuration allows transfer of Pond C-2 water to the Broomfield Diversion Ditch or to Ponds B-5/A-4, and Pond B-5 water to Pond A-4. Pond A-3 and Pond B-5 waters are normally transferred to Pond A-4 without radionuclide sampling and analysis. However, the Pond A-4 discharge depends on the Pond A-4 predischarge sampling results for radionuclides. Pond B-5 is sampled for radionuclide analyses during transfer if heavy precipitation events force the transfer of Pond B-5 to Pond A-4 during Pond A-4 discharge.

Seasonal weather conditions, unusual precipitation amounts, soil moisture, and Sewage Treatment Plant (STP) flows create variability in the quantity and frequency of pond transfers. However, the average terminal pond discharge rate from RFP is roughly 150 million gallons (Mgal)/year or 15-20 Mgal every 6 weeks. Of this volume, approximately 1/3 is STP effluent and 2/3 is storm water flow. Each discharge event (approximately nine per year) requires 10-14 days to complete.

1.6 Analysis of Minimum Detectable Activity

Laboratory analysis reports for radionuclides provide the reported concentration of the radionuclide analyte along with the individual "error" and the minimum detectable activity of the analyte for that particular analysis. The "error" value can be defined as the adjustment used to obtain an interval which, with 95% confidence, contains the sample's concentration. A large reported error indicates more uncertainty in the reported concentration. The minimum detectable activity (MDA) is the smallest concentration that could have been detected for the analysis of the sample.

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[2] National Pollution Discharge Elimination System Permit #CO-0001333

[3] Agreement in Principle, State of Colorado and Department of Energy, June 1989

[4] Rocky Flats Interagency Agreement, Environmental Protection Agency, State of Colorado, Department of Energy, January, 1991

New sampling protocol was initiated in November 1992, and is described in the 1992 Annual Update to this Workplan (see Table 1.1). Radionuclide data from 306 samples collected during 1992 and 1993 were statistically examined to determine the relationship between the volume of the sample analyzed and the sizes of the reported error and MDA.

Week Number	**Sampling Scheme**	**Analytical Volume**	**Approximate MDA for Pu /Am**
Week 1	1 In-pond Depth Composite Sample	4 liter	0.02 pCi/L*
Week 2	1 In-pond Depth Composite Sample	4 liter	0.02 pCi/L
Week 3	2 In-pond Depth Composited Sample (CDH splits)	4 liter	0.02 pCi/L
Week 4	1 In-pond Depth Composited Sample	4 liter	0.02 pCi/L
Week 5	1 In-pond Depth Composited Sample	4 liter	0.02 pCi/L
Week 6	Seven Daily (Discharge) Samples	7 liter	0.01 pCi/L
Week 7	Seven Daily (Discharge) Samples	7 liter	0.01 pCi/L

* pCi/L = Picocurie per Liter (10^{-12} Curies/Liter)

Table 1.1 - Current Sampling Schedule for Pond A-4

Tables 1.2 through 1.5 summarize the relationship between sample volume and the plutonium-239/240 MDA, americium-241 MDA, plutonium error, and americium error, respectively. The data are also graphically presented using boxplots in Figures 1.2 through 1.5. The box connects the 25th and 75th percentiles of the data. A horizontal line represents the median of the data, and a star represents the mean. Vertical lines are drawn to the minimum and maximum data points that are at a distance from the box of no more than 1.5 times the length of the box. Data values exceeding this distance from the box are individually denoted by squares.

These graphics show that the MDA decreases as the sample volume increases and the variability in the MDA values also decreases with larger volumes. The largest changes occur between samples of one liter and samples exceeding one liter. Tables 1.2 and 1.3 also show the number of samples for which the MDA exceeds the CWQCC Segment 4 standard for the analyte. Over 20% of the one-liter samples yield an MDA exceeding this standard, while no MDA exceeds the standard on the larger sample volumes.

Similar relationships are found for the reported error. Figures 1.4 and 1.5 and Tables 1.4 and 1.5 show that both the mean and variability of the reported error decrease with larger sample volumes.

Sample Volume (Liters)	Sample Size	Mean (pCi/L)	Standard Deviation (pCi/L)	Minimum (pCi/L)	Maximum (pCi/l)	Number Exceeding Standard
1	87	0.0469	0.0061	0.013	0.064	21
3	6	0.0177	0.0029	0.015	0.023	0
4	70	0.0141	0.0032	0.009	0.025	0
5	1	0.0090	N/A	0.009	0.009	0
6	14	0.0090	0.0034	0.006	0.020	0
7	128	0.0075	0.0016	0.005	0.016	0

Table 1.2 - Plutonium-239/240 MDA Data Summaries

Sample Volume (Liters)	Sample Size	Mean (pCi/L)	Standard Deviation (pCi/L)	Minimum (pCi/L)	Maximum (pCi/l)	Number Exceeding Standard
1	93	0.0489	0.0057	0.008	0.073	19
3	6	0.0172	0.0012	0.016	0.019	0
4	85	0.0125	0.0016	0.010	0.018	0
5	2	0.0115	0.0035	0.009	0.014	0
6	8	0.0089	0.0006	0.008	0.010	0
7	127	0.0074	0.0010	0.006	0.011	0

Table 1.3 - Americium-241 MDA Data Summaries

Sample Volume (Liters)	Sample Size	Mean (pCi/L)	Standard Deviation (pCi/L)	Minimum (pCi/L)	Maximum (pCi/l)
1	87	0.0087	0.0041	0.001	0.023
3	6	0.0058	0.0015	0.004	0.008
4	70	0.0055	0.0043	0.001	0.024
5	1	0.0030	N/A	0.003	0.003
6	14	0.0036	0.0033	0.001	0.014
7	128	0.0023	0.0015	0.001	0.009

Table 1.4 - Plutonium-239/240 Error Data Summaries

Sample Volume (Liters)	Sample Size	Mean (pCi/L)	Standard Deviation (pCi/L)	Minimum (pCi/L)	Maximum (pCi/l)
1	94	0.0092	0.0031	0.001	0.021
3	6	0.0043	0.0012	0.003	0.006
4	85	0.0034	0.0014	0.001	0.009
5	2	0.0040	0.0028	0.002	0.006
6	8	0.0031	0.0014	0.002	0.006
7	127	0.0022	0.0012	0.001	0.010

Table 1.5 - Americium-241 Error Data Summaries

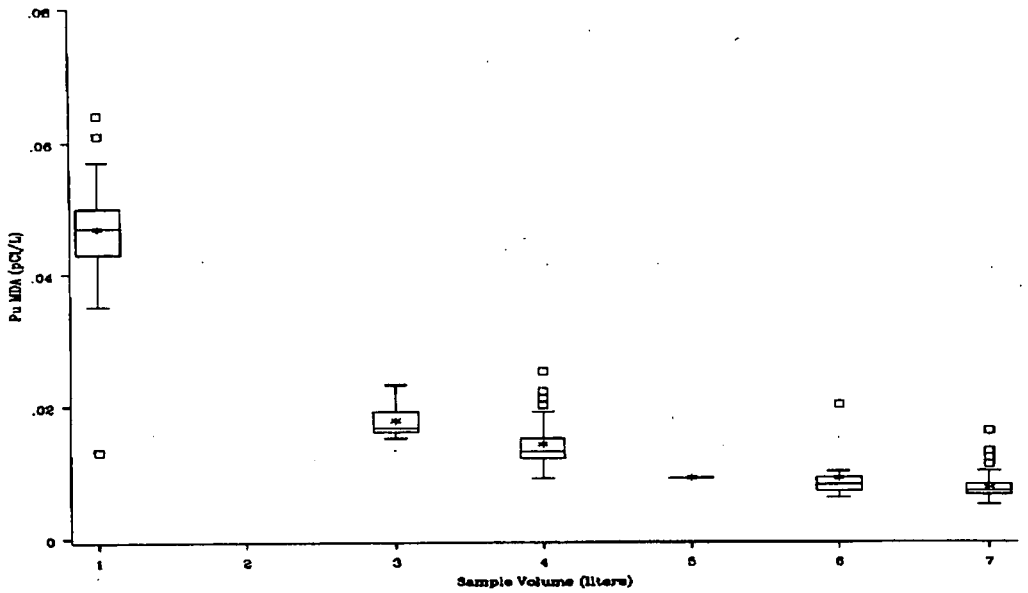

Figure 1.2 - Plutonium-239/240 Minimum Detectable Amount

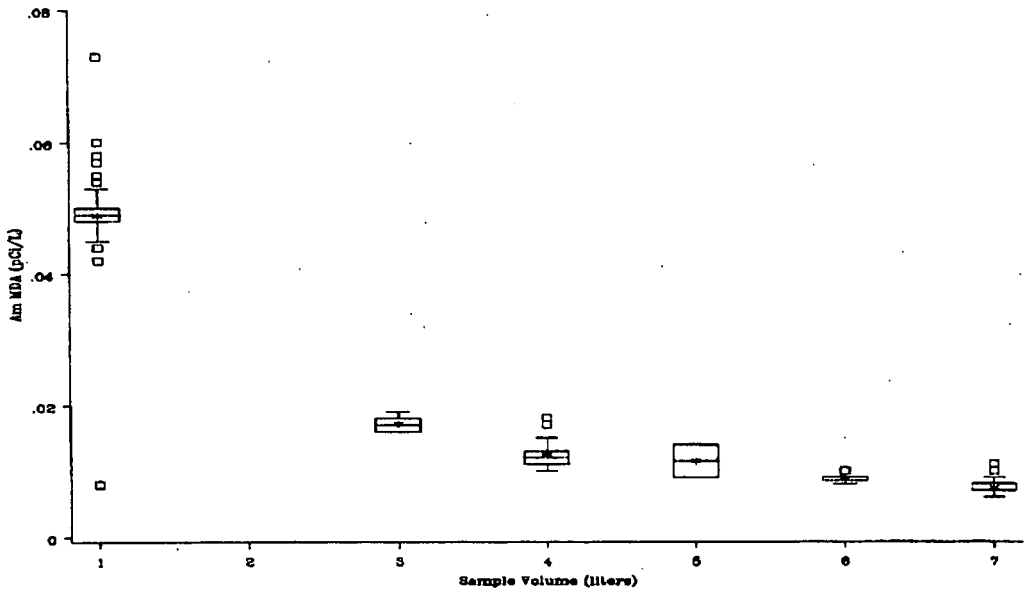

Figure 1.3 - Americium-241 Minimum Detectable Amount

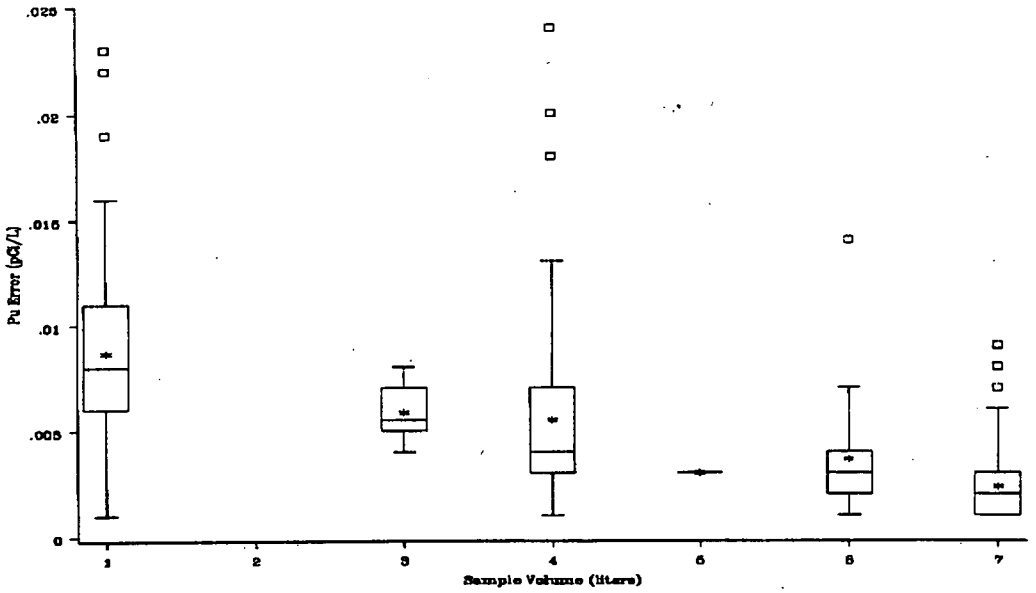

Figure 1.4 - Plutonium-239/240 Error

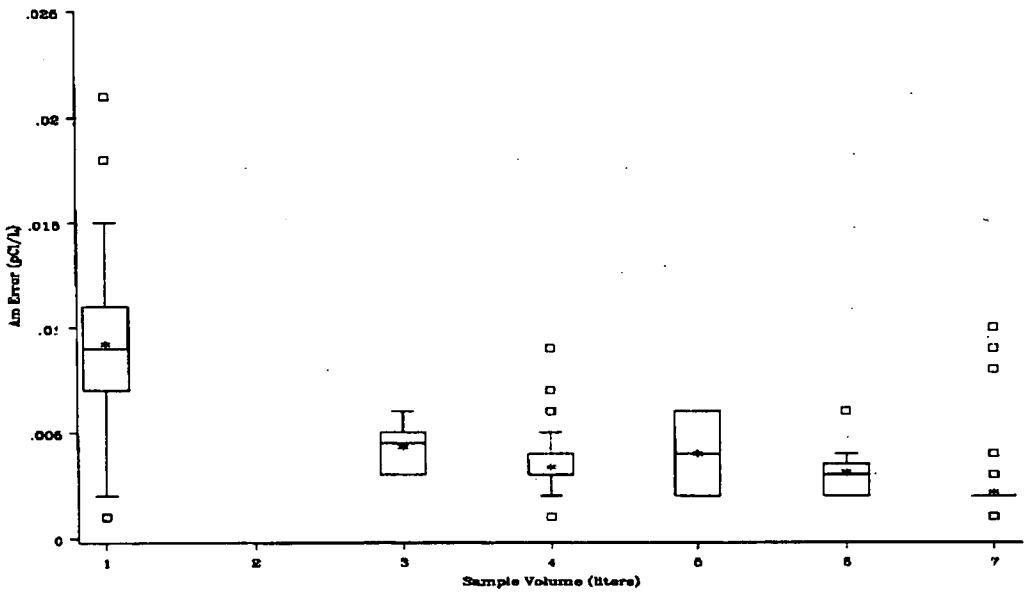

Figure 1.5 - Americium-241 Error

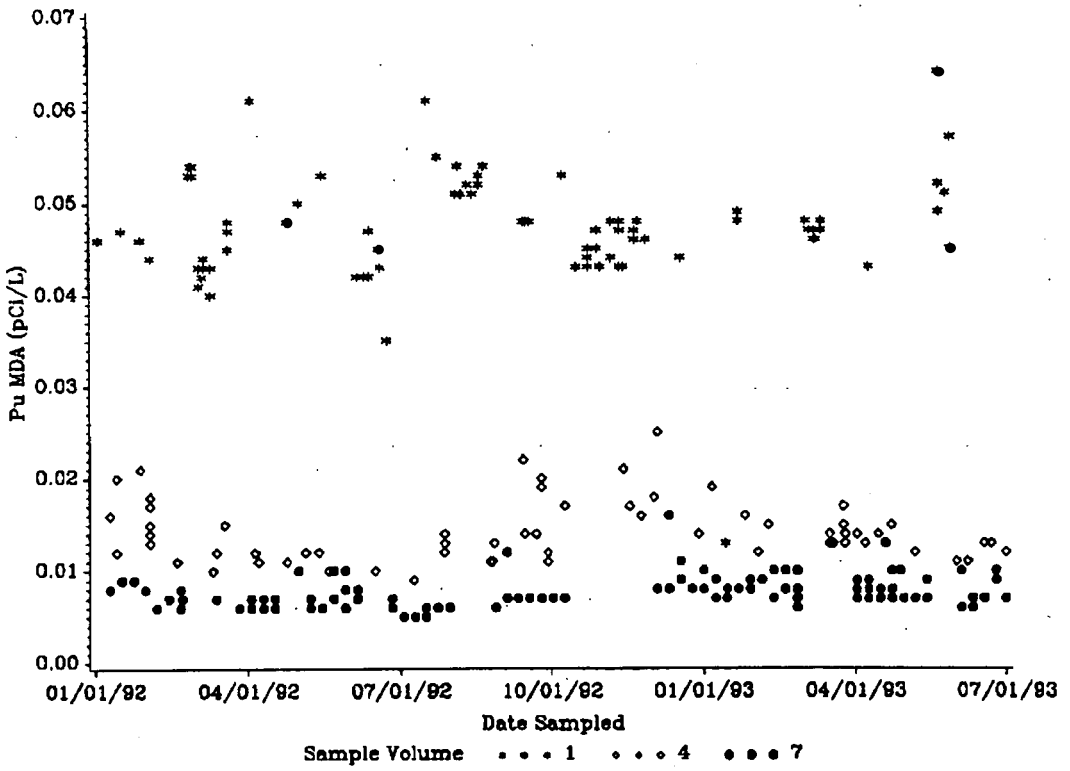

Figure 1.6 - Plutonium-239/240 Minimum Detectable Amount

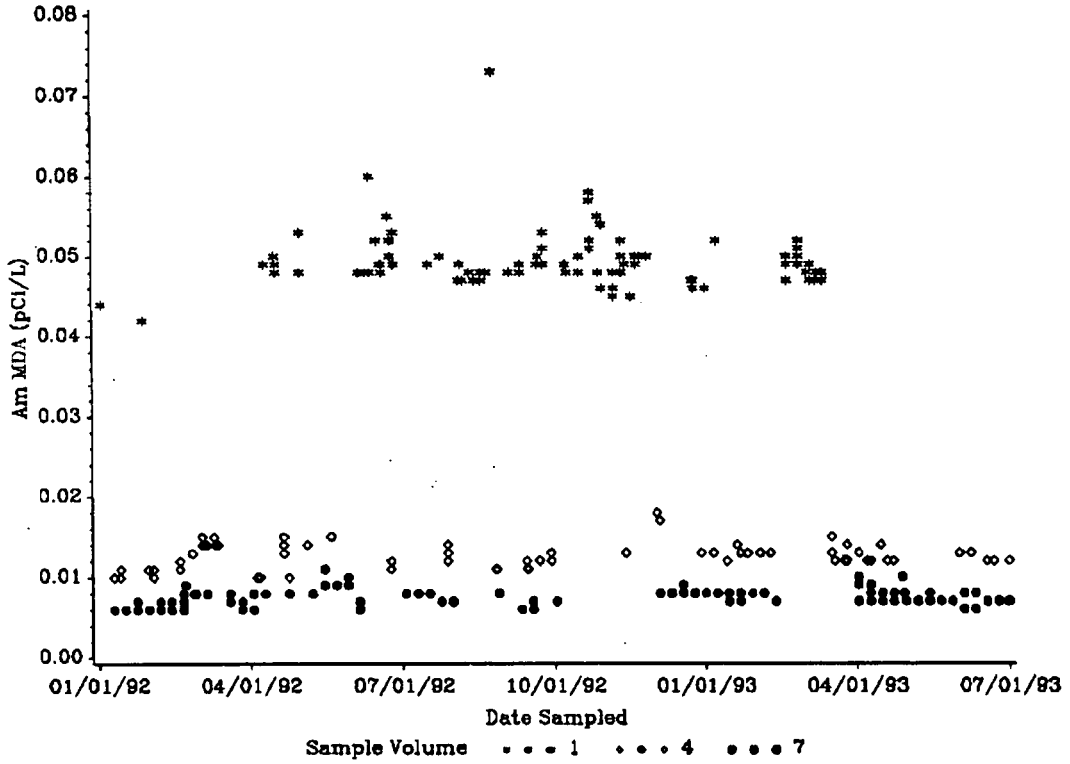

Figure 1.7 - Americium-241 Minimum Detectable Amount

Parametric and nonparametric analyses of variance methods were applied to the data for sample volumes of 1, 4, and 7 liters. These three volumes were chosen because much less data are available for the other sample volumes. Analyses on plutonium MDA, americium MDA, plutonium error, and americium error indicate differences between the results for each volume. The observed p-values from all analyses are less than 0.0001, indicating the level of significance between the means of the results at these volumes. Figures 1.6 and 1.7 show the relationships between the MDA value and the date on which the sample was taken. These relationships should correspond very closely to the relationships between the MDA values and the date on which the laboratory analysis was performed. The plots show no dramatic trends or shifts over time. In particular, the plots do not show any decrease in the MDA during 1993.

2.0 WORKPLAN ELEMENT #2: ASSESSMENT OF WATER QUALITY

Tables of summary statistics and graphical results are presented for radionuclide levels in surface water samples taken from Ponds A-4, C-1, C-2 , and Walnut Creek at Indiana Street sampling locations. The samples were collected during the time period from January 1988 to July 1993. For most of the analyte/location combinations, the data show smaller mean concentrations and smaller variation for the 1992 through 1993 time period than for earlier time periods.

Summary statistics for plutonium-239/240, americium-241, uranium-233/234 and uranium-238 are presented in Tables 2.1 through 2.4. Each table presents the results by sampling location and time frame. The results are presented for the 1988 through 1989, the 1990 through 1991, and the 1992 through 1993 time periods. The 1992 through 1993 time period contains samples taken through July 1, 1993.

These tables show that, for all analyte/location combinations, the standard deviations of concentrations during the 1992 through 1993 time period are either smaller or approximately the same as those during the earlier time periods. The 1992-1993 means are smaller than the 1988-89 and 1990-91 means for most of the analyte/location combinations.

These trends are also evident in graphical representations of the data. Frequency histograms for plutonium-239/240, americium-241, uranium-233/234, and uranium-238 for the four sampling locations are presented in Figures 2.1 through 2.16. The histograms are comprised of rectangles showing the distribution of the concentrations. The width of each rectangle represents an interval of values, and the height of each rectangle represents the number, or frequency, of samples with concentrations in that interval. For each location, separate histograms are made for each time period. The same frequency scale is used for all histograms to facilitate direct comparisons between radionuclides, locations, and/or time periods.

Additional plots were created, but not included in this report which indicate plutonium-239/240 and americium-241 not showing any noticeable time effects for the majority of values. However, fewer outlying concentrations appear in the 1992 through 1993 time period than in the earlier time periods, resulting in both smaller mean concentrations and smaller standard deviations. The plots for uranium-233/234, and uranium-238 indicate distinct trends of decreasing mean concentration and decreasing variation over time at the Pond A-4 and the Walnut Creek at Indiana Street locations.

No noticeable seasonal trends were seen in the data. The plots for uranium-233/234 and uranium-238 at Pond C-1 show some runs of increasing and decreasing concentrations. However, closer examination of these runs does not reveal any seasonal pattern, as the behavior of the runs differs from year to year.

Location		Pond A-4	Pond C-1	Pond C-2	Walnut
	Sample Size	26	75	11	53
1988-1989	Mean (pCi/L)	0.011	0.013	0.053	0.014
	Std. Dev.	0.027	0.022	0.040	0.023
	Sample Size	112	102	31	109
1990-1991	Mean (pCi/L)	0.003	0.015	0.020	0.004
	Std. Dev.	0.025	0.030	0.021	0.018
	Sample Size	70	72	23	30
1992-1993	Mean (pCi/L)	0.001	0.010	0.028	0.004
	Std. Dev.	0.010	0.013	0.022	0.016

Table 2.1 - Summary Statistics for Plutonium-239/240

Location		Pond A-4	Pond C-1	Pond C-2	Walnut
	Sample Size	26	74	11	53
1988-1989	Mean (pCi/L)	0.012	0.008	0.043	0.014
	Std. Dev.	0.028	0.016	0.050	0.024
	Sample Size	109	98	29	110
1990-1991	Mean (pCi/L)	0.009	0.007	0.007	0.009
	Std. Dev.	0.025	0.018	0.019	0.022
	Sample Size	71	74	22	30
1992-1993	Mean (pCi/L)	0.001	0.001	0.006	0.002
	Std. Dev.	0.010	0.006	0.006	0.010

Table 2.2 - Summary Statistics for Americium-241

Location		Pond A-4	Pond C-1	Pond C-2	Walnut
	Sample Size	26	75	10	53
1988-1989	Mean (pCi/L)	2.147	0.768	0.790	2.253
	Std. Dev.	0.707	0.665	0.487	1.333
	Sample Size	112	102	30	111
1990-1991	Mean (pCi/L)	0.998	0.667	1.269	1.080
	Std. Dev.	0.783	0.528	0.523	0.617
	Sample Size	71	73	25	28
1992-1993	Mean (pCi/L)	0.740	0.781	0.867	0.824
	Std. Dev.	0.277	0.287	0.163	0.318

Table 2.3 - Summary Statistics for Uranium-233/234

Location		Pond A-4	Pond C-1	Pond C-2	Walnut
	Sample Size	26	74	10	53
1988-1989	Mean (pCi/L)	3.573	0.532	1.086	2.311
	Std. Dev.	1.388	0.339	0.792	1.316
	Sample Size	112	102	30	111
1990-1991	Mean (pCi/L)	1.140	0.457	1.560	1.074
	Std. Dev.	0.870	0.225	0.700	0.606
	Sample Size	71	73	25	28
1992-1993	Mean (pCi/L)	0.811	0.570	1.090	0.816
	Std. Dev.	0.280	0.218	0.275	0.322

Table 2.4 - Summary Statistics for Uranium-238

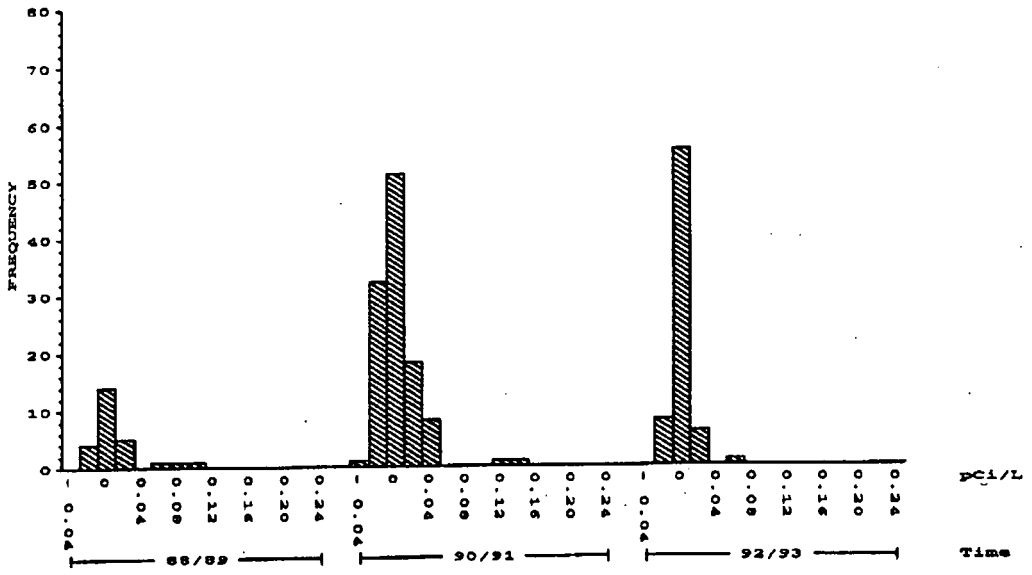

Figure 2.1 - Plutonium-239/240 Concentration in Pond A-4

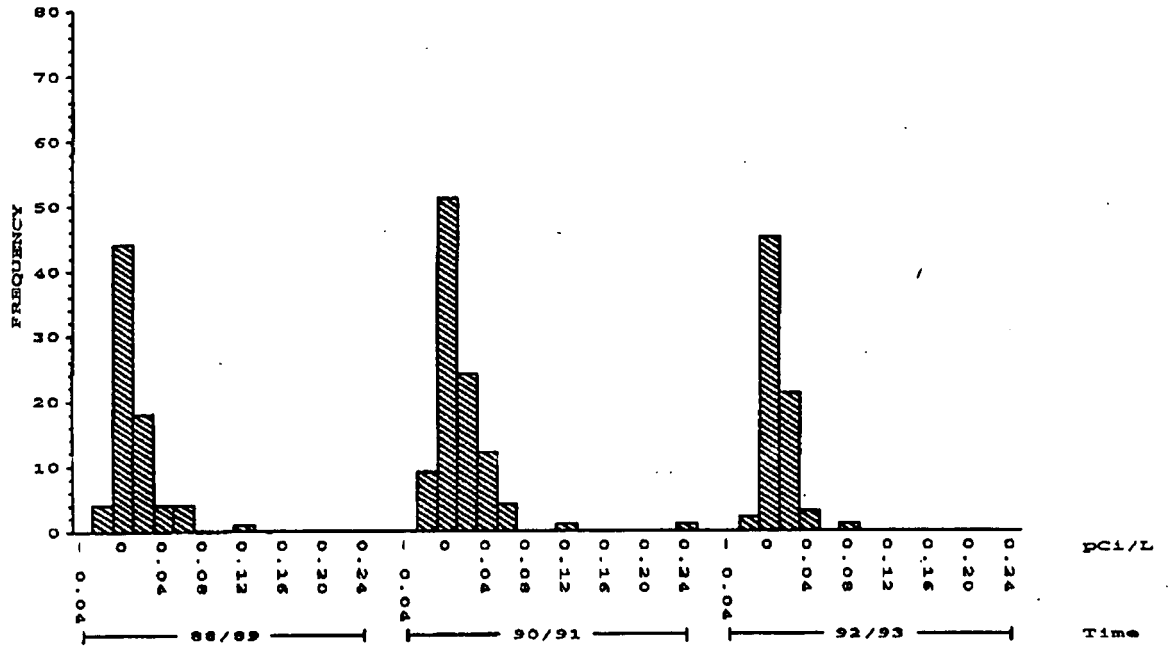

Figure 2.2 - Plutonium-239/240 Concentration at Pond C-1

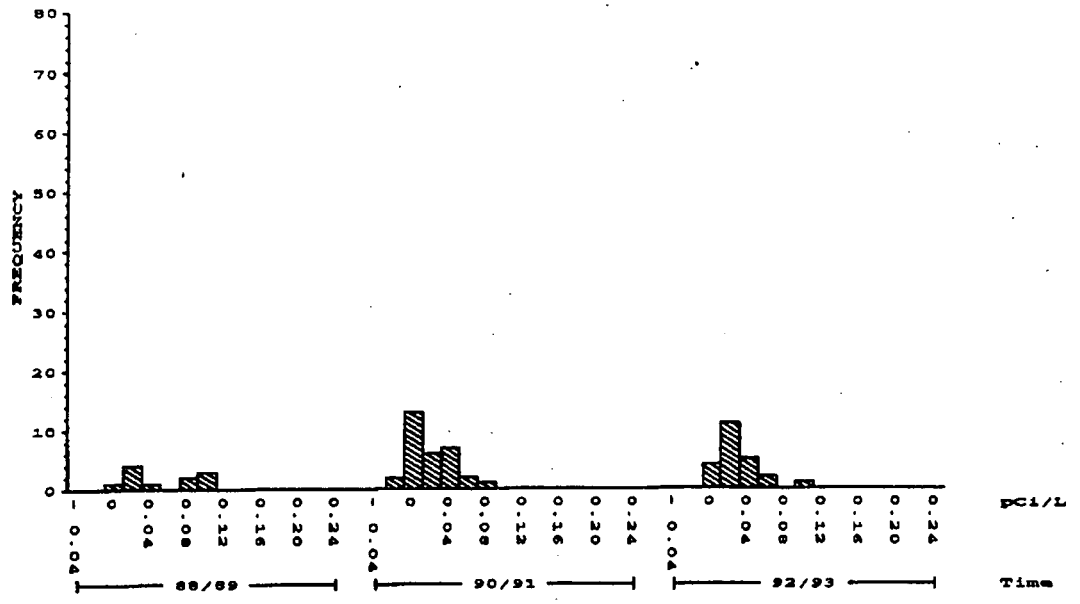

Figure 2.3 - Plutonium-239/240 Concentration in Pond C-2

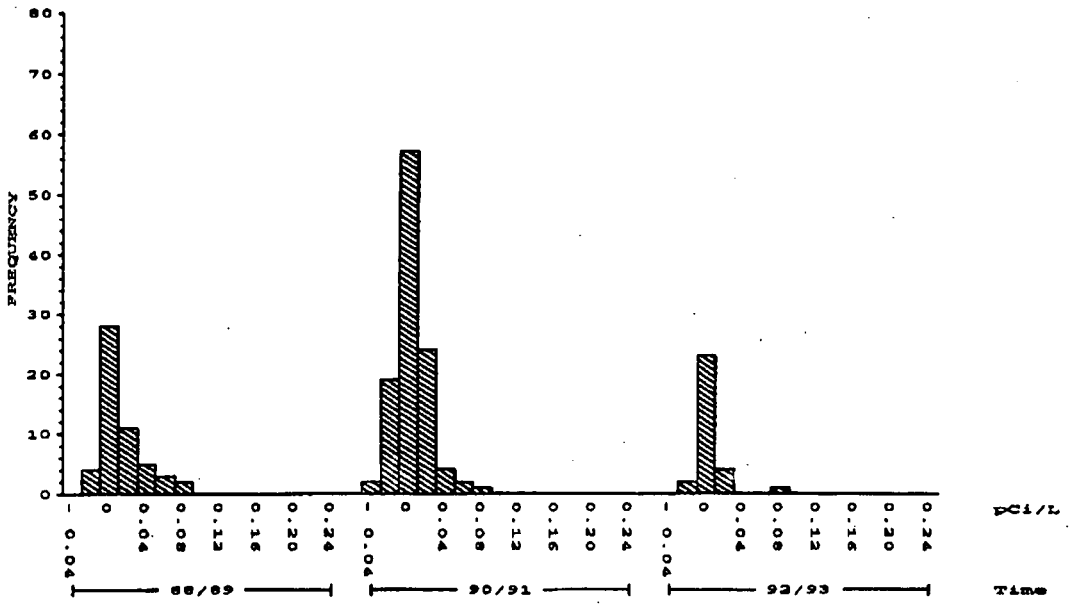

Figure 2.4 - Plutonium-239/240 Concentration at Walnut/Indiana

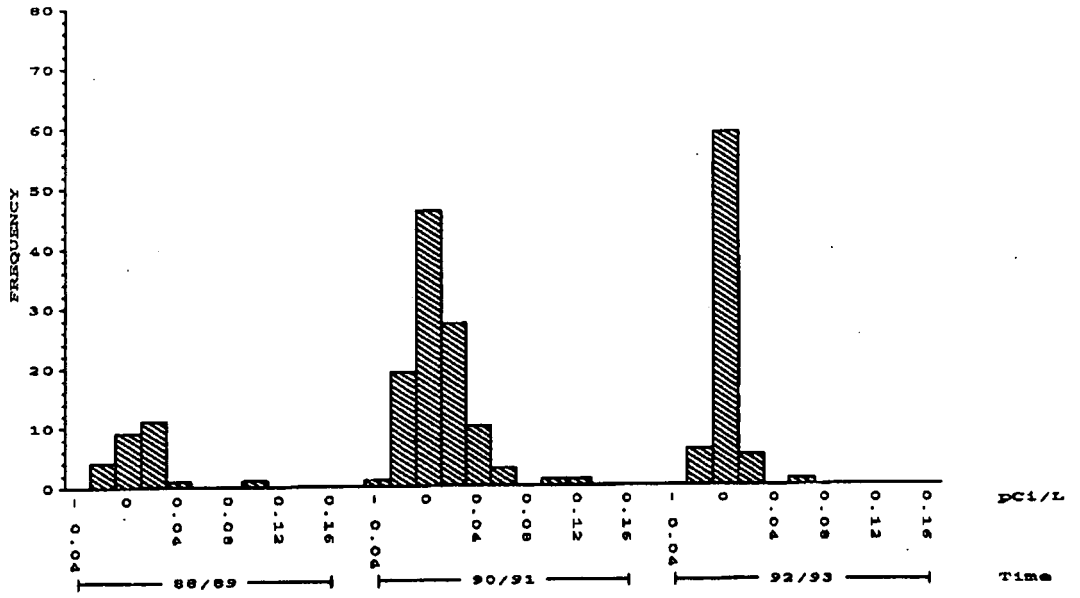

Figure 2.5 - Americium-241 Concentration in Pond A-4

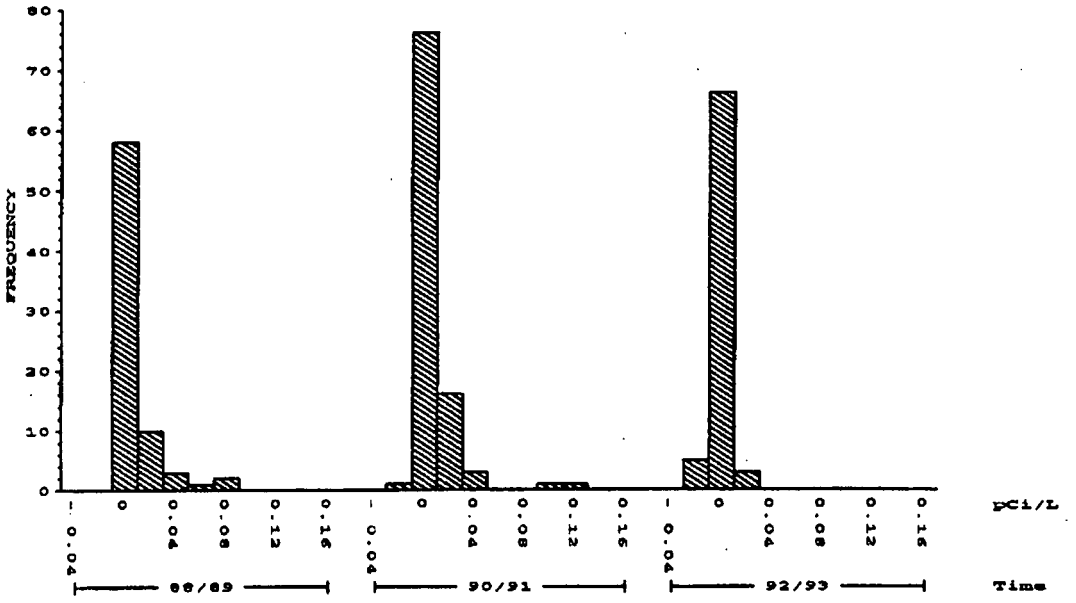

Figure 2.6 - Americium-241 Concentration in Pond C-1

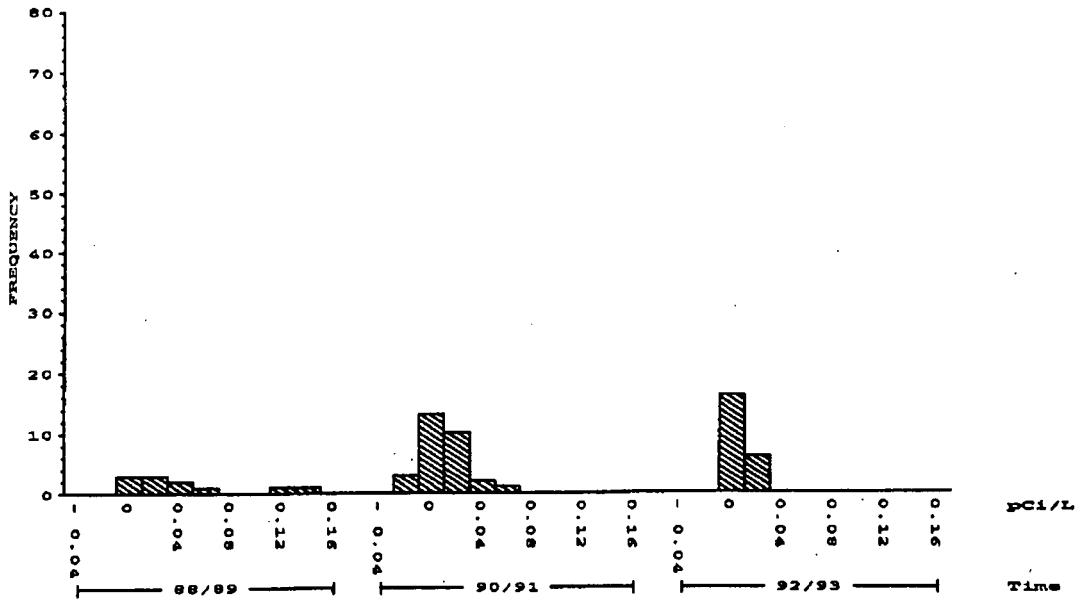

Figure 2.7 - Americium-241 Concentration in Pond C-2

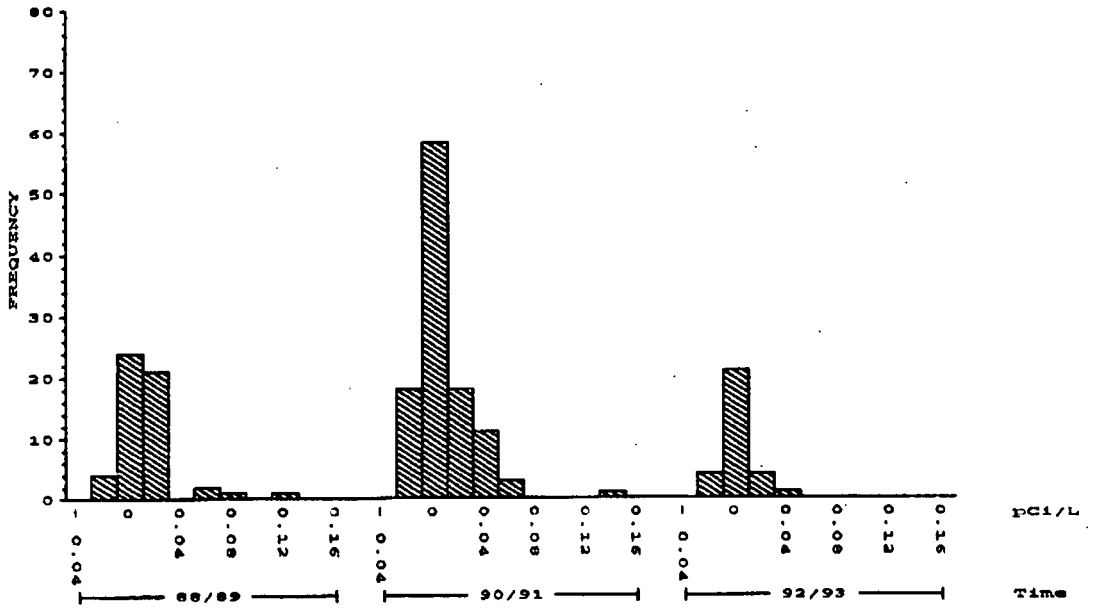

Figure 2.8 - Americium-241 Concentration at Walnut/Indiana

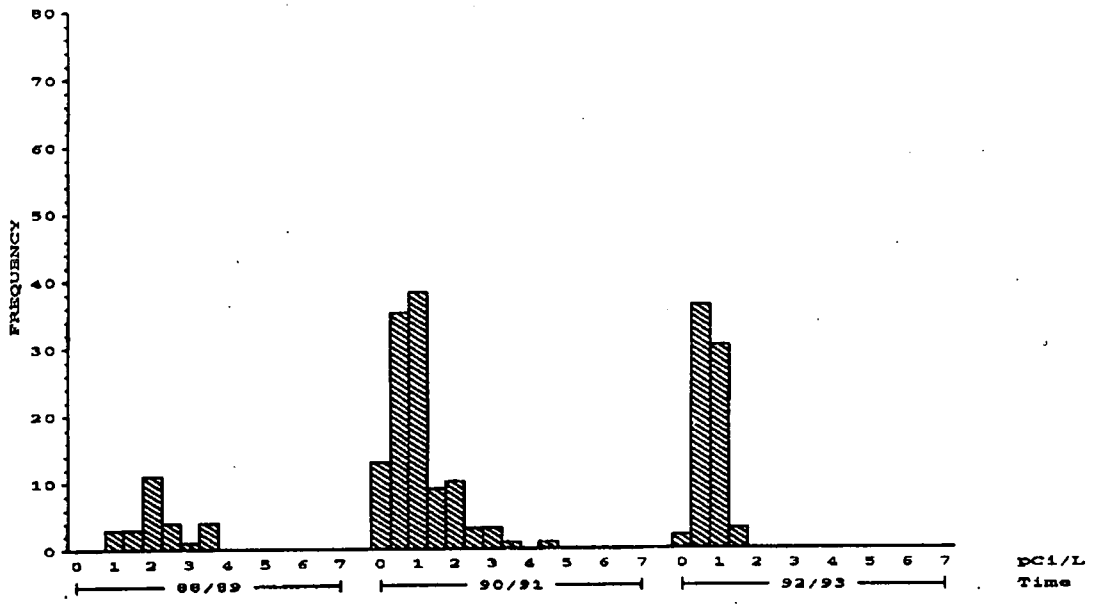

Figure 2.9 - Uranium-233/234 Concentration in Pond A-4

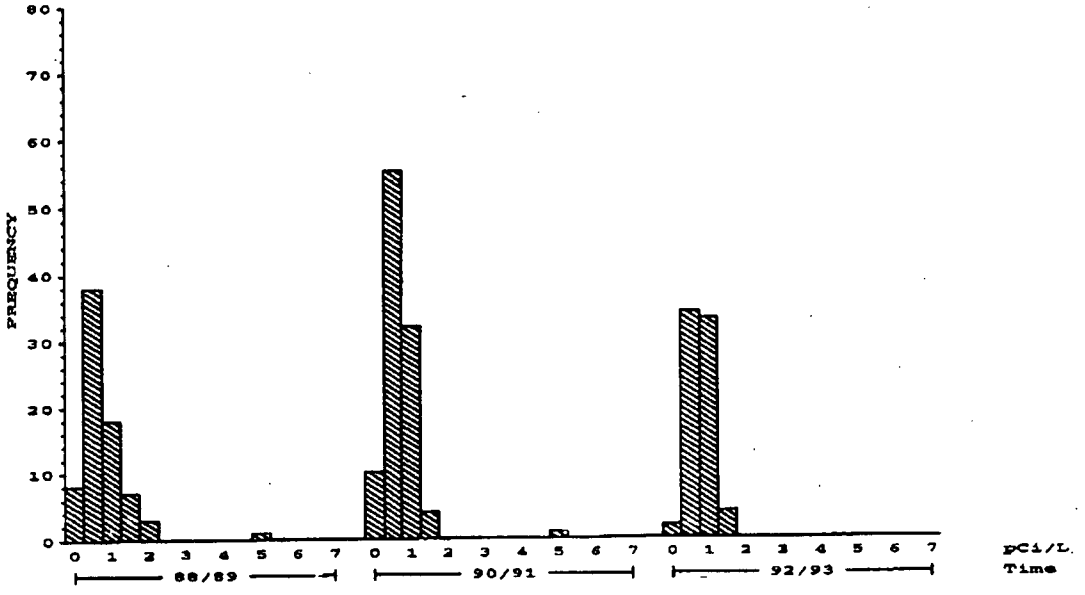

Figure 2.10 - Uranium-233/234 Concentration in Pond C-1

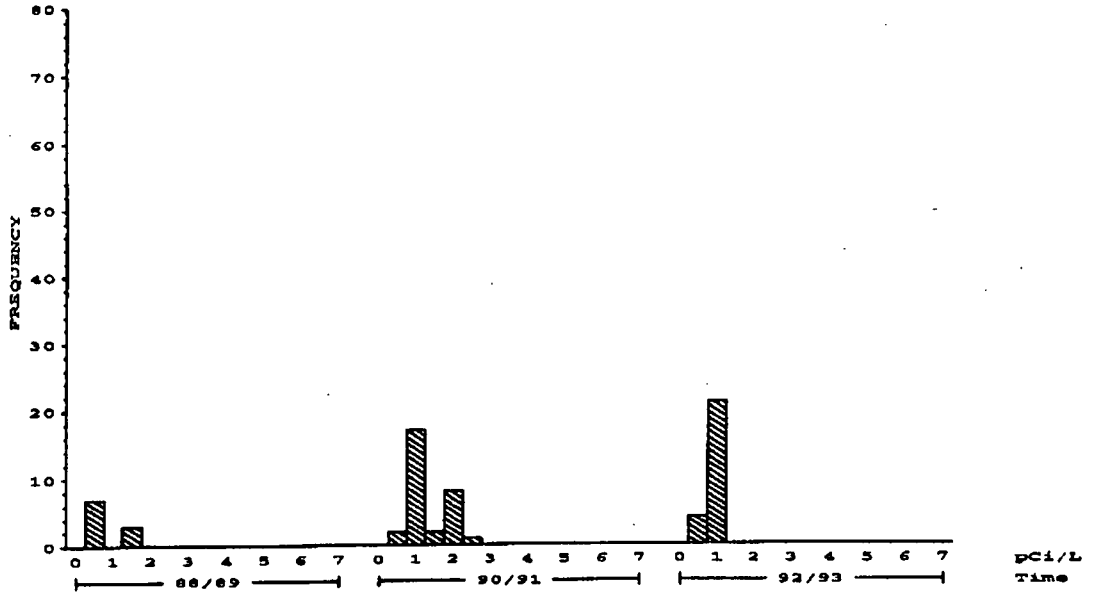

Figure 2.11 - Uranium-233/234 Concentration in Pond C-2

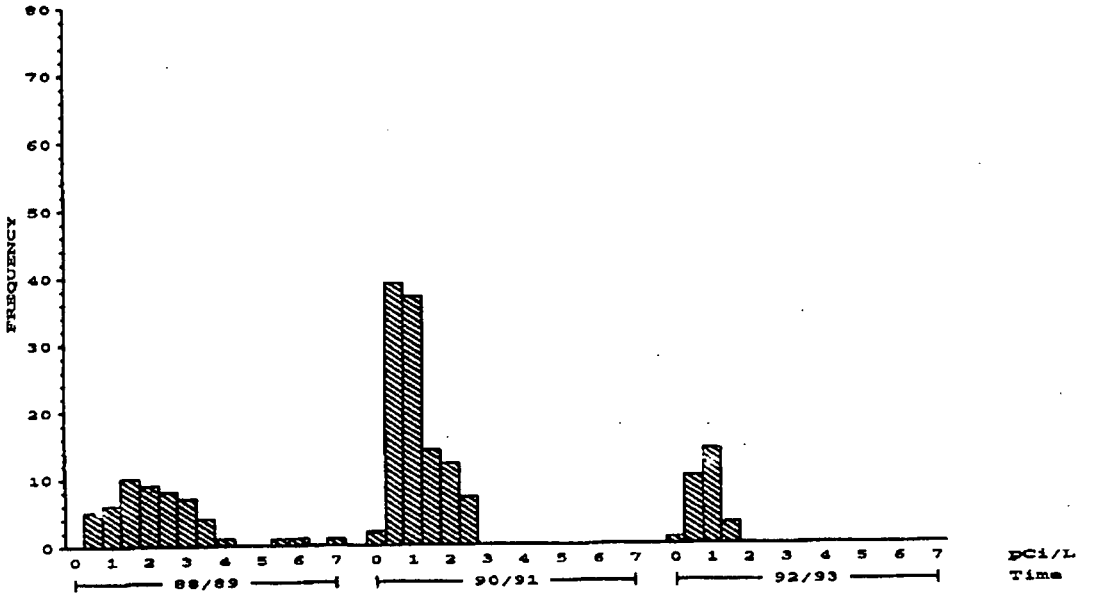

Figure 2.12 - Uranium-233/234 Concentration at Walnut/Indiana

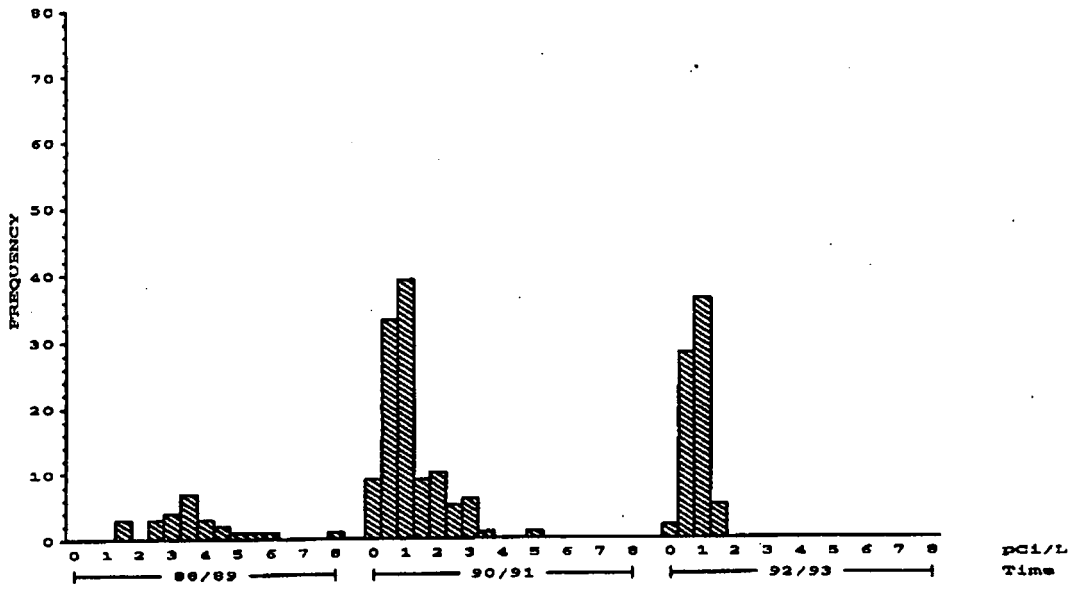

Figure 2.13 - Uranium-238 Concentration in Pond A-4

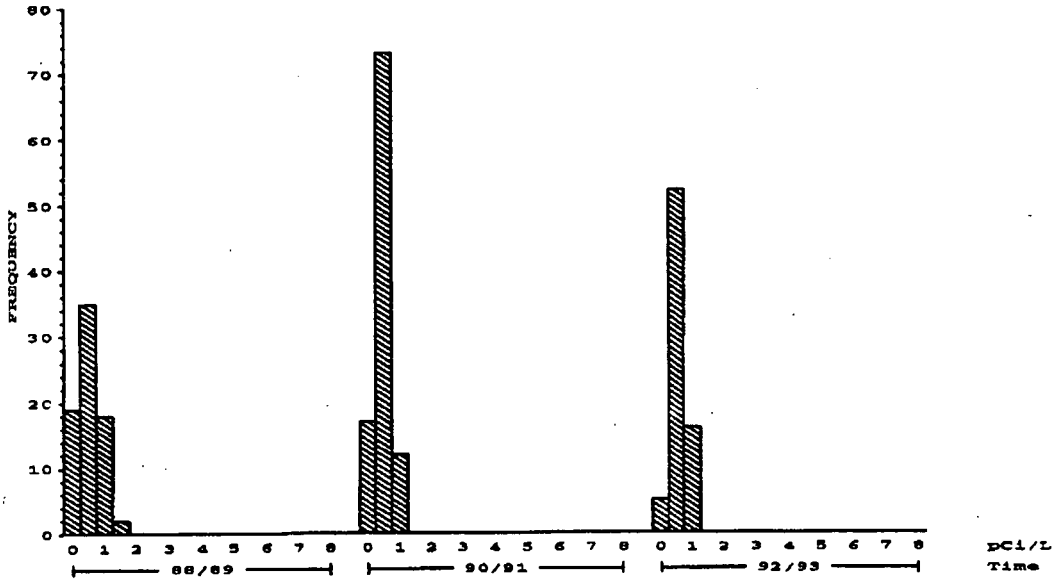

Figure 2.14 - Uranium-238 Concentration in Pond C-1

Figure 2.15 - Uranium-238 Concentration in Pond C-2

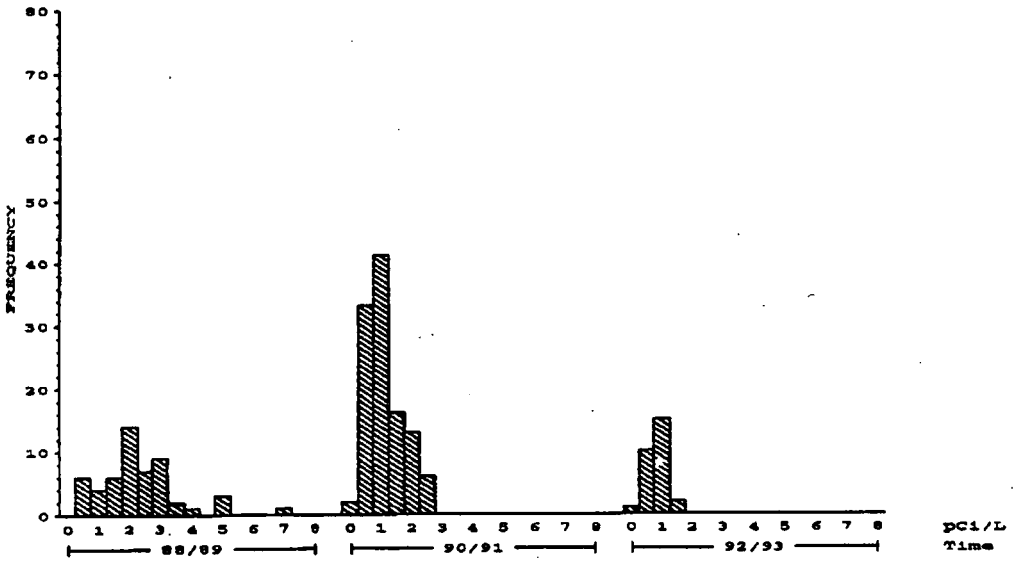

Figure 2.16 - Uranium-238 Concentration at Walnut/Indiana

3.0 WORKPLAN ELEMENT #3: ANALYTICAL METHODS

3.1 General Considerations

The Workplan will establish validated methods as identified by EPA and the State, including as appropriate, the methods delineated in 40 CFR 141.25, to determine concentrations of the parameters below. For parameters for which no validated standard analytical method exists, DOE will propose an analytical method for EPA and State approval." (IAG 1991)

This section describes the improvements that have been made in 1993 concerning radionuclide analytical capability. Improvement areas include MDA and particle counting analysis.

3.2 Minimum Detectable Activity

The original Workplan described several approaches to improve analytical performance: improving detection limits, increasing analytical sensitivity, improving chemical separations, increasing sample volumes, and increasing counting times. The simplest approach, increasing sample volumes, was evaluated first.

The original Workplan stated that MDAs for recent historical radiometric data from RFP approximated a 0.08 pCi/L level for the typical one liter sample. Following a transition period which started in November 1992, the sample volumes for plutonium and americium were routinely increased to four liters (for non-discharge samples) or seven liters (for discharge samples). The sample MDAs and associated sample error were significantly reduced, as shown in the figures and tables for section 1.6.

3.3 Particle Analysis System

Water characterization information shows much of the residual plutonium in surface water is asociated with waterborne particulate matter. Some with micron and submicron sized particles. Thus, monitoring particulate levels can provide a near real-time measure of plutonium contaminant levels.

Particle counting, being an established technology, is finding greater applicability to water treatment for domestic use and environmental applications. Water treatment technological advances are driven by public demand for improved drinking water quality, and managing water and treatment in the environmental and restoration applications.

Particle counting in filtration processes is directly applicable at RFP and in industry to include drinking water treatment, storm water treatment, and environmental restoration water methods. Water filtration processes may be improved by applying real-time or discrete sample mode monitoring and control methods with particle counting technology. Particle counting simultaneously sizes and enumerates individual particles providing distinct particle distribution profiles. Particle count and size distribution data can be used to monitor many types of water filtration systems to assess the effective removal of micron-sized particulate material. This attribute has broad applicability to water treatment process control, design, and selection as well as for establishing drinking water quality criteria.

The applicability of particle counting technology for analysis of various water treatment systems at the Rocky Flats Plant was demonstrated and documented during 1993.[5] The particle analysis was used to

[5] E. J. Moritz and C. R. Hoffman, "Environmental Applications of the Particle Analysis System", RFP-4738, EG&G Rocky Flats Inc., September 1993.

determine the water clarity of samples from environmental remediation membrane filters, storm water filter bags and cartridge treatments, and drinking water treatment operations. Water samples were evaluated in either discrete (batch sampling and measurement) or on-line mode (real-time data acquisition) from the RFP drinking water plant, storm water filtration operations, and RFP Operable Units 1 & 2.

Data showed filtration efficiencies, particle counts, particle size distributions, and real-time treatment system performance. Filter ripening, and loading was also shown with on-line measurement and with the batch sampling.

Particle counting proved more sensitive than the turbidimetric measurement technique commonly used by the water treatment industry. Particle counting is a two-dimensional measurement of counts and sizes, whereas, turbidity is a one dimensional measure of water quality. Samples showing identical turbidities could be distinguished easily with the Particle Analysis System, (PAS).

The PAS is proving to be an efficient and reliable water quality measurement tool, and applicable to a variety of water treatment systems at RFP. Filtration technologies tested are reported in Workplan Element #4 along with the application of the PAS.

3.4 Goals and Targets for Analytical Improvements

Four analytical goals were identified in the original *Workplan*. These goals were targets towards which future improvements could aim. An anticipated timeframe to reach these targets was given as three to five years. The original targets and the progress towards them are stated as follows:

1. "*To determine compliance and acceptability of continuing discharges - develop analytical protocol having Pu/Am MDA of 20 femto Curie per liter, 10^{-15} (fCi/L) or better with a turnaround time of 1 day or less.*"

Current radiometric methods have achieved a 0.01-0.02 pCi/L MDA, however, the method requires 10 days. This goal would be achievable with an approximate 100-liter sample volume whose activity could be concentrated to produce quantifiable radiometrics within a roughly 8-hour count time. (The remaining time is needed for sample preparation.) Since current evaporative methods are time-inefficient and risk contamination at these low levels, a radioactivity scavenging pretreatment will be required. Unfortunately, current information on the strong association of plutonium with particulate matter suggests chemically selective processes like ion exchange will be ineffective at scavenging/removal of plutonium from RFP surface water. Chemically non-specific technologies such as ultrafiltration, reverse osmosis, and coagulation filtration are potentially applicable and remain to be considered for effectiveness, reliability, and cost. Current operational time constraints on water management continue to allow for adequate water quality control and monitoring in the absense of single-day analytical turnaround.

2. "*To demonstrate treatment methods to remove residual radionuclides - develop analytical protocol having Pu/Am MDA of 3 fCi/L with turnaround time of 10-14 days.*"

The Los Alamos National Laboratory (LANL) has worked with RFP to demonstrate that these results are possible, but only under tightly controlled conditions and at a cost ten-fold higher than current protocols. Fortunately, current radiometric methods (reported earlier) are adequate to demonstrate compliance with site-specific water quality standards.

3. "*To provide real-time radiometric measurements - develop detector with LLD of 7.5 pCi/L total alpha in effluent water.*"

At this time, commercial real-time radiometric measurement capability does not exist.

4. *"To establish better understanding of environmental Pu - define Pu occurrence and characteristics in RFP pond water."*

LANL has conducted research activities under contract to RFP which define and characterize the occurrence of environmental plutonium at RFP. Section 4.2 of this appendix provides additional details.

4.0 Workplan Element #4: Treatment Evaluations and Proposals

"The Workplan will require DOE to identify potential treatment technologies to be utilized in the event that water quality for the terminal ponds exceeds State standards. If no existing technologies adequate to achieve the standards are identified, DOE will use reasonable efforts to develop and implement such technologies. If achieving water quality that does not exceed the standards requires additional treatment or development of additional technologies, the parties agree to negotiate appropriate modifications to the Workplan, including schedules." (IAG 1991)

4.1 Improving Filtration

4.1.1 Conclusions to Date

The primary focus of this effort is on physical separation methods, specifically filtration, rather than chemical treatment methods. The main goal is to improve treatments applicable to the storm water management practices at RFP. In order to reach this goal, the existing treatment system, from prior operations, still includes filter bag filtration and granular activated carbon.

The 1993 accomplishments in improving filtration include: (1) evaluating improved filter bags and 2-micron filter cartridges using the Particle Analysis System, (2) testing of a microstrainer (microstraining would assist in removing gross solids and algae and would have been considered as the first step in treatment of the storm water collected in the ponds), and (3) performing a second industrial water treatment test using a multimedia filter. Additional details of each test are provided below.

The filter bag pilot testing, utilizing an application of the PAS, was completed in February 1993. The filter bag testing was performed to evaluate improved ASTM-rated filter bags in the existing filtration equipment used in the past pond water treatment operations. A reduction in turbidity and total suspended solids was determined while total dissolved solids went unchanged. It was also found that pond water solids levels changed seasonally and thus have an impact on filtration. Filter breaches and filtration efficiencies were determined with particle counting techniques and provided a more detailed picture of water clarity.

A cartridge filter pilot test was completed and a final report was issued in August 1993.[6] This study determined the performance of a pilot scale cartridge filter tank utilized to treat water at Rocky Flats Plant terminal Pond C-2 without chemical treatment. The filter tank was fitted with eight polypropylene cartridges vendor rated at 99% removal efficiency for particles of 2 microns (μ) and larger. The test was at

[6] E. J. Moritz and C. R. Hoffman, "Water Treatment Cartridge Filter Pilot Test at Pond C-2", SWD-018-93, EG&G Rocky Flats Inc., August 1993.

a flowrate of 200 gallons per minute in a stainless vessel. Performance was determined by measuring total dissolved solids (TDS), total suspended solids (TSS), nephelometric turbidity units (NTU), gross alpha (α) activity, gross beta (β) activity, plutonium levels, total particle counts (TPC), and differential particle counts (DPC) upstream and downstream from the tank at time intervals throughout the test.

Performance testing shows that the cartridge treatment method produced a high quality effluent. TSS, NTU, gross α, and plutonium levels were significantly reduced for most treated water samples. TPC and DPC data showed a 98% removal efficiency for particles in the 1-50μ range, see Table 4.1. The particle distribution of the final effluent of the cartridges at the 30-minute interval is shown in Figure 4.1. This treatment method had no statistically significant affect on TDS and gross β activity levels.

A multimedia filter pilot test was also completed. The vendor performed a pilot test at Pond A-4 to determine turbidity and total suspended solids removal efficiency. Without chemical treatment , the multimedia deep bed filter can remove up to 70% of the suspended material. The multimedia deep bed filter would probably be the best candidate as the first stage of filtration in the event the pond water exceeded CWQCC standards, environmental laws, or agreements. A final report was issued in June 1993.

Time in Minutes	Raw Water TPC 1-50 Microns	Treated Water TPC 1-50 Min\crons	Overall Filtration Efficiency
0	7717674	379054	95.1%
5	7717674	159234	97.9%
10	7717674	243264	96.9%
15	7717674	176404	97.7%
30	7717674	181789	97.6%

Table 4.1 - Summary of Particle Counts and Efficiencies for Cartridge Filter Pilot Test

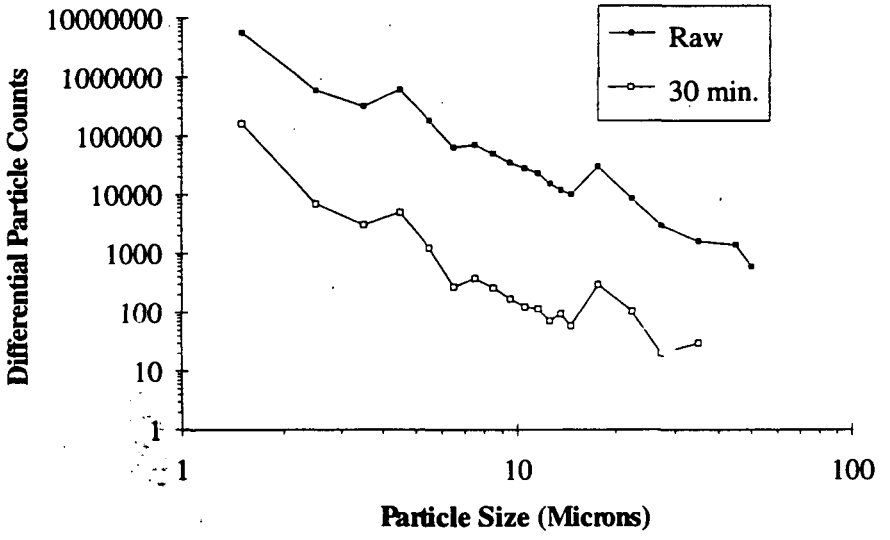

Figure 4.1 - Cartridge Filter Pilot Test Final Effluent Particle Distribution

4.1.2. Future Work

The capability to monitor and treat pond water should be maintained and improved to protect downstream users in the event of a surface water contamination event at RFP. This approach will assure that discharged water is of high quality, meets appropriate regulations and agreements and that the discharges are timely to

preserve adequate margins of dam safety. Therefore, actions will continue throughout 1994 to evaluate alternative treatment and monitoring technologies in order to implement improvements to the environmental surface water programs. Planned future actions include the following:

1. A Flocculation, Plate, and Frame pilot test will be conducted at Pond A-4 for control of potential contaminants in surface waters. This test would work in conjunction with the previous multimedia pilot test and the backflush stream. This test is proposed for the summer of 1994.

2. A Multiple Unit Water Treatment pilot test will be conducted at Pond A-4 for control of potential contaminants in surface waters. This pilot test will measure various treatment unit operations and is proposed for the summer of 1994.

3. A pilot water treatment system will be assembled and tested for use with the Particle Analysis System multiple sensors. This is a bench-top set-up to validate multiple-sensor operation on-line real-time, using industrial standards as contaminants and testing various filters for removal of said contaminants. This set-up is being fabricated and tested in FY94.

4.2 Characterizing Radionuclides

4.2.1 Conclusions to Date

The LANL completed fiscal year 1993 to characterize the radioactivity in surface waters and sediments collected at RFP.[7] The study quantified radioactivity levels and determined whether the radioactivity was naturally occurring or anthropogenic. The study also analyzed samples collected from locations that were suspected to contain radioactive sources that could increase the radioactive surface-waters inventories at RFP.

Eighty-three water samples and 24 sediment samples were collected in support of the project. Over 800 separate analyses were performed. Waters in the terminal ponds A-4, B-5, C-2 and the effluent from the STP were sampled monthly. The waters in Ponds A-1, A-2, A-3, B-1, B-2, B-3, B-4 and C-1 were sampled quarterly. Special soil, sediment, and water samples collected at locations that could affect the surface-waters radioactivity inventories at RFP were also analyzed.

This project required the analytical measurement of the total alpha activity (gross alpha activity) in the samples, the determination of the amounts of radium, thorium, uranium, plutonium, and americium. These elements represent the major alpha emitting nuclides suspected in the water samples. (The results of this study intended to serve as a baseline by which the impact of future remediation efforts can be evaluated.)

All of the radioactivity observed in soil, sediment, and water samples collected at RFP was naturally occurring, the result of processes at RFP or the result of global fallout. No extraneous anthropogenic alpha, beta, or gamma activities were detected. The largest source of anthropogenic radioactivity detected during this study was the sediments currently residing in the ponds. One gram of sediment from a holding pond contains approximately 50 times more plutonium than 1 liter of water from the pond. Plutonium and depleted uranium appear to be moving down the South Interceptor Ditch and through the A-1 Bypass.

The upper Ponds A-1, A-2, A-3, B-1, B-2, B-3, and B-4 contain measurable quantities of plutonium, americium, and depleted uranium. The plutonium concentrations in these ponds ranged from 0.004 to 3.09

[7] Erfurd, D.W., D. J. Rokop, and R. E. Perrin. Characterization of the Radioactivity in Surface-Waters and Sediments Collected at the Rocky Flats Facility. Los Alamos National Laboratory. LA-UR-93-4383.

pCi/L plutonium 239/240. The uranium concentrations ranged from 0.2 to 15.8 pCi/L. Essentially 100% of the uranium in Pond A-1 and Pond A-2 originated as depleted uranium. All other ponds, except Pond C-1, contain mixtures of naturally occurring and depleted uranium. No depleted uranium was detected in Pond C-1.

The largest source of radioactivity in the terminal Ponds A-4, B-5 and C-2 was naturally occurring uranium and its decay product radium. There is 70-450 times more alpha activity resulting from the decay of naturally occurring radium than alpha activity resulting from the plutonium in the terminal ponds. Plutonium and americium concentrations in the terminal ponds were consistent with the values published in our previous report. The largest source of anthropogenic radioactivity in the terminal ponds was depleted uranium. Approximately half of the uranium present in Ponds A-4 and C-2 originated as depleted uranium. Approximately 20% of the uranium in the waters collected from Pond B-5 originated as depleted uranium.

Approximately one-third of the uranium present in the effluent from the STP originated as depleted uranium. No depleted uranium was detected in the Raw Water Pond that supplies the water processed at STP. No plutonium or anthropogenic uranium was detected in the influent or effluent from the Water Treatment Facility at B-124. The source of depleted uranium in the effluent from STP has not been positively identified.

No uranium or plutonium attributable to RFP was detected in sediments collected at the Coal Creek-Woman Creek Headgate. Plutonium and depleted uranium were detected in sediments collected from the Walnut and Indiana Street Sampling Pond. This indicates that the depleted uranium and plutonium are entering the surface waters at the RFP site.

Plutonium and depleted uranium were detected in soil samples collected from the South Interceptor Ditch. The plutonium and uranium concentrations varied from location to location within the South Interceptor Ditch. This suggests that these materials are entering the ditch at specific places. The uranium in the sediments collected from Pond C-1 is naturally occurring uranium. Approximately 50% of the uranium detected in the waters and 90% of the uranium detected in the sediment sample collected from Pond C-2 were anthropogenic. This implies that the depleted uranium is being transported down the South Interceptor Ditch by water into Pond C-2.

Radium activities in the water samples were consistent with the activities predicted to be present from the naturally occurring uranium. In general, the radium activities were lower than the total uranium activities. This is explained by the fact that the water samples contained depleted uranium. The radium is chemically separated during uranium processing. The depleted uranium released into the environment did not contain large amounts of radium.

The plutonium concentrations in Pond C-2 appear to vary seasonally.

4.2.2 Future Work

Research to date has provided significant improvements in the areas of radionuclide quantification and characterization. For example, this is the first reported study which identified and utilized the separation of uranium in environmental samples into its naturally occurring and its anthropogenic components. This research is crucial for discerning the origin of radionuclide contaminated areas and determining suitable treatment for them.

Funding was not available to continue research for radionuclide characterization in fiscal year 1994. If funding were to become available in the future, the following areas of continued research would be beneficial.

1. Characterize additional locations to determine the affect they are having on surface waters. Locations discovered to affect the surface waters at RFP should be sampled in a manner that provides data that can be modeled to predict further impacts of the site on water quality.

2. Continue sampling efforts to characterize the depleted uranium plume that was discovered at RFP. Collect these samples both onsite and offsite. Monitor wells and seeps to determine if anthropogenic uranium is present. Analyze soil samples to determine if depleted uranium exists as surface contamination.

3. Initiate studies to determine the cause for the seasonal variation in Pond C-2. Identification of the cause of the seasonal variation may provide information which is useful in guaranteeing discharges from Pond C-2 always remain in compliance with all appropriate regulations.

4. Monitor Pond C-1 to determine whether the high plutonium concentration was an anomaly or an indication that plutonium is now being introduced into the pond, since the plutonium concentration measured in water collected from Pond C-1 on August 23, 1993, was significantly higher than previous measurements.

5. Monitor Pond A-1 to determine if the increasing uranium concentration was real or a sampling artifact.

6. Collect additional samples from the OU-4 West Holding Tank to verify or repudiate the original measurement of uranium that was enriched in uranium-235. Perform replicate sampling and sample the solar evaporation ponds in conjunction with this project.

APPENDIX D
TECHNOLOGY DATA SUMMARIES FOR TREATMENT TECHNOLOGIES REVIEWED IN FY 93 ANNUAL REPORT

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TECHNOLOGY DATA SUMMARIES FOR TREATMENT TECHNOLOGIES REVIEWED IN FY 93 ANNUAL REPORT

D.1 INTRODUCTION

Four treatment technologies were newly identified during the literature review completed in FY 93. These technologies are:

- Biosorption
- Membrane-based oil extraction
- Ultrasonic degradation
- X-ray treatment.

A description of each of these technologies is given in the following subsections. In addition, a discussion of the applications, and advantages/disadvantages of each technology is given.

D.2 BIOSORPTION

Biosorption is a combined sorption system comprised of a GAC support covered with a thin layer of micro-organisms (biofilm). The biosorption column was developed to enhance removal of organic pesticides from contaminated water. In addition to adsorption some biodegradation of pesticides occurs regenerating the GAC surfaces. Biosorption column treatment has been shown to significantly lower organo-chlorine and organo-phophorus pesticide concentrations in water. Biosorption is performed in an adsorption column filled with activated carbon and a biofilm formed using the microflora from an available water source. Contaminated water is treated by passing it through the biosorption system.

Biosorption has been shown to be useful in the removal and potential subsequent degradation of organo-chlorine and organo-phosphorus pesticides from contaminated water.

The adsorption capacity of GAC is increased by the presence of a biofilm. Microorganisms present in the biofilm metabolize the organic pesticide in the water, thus regenerating the surface of the carbon and eliminating the cost of carbon renewal. Destruction of pesticides by microbes eliminates additional costly treatment. This process has been demonstrated in the laboratory; biosorption of pesticides has not been performed at pilot- or full- scale.

D.3 MEMBRANE-BASED OIL EXTRACTION

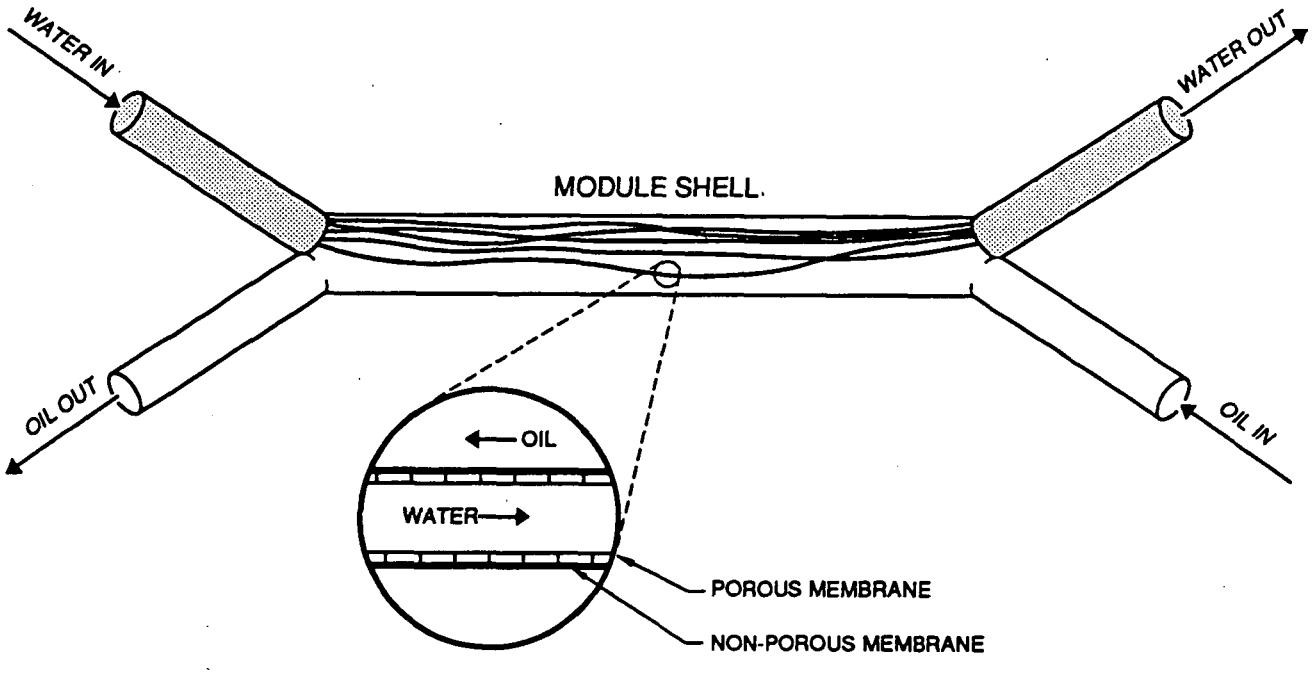
MBOE is a separation process in which nonpolar, hydrophobic organic chemical species are extracted from aqueous solutions into oil using a hollow fiber membrane filtration system. Hollow fiber membranes are constructed of coated microporous polypropylene. To perform the extraction, the water-filled membrane fibers are immersed in nonvolatile oil. The membrane pores are air-filled and do not fill with water because the nonpolar character of the polypropylene prevents water wetting of aqueous contact surfaces, while a special coating prevents oil wetting of oil contact surfaces. The water is pumped through the lumen of the membrane and the oil is recirculated in a counter-current fashion, concentrating the contaminant in the oil. Contaminants diffuse from the water to the membrane surface, volatilize into the gas-filled pores through the oil contact surface coating and dissolve into the oil. Extraction proceeds at ambient temperature and pressure. Figure D-1 shows a membrane module, detailing counter-current oil and water flow.

MBOE can theoretically be applied to any nonpolar, hydrophobic organic compounds in water such as VOCs and SVOCs (e.g. solvents, pesticides, or chlorinated organics). MBOE may be considered as a primary or secondary separation technique for the treatment of water contaminated with organics. Membrane separations are not applicable to soils whether in situ or ex situ.

An alternative application of MBOE involves toxic heavy metal chelation and subsequent solvent extraction from aqueous waste streams. Chelation is the binding of inorganic metals by organic ligands with specific properties. Ligands used for MBOE would exhibit nonpolar semi-volatile or volatile characteristics to aid in extraction. The microporous hollow fiber solvent extraction method has been demonstrated to provide excellent removal of Cu^{2+} and Cr^{6+}. Further studies are currently underway to determine the effectiveness of this technology for the removal of additional metals. Targeted metals may include:

- Zinc
- Copper
- Chromium
- Nickel
- Cadmium
- Mercury.

Metallic radionuclides may also be targeted for removal from aqueous waste streams with the MBOE.



Membrane Module Schematic Showing Fiber Cross-Section

Note: Figure represents information provided in part by Zander (1992)

Figure D-1

The MBOE configuration allows for the efficient treatment of large volumes of aqueous waste contaminated with nonpolar hydrophobic organic material or heavy metals. Extraction yields small quantities of waste oil. Continuous flow MBOE removes contaminants from aqueous wastewaters at least an order of magnitude faster on a volume basis than separations in packed tower aerators and achieves excellent contaminant removals (Zander, 1992). Additional advantages of MBOE follow:

- MBOE proceeds in a closed system, preventing loss of volatiles from system.
- Extraction occurs readily at ambient pressure; avoiding the need for a pressure differential as in other membrane processes such as reverse osmosis.
- Oil and water are not in contact, eliminating back-contamination of water from the solvent oil.

Additional treatment of the organic solvent (oil) may be needed following MBOE. This secondary treatment requirement can be easily performed using conventional treatment technologies such as ion exchange for metals removal. Treating the organic solvent with ion exchange for metals removal rather than directly treating the aqueous waste stream with ion exchange may lead to reduced usage of ion exchange media since competing ions that would likely be present in the aqueous stream would not be present in the organic solvent following selective chelation of metals. Efficient use of ion exchange resin eliminates the need for frequent regeneration and reduces the generation of brines. This technology has not yet been proven on a full scale, and further analysis will need to be performed to determine the economic feasibility of this extraction method.

D.4 ULTRASONIC DEGRADATION OF CHLORINATED HYDROCARBON COMPOUNDS

Ultrasonic degradation is the application of ultrasonic radiation to aqueous or other solvent solutions containing chemical contaminants. Ultrasonic radiation is applied to cause specific functional groups that are part of contaminant molecules to separate into solution. Application time is a principal operational parameter. The ultrasonic radiation leads to acoustical cavitation, which results from the formation and subsequent collapse of small gas bubbles in the aqueous or solvent solution being treated. The bubbles have transient internal temperatures approaching 5,000 degrees Kelvin. The cleavage of specific functional groups from contaminant molecules is a direct result of thermal pyrolytic decomposition in the hot interfacial regions of the collapsing cavitation bubbles, and an indirect result of reactions associated with thermally produced $^{\bullet}OH$ (hydroxyl) radicals.

Ultrasonic degradation can be used with a variety of organic and inorganic chemicals but is best considered for chemically and biologically refractive compounds. Chemically and biologically refractive compounds are stable chemicals that resist chemical conversion or biodegradation. For example, chemicals such as the chlorinated solvents carbon tetrachloride or trichloroethylene are refractive chemicals that are "ultrasonically" degradable. Pesticides, herbicides, pentachlorophenol (PCP), polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) are also chemically refractive compounds that can be detoxified using this technology. Ultrasonic degradation is not useful for insitu soil treatment but may be used to treat waste solvents following exsitu soil extraction. For contaminated groundwater, ultrasonic degradation has potential insitu applicability.

Ultrasonic degradation has been used in the laboratory to successfully degrade parathion, carbon tetrachloride, and hydrogen sulfide (Kotronarou et al, 1992). Trinity Environmental Technologies has performed bench-scale soil extraction/ultrasonically assisted detoxification of PCB contaminated soils (EPA 1992).

By-products of ultrasonic degradation include heat, chemical intermediates and ionic species. Trinity Environmental Technologies identified these by-products as nontoxic, while Kotronarou et al (1992) identified specific intermediate species and final by-products of decomposed parathion. Chemical intermediates of parathion degradation are:

- Benzoquinone
- Hydroquinone
- 4-nitrocatechol
- Formic acid
- Oxalic acid
- P-nitrophenol.

Products of complete parathion sonolysis are:

- Sulfate
- Nitrate
- Nitrite
- Chloride
- Carbon dioxide
- Phosphate.

Figure D-2 shows a schematic of the chemical steps which occur in ultrasonic degradation.

FIRST PHASE

CONTAMINENT $\xrightarrow[H_2O]{SONOLYSIS}$ INTERMEDIATES

FINAL PHASE

INTERMEDIATES $\xrightarrow[H_2O]{SONOLYSIS}$ PO_4^{3-}, SO_4^{2-}, NO_3^-, CO_2, H^+, Cl^- FINAL PRODUCTS

Ultrasonic Degradation Schematic

Note: Figure represents information provided in part by Kotronarou (1992)

Figure D-2

Ultrasonic radiation may be generated directly from a commercially available ultrasonic radiation probe placed into solution or as part of a reaction vessel. Ultrasonic degradation reaction progress is time dependent; complete degradation requires large amounts of energy. Reactor efficiencies are affected by probe surface area and configuration.

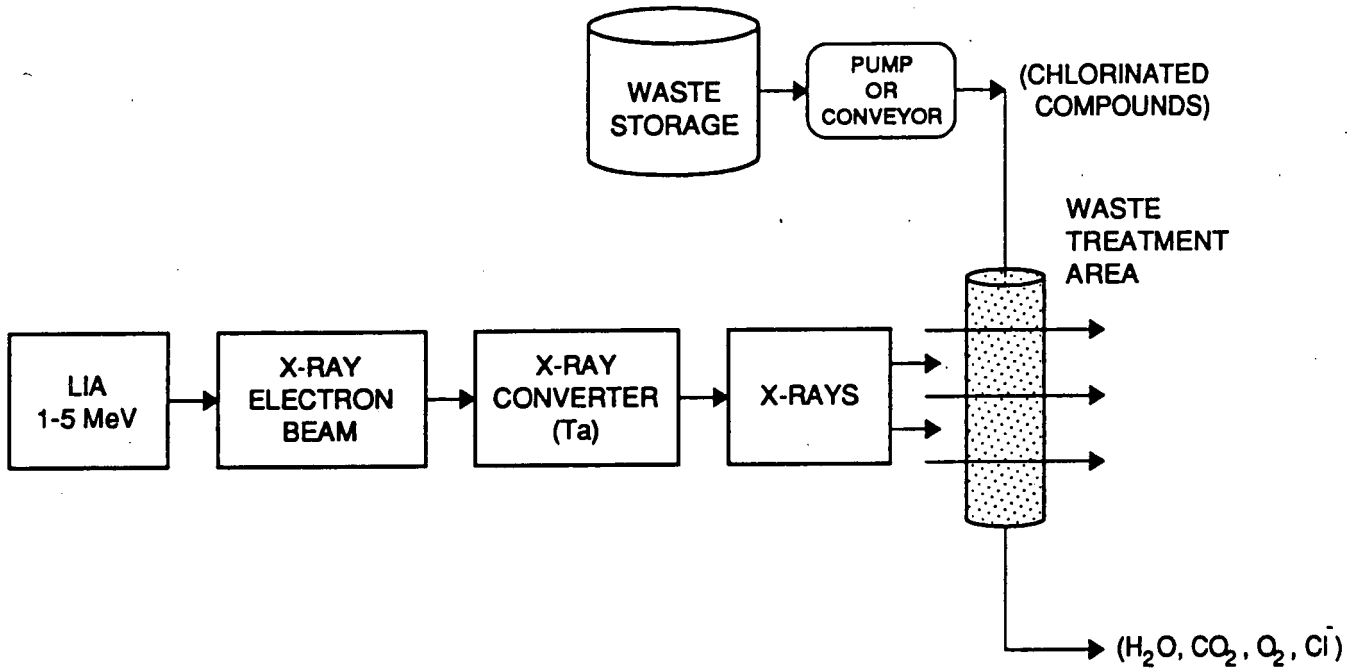
System simplicity is the primary advantage of ultrasonic degradation. Decomposition of chemically and biologically refractive compounds into nontoxic by-products can be achieved without the addition of costly or potentially hazardous chemical reactants. Use of a probe type ultrasonic radiation generation device may be useful for aquifer restoration although this specific application has not been tested.

Disadvantages of this technology include: required pretreatment of solid matrices, the possibility of incomplete degradation yielding potentially toxic intermediate species, and inefficient energy utiiization. While ultrasonic degradation is not as cost effective as separation or concentration technologies, its use may be applicable for destruction of refractive compounds not easily achieved by other means.

D.5 X-RAY TREATMENT

X-ray treatment is an effective method for destroying VOCs and SVOCs present in soil and aqueous solutions. The technology is capable of treating a large number of contaminants without any required additives or pretreatment. X-ray treatment uses ionizing radiation to bombard the contaminated medium with energetic photons. The collision between the energetic photons and matter generates energetic electrons within the contaminated medium. These electrons break up complex molecules to form radicals that react with organic contaminants to form water and harmless gases. An alternative technology which uses direct electron beam processing has been proven highly effective for the destruction of organic contaminants in aqueous waste streams. However, because the electron beam does not penetrate very deeply into the material being processed, special material handling methods are required and can be a problem. X-ray processing does not have this potential problem because the penetration depth of x-rays in soil and aqueous media is tens of centimeters long.

In applying x-ray treatment, a linear induction accelerator (LIA) is used to generate the x-rays by accelerating electron beams to energies of 1 to 5 million electron volts (MeV). A pulse of electrons, 55 nanoseconds in duration, is directed into the converter to generate x-rays. The x-rays are then directed to penetrate the waste material as shown in Figure D-3. Electron accelerators offer a high level of safety because the LIA output is easily turned off by shutting down the electrical power.



X-Ray Treatment Process Schematic

Note: Figure represents information provided in part by EPA (1992)

Figure D-3

The physical mechanism for the destruction of organic contaminants depends on the ionizing substrate. In oxygenated water, the energetic electrons break up water molecules to form •OH radicals that react to destroy the organic compounds. The organic contaminants are broken down to form simpler compounds such as water, carbon dioxide, and oxygen. This mechanism is also important in the treatment of nonaqueous media such as soils, sediments and sludges that have a high moisture content.

X-ray processing is capable of treating a large number of organic contaminants. Organic wastes that may be treated include benzene, trichloroethane, trichloroethylene, and PCBs. The penetration depth of the x-rays allows for the treatment of large volumes of either flowing waste or waste contained in sealed disposal drums.

Very little quantitative information is available regarding the actual effectiveness of x-ray treatment of contaminated waste at this time. Several bench-scale studies are currently underway to collect data for the construction of a processing pilot plant, which will be utilized to examine the required x-ray dose for the destruction of various organic contaminants as well as the operational cost of meeting the necessary power requirements.

This x-ray treatment technology effects treatment of a large number of contaminants without requiring any additives or pretreatment. This technology achieves high destruction efficiencies without any secondary treatment of air emissions or waste residuals, and large volumes of waste may be treated efficiently with very minimal material handling. X-ray treatment, however, has not been proven in the field, and additional testing and research is required to assess the advantages and limitations of this treatment technology.