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SECTION 2 OF 2

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APPENDIX C

216-B-3 POND SYSTEM PHASE 1 SOIL AND SEDIMENT SAMPLING

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1.0 INTRODUCTION

1.1 BACKGROUND

The 216-B-3 Pond System (hereinafter referred to as B Pond) is undergoing evaluation to characterize the potential hazards that may be present in the soil and sediments. The dangerous chemical and radionuclide inventory of the soils and sediments is relatively unknown. Information gathered will assist in evaluating closure and/or remediation activities. The B Pond is part of the 200-BP-11 operable unit (WHC 1989a, p A-35).

A Westinghouse Hanford Company (Westinghouse Hanford) sampling plan, *216-B-3 Pond Characterization of the Hazardous Waste Inventory in the Near-Surface Soil and Sediments* (Roos and Woodworth 1989), governs the characterization effort. The sampling plan sets forth a phased approach toward characterizing the soils and sediments of B Pond. Phase 1 is an initial sampling effort assessing near-surface soil contamination within the 216-B-3 Pond, the 216-B-3-3 Ditch, and the three expansion ponds (216-B-3A, 216-B-3B, and 216-B-3C). This phase includes the estimation of background soil concentrations in the vicinity of the site. Phase 2 is to be an extension of the characterization work utilizing data and knowledge from Phase 1. Phase 3 will examine the vertical distribution of contaminants beneath the surface soil.

This document summarizes the sampling activities undertaken and the analytical results obtained in Phase I of the soil and sediment sampling of B Pond.

1.2 SETTING

The B Pond is located adjacent to the 200 East Area on the Hanford Site in southeast Washington (Figure 1), is classified as a RCRA TSD unit, and for the purposes of this study, comprises the following (Figure 2):

- Open section of the 216-B-3-3 Ditch, approximately 3,700 feet
- 216-B-3 Pond (B-3 Pond), approximately 35 acres
- 216-B-3A Pond (hereinafter referred to as 3A Pond), approximately 11 acres
- 216-B-3B Pond (hereinafter referred to as 3B Pond), approximately 11 acres
- 216-B-3C Pond (hereinafter referred to as 3C Pond), approximately 41 acres.

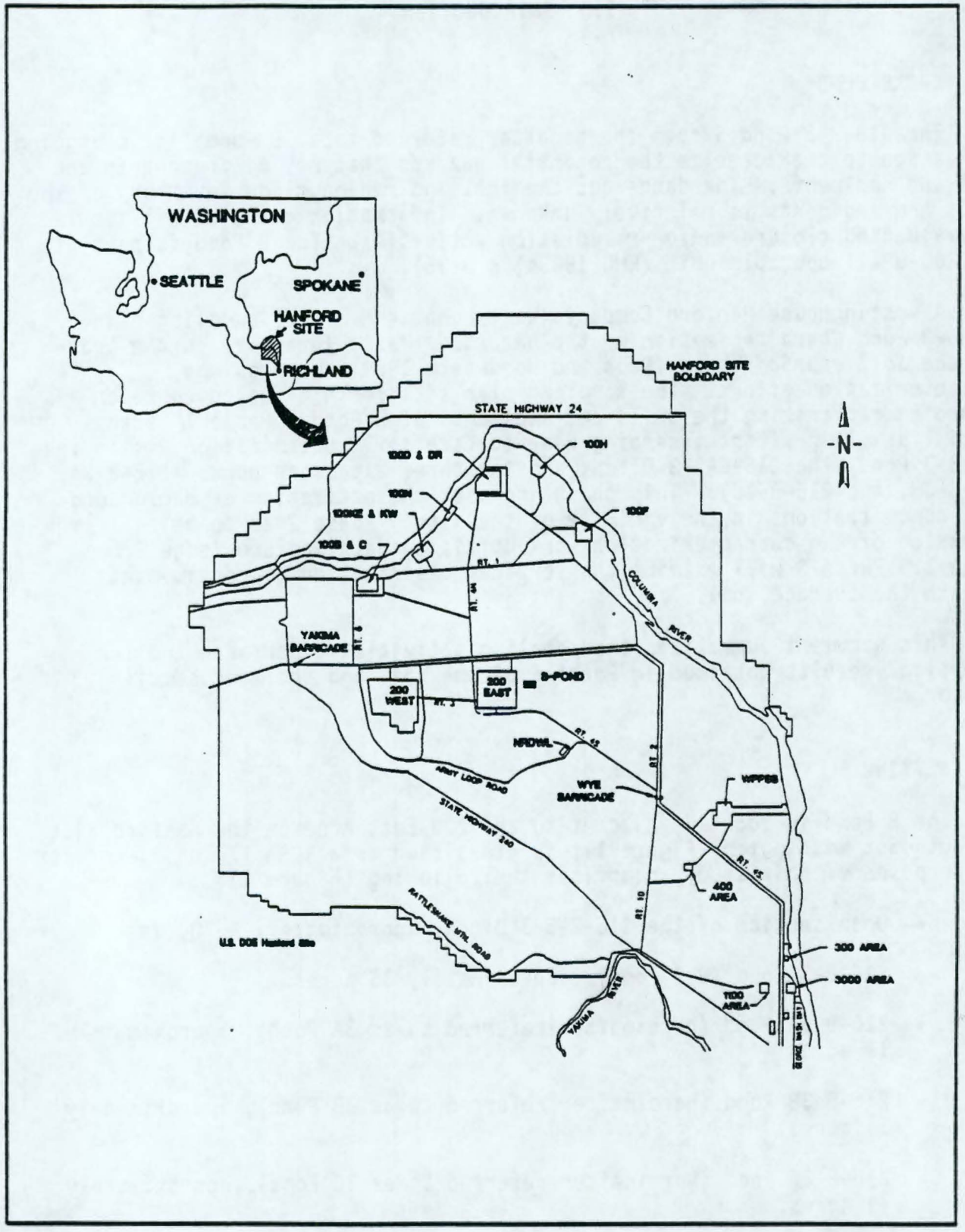

Figure 1. Map of the Hanford Site.

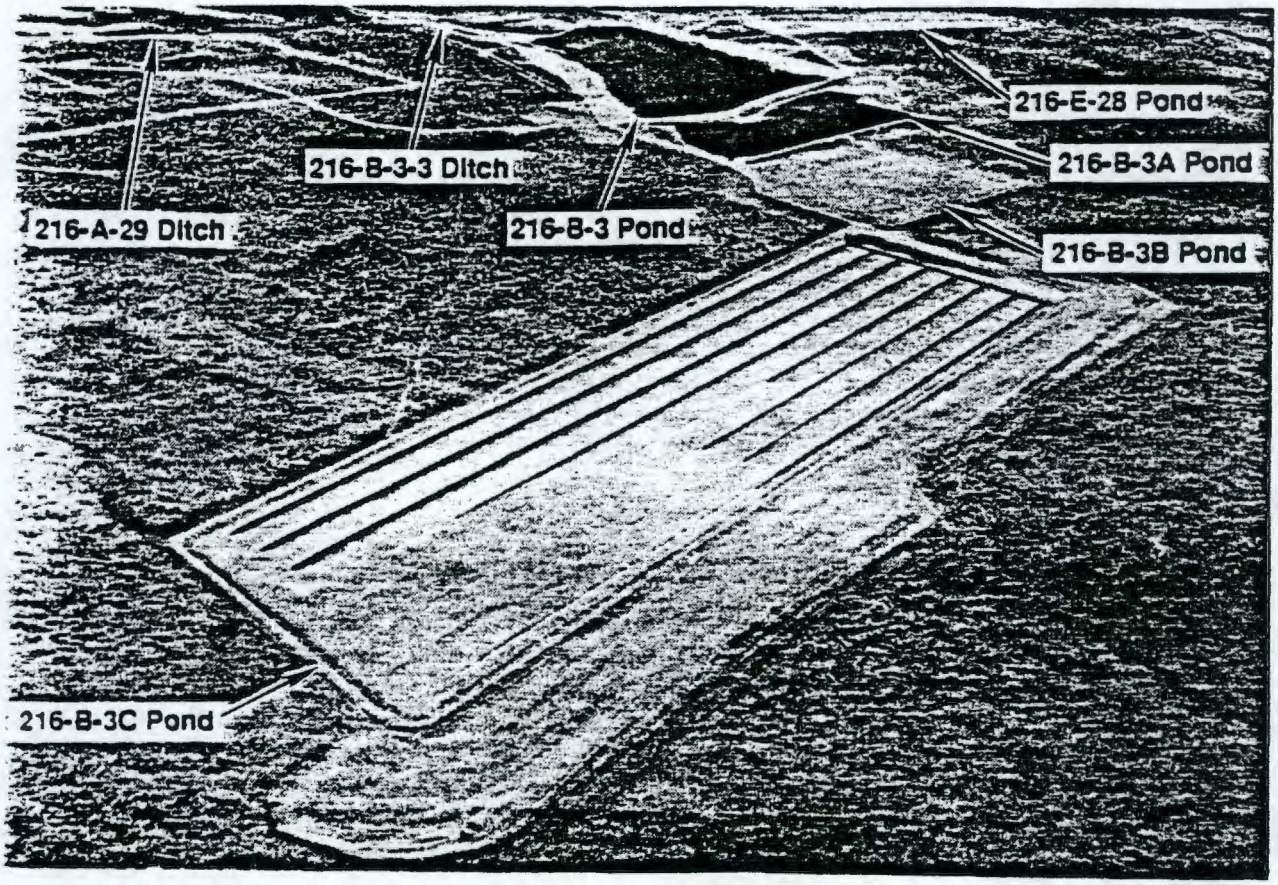

Figure 2. Aerial Photograph of the 216-B-3 Pond System and Surrounding Areas (1988).

Water flows into the B-3 Pond through the 216-B-3-3 Ditch. The B-3 Pond and 3A Pond are normally full of water. Flow to 3A Pond is controlled at the east end of the B-3 Pond. Water from 3A Pond can go to 3B Pond or 3C Pond; currently, 3B Pond is not in use. Although this document uses the term pond, the 3B Pond and the Contingency Pond (labeled 216-E-28 Pond in Figure 2) are actually dry basins. The 3C Pond has a series of eight parallel infiltration trenches into which water from 3A Pond is usually channelled. The water in 3C Pond has never been above the tops of the trenches, which cover a much smaller total area than the pond itself. The trenches are not usually wet along their entire length. The wet area varies with water level.

The Contingency Pond was constructed to provide emergency overflow capability for B Pond. It lies north and slightly west of the B-3 Pond. This facility was constructed in 1987. The area is dry and has not been utilized for waste disposal. Sagebrush and native plants populate the undisturbed areas around B Pond. Both the unused, but man-impacted Contingency Pond area, and the area of native desert vegetation were utilized in Phase 1 as sources for background samples.

The B Pond area has received liquid effluent from activities in the 200 East Area since 1945. Effluent originating within the 200 East Area flows into open ditches upon exit. This liquid effluent provides water to B Pond. The B-3 Pond (sometimes referred to as the main pond) is the oldest pond in the system and contains the largest volume of water; the level of the pond and the inflow have changed with time. Originally, B-3 pond was supplied through the 216-B-3-1 Ditch. In 1964, the 216-B-3-1 Ditch was replaced by the 216-B-3-2 Ditch. In 1970, the 216-B-3-2 Ditch was replaced by the present 216-B-3-3 Ditch. Both the 216-B-3-1 and 216-B-3-2 Ditches were removed from service due to radioactive contamination and filled with soil to reduce contaminant mobility. The three expansion ponds (3A, 3B, and 3C) were placed in service in 1983, 1984, and 1985, respectively. Since taken out of service in May 1985, several feet of soil have been removed from the former 3B Pond bottom in an attempt to increase percolation during future use. The material removed was piled adjacent to the B-3 Pond.

The B Pond primarily received steam condensate, cooling water, chemical sewer discharges, and process waste water. Some mixed waste has been discharged to B Pond. Administrative and physical controls have been implemented to eliminate dangerous waste discharges. The B Pond is still in use for nondangerous waste water disposal and is undergoing closure in accordance with RCRA. The *216-B-3 Pond System Closure/Postclosure Plan* (DOE-RL 1990) provides a broader perspective of this closure and includes chapters on process information and waste characteristics (Chapters 3-4, p 3-1 to 4-14).

2.0 PRESAMPLING ACTIVITIES

2.1 OBJECTIVES

The *216-B-3 Pond System Closure/Postclosure Plan* (DOE-RL 1990, p 7-4) stated four major objectives for Phase 1:

- Assess near-surface soil contamination within the B-3 Pond, 216-B-3-3 Ditch, and three expansion ponds (3A, 3B, and 3C)
- Estimate background values
- Identify constituents of concern
- Estimate the variability of concentrations present at the sites.

2.2 SITE GRID AND ALLOCATION FOR SOIL/SEDIMENT SAMPLING

Sampling sites for Phase 1 were set forth in the sampling plan document (Roos and Woodworth 1989). Reference to that document is appropriate for those desiring the rationale for site selection. The procedure utilized was intended to provide representative sample locations for each of the units of B Pond. Additionally, a small number of sites was selected because information about specific locations was also desired.

A site grid was established to assist in defining the sampling locations within each unit of interest. The perimeters of the 216-B-3 Pond, 3A Pond, 3B Pond, and the Contingency Pond were surveyed and staked relative to the Hanford Site coordinate system.

Most sites within the TSD unit were selected randomly; the sites sampled include the following:

- Nine sites in the 216-B-3-3 Ditch
- Twenty sites in the B-3 Pond
- Seven sites in 3A Pond
- Five sites in 3B Pond
- Eight sites in 3C Pond.

A BASIC random number generator was used to select the sample sites from among a population of grid coordinate intercepts falling within the boundaries of each unit of interest. In the B-3 Pond, a square grid system of 100-foot intervals was used. In 3A and 3B Ponds, the lines of the grid were set at 50-foot intervals due to the smaller acreage. The point N42600, W43600 of the Hanford Site coordinate system corresponded to 0,0 of the B-3 Pond grid. The point N42350, W41750 was the origin for the 3A Pond grid, and N42250, W41100 was the origin for the 3B Pond grid. Randomization in 3A Pond was performed in two blocks. Three locations were randomly allocated from the trenched area, and four locations were randomly allocated from the remainder of the pond. There are eight long infiltration trenches in 3C Pond. In both 3C Pond and the 216-B-3-3 Ditch, potential sampling points were at 100-foot intervals

in the channels. Randomization in 3C Pond was restricted to one random location per ditch for a total of eight sites. These sites were referenced from the northwest end of the 2,200-foot trenches. Locations in the 216-B-3-3 Ditch were randomly allocated within two blocks. After the sampling was initiated, the scope of the project was changed with respect to the 216-B-3-3 Ditch. Sampling was extended upstream from the confluence of the 216-A-29 and 216-B-3-3 Ditches. Four locations were randomly selected from among points at 100-foot intervals in the lower section of the ditch. Five additional random samples were likewise selected from the upper section of the ditch. Locations were referenced from the confluence of the two ditches in the lower section and from the beginning of the 216-B-3-3 Ditch in the upper section.

In addition to randomly allocated sites, samples were to be collected from the following locations:

- The closest possible point to the head end of the 216-B-3-3 Ditch
- The intersection of the 216-B-3-3 and 216-A-29 ditches
- The present inlet area of the B-3 Pond
- The deepest area of the B-3 Pond.

Background samples were to be collected from two types of sites. Five representative samples were to be selected from the Contingency Pond area. This area was surveyed at 100-foot intervals, and the sampled locations were randomly selected from among the population of intercepts within the Contingency Pond. This area was selected for background sampling based on the fact that it has not received influent, is a manmade basin, and is constructed in an adjacent area and fashion. Five additional background samples were to be chosen at sites surrounding B Pond. These sites were recorded in the field logbook using compass headings of several permanent landmarks. It was intended that these samples would provide information concerning the composition and variability of background soil in the area. These samples were taken from areas of native vegetation several hundred feet from the TSD. These locations all appear to be typical of the presystem environment, and were selected by professional judgement on that basis. Figure 3 shows the background sample locations.

2.3 EQUIPMENT PREPARATION

A sampling platform was constructed for use in the B-3 Pond and 3A Pond by connecting two 14-foot, flat-bottom aluminum boats. Stainless-steel scoopulas, spoons, bowls, shovels, and augers were prepared for use in accordance with the laboratory decontamination of field equipment specified in environmental investigation instruction (EII) 5.5, "Decontamination of Equipment for RCRA/CERCLA Sampling" (WHC 1989b). Cleaned equipment was wrapped in aluminum foil by cleaning personnel and remained wrapped until use. Precleaned sample containers were purchased and used for all samples. The containers come presealed from the manufacturer with tamper-indicating seals affixed.

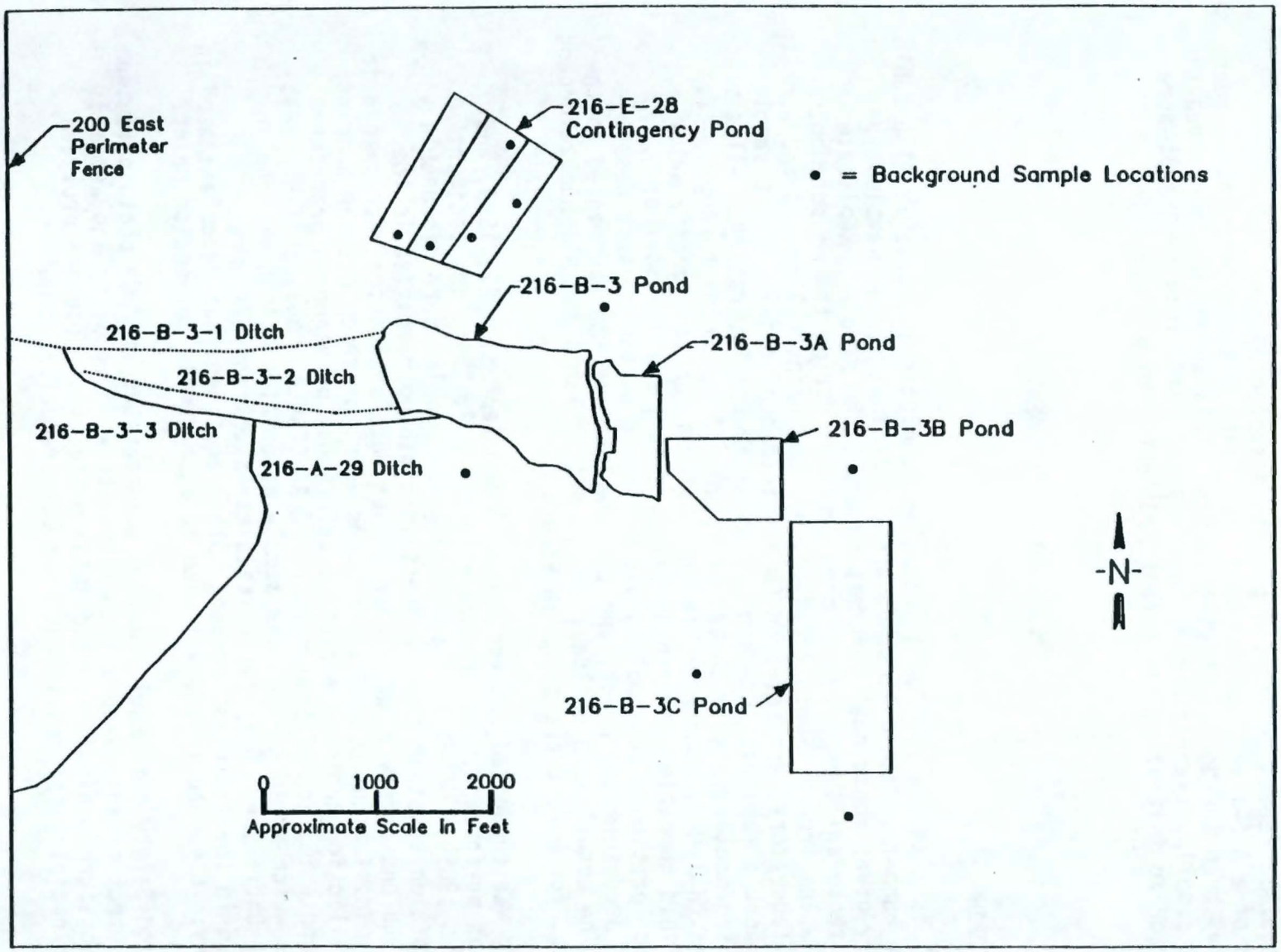

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Figure 3. B Pond System Background Sampling Sites.

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2.4 SITE EXPLORATION

Before sample collection in the B-3 Pond, a survey of water and sediment depth was performed. A check of 28 points in the pond showed a maximum water depth of about 12 feet. Sediment depth was assessed by hand-forced penetration of a 0.5-inch-diameter metal rod. The maximum penetration found was 1 foot with an average of about 4 inches. This survey was performed to provide the sampling team with some knowledge of conditions in the 35-acre B-3 Pond prior to initiating the actual sediment sample collection.

3.0 SAMPLING SOILS/SEDIMENTS

3.1 COLLECTION

Table 1 is a sample key for all samples submitted in Phase 1. The table lists sample numbers, date collected, area, coordinates, and sample type. The type category gives additional information about the sample. Replicate samples are those split into two or more portions during the measurement process. Samples from a single location, divided upon collection, and sent to the primary laboratory, are referred to as field duplicates. Split samples were those where a replicate was sent to an alternate laboratory. All samples are soil or sediment samples with the exception of the B-206 through B-211 water samples (H_2O is attached to the type designation to identify water samples). Field conditions prevented sampling at a small number of predesignated locations, so sampling was performed at the closest possible site to that predetermined point, and the new location was documented in the field log. The actual sampled location appears in Table 1. All nonbackground sampling sites for B Pond are shown in Figure 4.

Sampling was conducted between August 3 and September 21, 1989, and collection was performed in accordance with EII 5.2, "Soil and Sediment Sampling" (WHC 1989b). Personnel collecting the samples wore disposable vinyl gloves in addition to other clean protective clothing specified in the approved health and safety plan. These gloves were shed after each sample in an effort to minimize the potential for cross-contamination between samples. All sample collection tools were cleaned before use by standard procedures EII 5.5, "Decontamination of Equipment for RCRA/CERCLA Sampling" (WHC 1989b). Cleaned tools which would contact the sample material remained wrapped in aluminum foil until use. Only large stainless-steel shovels were decontaminated in the field and reused. Other equipment was decontaminated in the laboratory. Clean equipment was used at each sample collection point.

Health and Safety personnel provided and operated an HNU* photoionization detector to detect organic vapors in addition to wind velocity and wet and dry-bulb temperature monitoring. Radiation protection personnel provided monitoring of radiological conditions with Geiger-Mueller counters.

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*HNU is a trademark of HNU Systems, Inc.

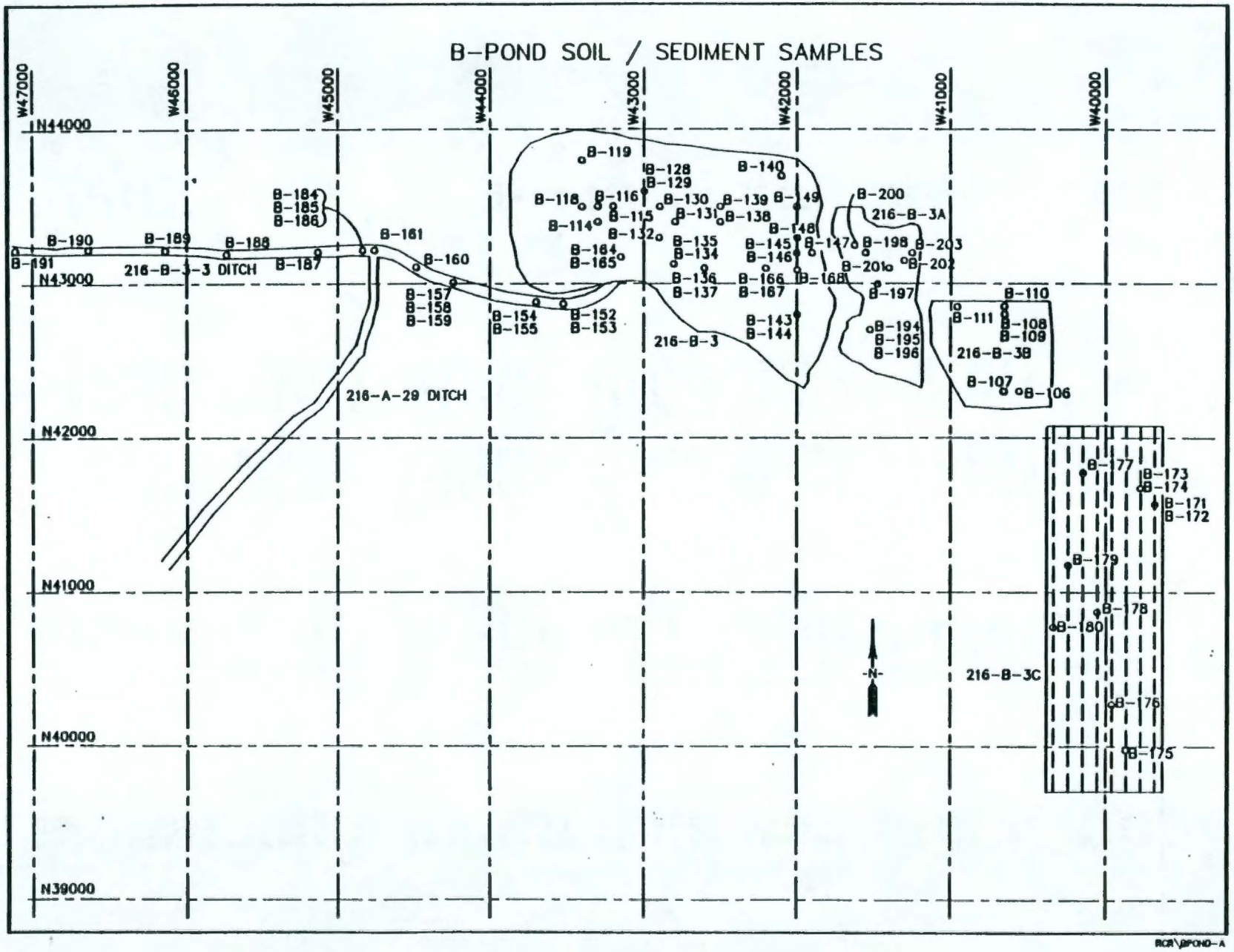

Figure 4. B Pond System Nonbackground Sampling Sites.

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Table 1. B Pond Phase 1 Sample Key. (Sheet 1 of 3)

Sample number	Collection date	Site/Pond	Coordinates		Sample type
			North	West	
B-101	8/04	Cont Bkg	N44900	W42800	Reg
B-102	8/04	Cont Bkg	N45100	W42600	Reg
B-103	8/04	Cont Bkg	N44800	W43500	Reg
B-104	8/04	Cont Bkg	N44600	W43200	Reg
B-105	8/04	Cont Bkg	N45400	W42500	Reg
B-106	8/04	3B Pond	N42300	W40550	Reg
B-107	8/04	3B Pond	N42300	W40650	Reg
B-108	8/04	3B Pond	N42800	W40650	Fdup
B-108	8/03	3B Pond	N42800	W40650	Split
B-109	8/04	3B Pond	N42800	W40650	Fdup
B-110	8/04	3B Pond	N42850	W40650	Reg
B-111	8/04	3B Pond	N42850	N40950	Reg
B-112	8/04	3B Pond	----	----	Comp 106 to 111
B-113	8/04	3B Pond	----	----	Blk
B-114	8/10	B-3 Pond	N43400	W43300	Reg
B-115	8/10	B-3 Pond	N43500	W43200	Reg
B-116	8/10	B-3 Pond	N43500	W43300	Reg
B-117	8/10	B-3 Pond	----	----	Blk
B-118	8/11	B-3 Pond	N43500	W43400	Reg
B-119	8/11	B-3 Pond	N43800	W43400	Reg
B-120	8/10	Sage Bkg	SW of B-3 Pond		Split
B-121	8/10	Sage Bkg	SW of B-3 Pond		Fdup
B-122	8/10	Sage Bkg	SW of B-3 Pond		Fdup
B-123	8/10	Sage Bkg	W of 3C Pond		Reg
B-124	8/10	Sage Bkg	S of 3C Pond		Reg
B-125	8/10	Sage Bkg	E of 3B Pond		Reg
B-126	8/10	Sage Bkg	NE of B-3 Pond		Reg
B-127	8/11	B-3 Pond	----	----	Comp 118, 119, 116
B-128B	8/11	B-3 Pond	----	----	Blk
B-128	8/17	B-3 Pond	N43600	W43000	Fdup
B-129	8/17	B-3 Pond	N43600	W43000	Fdup
B-130	8/17	B-3 Pond	N43500	W42900	Reg
B-130	8/17	B-3 Pond	N43500	W42900	Split
B-131	8/17	B-3 Pond	N43400	W42800	Reg
B-132	8/17	B-3 Pond	N43300	W42900	Reg
B-133	8/17	B-3 Pond	----	----	Comp 128, 130 to 132, and extra site N43500, W42900
B-134	8/18	B-3 Pond	N43100	W42800	Fdup
B-135	8/18	B-3 Pond	N43100	W42800	Fdup
B-136	8/18	B-3 Pond	N43100	W42600	Reg
B-137	8/18	B-3 Pond	N43100	W42600	Split
B-138	8/18	B-3 Pond	N43400	W42500	Reg
B-139	8/18	B-3 Pond	N43500	W42500	Reg
B-140	8/18	B-3 Pond	N43700	W42100	Reg
B-141	8/18	B-3 Pond	----	----	Comp 134 to 140
B-142	8/18	B-3 Pond	----	----	Blk
B-143	8/18	B-3 Pond	N42800	W42000	Reg
B-144	8/25	B-3 Pond	N42800	W42000	Split
B-145	8/25	B-3 Pond	N43200	W42000	Fdup
B-146	8/25	B-3 Pond	N43200	W42000	Fdup
B-147	8/25	B-3 Pond	N43200	W41900	Reg
B-148	8/25	B-3 Pond	N43300	W42000	Reg
B-149	8/25	B-3 Pond	N43500	W42000	Reg
B-150	8/25	B-3 Pond	----	----	Comp 143 to 149
B-151	8/25	B-3 Pond	----	----	Blk

Table 1. B Pond Phase 1 Sample Key. (Sheet 2 of 3)

Sample number	Collection date	Site/Pond	Coordinates North	Coordinates West	Sample type
B-152	8/28	B-3-3 Ditch	1,279 ft below A-29		Fdup
B-153	8/28	B-3-3 Ditch	1,279 ft below A-29		Fdup
B-154	8/28	B-3-3 Ditch	1,200 ft below A-29		Fdup
B-155	8/28	B-3-3 Ditch	1,200 ft below A-29		Split
B-156	8/28	B-3-3 Ditch	----	----	Blk
B-157	8/31	B-3-3 Ditch	950 ft below A-29		Split
B-158	8/31	B-3-3 Ditch	950 ft below A-29		Reg
B-159	8/31	B-3-3 Ditch	950 ft below A-29		Fdup
B-160	8/31	B-3-3 Ditch	300 ft below A-29		Reg
B-161	8/31	B-3-3 Ditch	0 ft		Select-Junction
B-162	8/31	B-3-3 Ditch	----	----	Comp 152, 154, 157, 160, 161
B-163	8/31	B-3-3 Ditch	----	----	Blk
B-164	9/07	B-3 Pond	N43175	W43150	Select-Inlet, Fdup
B-165	9/07	B-3 Pond	N43175	W43150	Select-Inlet, Fdup
B-166	9/07	B-3 Pond	N43100	W42200	Reg
B-167	9/07	B-3 Pond	N43100	W42200	Split
B-168	9/07	B-3 Pond	N43090	W42000	Select-Deepest
B-169	9/07	B-3 Pond	----	----	Comp 164, 166, 168
B-170	9/07	B-3 Pond	----	----	Blk
B-171	9/08	3C Pond	Ditch 8, 500 ft		Fdup
B-172	9/08	3C Pond	Ditch 8, 500 ft		Fdup
B-173	9/08	3C Pond	Ditch 7, 400 ft		Split
B-174	9/08	3C Pond	Ditch 7, 400 ft		Reg
B-175	9/08	3C Pond	Ditch 6, 2,100 ft		Reg
B-176	9/08	3C Pond	Ditch 5, 1,800 ft		Reg
B-177	9/08	3C Pond	Ditch 3, 300 ft		Reg
B-178	9/08	3C Pond	Ditch 4, 1,200 ft		Reg
B-179	9/08	3C Pond	Ditch 2, 900 ft		Reg
B-180	9/08	3C Pond	Ditch 1, 1,300 ft		Reg
B-181	9/08	3C Pond	(Dry Sites)		Comp 175, 176
B-182	9/08	3C Pond	(Wet Sites)		Comp 171, 173, 177 to 180
B-183	9/08	3C Pond	—	—	Blk
B-184	9/18	B-3-3 Ditch	2,300 ft from head end		Fdup
B-185	9/18	B-3-3 Ditch	2,300 ft from head end		Fdup
B-186	9/18	B-3-3 Ditch	2,300 ft from head end		Split
B-187	9/18	B-3-3 Ditch	2,000 ft from head end		Reg
B-188	9/18	B-3-3 Ditch	1,400 ft from head end		Reg
B-189	9/18	B-3-3 Ditch	1,000 ft from head end		Reg
B-190	9/18	B-3-3 Ditch	500 ft from head end		Reg
B-191	9/18	B-3-3 Ditch	30 ft from head end		Select-Head end
B-192	9/18	B-3-3 Ditch	----	----	Comp 184, 187-191
B-193	9/18	B-3-3 Ditch	----	----	Blk
B-194	9/21	3A Pond	N42700	W41525	Fdup-Trench
B-195	9/21	3A Pond	N42700	W41525	Split-Trench
B-196	9/21	3A Pond	N42700	W41525	Fdup-Trench
B-197	9/21	3A Pond	N43000	W41475	Reg-Trench
B-198	9/21	3A Pond	N43200	W41550	Reg-Trench
B-199	9/21	3A Pond	(Trench)		Comp 194, 197, 198
B-200	9/21	3A Pond	N43250	W41625	Reg
B-201	9/21	3A Pond	N43100	W41400	Reg
B-202	9/21	3A Pond	N43150	W41300	Reg
B-203	9/21	3A Pond	N43200	W41250	Reg
B-204	9/21	3A Pond	(Out of trench)		Comp 200, 201, 203, 204
B-205	9/21	3A Pond	----	----	Blk

Table 1. B Pond Phase 1 Sample Key. (Sheet 3 of 3)

Sample number	Collection date	Site/Pond	Coordinates		Sample type
			North	West	
B-206	9/28	B-3 Pond	60 ft W of SE corner		Fdup-H_2O
B-207	9/28	B-3 Pond	60 ft W of SE corner		Fdup-H_2O
B-208	9/28	B-3 Pond	Inlet		Reg-H_2O
B-209	9/28	B-3 Pond	NW corner		Reg-H_2O
B-210	9/28	B-3 Pond	NE corner		Reg-H_2O
B-211	9/28	B-3 Pond	(H_2O)		Comp 206, 208-210

Cont Bkg = Background: Contingency Pond
3B Pond = 216-B-3B Pond
B-3 Pond = 216-B-3 Pond (main pond)
Sage Bkg = Background: Area of native vegetation
B-3-3 Ditch = 216-B-3-3 Ditch
A-29 = 216-A-29 Ditch
3C Pond = 216-B-3C Pond
3A Pond = 216-B-3A Pond
Blk = Equipment blank -- clean silica sand
Reg = Regular sample
Split = Split samples sent to an alternate laboratory
Fdup = Field duplicate sample sent to primary laboratory
Comp xxx, = Composite of samples B-xxx, ...
Select-y = Nonrandomly selected sample location of attribute y
Trench = Deeper trench area of 216-B-3A Pond
Inlet = Inlet area in 216-B-3 Pond
Junction = Intersection of 216-A-29 and 216-B-3-3 Ditches
H_2O = Pond water sample (not soil sample).

Dry soil samples were collected by removing approximately 6 inches of surface soil prior to sample collection. This was specified in the sampling plan to minimize the influence of any surface disturbances (e.g., windblown material, vegetation) and to obtain a representative sample of the site (Roos and Woodworth 1989). Stainless-steel scoopulas, spoons, trowels, and shovels were used in the sample collection, as appropriate. Tools used to remove overburden were separate from those used to collect the sample (clean tools were used at each location). Soil exposed at the bottom of the hole was immediately collected for volatile organic analysis. Containers appropriate to the rest of the requested analyses were filled as rapidly as possible. All samples from the Contingency Pond, the native background sites, and 3B Pond were dry samples. Samples B-175, B-176, and their composite B-181 were dry samples taken from 3C Pond. Other sampling points in 3C Pond were wet.

Sediment samples were collected from 3A Pond, B-3 Pond, and the 216-B-3-3 Ditch using a 3 x 12-inch i.d. soil recovery auger. A 3 x 30-inch auger was tried during early efforts in the B-3 Pond, but was never superior for collecting deeper sediment samples than the 12-inch auger. Multiple borings were necessary to obtain sufficient quantities of material for all the requested analyses. These were always commingled in a stainless-steel bowl prior to allocation to the individual sample analysis containers sent to the laboratories.

Sediment collection at the water-covered sites of 3C Pond was performed with stainless-steel shovels. Some samples in the lower 216-B-3-3 Ditch were also collected by shovel because of the rocky nature of the sediments. All sediment material collected at a specific sampling location was placed in a large stainless-steel bowl, the excess water was decanted, and the sample was homogenized and packed into containers. As with the dry soil samples, the handling of material submitted for volatile organic analysis was kept to an absolute minimum.

Composite samples were usually collected at a frequency of one per sampling day in accordance with the sampling plan (Roos and Woodworth 1989). They were composed of soil/sediment split from each sample within a particular pond (or ditch) area. Prior to compositing, the material was kept on ice in clean sealed sample jars (125 mL). Upon taking the final sample of the day or area, the respective jars were emptied into a stainless-steel bowl, mixed, and dispensed into sample containers.

Once sample containers were filled, the exterior was wiped and/or rinsed clean, labeled, sealed in plastic bags, and placed on ice. Prior to transport to the laboratory, a tamper-indicating seal was placed on every sample container. Each sample was double checked for proper seal and labeling. Sample number and location were verified as properly recorded in the field logbook. Chain-of-custody and sample-analysis-request forms were completed and checked. All samples were rebagged (double bags) after label verification and placed on ice for transport to the laboratory the same day by collection personnel.

3.2 QUALITY ASSURANCE SAMPLES

The approved sampling plan called for at least one pair of split samples and one pair of duplicates for every 20 samples or one per day, whichever resulted in the greater number of quality assurance (QA) samples. Three types of QA samples were submitted from the field.

- Duplicate samples were defined in this project as samples from the same location submitted as two separate samples for separate analysis at a single laboratory.

- Split samples were defined identical to duplicates except that one sample would be analyzed at one laboratory and the second of the pair would be analyzed at an independent laboratory.

- Equipment blanks of clean silica sand were also submitted for analysis daily. These blanks were prepared by mixing an aliquot of silica sand under field conditions with decontaminated equipment.

Duplicate samples would be used to assess the variability inherent in the solitary estimate available for most sample collection points. Split samples were to serve as interlaboratory comparison. Equipment blanks were used to indicate errors of contamination in the measurement system.

Additional laboratory QA measures included reporting matrix spikes, matrix spike duplicates, blanks, and, in the case of organic analytes -- surrogate recoveries (surrogates are synthetic compounds added by the laboratory to monitor method performance).

3.3 REQUESTED ANALYSES

Table 2a summarizes the types of analyses originally requested for individual soil/sediment samples. Later, it was determined that comparison to background would be more appropriate if the strong acid digestion Method 3050 (EPA 1986) was employed instead of the acetic acid digestion used for Extraction Procedure (EP) toxicity determinations. In February 1990, this analysis was requested on samples held in storage by the laboratory. Analytical results were reported for those elements listed in Table 2b. The method yielded higher concentrations of analytes for the comparisons. In each method, the soils are processed in a digestion procedure, and the extract analyzed. The amounts extracted by the two methods can differ by orders of magnitude due to the different strength of the acids employed. The majority of all site and background values were below the corresponding required contract detection limit (CDL) for the EP-toxicity digestion. This makes comparisons to background error prone due to the uncertainty of quantification. The characteristic of EP toxicity is determined by comparison to regulatory limits using the prescribed EP-toxicity extraction. The only elements regulated or even defined for EP toxicity are arsenic, barium, cadmium, lead, chromium, mercury, selenium, and silver. Because the objective of this study involves comparison to background values, results of other elements listed in the sampling plan under the category of "EP-Toxic Metals, Enhanced" will not be the presented by that digestion method.

Table 2a. Requested Analyses, Individual Samples. (sheet 1 of 2)

Constituent	Method	CDL[a]
Arsenic, µg/g	7060[b]	0.5
Lead, µg/g	7421[b]	0.5
Mercury, µg/g	7470[b]	0.2
Selenium, µg/g	7740[b]	0.5
Thallium, µg/g	7841[b]	1.0
EP Toxic Metals, Enhanced, µg/L	1310[b]	
aluminum		1,500
antimony		1,000
arsenic		500
barium		1,000
beryllium		50
boron		100
cadmium		100
calcium		500
chromium		500
cobalt		200
copper		100
iron		300
lead		500
lithium		100
magnesium		500
manganese		50
mercury		20
molybdenum		400
nickel		100
potassium		1,000
selenium		500
silicon		500
silver		500
sodium		2,000
strontium		100
tin		300
titanium		600
vanadium		50
zinc		50
zirconium		500
Sulfide, µg/g	9030[b]	10.0
Cyanide, µg/g	9010[b]	0.5
Ammonium, µg/g	1426-C/D[c]	0.5
Gross alpha	A-703[c]	N/A
Gross beta	A-703[c]	N/A
Anions, µg/g	300[b]	
bromide		1.0
chloride		1.0
fluoride		1.0
nitrate		1.0
nitrite		1.0
phosphate		2.0
sulfate		1.0
Volatile Organics (Targeted Constituents), µg/kg	8240[b]	
1,1,1-trichloroethane		5
1,1,2-trichloroethane		5
benzene		5
carbon tetrachloride		5
methyl ethyl ketone		10
tetrachloroethylene		5
toluene		5
trichloroethylene		5
xylene (o,p)		5
chloroform		5
1,1-dichloroethane		5
1,2-dichloroethane		500
total-1,2-dichloroethylene		5
methylene chloride		5
vinyl chloride		10
xylene (m)		5

Table 2a. Requested Analyses, Individual Samples. (sheet 2 of 2)

Constituent	Method	CDL[a]
Volatile Organics (Targeted Constituents), µg/kg	8240[b]	
methyl isobutyl ketone		10
acetone		10
tetrahydrofuran		10
p-dichlorobenzene		5
1,4-dioxane		500
pyridine		500
acrolein		10
acrylonitrile		10
bis(chloromethyl) ether		5
bromoacetone		5
methyl bromide		10
carbon disulfide		10
chlorobenzene		5
2-chloroethyl vinyl ether		5
chloromethyl methyl ether		10
methyl chloride		10
crotonaldehyde		10
1,2-dibromo-3-chloropropane		10
1,2-dibromo-ethane		10
dibromomethane		10
1,4-dichloro-2-butene		10
dichlorodifluoromethane		10
1,1-dichloroethylene		10
1,2-dichloropropane		5
1,3-dichloropropene		5
n,n-diethylhydrazine		10
1,1-dimethylhydrazine		10
1,2-dimethylhydrazine		10
iodomethane		10
methacrylonitrile		10
methanethiol		10
pentachloroethane		10
1,1,1,2-tetrachloroethane		10
1,1,2,2-tetrachloroethane		5
bromoform		5
trichloromethanethiol		10
trichloromonofluoromethane		10
1,2,3-trichloropropane		10
acetonitrile		10
formaldehyde		500
ethylene oxide		10
ethyl methacrylate		10
ethylbenzene		5
styrene		5
bromodichloromethane		5
dibromochloromethane		5
2-hexanone		50
allyl chloride		100
chloroethane		10
propionitrile		5
vinyl acetate		5

[a]CDL for EP-toxic metals are listed as concentration in the prescribed extract
[b]EPA 1986
[c]ASTM 1987
CDL = contract detection limit
EP = Extraction Procedure
N/A = standard reference not available.

Table 2b. Metals Analyses Using Methods 3050/6010[a].

Constituent	CDL[b]	Constituent	CDL[b]
aluminum	15.0	manganese	0.5
antimony	10.0	molybdenum	4.0
barium	0.6	nickel	1.0
beryllium	0.5	potassium	10.0
boron	1.0	silicon	20.0
cadmium	0.2	silver	1.0
calcium	5.0	sodium	20.0
chromium	1.0	strontium	1.0
cobalt	2.0	tin	3.0
copper	1.0	titanium	6.0
iron	5.0	vanadium	0.5
lithium	10.0	zinc	0.5
magnesium	5.0	zirconium	5.0

[a]EPA 1986
[b]All values in micrograms per gram.

Instead, the data for digestion Method 3050/inductively coupled plasma (ICP) spectroscopy analysis 6010 (EPA 1986) is presented. Elements not reported by the aforementioned method (arsenic, lead, mercury, selenium, thallium) are those for which a total metal determination was already requested by a more sensitive method.

Composite samples were screened for a broader array of organic analytes than individual samples as verification of waste stream characterization. The list of analytes for composite samples is given in Table 3.

Lists of organic compounds routinely reported by the contract laboratory are included in Tables 2a, 2b, and 3. Additional compounds may be reported. The 'other' compounds may be identified or listed as unknowns (a search of the EPA/NIH Mass Spectral Data Base is included in the analysis).

Tables 2a and 3 reference standard methods and give minimum required CDLs. These limits were set forth in the project QA plan, Appendix C, of the sampling plan (Roos and Woodworth 1989). These limits correspond to the administratively determined CDLs of the primary laboratory. The CDLs given are for soil matrices. Water matrices may have different CDLs. Generally, CDLs correspond to the recommended limits of the referenced method when they exist. At times, they are below a practical quantitation limit (PQL).

The primary laboratory analyzed one-half of the total split samples as regular samples. The alternate laboratory performed EP toxicity, sulfide, cyanide, ammonium, and anion analyses on the remaining split samples. Analysis of matrix spikes (MS), matrix spike duplicates (MSD), blanks, calibration, and/or verification standards were not reported. The results of the 11 split samples delivered to the 325 Laboratory lacked sufficient QA information for Westinghouse Hanford data validation. Data from the these split samples are, therefore, not included with this report.

Table 3. Requested Analyses, Composite Samples. (sheet 1 of 3)

Constituent	CDL
Polychlorinated Biphenyl, µg/g (Method[a] 8080)	
Arochlor 1016	1.0
Arochlor 1221	1.0
Arochlor 1232	1.0
Arochlor 1242	1.0
Arochlor 1248	1.0
Arochlor 1254	1.0
Arochlor 1260	1.0
Herbicides, µg/g (Method[a] 8150)	
2,4-D	1.0
2,4,5-TP (Silvex)	1.0
2,4,5-T	1.0
Enhanced Pesticides, µg/g (Method[a] 8080)	
Endrin	0.01
Methoxychlor	1.0
Toxaphene	1.0
Alpha BHC	0.01
Beta BHC	0.01
Gamma BHC	0.01
Delta BHC	0.01
4,4'-DDD	0.01
4,4'-DDE	0.01
4,4'-DDT	0.01
Heptachlor	0.01
Heptachlorepoxide	0.01
Kepone	1.0
Dieldrin	0.01
Aldrin	0.01
Chlorodane	1.0
Endosulfan alpha	0.01
Endosulfan beta	0.01
Endosulfan sulfate	0.05
Chlorobenzilate	0.3
Phosphorus Pesticides, µg/g (Method[a] 8140)	
Tetraethylpyrophosphate	1.0
Carbophenothion	1.0
Disulfoton	1.0
Dimethoate	0.2
Methylparathion	1.0
Parathion	1.0
Phorate	1.0

Constituent	CDL
Semivolatiles, µg/g (Method[a] 8270)	
Cresol	1.0
1,2-Dichlorobenzene	1.0
1,3-Dichlorobenzene	1.0
p-Dichlorobenzene	1.0
Hexachlorobenzene	1.0
Pentachlorobenzene	1.0
Pentachlorophenol	5.0
1,2,4,5-Tetrachlorobenzene	1.0
1,2,4-Trichlorobenzene	1.0
Hexachlorophene	1.0
Napthalene	1.0
1,2,3-Trichlorobenzene	1.0
Phenol	1.0
1,3,5-Trichlorobenzene	1.0
1,2,3,4-Tetrachlorobenzene	1.0
1,2,3,5-Tetrachlorobenzene	1.0
Kerosene	1,000
Strychnine	5.0
Maleic hydrazide	50.0
Nicotinic acid	10.0
Tributylphosphate	1.0
Chlorobenzene	1.0
Acetophenone	1.0
Warfarin	1.0
2-Acetylaminofluorene	1.0
4-Aminobiphenyl	1.0
5-(Aminomethyl)-3-isoxazolol	1.0
Amitrole	1.0
Aniline	1.0
Aramite	1.0
Auramine	1.0
Benz(c)acridine	1.0
Benz(a)anthracene	1.0
Benzene, dichloromethyl	1.0
Benzenethiol	1.0
Benzidine	1.0
Benzo(b)fluoranthene	1.0
Benzo(j)fluoranthene	1.0
p-Benzoquinone	1.0
Benzyl chloride	1.0
Bis(2-chloroethoxy)methane	1.0
Bis(2-chloroethyl) ether	1.0
Bis(2-ethylhexyl)phthalate	1.0
4-Bromophenyl phenyl ether	1.0
p-Chloroaniline	1.0
p-Chloro-m-cresol	1.0
1-Chloro-2,3-poxypropane	1.0
2-Chloronapththalene	1.0
Chlorophenol	1.0
Chrysene	1.0
Dibenz(a,h)acridine	1.0
Dibenz(a,j)acridine	1.0
Dibenz(a,h)anthracene	1.0
7h-Dibenzo(c,g)carbazole	1.0
Dibenzo(a,e)pyrene	1.0
Dibenzo(a,h)pyrene	1.0
Dibenzo(a,i)pyrene	1.0
Di-n-butyl phthalate	1.0
3,3'-Dichlorobenzidine	1.0
2,4-Dichlorophenol	1.0
2,6-Dichlorophenol	1.0
Diethyl phthalate	1.0
Dihydrosafrole	1.0
3,3'-Dimethozybenzidine	1.0
Thiofanox	1.0

Table 3. Requested Analyses, Composite Samples. (sheet 2 of 3)

Constituent	CDL	Constituent	CDL
Semivolatiles (Cont.)			
Dimethyl phthalate	1.0	2-Cyclohexyl-4,6-dinitrophenol	1.0
m-Dinitrobenzene	1.0	7,12-Dimethylbenz(a)anthracene	1.0
4,6-Dinitro-o-cresol	1.0	Alpha, alpha-dimethyl phenethylamine	1.0
2,4-Dinitrophenol	1.0	4,4-Methylenebis(2-chloro analiline)	1.0
2,4-Dinitrotoluene	1.0	2-Methol-2-(methylthio) propionaldehyde-o-(methylcarbonyl)oxime	1.0
2,6-Dinitrotoluene	1.0	o,o,o-Triethyl phosphorothioate	1.0
Di-n-octyl phthalate	1.0	tris(2,3-Dibromopropyl) phospahte	1.0
Diphenylamine	1.0	bis(2-Chloro-1-methylethyl) ether	1.0
1,2-Diphenylhydrazine	1.0	sym-Trinitrobenzene	1.0
Di-n-propylnitrosamine	1.0	Benzo(a)pyrene	1.0
Ethyleneimine	1.0	Chlornaphazin	1.0
Ethyl methanesulfonate	1.0	bis(2-Chloroisopropyl) ether	1.0
Fluoranthene	1.0	Hexachloropropene	1.0
Hexachlorobutadiene	1.0	Isophorone	1.0
Hexachlorocyclopentadiene	1.0	Acenaphthene	1.0
Hexachloroethane	1.0	Fluorene	1.0
Ideno(1,2,3-cd)pyrene	1.0	Anthracene	1.0
Isosafrole	1.0	Pyrene	1.0
Melononitrile	1.0	o-Nitrophenol	1.0
Melphalan	1.0	2-Methylnaphthalene	1.0
Methapyrilene	1.0	Phenanthrene	1.0
Butyl benzyl phthelate	1.0	Benzyl alcohol	1.0
2-sec-Butyl-4,6-dinitro phenol	1.0	Benzo(k)fluoranthene	1.0
Chloroalkyl ethers	1.0	Benzo(ghi)perylene	1.0
2-Methyllactonitrile	1.0	Dinoseb	1.0
Metholonyl	1.0	Diallate	1.0
2-Methylaziridine	1.0	N-Nitrosodiphenylamine	1.0
3-Methylcholanthrene	1.0	Dibenzofuran	1.0
2,4,6-Trichlorophenol	1.0	Acenaphthalene	1.0
Methyl methacrylate	1.0	o,o-Diethyl o-2-pyrazinyl phosphorothionate	1.0
Methyl methanesulfonane	1.0	Isodrin	1.0
1,4-Naphthoquinone	1.0	o-Nitroaniline	1.0
1-Naphthylamine	1.0	m-Nitroaniline	1.0
2-Naphthylamine	1.0	4-Nitroquinoline-1-oxide	1.0
p-Nitroaniline	1.0	Acetone	1.0
Nitrobenzene	1.0	Thiuram	1.0
p-Nitrophenol	1.0	Methylthiouracil	1.0
N-Nitrosodi-n-butylamine	1.0	p-Dimethylaminoazobenzene	1.0
N-Nitrosodiethanolamine	1.0	3,3'-Dimethybenzidine	1.0
N-Nitrosodiethylamine	1.0	2,4,5 Trichlorophenol	1.0
N-Nitrosodimethylamine	1.0	Toluenediamine	1.0
N-Nitrosomethylethylamine	1.0		
N-Nitroso-n-methylurethane	1.0		
N-Nitrosomethylvinylamine	1.0		
N-Nitrosomorpholine	1.0		
N-Nitrrosiperidine	1.0		
N-Nitrosopyrrolidine	1.0		
5-Nitro-o-toluidine	1.0		
Pentachloronitrobenzene	1.0		
Phenacetin	1.0		
p-Phenylenediamine	1.0		
Phthalic acid esters	1.0		
2-Picoline	1.0		
Reserpine	1.0		
Resorcinol	1.0		
o-Toluidine	1.0		
Safrole	1.0		
2,3,4,6-Tetrachlorophenol	1.0		

Table 3. Requested Analyses, Composite Samples. (sheet 3 of 3)

Constituent	CDL	Constituent	CDL
Gamma scan, pCi/g			
Sodium-22	0.02		
Potassium-40	0.35		
Cobalt-60	0.02		
Zirconium-95,niobium-95	0.03		
Ruthenium-106	0.17		
Cesium-134	0.02		
Cesium-137	0.02		
Cerium-144,praseodymium-144	0.18		
(Others relative to energy and photo yield of cesium-137)			
Strontium-90, pCi/g	0.005		

[a]EPA 1986
BHC = benzene hexachloride
CDL = contract detection limit
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane

4.0 FIELD OBSERVATIONS

4.1 WILDLIFE

Numerous waterfowl use the wet areas of B Pond. The sampling period did not coincide with the peak periods of waterfowl populations in the area. Nevertheless, the presence of very young Coots indicated some waterfowl were utilizing the site for nesting. Great Blue Herons were frequently observed in the 3C Pond trenches. Small goldfish were readily available there. Minnows were also observed while sampling the upper portion of the 216-B-3-3 Ditch. Clams were also present in the ditch. Notable emergences of mayfly adults took place from the B-3 Pond during the sampling effort, but there was a lack of ichthyic surface activity. One snake was observed. Deer tracks could be found in the vicinity of the site. No wildlife was observed within the dry engineered confines of either the 3B Pond or the Contingency Pond.

4.2 VEGETATION

Plant communities bordering and within the sampled areas did not appear highly unusual or indicative of adverse environmental effects due to water-borne contaminates. Vegetation was virtually absent in the Contingency Pond and 3B Pond; however, there was also a lack of topsoil in these areas. Vegetation was clearly less developed in association with 3A and 3C Ponds (newer structures) than around the B-3 Pond. There was a lack of vegetation on the higher ground between the trenches in 3C Pond as well as the drier ends of the trenches. Though sampling took place in the latter part of the summer, there were no significant algal blooms observed. Some submerged macrophytes were visible from the sampling platform in the B-3 Pond. Periphyton appeared thickest in the shallow, warm infiltration trenches of 3C Pond.

The plant community at the native background sample sites differed significantly from those of the pond areas. Plants in the native areas were those common to the surrounding desert -- drought tolerant and drought avoidant species. The vegetation was composed of riparian and aquatic species in the TSD. The differing vegetation not only emphasized that the physical environments were characteristically different, but that both the physical and biological influences on the soil were also different. At the native background sites, the soil was undisturbed. Topsoil was in place. Coarse and fine sand constituted a larger proportion of the total mass than the other areas. There was notably less cobble than within the engineered confines of B Pond or Contingency Pond.

4.3 WEATHER

During sampling collection, the weather was very dry with temperatures generally in the 80°F range. Winds were usually below 15 miles per hour, but at times, particularly as 3C Pond sampling was being completed, ranged

to approximately 25 miles per hour. Use of the sampling craft on the B-3 Pond and 3A Pond was restricted by practical and safety concerns to periods with winds less than 10 miles per hour.

4.4 GEOLOGY

The sediment sampled in the B-3 Pond and 3A Pond consisted primarily of medium to coarse sand overlain by fine sands and silts. Fine sand and silt were more prevalent at these sites than in the rockier 216-B-3-3 Ditch and 3C Pond. The Contingency Pond and 3B Pond structures are mostly cobble gravel with relatively small fractions of sand. Throughout B Pond, organic matter was much more prevalent where water was available (216-B-3-3 Ditch, B-3 Pond, 3A Pond, and the trenches of 3C Pond). Background sites in undisturbed native areas surrounding B Pond lacked the abundance of cobbles, which were chiefly composed of sand and silty sand.

The overlying soil of the Hanford Site is a very young soil by pedogenic standards. The arid climate reduces mineral weathering and soil forming processes. Lack of rainfall reduces the transport of ions to lower horizons in the soil profile. Evaporation can leave enhanced concentrations of easily exchanged elements on or near the surface.

Major minerals in the general area of B Pond as determined from thin section microscopic analysis (Westinghouse geological determination) and X-ray florescence analysis (Hooper and Swanson 1990, p 71) are polycrystalline and monocrystalline quartz, potassium feldspars, plagioclase, and basalts. Major elements found in the minerals of Hanford Site soils include magnesium, calcium, sodium, aluminum, potassium, iron, titanium, and silicon. As rocks decompose from weathering to form soil, the elements change in concentration, proportional composition, and structural arrangement.

4.5 MISCELLANEOUS

The water present in B Pond was clear. The current was strong in the 216-B-3-3 Ditch and the inflow to the infiltration trenches of 3C Pond. No unusual colors or odors were associated with the water; however, a decaying organic odor was noticed while collecting the samples from 3A Pond. An HNU photoionization detector showed an inconsistent reading as high as 1 part per million (the instrument detects total concentrations of many organic and some inorganic gases, but compound identification is not possible). Another sample from the B-3 Pond in about 10 feet of water was also noted as having an organic odor.

5.0 DISCUSSION OF BACKGROUND

The physical and temporal boundaries of background, the representativeness of the TSD, and whether or not the differences between values from the site and the defined background imply a detrimental

condition need to be considered. This section highlights how some of the 'background' issues have been addressed to this point in Phase 1 sampling and analysis.

The waste disposal operations related to B Pond are the reason for the attention of this study to characterize the sediments. RCRA closure requires that action be taken. Site characterization and removal of all waste from the site, and/or isolation of waste detrimental to human health or the environment has been described as the generic goal of the overall RCRA closure activity.

The concentrations derived from a defined background are one possible type of criteria by which the need for action can be assessed. The desirability of background for defining contamination makes some assumptions. One of these is that organisms have at least a tolerance for this background condition. The ecology of a waste site will always be different than that of background. Value judgments are inherent in defining contamination. Cleanup equaling loss of a nutrient source, loss of habitat, reproductive failure, loss of symbionts, changes in microclimate, etc., can be more significant to individual populations than legal definitions of contamination. Definitions of contamination that only reference maximum chemical concentrations are incomplete in an ecological context. All life forms have different susceptibilities, tolerances, and optimum concentration ranges of any given potential 'pollutant'. Even though a given pollutant may not affect a target population directly, it may have significant indirect effects.

For Phase 1, the criterion of contamination was to be background as determined by sampling from sites adjacent to the TSD. One type of site was a dry 2-year old excavated cobbly basin adjacent to the TSD. This is the area referred to as the Contingency Pond. It has never had waste water delivered to it. It is an altered natural environment, constructed similar to most of the B Pond facility and in the same area, but unused for waste disposal. The second type of background site was the native desert environment peripheral to B Pond. These sites are frequently referred to as sagebrush sites to differentiate them from the Contingency Pond. The soil was not exposed to the waste water delivered to the pond areas. None of the sampled soils had been visibly altered by human activities. The chosen sample collection points were more widely spread about the TSD than the first type of background site. Five locations from each background area were selected for sampling.

It was not anticipated that the chemical composition would be different between the two areas. Both sites were believed to be derived from the same parent material, and part of the same geologic formation. Analytical results, however, did show different elemental compositions between the random Contingency Pond sites and those selected by professional judgement from the native desert. Calcium serves as one example of the differences. From the five sites in the Contingency Pond, reported values were 6,830 to 9,923 µg/g (mean 8,700, coefficient of variation 17.2%). From the five sage sites, values ranged from 3,172 to 3,872 µg/g, (mean 3,555, coefficient of variation 8.02%). An equal number of sites were examined in each case, but the data suggested that the sampled parent populations were not equivalent.

Variability is inherent in nature. Both variability and concentration figure into the calculation of pollution defining threshold values. The fact that the two selected backgrounds were compositionally different should not automatically eliminate consideration of each. Some of the natural factors that affect soil composition are parent material, physical and chemical weathering, wind and water transport, geologic processes, climate, plants, and animals -- including microscopic species of the latter two.

For this report, it was determined that the values from the native sagebrush habitat would be utilized for TSD site comparisons with threshold values from the Contingency Pond available for user comparison. The choice of comparing to background values derived from the sagebrush sites is more conservative than using those values derived from the Contingency Pond. The majority of analytes have lower threshold values when calculated from the sagebrush background. For instance, of all the compared ICP total metals, only aluminum and chromium have higher threshold values. This is not an unbiased comparison to background. It may result in flagging locations that are not abnormal in terms of a broader background population. Both are local backgrounds. Neither background is recent pond sediment. Nutrient cycling, weathering, primary productivity, and physical environment are all drastically different between the surrounding desert and an aquatic environment.

6.0 COMPARISONS TO BACKGROUND

Comparisons to background were made using a tolerance interval approach. Analysis followed a scheme similar to that outlined in the EPA guidance *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (EPA 1989a, p 5-19 to 5-22). An analysis of variance (ANOVA) approach was not used because individual values are of prime concern; ANOVA is concerned with mean concentrations.

The tolerance interval approach allows comparison of individual values. It is most useful where there are not large natural spatial variations in the analytes of interest. The tolerance interval approach uses the background data to generate a confidence interval estimate of a quantile. For a one-sided confidence interval, a value is established to below which at least a specified proportion of the population lies with a specified confidence coefficient. EPA recommends using a 95% coverage ratio with a 95% confidence coefficient for RCRA groundwater monitoring (EPA 1989a, p 5-19). Tolerance intervals can be constructed assuming that the data or the transformed data are normally distributed. Nonparametric tolerance intervals can be constructed, but require such a large number of observations for similar coverage and confidence as to be impractical. The parametric tolerance interval is sensitive to departures from the assumed distribution.

The assumption that the data are normally distributed with an unspecified mean and variance may be tested using the Shapiro-Wilk test statistic. A discussion of the computation and use of statistic is provided by Gilbert (1987). Table 4 displays the Shapiro-Wilk test statistic for many of the analytes of the Phase 1 sagebrush area background samples. Unfortunately, the small number of Phase 1 background observations do not provide much data for definitive conclusions. For those analytes where all or nearly all background values are below CDL, the statistic was not calculated. Based on the available data, the assumption of a normal distribution was rejected for ammonium, zinc, and zirconium. If the normal assumption was rejected a lognormal assumption was tested. In this case, the test was applied to the natural logarithms of the observations. Ammonium values may be lognormally distributed. The lognormal assumption is rejected for zinc and zirconium.

The upper tolerance limit is calculated for most samples based on the normal assumption. This means that, given the assumption of a normal distribution and a 95% level of confidence, at least 95% of the background population is expected to be less than the tolerance limit. Using this approach, the upper tolerance limit is equal to the sum of the background average and a factor (K) times the background standard deviation. The value used for K is 4.210 and corresponds to a sample size of five for the stated coverage and confidence (Gilbert 1987, p 256). The calculated upper tolerance limits will be used as the threshold values. For ammonium, the natural antilog of the threshold value based on natural logarithm transformed data is compared to site values. In the cases of zinc and zirconium, a nonparametric approach is used. Here, the threshold value is set equal to the highest of the five observed background concentrations. The coverage and confidence is much less than using the normal assumption for the same sample size. Using a nonparametric, one-sided tolerance interval based on only five random samples, it could be expected with 95% confidence that at least 50% of the background population is less than the observed maximum value. Coverage of 95% and a confidence level of 95% would require a sample size of 59 (Conover 1980, p 447).

When data below the administratively determined CDL were available for calculating a limit, they were used with caution. The threshold values based on such data may have associated <u>relative</u> errors larger than those analytes for which quantitation is more certain. This is a matter of degree. The absolute errors may still be quite small. Substitution of arbitrary values for real data is not a preferable alternative (see Gilbert 1987, p 178). If the calculated threshold value was below a respective CDL, the CDL became the defacto threshold value since the project had established these a priori as minimum required levels (the project QA plan [Roos and Woodworth 1989] established minimum project requirements). The laboratory was accountable for individual values to that limit. When the threshold value exceeded the CDL, the comparisons were made in the usual fashion.

Table 4. Shapiro-Wilk W Test for Normality ($W_{0.05}$).

Analyte	W-statistic		Analytes not calculated
	Raw data[a]	Log values[b]	
Ammonium	0.749 Reject	0.863 Accept	Selenium
Arsenic	0.842 Accept		Cyanide
Lead	0.906 Accept		Mercury
Sulfide	0.979 Accept		Thallium
Chloride	0.898 Accept		Bromide
Nitrite	0.958 Accept		Fluoride
Nitrate	0.792 Accept		Arsenic[c]
Phosphate	0.854 Accept		Barium[c]
Sulfate	0.935 Accept		Cadmium[c]
Gross alpha	0.907 Accept		Chromium[c]
Gross beta	0.902 Accept		Lead[c]
Aluminum	0.877 Accept		Selenium[c]
Cadmium	0.923 Accept		Silver[c]
Calcium	0.946 Accept		Mercury[c]
Chromium	0.790 Accept		Boron
Cobalt	0.892 Accept		Molybdenum
Copper	0.906 Accept		
Iron	0.939 Accept		
Lithium	0.901 Accept		
Magnesium	0.969 Accept		
Manganese	0.900 Accept		
Nickel	0.781 Accept		
Potassium	0.953 Accept		
Silver	0.957 Accept		
Sodium	0.852 Accept		
Strontium	0.804 Accept		
Titanium	0.951 Accept		
Vanadium	0.897 Accept		
Zinc	0.646 Reject	0.650 Reject	
Zirconium	0.739 Reject	0.745 Reject	
Acetone	0.816 Accept		

[a]Null hypothesis: Distribution normal
[b]Null hypothesis: Distribution lognormal
[c]EP toxicity.

Multiple observations (field and/or laboratory duplicates) from a single jar or bowl of soil were not used as independent estimates of the overall site population parameters. Most locations in the study were represented by a single estimate. When multiple values were available, they were used to generate estimates of the population from which they were randomly allocated by using their mean. Laboratory duplicates represented the multiple observations on the individual sample. Likewise, field duplicates represented multiple observations at the specific sampling location. Thus, if sampling point values for a hypothetical analyte were 22, 10, 44, 25, and at a field-duplicated point (48 and 46), the overall population mean and standard deviation would be calculated based on the first four values and 47 as the representative fifth value.

The background threshold value for each analyte is recorded in Appendix A. Each was compared to every observed value. All observations exceeding their threshold value were recorded. Background observations from the unused dry contingency basin were also compared for reference. Only sample observations exceeding the threshold value are recorded in the list.

An asterisk in the far right-hand column of Appendix A denotes those field and/or laboratory duplicate samples whose respective average was less than the threshold value.

7.0 TABULATION OF DATA

7.1 DETECTION LIMIT AND OTHER QA FLAGS

Appendix B is a compilation of total metals data using a strong acid digestion and analysis by ICP. Appendix C contains data collected for other analyses. Not included in the summaries are data for those analytes that were entirely below detection limits. "Detection limit" as used throughout this report refers to a CDL, except where noted. A CDL is commonly used as a minimum goal required by a laboratory hired to do chemical analyses. In many cases this limit is derived directly from the prescribed standard procedure.

There are several ways of defining detection limits. The limit of detection (LOD) is a commonly used term referring to the mean plus three standard deviations of the signal from a reagent blank (this definition is clearly limited to those determinations that do not involve subtraction of a blank). The term method detection limit (MDL) is another form of detection limit definition based on a sample that actually contains the analyte at low levels. The EPA uses a multiple of the standard deviation of such observations to define MDL (EPA 1986, Revision 1, p one-16). The limit of quantitation (LOQ) is calculated from reagent blanks like an LOD but is a factor of 10 standard deviations from the mean of the blanks instead of three. Ideally, all measurements would be in excess of a quantitation limit for the method. Data in the appendices are flagged based on reagent blanks analyzed during the same period as Phase 1 data, and on the silica sand field blanks.

This report has attempted to present all data for those analytes above CDLs and appearing as potential contributors to any hazardous waste inventory at B Pond. Beryllium, barium, antimony, silicon, and tin are not listed among the elements disposed at B Pond according to the 216-B-3 closure plan (DOE-RL 1990, p 4-1 to 4-14). These five analytes are <u>only</u> considered in the Analyte Summary (Section 8), with the exception of EP-toxicity barium. In some cases, analytes are shown even though all site data were below CDL (most such data are summarized in Section 8). Much of the data presented in the appendices are below CDLs and flagged as such. The information was obtained from chemist bench sheets and should be considered as auxiliary, semi-quantitative information. Values calculated need to be used appropriately. Information below these limits can be useful to the data analyst.

Reagent blank data for the period of analyses, adjusted for nominal soil sample size, and data from the silica sand field blanks were scrutinized for evidence as to whether or not the contract laboratory was meeting CDL goals. There is evidence that the CDLs for total lead, mercury, sulfide, and selenium were ambitious. Except mercury, each estimated LOD for these analytes was below it's CDL, but LOQs were slightly in excess of these limits. Background noise on which LOD and LOQ are dependent can become magnified by dilution factors or inversely sample size used in the analysis and subsequent calculations. This has significance in the case of B Pond total mercury estimates. Based on nine reagent blanks and a nominal sample size of 0.2 g, mercury had an LOD of 0.39 µg/g and an LOQ of 2.92 µg/g -- both in excess of the 0.2 µg/g CDL.

Another purpose of the data tables in Appendices B and C are to help integrate a variety of QA flags with the numerical data. Reagent blanks, field blanks, MS/MSD, estimates of detection or quantitation limits, surrogate recoveries, etc., are used in constructing the tables. Laboratory quality control (QC) was not performed on a sample delivery batch basis but on a process basis. Because sample delivery groups were not traceable through the analytical process, flags for blanks and matrix recoveries were done on a per-analytical-day basis. Field blanks, though collected with a sample, were not necessarily analyzed the same day as associated samples, which makes batch interpretation very difficult. A single problem with a QA sample may generate flags on multiple analytical dates, unless there was contrary evidence to disassociate that QA anomaly with collection, extraction, and analytical dates. Holding times originate from the RCRA groundwater monitoring limits. The holding times are based upon liquid samples.

7.2 ACCURACY AND PRECISION ESTIMATES

Accuracy was assessed by MS and MSD on a project basis. Table 5 lists accuracy achieved on samples submitted in Phase 1. The average percent recovery, standard deviation of the percent recovery, and number of spikes (observations) is displayed. The laboratory determined which samples to spike as part of their routine QC.

Precision was assessed by field duplicates. No field duplicates were submitted for the analyses done on composite samples. Precision estimates are shown in Tables 6a and 6b. Both standard deviation and relative standard deviation are shown. Relative variability increases dramatically below the CDL, but is usually stable over a wider range than absolute variability. For those analytes where variability markedly trends upward with concentration, a graph is provided in Appendix D to help assess precision at the concentration of interest. A normal regression curve is not drawn through the points because standard deviation would not be expected to be normally distributed.

Table 5. Summary of Matrix Spike/Matrix Spike Duplicate Results.

Analyte	Spike Level		% Recovery					
			Soil/Sediment			Water		
	Soil, µg/g	Water, µg/L	Avg	Std Dev	n	Avg	Std Dev	n
EP Toxic Metals[a]								
Arsenic, µg/L	1,000	1,000	87.8	18.92	16	100.1	0.41	2
Barium, µg/L	2,000	2,000	103.3	4.87	18	103.8	0.81	2
Cadmium, µg/L	50	50	100.8	4.26	18	110.0	2.83	2
Chromium, µg/L	200	200	103.1	6.86	18	102.3	1.06	2
Lead, µg/L	500	500	95.1	4.91	16	103.1	0.14	2
Selenium, µg/L	1,000	1,000	94.8	6.75	16	99.8	1.48	2
Silver, µg/L	50	50	91.9	5.37	18	83.0	1.41	2
Mercury, µg/L	0.3	0.3	100.0	4.71	4	100.0	0.00	2[c]
Metals								
Aluminum	400		102.0	7.07	2			
Antimony	50		55.6	13.22	16			
Barium	400		96.2	4.37	16			
Beryllium	5		94.1	3.70	16			
Boron	50		84.6	4.11	16			
Cadmium	5		103.0	15.66	16			
Calcium	1,000		113.8	12.40	6			
Chromium	20		96.8	10.40	16			
Cobalt	50		93.8	6.23	16			
Copper	25		96.6	13.11	16			
Iron	100		135.0	65.05	2			
Lithium	50		101.5	4.50	16			
Magnesium	200		103.5	12.01	4			
Manganese	50		103.3	9.95	6			
Molybdenum	50		93.5	3.48	16			
Nickel	50		92.1	6.85	16			
Potassium	400		108.1	14.90	16			
Silicon	50		105.3	22.48	3			
Silver	5		83.9	11.86	16			
Sodium	800		110.8	10.63	16			
Strontium	50		107.2	8.08	16			
Tin	50		91.8	4.33	16			
Titanium	50		101.0	4.24	2			
Vanadium	50		118.9	19.59	16			
Zinc	50		100.7	11.93	16			
Zirconium	50		99.4	8.62	16			
Arsenic	5	50	83.7	5.12	14	90.0	2.83	2
Lead	5	50	95.1	6.15	14	95.0	1.41	2
Mercury[a]	1	0.3	110.0	8.94	16	101.7	1.91	4
Selenium	5	50	91.3	3.91	14	101.0	1.41	2
Thallium	5	50	92.6	5.73	14	89.0	1.41	2
Ions								
Cyanide	5	100/50	92.6	4.33	14	99.4	0.28	2
Sulfide	100	5,000	74.7	15.81	18	85.3	0.85	2
Ammonium	20	200	81.8	14.50	16	108.5	0.71	2
Bromide	1	1,000	105.1	9.51	20	102.7	0.35	2
Chloride[b]	1	1,000	106.4	7.48	18	103.5	0.71	2
Fluoride	1	1,000	74.6	16.03	20	95.7	1.20	2
Nitrate	4	4,000	97.1	10.77	20	97.3	0.34	2
Nitrite	1	1,000	97.5	36.07	20	102.4	1.48	2
Phosphate	4	4,000	54.8	29.36	20	91.5	2.12	2
Sulfate[b]	4	4,000	98.5	12.57	18	99.2	0.07	2
Volatiles								
Benzene	0.2 to 0.5	20	94.1	10.8	18	136.0	7.1	2
Toluene	0.2 to 0.5	20	93.7	12.2	18	128.0	9.9	2
Trichloroethene	0.2 to 0.5	20	91.9	11.5	18	127.5	7.8	2
Chlorobenzene	0.2 to 0.5	20	103.0	11.3	18	123.5	9.2	2
1,1-Dichloroethene	0.2 to 0.5	20	74.6	21.8	18	129.5	12.0	2

[a]Statistics for water matrices derived from contract laboratory QC report for first quarter FY90. (Matrix spike recoveries were not reported for B Pond-specific water samples.)
[b]Excludes B-105 soil matrix spike/matrix spike duplicates due to level in sample.

Table 6a. Field Duplicates/Precision
B Pond Phase 1 Soil/Sediment Samples (11 Duplicate Pairs).

Analyte	Absolute Std Dev	Relative Std Dev, %	Comments
EP Toxic Metals, µg/L			
Arsenic	8.42	NC	All below CDL
Barium	20.1	9.71	All below CDL
Cadmium	4.21	76.2	All below CDL
Chromium	1.67	NC	All below CDL
Lead	3.81	NC	All below CDL
Selenium	13.1	NC	All below CDL
Silver	0.52	NC	All below CDL
Mercury	NC	NC	Reported as <CDL
Metals, µg/g			
Arsenic	0.41	21.7	
Lead	35.6	31.7	See Appendix D
Mercury	0.33	39.6	See Section 8.1.3
Selenium	0.06	58.0	All below CDL
Thallium	0.05	45.7	All below CDL
Aluminum	963.0	15.0	
Boron	0.1	NC	All below CDL
Cadmium	0.690	9.76	
Calcium	532.0	9.36	
Chromium	1.85	21.5	
Cobalt	0.795	10.0	
Copper	1.62	10.6	
Iron	2,273.0	9.58	
Lithium	0.823	12.5	
Magnesium	454.0	9.20	See Appendix D
Manganese	54.3	14.7	
Molybdenum	NC	NC	All below CDL
Nickel	1.77	18.9	
Potassium	159.0	17.8	
Silver	0.20	90.3	
Sodium	26.4	10.2	
Strontium	1.97	8.08	
Titanium	201.0	11.8	
Vanadium	5.90	12.3	
Zinc	8.60	14.8	See Appendix D
Zirconium	2.84	12.5	See Appendix D
Ions, µg/g			
Cyanide	0.013	27.3	All below CDL
Sulfide	0.778	147.0	All below CDL
Ammonium[a]	1.17	50.8	See Appendix D
Bromide	0.00	NC	All below CDL
Chloride	0.457	29.6	See Appendix D
Fluoride	0.082	18.4	All below CDL
Nitrate	0.179	68.3	All below CDL with two exceptions
Nitrite	0.022	14.7	All below CDL
Phosphate	0.347	19.1	All below CDL with one exception
Sulfate	8.61	19.4	See Appendix D
Radiological, pCi/g			
Gross alpha	0.655	39.0	
Gross beta	3.94	5.89	
Volatiles[b], µg/g (All <SW-846 PQL)			
Acetone	0.036	63.7	7 of 22 observations <CDL
Methyl ethyl ketone	0.0024	5.61	All below CDL

[a]Values given are on the untransformed data. The standard deviation and coefficient of variation on the natural-log transformation of the data are 0.299 and 42.9%, respectively.
[b]Based on nine paired duplicates (two pair lost due to freezing).
CDL = contract detection limit.
NC = not calculated.
PQL = practical quantitation limit.

Table 6b. Field Duplicates/Precision Water Samples (One Duplicate Pair)[a].

Analyte	Absolute Std Dev, µg/L	Relative Std Dev, %	Analyte	Absolute Std Dev, µg/L	Relative Std Dev, %
EP Toxic Metals			Ions		
Arsenic	2.83	20.2	Cyanide	NC	NC
Barium	1.41	4.71	Sulfide	NC	NC
Cadmium	0.00	NC	Ammonium	NC	NC
Chromium	0.00	NC	Bromide	NC	NC
Lead	8.49	141.0	Chloride	53.0	2.0
Selenium	0.71	4.29	Fluoride	2.1	1.5
Silver	0.71	141.0	Nitrate	149.0	64.4
Mercury	0.00	NC	Nitrite	NC	NC
			Sulfate	25.5	0.0
Metals					
Arsenic	0.0007	47.1	Radiological, pCi/L		
Lead	0.0007	141.0			
Mercury	0.00	NC	Gross alpha	0.54	19.0
Selenium	0.0007	141.0	Gross beta	2.16	101.6[b]
Thallium	0.0007	20.2			
			Volatiles (none detected)		

[a]Data used to compute precision were <CDL except for chloride, sulfate, and gross alpha
[b]One of two lab-estimated analytical error (2 sigma)
CDL = contract detection limit.

8.0 ANALYTE SUMMARY

8.1 SUMMARY OF METAL ANALYSES

Metals requested for analysis (Tables 2a and 2b) will be described relative to holding time, concentrations exceeding the threshold value, and CDL. According to RCRA, B Pond is categorized as a surface impoundment, which is a depression or diked area used for storage, treatment, and disposal of hazardous waste in liquid or semisolid form. The compliance of such a facility is influenced by 40 CFR 264 (EPA 1989b). Metals listed in *Groundwater Monitoring List*, 40 CFR 264, Appendix IX, will be of priority concern. The following list represents those metals requested for analysis using ICP analysis, Method 3050/6010; atomic absorption/graphite furnace analysis, Method 7421; and cold vapor atomic absorption analysis, Method 7470. The metals of the EPA groundwater monitoring list (EPA 1989b) are underlined.

aluminum	cadmium	lead	nickel	strontium	zirconium
antimony	calcium	lithium	potassium	thallium	
arsenic	chromium	magnesium	selenium	tin	
barium	cobalt	manganese	silicon	titanium	
beryllium	copper	mercury	silver	vanadium	
boron	iron	molybdenum	sodium	zinc	

Aluminum, boron, calcium, iron, lithium, magnesium, manganese, molybdenum, potassium, silicon, strontium, titanium, and zirconium are metals that are common to most soils in concentrations less toxic than other metals. These metals are also easily complexed by other soil components. For these reasons, these metals have been omitted or not included in the *Groundwater Monitoring List*, 40 CFR 264, (EPA 1989b, Appendix IX). These elements are naturally occurring in soil and geologic minerals that eventually undergo dissolution and become components of the soil. Table 7 lists these elements in typical soil concentration ranges throughout the world (Clark and Washington 1924, Swaine 1955, Vinogradov 1959, Jackson 1964, Mitchell 1964, Taylor 1964, Bowen 1966, Lindsay 1979, Barber 1984, and Bohn et al. 1985). The far right column represents the highest value above the background level for that particular element in B Pond.

Apparent from comparing the two sets of data in Table 7, concentrations of those elements, determined by ICP Method 3050/6010 for B Pond, are within normal soil concentration ranges. Amended by the omission from the EPA groundwater monitoring list (EPA 1989b, Appendix IX), the above soil concentrations pose little threat for human, animal, or plant health of B Pond.

The metals from the groundwater monitoring list are listed in Table 8 with respective typical soil concentration ranges throughout the world (Clark and Washington 1924, Swaine 1955, Vinogradov 1959, Jackson 1964, Mitchell 1964, Taylor 1964, Bowen 1966, Lindsay 1979, Barber 1984, Bowen 1979, and Bohn et al. 1985). The far right column represents the highest observed value for that particular element in B Pond. Apparent from comparing the two sets of data in Table 8, cadmium, lead, and mercury total metal concentrations for B Pond are higher than the upper limits of the common ranges for soils and higher than background levels of B Pond. Neither these elements nor arsenic, barium, chromium, selenium, or silver were close to levels demonstrating the characteristic of EP toxicity. Only a single sample in Phase 1 exceeded any respective EP toxic CDL. Except for selenium, CDLs were an order of magnitude below the EP toxic defined levels. The selenium CDL was one-half of the EP toxic defined concentration. A discussion of total cadmium, lead, and mercury, as differentiated from EP leachable, is presented relative to the threshold values and common concentration ranges.

8.1.1 Cadmium

Holding times for the sagebrush site samples were slightly exceeded. This should not significantly affect the results. Concentrations exceeding the threshold value were found in the 3A Pond, B-3 Pond, and B-3-3 Ditch. Of the eight samples taken from the 3A Pond, one was above the threshold value. Of the 30 samples taken from the B-3 Pond, 70% were above the threshold value. Of the 15 samples taken from the B-3-3 Ditch, 20% were above the threshold value. Numerous sites in the 3A Pond, B-3 Pond, and the B-3-3 Ditch exceeded the upper common soil range (7.0 µg/g) found in referenced literature. Background observations were close to this referenced value.

Table 7. Metal Concentrations in Soils.

Element	Common range for soils, µg/g	Highest observed value (Method 3050), µg/g
aluminum	10,000 to 300,000	16,699
boron	2 to 100	<1.0 CDL
calcium	7,000 to 500,000	16,510
iron	7,000 to 550,000	37,479
lithium	5 to 200	16
magnesium	600 to 10,200	7,423
manganese	20 to 3,000	856
molybdenum	0.2 to 5	<4.0 CDL
potassium	400 to 30,000	2,867
silicon	230,000 to 350,000	2,093
sodium	750 to 7,500	465
strontium	50 to 1,000	46
titanium	1,000 to 10,000	2,917
zirconium	60 to 2,000	39

Table 8. Groundwater Monitoring List Metals (EPA 1989a).

Element	Common range for soils, µg/g	Highest observed value (Method 3050), µg/g
antimony	0.2 to 10	<10.0 CDL
arsenic	1 to 50	<background of 4.9
barium	100 to 3,000	116.4
beryllium	0.1 to 40	<0.5 CDL
cadmium	0.01 to 7	22.6
chromium	1 to 1,000	34.5
cobalt	1 to 40	11.2
copper	2 to 100	43.1
lead	2 to 200	618.0
mercury	0.01 to 0.3	15.6
nickel	5. to 500	19.2
selenium	0.1 to 2	<1.0 CDL
silver	0.01 to 5	5.1
thallium	0.1 to 0.8	<1.0 CDL
tin	2 to 200	11.8
vanadium	20 to 500	81.8
zinc	10 to 300	111.3

8.1.2 Lead

Lead was determined using Method 7421, atomic absorption/graphite furnace analysis. This analysis also employs Method 3050 extraction technique. Concentrations exceeding the threshold value were found in B-3 Pond. Of the 30 samples taken from B-3 Pond, 70% were above the threshold value. Three of the 22 sample collection points were above the upper limit of 200 µg/g lead for soils.

8.1.3 Mercury

Mercury was determined using cold vapor atomic absorption analysis. For the five sage site samples, all values for mercury analysis were less than the CDL of 0.2 µg/g. All values less than this were reported by the laboratory only as less-than values. For computation of precision statistics, all mercury less-than values were assigned a value equal to 0.2 µg/g. Values exceeding the CDL were found in the B-3 Pond and the B-3-3 Ditch. Of the 30 samples taken from the B-3 Pond, 73% were above the threshold values. Of this 73%, 95% were above the upper limit of 0.3 µg/g mercury for soils. Of the 15 samples taken from B-3-3 Ditch, 20% were above the threshold values. Of this 20%, 33% were above the upper limit of 0.3 µg/g mercury for soils. Only two observations from the main pond (7.0 and 15.6 µg/g) were above both a dilution adjusted LOQ and LOD.

8.2 IONS

8.2.1 Ammonium

Many holding times were exceeded for this analysis. All background samples exceeded the 28-day allowed holding time by approximately 2 weeks. The threshold value may be biased by the affect of holding time. The MS/MSD associated with these background samples was also the lowest recorded, (average = 57.5%).

Sampling site values in 3A Pond and B-3 Pond exceed the threshold value estimated from available data. All water samples from the main pond were found to have ammonium levels below the 50 µg/L CDL.

Ammonium compounds were among those known to have been disposed of in B Pond. It is doubtful that these contributed to any elevated levels in the present-day sediments at the TSD. Ammonium readily undergoes physical and biological transformations. Ammonia is generated by heterotrophic bacteria as the primary end product of decomposition of organic matter (it is also a major excretory product of aquatic animals). Ammonia in solution is present primarily as ammonium. The measurement procedure does not differentiate between these two forms of nitrogen. High ammonium levels are typically associated with pollution from degradable organic matter. This type of pollution is not a viable concern given the types of effluents disposed of in B Pond. Normal sediment ammonium concentrations still need definition. Ammonification in pond sediments and subsequent sorption to the sediments, as well as accumulation in the interstitial water, would normally contribute to higher concentrations of ammonium in pond sediments than in a desert. Wetzel (1975, p 196) reports fixed and exchangeable ammonium in Wisconsin hard water oligotrophic lake sediments at 66 mg/kg each (total 132 mg/kg). Eutrophic lakes have higher total sediment ammonium concentrations. The maximum concentration found in Phase 1 samples was 16.2 µg/g. This concentration does not appear abnormally high for sediment. Production and decomposition of organic material in either the dry 3B Pond, the dry Contingency Pond, or native desert are inhibited by a lack of moisture.

8.2.2 Bromide

All bromide results were far below the 1.0 µg/g CDL. Accuracy on spike recoveries in soil averaged 105%. Precision on field duplicates was not calculated because all values were equal to zero according to chemist sheets. Clearly this is not to be a future constituent of concern.

8.2.3 Chloride

Chloride was the second most frequently detected anion behind sulfate. Chloride data are presented in Appendix C, Table C-5. The chloride values of the background sagebrush areas are below reliable detection levels. Chloride is introduced via water to B Pond. It does not appear that it is anywhere close to levels of environmental significance. The highest levels were actually found in samples from the dry unused Contingency Pond background site.

8.2.4 Cyanide

All cyanide measurements were below their respective CDL (0.5 µg/g soil, 10 µg/L water). Holding times were exceeded for all sample numbers prior to B-144. This included all background samples and all samples from 3B Pond. The holding time is 14 days. Some samples were held as long as 28 days and three were held for 5 weeks. Samples not exceeding holding times were consistent with those that did exceed holding times - no detectable cyanide. There was no detectable concentration of cyanide in the B-3 Pond water samples. All MS recoveries were acceptable.

8.2.5 Fluoride

Data for fluoride are displayed in Appendix C, Table C-6. Virtually all the data are below the CDL. The only samples reported above 1 µg/g were those with matrix effects. The one exception to this is a 1.3 µg/g value from a sample in the B-3-3 Ditch. Fluoride is not at hazardous levels in the near-surface soils and sediments of B Pond.

8.2.6 Nitrate, Nitrite

The nitrate and nitrite data are presented in Table C-7 of Appendix C. Nitrate is the predominate form of the two. There are no observed concentrations greater than the threshold value in B Pond. Levels are clearly higher in the dry sites of 3B Pond, the background sites, and the two dry sample sites of 3C Pond. The highest nitrate concentration was associated with a native background site.

8.2.7 Phosphate

Phosphate data are displayed in Table C-8 of Appendix C. All site data are below CDL. There are no observed concentrations greater than the threshold values at the site. Levels are higher in the native sage area than the soils and sediments of B Pond. Phosphate should no longer be an analyte of concern in the near-surface soils and sediments of B Pond.

8.2.8 Sulfate

Sulfate data are displayed in Appendix C, Table C-9. The graph of field duplicates, Appendix D, shows a strong correlation between variability and concentration over the ranges found at B Pond. Under the normal distribution, the mean and standard deviation are uncorrelated. If the mean and standard deviation estimates generated from repeated sampling are proportional to each other, then the parent population is not normally distributed. A lognormal tolerance interval would be a better choice to apply in this case. Although field duplicate data were not restricted to background sites, they suggest that the tolerance interval should not be based on a normal distribution. A lognormal distribution would result in a higher threshold value. Only observations associated with the B-3 Pond would exceed value. Note that in either case, the unused Contingency Pond is far higher in sulfate than the TSD unit. This anion can be found in higher concentrations from natural weathering of soil materials and other processes than is found in B Pond.

8.2.9 Sulfide

Only two samples were above the CDL (10 µg/g) among all sites. Sample B-179 from 3C Pond was reported at 10.9 µg/g and sample B-198 from 3A Pond was reported at 25.7. All background samples were analyzed 1 to 2 weeks after holding times had expired. Both associated pairs of MS/MSD analyzed that day had low-spike recoveries (58%/60% and 50%/49%). The low recovery was attributed by the laboratory to a matrix effect. The average of either type of background site was below one-half the CDL. A LOD calculated from the five reagent blanks, (average + 3s), is below the CDL, but an LOQ (average + 10s) is equal to 16.7 µg/g.

The holding time of 7 days was exceeded by 1 to 2 weeks for samples B-101 through B-142. Samples B-152 to B-163 and B-184 to B-193 exceeded the holding time by 1 to 4 days. This problem affects all measurements from either background, 3B Pond, and the B-3-3 Ditch. Sample B-118, a sample from the B-3 Pond analyzed 28 days after collection, also had low spike recoveries attributed to matrix effects. Another sediment sample from the B-3 Pond analyzed on the same day had satisfactory recoveries. All water samples analyzed for sulfide were reported below CDL (1 µg/mL).

The data are weak, but do not indicate dangerous concentrations of sulfide. It is a naturally occurring compound in pond sediments and would be consistent with observed concentrations of sulfate in excess of that observed from the sagebrush sites.

8.3 ORGANICS

8.3.1 Chlorinated Herbicides

All composite samples were tested for the herbicides 2,4-D, 2,4,5-T, and 2,4,5-TP (Silvex). The CDL were 1.0 µg/g for each analyte in soil samples and 2.0 µg/L in water. None of the herbicides were found present in any of the samples. The surrogate 2,4-DB was reported slightly out of limits for sample B-162 (60%) and B-169 (44%) versus the 63% to 151% allowable range. Sample B-162 was the composite sample from the lower part of the B-3-3 Ditch. Sample B-169 was a composite containing material from the inlet area of the pond, the deepest sampling location, and one other site. Another aliquot of this sample was reextracted and reanalyzed, and the results were consistent. The laboratory attributed the low surrogate recovery to a matrix effect. The sample was noted to have formed an emulsion during the extraction process. The MS/MSD analyses are not available for B Pond samples. Method performance for soil matrices appears very poor based on reported spike recoveries for the scant data several months prior to and after analysis of B Pond samples. The allowed QC limits referred to previously were established by the laboratory, but it is not clear from the available data that the method was capable of meeting those limits. Phase 1 data do not contradict that the site is clean with respect to the aforementioned herbicides, but the analytical evidence is not conclusive. The volume of water passing through the system and site disposal practices argue against significant quantities of these herbicides being present in the sediments of the pond.

8.3.2 Chloropesticides

Analysis for the chloropesticides consisted of all the analytes listed in Table 3 under the heading "Pesticides, Enhanced". Respective soil and water matrix minimum CDL are also given in Table 3. Several samples required raising the reported less-than value due sample specific matrix effects. Samples B-150, one of five composite sediment samples from the main pond, was associated with a twentyfold increase in reported less-than levels for all analytes. Samples B-133, B-141, and B-169 had detection levels increased tenfold for those analytes with retention times less than 10 minutes. These three composite samples were also from B-3 Pond. Analytes reported to higher detection limits included all four benzene hexachloride (BHC) compounds, heptachlor, heptachlorepoxide, aldrin, and alpha endosulfan. Samples B-199 and B-204 were reported likewise. Additionally, DDE was reported as less than a tenfold increased limit due to matrix effects in these two samples from 3A Pond. Surrogate recoveries for dibutylchlorendate and/or 2,4,5,6-tetrachloro-meta-xylene were all within acceptable limits. A MS/MSD was performed on sample B-181. Spikes of endrin, lindane (gamma BHC), DDT, heptachlor, dieldrin, and aldrin at 0.2 to 0.5 µg/g were performed. Recoveries of endrin were high; however, the problem was later traced to interference in the standard (high chlorobenzilate concentration). All remaining spikes had acceptable recoveries that ranged between 95 and 126%. Phase 1 data supports the initial perceptions that the chloropesticides are not a serious constituent of concern in the soil and sediments of B Pond.

8.3.3 Phosphorous Pesticides

Phosphorous pesticides analyzed for include tetraethylpyrophosphate, carbophenothion, disulfoton, dimethoate, methylparathion, parathion, and phorate. The soil CDL was 1.0 µg/g for all except dimethoate, which was 2.0 µg/g. Water CDLs were 2.0 µg/L for all compounds. No compound was reported at or above it's respective limit. A MS/MSD was performed on sample B-181. The respective recoveries were an acceptable 76 and 88% using a spike level of 2.0 µg/g. A spike was not performed on the single B Pond water sample submitted for this analysis, but the laboratory QC-report for the respective quarter shows 10 MS during the quarter; all were acceptable and ranged 88 to 118%. All holding times were met.

The organophosphate pesticides are known to degrade rapidly in soil, and the rate of degradation increases with moisture content (Guenzi 1974). According to Pionke and Chesters (1973) most organophosphorus insecticides, with the exception of diazanon which degrades in acid, are hydrolyzed in water at alkaline pH. Phase 1 sampling confirmed that the above phosphorus pesticides are not a constituent of concern in the sediments of B Pond.

8.3.4 Polychlorinated Biphenyls

Polychlorinated biphenyls tested for included arochlors 1016, 1221, 1232, 1242, 1248, 1254, and 1260. The minimum CDL for soil is 1.0 µg/g and the minimum for water is 1.0 µg/L. Matrix effects required dilution and upward adjustment of the reported less-than values twentyfold on samples B-150 (for arochlors 1016-1254), and B-199 (for arochlors 1221, 1232, 1242, and 1260). Tenfold adjustments were required on sample B-204 for the same arochlors adjusted in reporting sample B-199. Fivefold dilutions were required due to high background noise in samples B-133 and B-141 for the above arochlors. The remaining seven composite samples did not require dilutions. All samples were reported as less than their respective detection limits. A MS/MSD was run on sample B-192 using arochlor 1254. The recoveries of 116 and 120% were well within the acceptable limits. All surrogate recoveries for each sample were within acceptable limits with one exception. Sample B-127, a composite of three samples from the B-3 Pond, had a low recovery for surrogate dibutylchlorendate (1.3%) and a high surrogate recovery for 2,4,5,6-tetrachloro-meta-xylene (289%). Typical recoveries range 20 to 150%. Other composite samples from the B-3 Pond showed no evidence of contamination. Surrogate recoveries for the single composite water sample from the B-3 Pond were acceptable. A MS was not done on this specific sample, but all six water sample MS reported in the laboratory QC report for the respective quarter were acceptable. Phase 1 data do not indicate polychlorinated biphenyls contamination in the near-surface sediments of B Pond.

8.3.5 Semivolatiles

Bis(2-ethylhexyl)phthalate was the only compound identified from the entire target list of Table 3 for either soil, sediment, or water samples. It was identified at 2.4 µg/g in sample B-169, 3.5 µg/g in B-181, and

6.7 µg/g in B-182. All three results are considered qualified nondetects due to associated blank contamination at 8.0 µg/g. Six compounds were used as surrogates in the analysis, (2-fluorophenol, phenol-D5, nitrobenzene-D5, 2-fluorobiphenyl, 2,4,6-tribromophenol, and p-terphenyl). All surrogate recoveries were within acceptable limits as determined by EPA methods (EPA 1986).

Matrix spikes were run on sediment sample B-127 for several compounds as shown in Table 9. Spike recovery for one compound was less than 10% over its respective advisory limit. All other spike recoveries are within guideline limits. There is no indication that any of the long list of compounds analyzed by this method should continue to be constituents of concern in the near-surface sediments of B Pond.

Table 9. Semivolatile Spike Recoveries.

Compound	Spike added, ng	% Rec	
		MS	MSD
p-chloro m-cresol	100	55.6	54.0
2-chlorophenol	100	49.8	60.3
di-n-butylphthalate	50	127.4a	72.8
1,4-dichlorobenzene	50	39.8	45.4
2,4-dinitrotoluene	50	71.6	59.2
n-nitroso-di-n-propylamine	50	47.4	60.2
4-nitrophenol	100	71.2	80.3
pentachlorophenol	100	93.3	79.0
1,2,4-trichlorobenzene	50	61.0	54.2
phenol	100	39.7	36.8
acenaphthene	50	51.0	89.4
pyrene	50	63.6	65.6

[a]Spike recovery outside advisory QC limits for this compound from water.

8.3.6 Volatile Organics

Volatile organics found were generally insignificant. Data for the volatiles are shown in Appendix C, Tables C-10 through C-13. Acetone was present in more samples than any other organic compound. None was reported in the Contingency Pond samples, but all other categories including the field equipment sand blanks, samples from the native sagebrush area, and laboratory blanks had some samples with acetone above the 10 µg/kg CDL.

The two highest concentrations of acetone reported were from samples B-115 (333 µg/kg) and B-129 (160 µg/kg); both samples were from the B-3 Pond. Neither is believed to be representative of actual field conditions. Sample B-129 was a field duplicate. Acetone reported in it's respective pair (B-128) was less than the 10 µg/kg CDL (moisture considered). Sample B-115 not only had the highest reported concentration for acetone, but also the other common laboratory contaminants. The sample had the highest reported values for methyl ethyl ketone and methylene chloride. Some methyl ethyl ketone was thought to originate from fresh paint in one of the laboratory rooms according to the quarterly QC report

supplied by the contract laboratory. Methylene chloride is a common laboratory solvent. The reported sample was run on August 22, 1989; however, the MS/MSD were run prior to this date on August 16, 1989. There are no reported sample results for this date. With the exception of problem sample B-115, all other compounds found in the B-3 Pond are below the practical quantitation guidelines of EPA (1986, Revision 1).

The contract laboratory program guidelines use a 10x rule for evaluating common laboratory contaminants in environmental samples. If an associated blank is noted to have a certain level of a common laboratory contaminant, the data are qualified as a nondetect when they are above the CDL but within 10 times the concentration found in the blank.

A tentatively identified compound (1,3-dichlorobenzene) was found in two 3B Pond samples. One of these samples was a field duplicate. It's respective pair had no detectable trace of the compound. This compound has also been reported in the laboratory QC report as one of several present in water matrix (volatile organic analysis) blanks during the respective quarter and in a soil (volatile organic analysis) blank in the following quarter. The fact that it is at a very low level was not present in any of the other samples from 3B Pond and is known to have potential as a laboratory contaminant suggest it is an artifact of the measurement system.

8.4 RADIONUCLIDES

The data on gross alpha, gross beta, strontium-90 concentration, and gamma activities are listed in Appendix C, Tables C-14 and C-15. These parameters are not regulated under current RCRA regulations. The data are presented in the appendix because they were collected as part of the Phase 1 B Pond investigations. Background samples were not collected, nor were comparisons made. Levels of radioactivity were surprisingly low in the sampled material. The highest observed gross beta measurement (718 pCi/g) was from a 3C Pond sample.

9.0 CONCLUSIONS

Phase 1 characterization efforts show additional work is needed to define acceptable levels of many naturally occurring compounds; particularly where the background is not strictly comparable. Natural spatial and seasonal differences in background may be poorly represented in highly localized background measurements.

Many analytes were investigated in Phase 1. These compounds do not appear present at hazardous levels in the sampled near-surface soils and sediments of B Pond. There are many observations greater than native background in the B-3 Pond. Lead, cadmium, and mercury are believed to be the most significant. Each element was far below levels exhibiting the characteristic of EP toxicity. None of the data indicate that the near-surface soil/sediment would be classified dangerous waste under any of the WAC 173-303, *Dangerous Waste Regulations* (Ecology 1989). Further

characterization activities of the soil profile with depth should pay close attention to QA for volatile organic analysis sampling. Sampling for other organic analyses is not justified based on Phase 1 results.

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APPENDIX A

OBSERVATIONS EXCEEDING BACKGROUND TOLERANCE LIMIT

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APPENDIX A

OBSERVATIONS EXCEEDING BACKGROUND TOLERANCE LIMIT

Appendix A contains a list of observations exceeding a soil background tolerance limit, or when applicable, a regulatory or contract detection limit (CDL). Each observation was compared to determine if it exceeded the stated value. Where possible, an alternate background limit from the contingency pond data is provided. Inorganic analytes appear first in alphabetical order. An asterisk in "Type" column denotes those field and/or laboratory duplicate samples whose respective duplicate average is below the threshold value. (The type "Select" is used to denote those samples from judgement selected locations, i.e., nonrandom). The designation "EP" denotes results of the extraction procedure toxicity analyses for those elements previously defined for that waste characteristic. The EP results immediately follow total metal determinations where applicable. The list concludes with the organic analytes in the following order: volatile organics, semivolatiles, herbicides, pesticides, phosphorous pesticides, and polychlorinated biphenyls.

INORGANIC ANALYTES

Aluminum--Threshold value: 11,238 µg/g
(Alternate background limit: 10,090 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-114	12,189	N43400	W43300	Regular
B-3 Pond	B-129	12,327	N43600	W43000	Field duplicate*
B-3 Pond	B-130	14,913	N43500	W42900	Regular
B-3 Pond	B-132	13,370	N43300	W42900	Regular
B-3 Pond	B-134	12,052	N43100	W42800	Field duplicate
B-3 Pond	B-135	12,537	N43100	W42800	Field duplicate
B-3 Pond	B-145	11,424	N43200	W42000	Field duplicate
B-3 Pond	B-146	12,381	N43200	W42000	Field duplicate
B-3 Pond	B-147	14,119	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	16,699	N43200	W41900	Laboratory duplicate
B-3 Pond	B-148	11,384	N43300	W42000	Regular
B-3-3 Ditch	B-191	11,747	30' from head end		Select

Ammonium--Threshold value: 6.26 µg/g; lognormal TI used
(Alternate background limit: 13.98 µg/g, lognormal TI)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-198	7.59	N43200	W41550	Regular
3A Pond	B-203	7.79	N43200	W41250	Regular
B-3 Pond	B-114	7.39	N43400	W43300	Regular
B-3 Pond	B-115	8.31	N43500	W43200	Regular
B-3 Pond	B-116	9.62	N43500	W43300	Regular
B-3 Pond	B-118	9.46	N43500	W43400	Regular

Ammonium (Cont)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-119	6.91	N43800	W43400	Regular
B-3 Pond	B-128	7.33	N43600	W43000	Field duplicate
B-3 Pond	B-129	11.77	N43600	W43000	Field duplicate
B-3 Pond	B-130	9.61	N43500	W42900	Regular
B-3 Pond	B-131	10.28	N43400	W42800	Regular
B-3 Pond	B-132	9.23	N43300	W42900	Regular
B-3 Pond	B-134	10.41	N43100	W42800	Field duplicate
B-3 Pond	B-135	11.26	N43100	W42800	Field duplicate
B-3 Pond	B-138	15.59	N43400	W42500	Regular
B-3 Pond	B-139	8.44	N43500	W42500	Regular
B-3 Pond	B-140	10.23	N43700	W42100	Regular
B-3 Pond	B-143	9.9	N42800	W42000	Regular
B-3 Pond	B-145	16.2	N43200	W42000	Field duplicate
B-3 Pond	B-146	15.4	N43200	W42000	Field duplicate
B-3 Pond	B-147	14.5	N43200	W41900	Regular
B-3 Pond	B-148	11.6	N43300	W42000	Regular
B-3 Pond	B-149	7.0	N43500	W42000	Regular
B-3 Pond	B-165	6.7	N43175	W43150	Select
B-3 Pond	B-166	10.2	N43100	W42200	Regular
B-3 Pond	B-168	15.7	N43090	W42000	Select

Arsenic--Threshold value: 4.91 µg/g
(Alternate background limit: 7.59 µg/g)
All observations below threshold

Arsenic, (EP)--Regulatory threshold value: 5 mg/L
CDL = 500 µg/L
No observations >CDL

Barium, (EP)--Regulatory threshold value: 100 mg/L
CDL = 1,000 µg/L
No observations >CDL

Boron--Regulatory threshold value: not calculated (NC)
All values <CDL

Bromide--Threshold value: NC
All values <CDL

Cadmium--Threshold value: 8.23 µg/g
(Alternate background limit: 9.58 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-196	8.7	N42700	W41525	Field duplicate*
B-3 Pond	B-114	9.9	N43400	W43300	Regular
B-3 Pond	B-115	8.8	N43500	W43200	Laboratory duplicate
B-3 Pond	B-115	8.6	N43500	W43200	Laboratory duplicate
B-3 Pond	B-116	9.8	N43500	W43300	Regular
B-3 Pond	B-118	8.8	N43500	W43400	Regular
B-3 Pond	B-119	22.6	N43800	W43400	Laboratory duplicate

Cadmium (Cont)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-119	20.8	N43800	W43400	Laboratory duplicate
B-3 Pond	B-129	9.1	N43600	W43000	Field duplicate
B-3 Pond	B-130	11.7	N43500	W42900	Regular
B-3 Pond	B-131	11.2	N43400	W42800	Regular
B-3 Pond	B-132	12.2	N43300	W42900	Regular
B-3 Pond	B-134	15.8	N43100	W42800	Field duplicate
B-3 Pond	B-135	16.1	N43100	W42800	Field duplicate
B-3 Pond	B-146	8.8	N43200	W42000	Field duplicate
B-3 Pond	B-147	11.1	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	12.3	N43200	W41900	Laboratory duplicate
B-3 Pond	B-149	17.9	N43500	W42000	Regular
B-3 Pond	B-168	9.1	N43090	W42000	Select
B-3-3 Ditch	B-154	9.4	1,200' from A-29		Regular
B-3-3 Ditch	B-161	9.2	At A-29 junction		Select
B-3-3 Ditch	B-191	9.5	30' from head end		Select

Cadmium, (EP)--Regulatory threshold value: 1 mg/L
CDL = 100 µg/L
One observation >CDL; none exceeding regulatory limit

Area	Sample	µg/L	Coordinates		Type
B-3 Pond	B-119	259	N43800	W43400	Regular

Calcium--Threshold value: 4,755 µg/g
(Alternate background limit: 14,997 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-194	5,200	N42700	W41525	Field duplicate
3A Pond	B-196	5,948	N42700	W41525	Field duplicate
3A Pond	B-197	9,463	N43000	W41475	Regular
3A Pond	B-200	16,510	N43250	W41625	Regular
3A Pond	B-201	9,684	N43100	W41400	Regular
3A Pond	B-202	11,808	N43150	W41300	Regular
3A Pond	B-203	8,265	N43200	W42500	Regular
3B Pond	B-106	9,331	N42300	W40550	Regular
3B Pond	B-107	7,683	N42300	W40650	Regular
3B Pond	B-108	7,704	N42800	W40650	Field duplicate
3B Pond	B-109	7,366	N42800	W40650	Field duplicate
3B Pond	B-110	9,099	N42850	W40650	Regular
3B Pond	B-111	6,986	N42850	W40950	Regular
3C Pond	B-171	5,154	Ditch 8, 500'		Field duplicate
3C Pond	B-172	5,326	Ditch 8, 500'		Field duplicate
3C Pond	B-175	4,788	Ditch 6, 2,100'		Regular
3C Pond	B-176	5,331	Ditch 5, 1,800'		Regular
3C Pond	B-178	5,818	Ditch 4, 1,200'		Regular
B-3 Pond	B-146	4,906	N43200	W42000	Field duplicate*
B-3 Pond	B-147	5,315	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	5,400	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-152	5,090	1,279' from A-29		Field duplicate

Calcium (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3-3 Ditch	B-153	7,211	1,279' from A-29	Field duplicate
B-3-3 Ditch	B-154	9,381	1,200' from A-29	Regular
B-3-3 Ditch	B-158	5,419	950' from A-29	Field duplicate, Laboratory duplicate
B-3-3 Ditch	B-158	4,885	950' from A-29	Field duplicate, Laboratory duplicate
B-3-3 Ditch	B-159	4,889	950' from A-29	Field duplicate
B-3-3 Ditch	B-189	5,259	1,000' from head end	Regular
B-3-3 Ditch	B-191	5,064	30' from head end	Select
Cont. Bkg.	B-101	6,830	N44900 W42800	Regular
Cont. Bkg.	B-102	9,831	N45100 W42600	Regular
Cont. Bkg.	B-103	9,923	N44800 W43500	Regular
Cont. Bkg.	B-104	7,328	N44600 W43200	Regular
Cont. Bkg.	B-105	9,764	N45400 W42500	Laboratory duplicate
Cont. Bkg.	B-105	9,416	N45400 W42500	Laboratory duplicate

Chloride--Threshold value: 1.47 µg/g
(Alternate background limit: 97.0 µg/g; excluding indeterminate results)
NOTE: All sagebrush background observations are <CDL

Area	Sample	µg/g	Coordinates	Type
3A Pond	B-198	1.49	N43200 W41550	Regular
3A Pond	B-201	3.71	N43100 W41400	Regular
3A Pond	B-203	1.67	N43200 W42500	Regular
3C Pond	B-177	7.90	Ditch 3, 300'	Regular
B-3 Pond	B-114	4.04	N43400 W43300	Regular
B-3 Pond	B-115	1.63	N43500 W43200	Regular
B-3 Pond	B-116	2.01	N43500 W43300	Regular
B-3 Pond	B-119	2.05	N43800 W43400	Regular
B-3 Pond	B-130	2.56	N43500 W42900	Regular
B-3 Pond	B-131	5.58	N43400 W42800	Regular
B-3 Pond	B-132	3.60	N43300 W42900	Regular
B-3 Pond	B-134	1.81	N43100 W42800	Field duplicate
B-3 Pond	B-135	3.80	N43100 W42800	Field duplicate
B-3 Pond	B-136	4.22	N43100 W42600	Regular
B-3 Pond	B-140	2.13	N43700 W42100	Regular
B-3 Pond	B-143	1.51	N42800 W42000	Regular
B-3 Pond	B-147	4.74	N43200 W41900	Regular
B-3 Pond	B-168	1.93	N43090 W42000	Select
B-3-3 Ditch	B-154	1.84	1,200' from A-29	Regular
B-3-3 Ditch	B-161	1.83	0' from A-29	Select
B-3-3 Ditch	B-191	2.00	30' from head end	Select
Cont. Bkg.	B-101	21.7	N44900 W42800	Regular
Cont. Bkg.	B-104	17.6	N44600 W43200	Regular

Cont. Bkg. = Contingency pond background.

Chromium--Threshold value: 12.86 µg/g
(Alternate background limit: 8.78 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-115	13.6	N43500	W43200	Laboratory duplicate
B-3 Pond	B-115	12.9	N43500	W43200	Laboratory duplicate
B-3 Pond	B-116	13.1	N43500	W43300	Regular
B-3 Pond	B-130	34.5	N43500	W42900	Regular
B-3 Pond	B-131	18.5	N43400	W42800	Regular
B-3 Pond	B-132	18.1	N43300	W42900	Regular
B-3 Pond	B-135	13.5	N43100	W42800	Field duplicate
B-3 Pond	B-138	13.2	N43400	W42500	Laboratory duplicate
B-3 Pond	B-138	12.9	N43400	W42500	Laboratory duplicate
B-3 Pond	B-145	19.5	N43200	W42000	Field duplicate
B-3 Pond	B-146	25.5	N43200	W42000	Field duplicate
B-3 Pond	B-147	26.2	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	29.1	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-191	18.6	30' from head end		Select

Chromium, (EP)--Regulatory threshold value: 5 mg/L
CDL = 500 µg/L
No observations >CDL

Cobalt--Threshold value: 9.7 µg/g
(Alternate background limit: 12.8 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-138	9.7	N43400	W42500	Laboratory duplicate*
B-3 Pond	B-145	10.2	N43200	W42000	Field duplicate
B-3 Pond	B-146	10.5	N43200	W42000	Field duplicate
B-3 Pond	B-147	9.8	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	10.6	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-152	11.2	1,279' from A-29		Field duplicate
B-3-3 Ditch	B-189	9.9	1,000' from head end		Regular
B-3-3 Ditch	B-191	10.3	30' from head end		Select

Copper--Threshold value: 15.96 µg/g
(Alternate background limit: 22.76 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-196	17.2	N42700	W41525	Field duplicate*
3A Pond	B-201	18.6	N43100	W41400	Regular
3A Pond	B-202	20.1	N43150	W41300	Regular
3B Pond	B-108	16.1	N42800	W40650	Field duplicate*
3C Pond	B-171	16.3	Ditch 8, 500'		Field duplicate
3C Pond	B-172	17.9	Ditch 8, 500'		Field duplicate
3C Pond	B-177	18.5	Ditch 3, 300'		Regular
3C Pond	B-180	16.9	Ditch 1, 1,300'		Laboratory duplicate
3C Pond	B-180	16.2	Ditch 1, 1,300'		Laboratory duplicate
B-3 Pond	B-114	20.4	N43400	W43300	Regular

Copper (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3 Pond	B-115	19.2	N43500 W43200	Laboratory duplicate
B-3 Pond	B-115	17.3	N43500 W43200	Laboratory duplicate
B-3 Pond	B-116	17.7	N43500 W43300	Regular
B-3 Pond	B-128	17.9	N43600 W43000	Field duplicate
B-3 Pond	B-130	32.9	N43500 W42900	Regular
B-3 Pond	B-131	25.6	N43400 W42800	Regular
B-3 Pond	B-132	16.7	N43300 W42900	Regular
B-3 Pond	B-135	17.6	N43100 W42800	Field duplicate
B-3 Pond	B-138	17.7	N43400 W42500	Laboratory duplicate
B-3 Pond	B-138	16.7	N43400 W42500	Laboratory duplicate
B-3 Pond	B-145	18.2	N43200 W42000	Field duplicate
B-3 Pond	B-146	20.4	N43200 W42000	Field duplicate
B-3 Pond	B-147	25.2	N43200 W41900	Laboratory duplicate
B-3 Pond	B-147	27.7	N43200 W41900	Laboratory duplicate
B-3 Pond	B-148	17.4	N43300 W42000	Regular
B-3 Pond	B-164	16.9	N43175 W43150	Select-Field duplicate
B-3-3 Ditch	B-154	23.5	1,200' from A-29	Regular
B-3-3 Ditch	B-161	19.7	At A-29 junction	Select
B-3-3 Ditch	B-188	17.5	1,400' from head end	Regular
B-3-3 Ditch	B-189	17.6	1,000' from head end	Regular
B-3-3 Ditch	B-190	19.4	500' from head end	Regular
B-3-3 Ditch	B-191	43.1	30' from head end	Select
Cont. Bkg.	B-103	18.1	N44800 W43500	Regular
Cont. Bkg.	B-104	16.4	N44600 W43200	Regular
Cont. Bkg.	B-105	16.2	N45400 W42500	Laboratory duplicate*

Cyanide--Threshold value: NC
All values <CDL

Fluoride--Threshold Value: < CDL
Default to CDL, 1.0 µg/g
NOTE: All sagebrush background observations are <1/2 CDL. All contingency pond background observations are <CDL or have matrix interferences.

Area	Sample	µg/g	Coordinates	Type
B-3-3 Ditch	B-161	1.29	0'	Select

Iron--Threshold value: 29,437 µg/g
(Alternate background limit: 40,909 µg/g)

Area	Sample	µg/g	Coordinates	Type
B-3 Pond	B-129	30,750	N43600 W43000	Field duplicate*
B-3 Pond	B-131	30,250	N43400 W42800	Regular
B-3 Pond	B-132	35,716	N43300 W42900	Regular

Iron (Cont)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-135	29,724	N43100	W42800	Field duplicate*
B-3 Pond	B-138	31,085	N43400	W42500	Laboratory duplicate
B-3 Pond	B-138	29,511	N43400	W42500	Laboratory duplicate
B-3 Pond	B-146	30,006	N43200	W42000	Field duplicate
B-3 Pond	B-147	32,099	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	36,021	N43200	W41900	Laboratory duplicate
B-3 Pond	B-148	32,809	N43300	W42000	Regular
B-3-3 Ditch	B-191	37,479	30' from head end		Select
Cont. Bkg.	B-103	29,671	N44800	W43500	Regular

Lead--Threshold value: 15.16 µg/g
(Alternate background limit: 7.13 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-130	356	N43500	W42900	Regular
B-3 Pond	B-131	618	N43400	W42800	Regular
B-3 Pond	B-132	112	N43300	W42900	Regular
B-3 Pond	B-135	19.1	N43100	W42800	Field duplicate
B-3 Pond	B-136	16.9	N43100	W42600	Regular
B-3 Pond	B-138	46.6	N43400	W42500	Regular
B-3 Pond	B-139	286	N43500	W42500	Regular
B-3 Pond	B-140	25.1	N43700	W42100	Laboratory duplicate
B-3 Pond	B-140	23.9	N43700	W42100	Laboratory duplicate
B-3 Pond	B-114	16.2	N43400	W43300	Regular
B-3 Pond	B-115	50.5	N43500	W43200	Regular
B-3 Pond	B-116	58.2	N43500	W43300	Regular
B-3 Pond	B-143	67	N42800	W42000	Regular
B-3 Pond	B-145	59	N43200	W42000	Field duplicate
B-3 Pond	B-146	226	N43200	W42000	Field duplicate
B-3 Pond	B-147	163	N43200	W41900	Regular
B-3 Pond	B-148	116	N43300	W42000	Regular
B-3 Pond	B-149	17	N43500	W42000	Regular
B-3 Pond	B-164	16.6	N43175	W43150	Select-Field duplicate*
B-3 Pond	B-166	76.9	N43100	W42200	Regular
B-3 Pond	B-168	74.4	N43090	W42000	Select

Lead, (EP)--Regulatory threshold value: 5 mg/L
CDL = 500 µg/L
No observations >CDL

Lithium--Threshold value: 10.2 µg/g
(Alternate background limit: 11.9 µg/g)
NOTE: All background observations are slightly below the 10 µg/g CDL

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-114	11.8	N43400	W43300	Regular
B-3 Pond	B-129	10.8	N43600	W43000	Field duplicate*

Lithium (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3 Pond	B-130	16.1	N43500 W42900	Regular
B-3 Pond	B-131	11.4	N43400 W42800	Regular
B-3 Pond	B-132	11.8	N43300 W42900	Regular
B-3 Pond	B-134	10.6	N43100 W42800	Field duplicate
B-3 Pond	B-135	11.4	N43100 W42800	Field duplicate
B-3 Pond	B-147	13.0	N43200 W41900	Laboratory duplicate
B-3 Pond	B-147	13.9	N43200 W41900	Laboratory duplicate
B-3-3 Ditch	B-154	10.8	1,200' from A-29	Regular
B-3-3 Ditch	B-191	10.8	30' from head end	Select

Magnesium--Threshold value: 6,408 µg/g
(Alternate background limit: 9,027 µg/g)

Area	Sample	µg/g	Coordinates	Type
3A Pond	B-200	6,546	N43250 W41625	Regular
B-3 Pond	B-135	6,439	N43100 W42800	Field duplicate*
B-3 Pond	B-147	6,553	N43200 W41900	Laboratory duplicate
B-3 Pond	B-147	7,423	N43200 W41900	Laboratory duplicate
B-3 Pond	B-148	6,649	N43300 W42000	Regular
B-3-3 Ditch	B-154	6,635	1,200' from A-29	Regular

Manganese--Threshold value: 391 µg/g
(Alternate background limit: 585 µg/g)

Area	Sample	µg/g	Coordinates	Type
3A Pond	B-194	518	N42700 W41525	Field duplicate
3A Pond	B-200	427	N43250 W41625	Regular
3A Pond	B-201	856	N43100 W41400	Regular
B-3-3 Ditch	B-152	427	1,279' from A-29	Field duplicate*
B-3-3 Ditch	B-188	427	1,400' from head end	Regular
B-3-3 Ditch	B-189	395	1,000' from head end	Regular
B-3-3 Ditch	B-190	570	500' from head end	Regular
Cont. Bkg.	B-103	398	N44800 W43500	Regular

Mercury--Threshold value: NC
Default to CDL, 0.2 µg/g
NOTE: Based on nine reagent blanks -- LOD = 0.39 µg/g; LOQ = 2.92 µg/g
All values including background censored by laboratory below CDL
Sagebrush sites -- 0 of 5 >CDL
Contingency pond area -- 0 of 5 >CDL
18 of 22 sites in the B-3 Pond >CDL (22 of 18 observations)
3 of 11 sites in the B-3-3 Ditch >CDL (3 of 15 observations)

Mercury (Cont)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-114	1.7	N43400	W43300	Laboratory duplicate
B-3 Pond	B-114	1.4	N43400	W43300	Laboratory duplicate
B-3 Pond	B-115	2.4	N43500	W43200	Regular
B-3 Pond	B-116	3.2	N43500	W43300	Regular
B-3 Pond	B-130	11.6	N43500	W42900	Regular
B-3 Pond	B-131	7.0	N43400	W42800	Regular
B-3 Pond	B-132	15.6	N43300	W42900	Regular
B-3 Pond	B-134	0.7	N43100	W42800	Field duplicate
B-3 Pond	B-135	1.1	N43100	W42800	Field duplicate
B-3 Pond	B-136	1.7	N43100	W42600	Regular
B-3 Pond	B-138	1.7	N43400	W42500	Regular
B-3 Pond	B-139	1.4	N43500	W42500	Regular
B-3 Pond	B-140	0.7	N43700	W42100	Regular
B-3 Pond	B-143	1.2	N42800	W42000	Laboratory duplicate
B-3 Pond	B-143	1.0	N42800	W42000	Laboratory duplicate
B-3 Pond	B-145	1.6	N43200	W42000	Field duplicate
B-3 Pond	B-147	3.7	N43200	W41900	Regular
B-3 Pond	B-148	1.2	N43300	W42000	Regular
B-3 Pond	B-164	0.8	N43175	W43150	Select-Field duplicate
B-3 Pond	B-165	0.3	N43175	W43150	Select-Field duplicate
B-3 Pond	B-166	0.6	N43100	W42200	Regular
B-3 Pond	B-168	0.7	N43090	W42000	Select
B-3-3 Ditch	B-154	0.2	1,200' from A-29		Regular
B-3-3 Ditch	B-161	0.6	At A-29 junction		Select
B-3-3 Ditch	B-188	0.4	1,400' from head end		Regular

Mercury, (EP)--Regulatory threshold value: 0.2 mg/L
CDL = 20 µg/L
No observations >CDL

Molybdenum--Threshold value: NC
All values <CDL

Nickel--Threshold value: 12.3 µg/g
(Alternate background limit: 22.0 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-130	14.6	N43500	W42900	Regular
B-3 Pond	B-147	13.7	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	15.0	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-184	13.5	2,300' from head end		Field duplicate*
B-3-3 Ditch	B-191	19.2	30' from head end		Select
Cont. Bkg.	B-102	13.9	N45100	W42600	Regular

Nitrate--Threshold value: 22.7 µg/g
(Alternate background limit: 5.33 µg/g)
No observations above threshold

Nitrite--Threshold value: 2.44 µg/g
(Alternate background limit: NC; all values <1/2 CDL)
No observations above threshold
NOTE: Most sagebrush background observations <CDL

Phosphate--Threshold value: 4.56 µg/g
(Alternate background limit: default to CDL, 2.0 µg/g)
No observations above threshold

Potassium--Threshold value: 1,758 µg/g
(Alternate background limit: 1,883 µg/g)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-114	1,841	N43400	W43300	Regular
B-3 Pond	B-129	2,019	N43600	W43000	Field duplicate
B-3 Pond	B-130	2,021	N43500	W42900	Regular
B-3 Pond	B-132	2,276	N43300	W42900	Regular
B-3 Pond	B-134	1,851	N43100	W42800	Field duplicate
B-3 Pond	B-135	1,939	N43100	W42800	Field duplicate
B-3 Pond	B-140	1,827	N43700	W42100	Regular
B-3 Pond	B-146	1,884	N43200	W42000	Field duplicate
B-3 Pond	B-147	2,522	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	2,867	N43200	W41900	Laboratory duplicate

Selenium--Threshold value: NC
All values <CDL

Selenium, (EP)--Regulatory threshold value: 1 mg/L
CDL = 500 µg/L
No observations >CDL

Silver--Threshold value: NC
Default to CDL, 1.0 µg/g
Sagebrush sites -- 0 of 5 >1/2 CDL
Contingency pond area -- 0 of 5 sites >1/2 CDL
Based on reagent blanks -- LOD = 0.45 µg/g; LOQ = 1.45 µg/g
1 of 8 sites in the 3C Pond >CDL, (1 of 10 observations)
11 of 22 sites in main pond >CDL, (16 of 30 observations)

Area	Sample	µg/g	Coordinates		Type
3C Pond	B-177	1.2	Ditch 3, 300'		Regular
B-3 Pond	B-115	2.5	N43500	W43200	Laboratory duplicate
B-3 Pond	B-115	2.1	N43500	W43200	Laboratory duplicate
B-3 Pond	B-116	1.7	N43500	W43300	Regular
B-3 Pond	B-130	4.6	N43500	W42900	Regular
B-3 Pond	B-131	3.6	N43400	W42800	Regular
B-3 Pond	B-132	2.2	N43300	W42900	Regular
B-3 Pond	B-135	1.2	N43100	W42800	Field duplicate
B-3 Pond	B-138	1.0	N43400	W42500	Laboratory duplicate
B-3 Pond	B-138	1.2	N43400	W42500	Laboratory duplicate
B-3 Pond	B-139	2.1	N43500	W42500	Regular
B-3 Pond	B-145	2.0	N43200	W42000	Field duplicate

Silver (Cont)

Area	Sample	µg/g	Coordinates		Type
B-3 Pond	B-146	2.0	N43200	W42000	Field duplicate
B-3 Pond	B-147	3.5	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	5.1	N43200	W41900	Laboratory duplicate
B-3 Pond	B-148	1.1	N43300	W42000	Regular
B-3 Pond	B-168	1.0	N43090	W42000	Select

Silver, (EP)--Regulatory threshold value: 5 mg/L
CDL = 500 µg/L
No observations >CDL

Sodium--Threshold value: 280.2 µg/g
(Alternate background limit: 493.5 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-202	465	N43150	W41300	Regular
3C Pond	B-176	283	Ditch 5, 1,800'		Regular
B-3 Pond	B-118	289	N43500	W43400	Regular
B-3 Pond	B-130	302	N43500	W42900	Regular
B-3 Pond	B-132	302	N43300	W42900	Regular
B-3 Pond	B-134	329	N43100	W42800	Field duplicate
B-3 Pond	B-135	296	N43100	W42800	Field duplicate
B-3 Pond	B-138	293	N43400	W42500	Laboratory duplicate*
B-3 Pond	B-145	289	N43200	W42000	Field duplicate
B-3 Pond	B-146	328	N43200	W42000	Field duplicate
B-3 Pond	B-147	290	N43200	W41900	Laboratory duplicate*
B-3 Pond	B-164	309	N43175	W43150	Select-Field duplicate
B-3 Pond	B-165	337	N43175	W43150	Select-Field duplicate
B-3 Pond	B-166	282	N43100	W42200	Regular
B-3-3 Ditch	B-153	292	1,279' from A-29		Field duplicate*
B-3-3 Ditch	B-154	307	1,200' from A-29		Regular
B-3-3 Ditch	B-158	291	950' from A-29		Field duplicate, Laboratory duplicate*
B-3-3 Ditch	B-188	309	1,400' from head end		Regular
B-3-3 Ditch	B-189	282	1,000' from head end		Regular
B-3-3 Ditch	B-191	293	30' from head end		Select
Cont. Bkg.	B-101	332	N44900	W42800	Regular
Cont. Bkg.	B-102	384	N45100	W42600	Regular
Cont. Bkg.	B-103	378	N44800	W43500	Regular
Cont. Bkg.	B-104	332	N44600	W43200	Regular
Cont. Bkg.	B-105	406	N45400	W42500	Laboratory duplicate
Cont. Bkg.	B-105	389	N45400	W42500	Laboratory duplicate

Strontium--Threshold value: 30.1 µg/g
(Alternate background limit: 33.1 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-197	30.6	N43000	W41475	Regular
3A Pond	B-200	46.1	N43250	W41625	Regular
3A Pond	B-201	31.0	N43100	W41400	Regular
3A Pond	B-202	31.7	N43150	W41300	Regular
B-3 Pond	B-130	34.7	N43500	W42900	Regular
B-3 Pond	B-147	31.5	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	33.7	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-154	34.8	1,200' from A-29		Regular

Sulfate--Threshold value: 5.55 µg/g
(Alternate background limit: 3,347 µg/g)
Alternate threshold value: 68.8 µg/g
(Based on lognormal tolerance interval, see text.)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-198	1.49	N43200	W41550	Regular
3A Pond	B-194	22.31	N42700	W41525	Field duplicate
3A Pond	B-196	36.90	N42700	W41525	Field duplicate
3A Pond	B-197	14.52	N43000	W41475	Regular
3A Pond	B-198	7.73	N43200	W41550	Regular
3A Pond	B-201	6.80	N43100	W41400	Regular
3A Pond	B-202	5.61	N43150	W41300	Regular
3A Pond	B-203	12.55	N43200	W42500	Regular
3C Pond	B-178	5.98	Ditch 4, 1200'		Regular
3C Pond	B-179	16.33	Ditch 2, 900'		Regular
3C Pond	B-180	5.62	Ditch 1, 1300'		Regular
B-3 Pond	B-114	141.20	N43400	W43300	Regular
B-3 Pond	B-115	172.40	N43500	W43200	Regular
B-3 Pond	B-116	208.80	N43500	W43300	Regular
B-3 Pond	B-118	35.80	N43500	W43400	Regular
B-3 Pond	B-119	8.80	N43800	W43400	Regular
B-3 Pond	B-128	9.69	N43600	W43000	Field duplicate
B-3 Pond	B-129	11.64	N43600	W43000	Field duplicate
B-3 Pond	B-130	27.67	N43500	W42900	Regular
B-3 Pond	B-131	14.94	N43400	W42800	Regular
B-3 Pond	B-132	8.17	N43300	W42900	Regular
B-3 Pond	B-134	88.70	N43100	W42800	Field duplicate
B-3 Pond	B-135	126.20	N43100	W42800	Field duplicate
B-3 Pond	B-138	11.30	N43400	W42500	Regular
B-3 Pond	B-139	20.02	N43500	W42500	Regular
B-3 Pond	B-140	29.07	N43700	W42100	Regular
B-3 Pond	B-143	11.20	N42800	W42000	Regular
B-3 Pond	B-145	8.27	N43200	W42000	Field duplicate
B-3 Pond	B-146	10.40	N43200	W42000	Field duplicate
B-3 Pond	B-147	31.47	N43200	W41900	Regular
B-3 Pond	B-148	8.23	N43300	W42000	Regular
B-3 Pond	B-149	6.85	N43500	W42000	Regular
B-3 Pond	B-168	5.87	N43090	W42000	Select

Sulfate (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3-3 Ditch	B-161	6.94	At A-29 junction	Select
B-3-3 Ditch	B-191	7.12	30' from head end	Select
Cont. Bkg.	B-101	84.2	N44900 W42800	Regular
Cont. Bkg.	B-103	1,664	N44800 W43500	Regular
Cont. Bkg.	B-104	281	N44600 W43200	Regular
Cont. Bkg.	B-105	192	N45400 W42500	Regular

Sulfide--Threshold value: NC
All values <CDL except two
Default to CDL, 10 µg/g
Sagebrush sites -- 0 of 5 <1/2 CDL
Contingency pond area -- 0 of 5 sites <1/2 CDL
Based on reagent blanks -- LOD = 5.63 µg/g; LOQ = 16.7 µg/g
1 of 7 sites in the 3A Pond >CDL, (1 of 8 observations)
1 of 8 sites in 3C Pond >CDL, (1 of 9 observations)

Area	Sample	µg/g	Coordinates	Type
3A Pond	B-198	25.7	N43200 W41550	Regular
3C Pond	B-179	10.9	Ditch 2, 900'	Regular

Thallium--Threshold value: NC
All values <CDL

Titanium--Threshold value: 2,552 µg/g
(Alternate background limit: 3,931 µg/g)

Area	Sample	µg/g	Coordinates	Type
3B Pond	B-106	2,599	N42300 W40550	Regular
B-3 Pond	B-129	2,620	N43600 W43000	Field duplicate*
B-3 Pond	B-132	2,848	N43300 W42900	Regular
B-3 Pond	B-138	2,864	N43400 W42500	Laboratory duplicate
B-3 Pond	B-138	2,821	N43400 W42500	Laboratory duplicate
B-3 Pond	B-139	2,917	N43500 W42500	Regular
B-3 Pond	B-145	2,748	N43200 W42000	Field duplicate
B-3 Pond	B-146	2,668	N43200 W42000	Field duplicate
B-3 Pond	B-148	2,646	N43300 W42000	Regular
B-3-3 Ditch	B-153	2,560	1,279' from A-29	Field duplicate*
Cont. Bkg.	B-103	2,714	N44800 W43500	Regular
Cont. Bkg.	B-105	2,806	N45400 W42500	Laboratory duplicate
Cont. Bkg.	B-105	2,762	N45400 W42500	Laboratory duplicate

Vanadium--Threshold value: 63.8 µg/g
(Alternate background limit: 95.3 µg/g)

Area	Sample	µg/g	Coordinates	Type
3B Pond	B-106	71.1	N42300 W40550	Regular
3B Pond	B-107	68.1	N42300 W40650	Regular

Vanadium (Cont)

Area	Sample	µg/g	Coordinates		Type
3B Pond	B-108	70.9	N42800	W40650	Field duplicate
B-3 Pond	B-118	65.0	N43500	W43400	Regular
B-3 Pond	B-119	67.2	N43800	W43400	Laboratory duplicate
B-3 Pond	B-129	69.3	N43600	W43000	Field duplicate
B-3 Pond	B-131	66.3	N43400	W42800	Regular
B-3 Pond	B-132	81.8	N43300	W42900	Regular
B-3 Pond	B-134	65.3	N43100	W42800	Field duplicate
B-3 Pond	B-135	68.8	N43100	W42800	Field duplicate
B-3 Pond	B-138	76.8	N43400	W42500	Laboratory duplicate
B-3 Pond	B-138	72.5	N43400	W42500	Laboratory duplicate
B-3 Pond	B-139	73.5	N43500	W42500	Regular
B-3 Pond	B-140	65.6	N43700	W42100	Regular
B-3 Pond	B-145	70.6	N43200	W42000	Field duplicate
B-3 Pond	B-146	72.6	N43200	W42000	Field duplicate
B-3 Pond	B-147	65.5	N43200	W41900	Laboratory duplicate
B-3 Pond	B-147	67.7	N43200	W41900	Laboratory duplicate
B-3-3 Ditch	B-152	65.6	1,279' from A-29		Field duplicate
B-3-3 Ditch	B-189	69.4	1,000' from head end		Regular
Cont. Bkg.	B-103	68.7	N44800	W43500	Regular
Cont. Bkg.	B-105	72.4	N45400	W42500	Laboratory duplicate
Cont. Bkg.	B-105	73.2	N45400	W42500	Laboratory duplicate

Zinc--Threshold value: maximum of five background values, 41.3 µg/g
(Alternate background maximum: 44 µg/g)

Area	Sample	µg/g	Coordinates		Type
3A Pond	B-194	41.7	N42700	W41525	Field duplicate
3A Pond	B-196	51.6	N42700	W41525	Field duplicate
3A Pond	B-197	49.5	N43000	W41475	Regular
3A Pond	B-198	46.5	N43200	W41550	Regular
3A Pond	B-200	42.7	N43250	W41625	Regular
3A Pond	B-201	47.7	N43100	W41400	Regular
3A Pond	B-201	47.7	N43100	W41400	Regular
3A Pond	B-202	55.0	N43150	W41300	Regular
3A Pond	B-203	45.4	N43200	W42500	Regular
3B Pond	B-106	41.4	N42300	W40550	Regular
3C Pond	B-171	43.1	Ditch 8, 500'		Field duplicate
3C Pond	B-172	77.7	Ditch 8, 500'		Field duplicate
3C Pond	B-176	49.4	Ditch 5, 1800'		Regular
3C Pond	B-177	68.5	Ditch 3, 300'		Regular
3C Pond	B-178	53.8	Ditch 4, 1200'		Regular
3C Pond	B-180	41.7	Ditch 1, 1300'		Laboratory duplicate*
B-3 Pond	B-114	92.6	N43400	W43300	Regular
B-3 Pond	B-115	58.0	N43500	W43200	Laboratory duplicate
B-3 Pond	B-115	55.9	N43500	W43200	Laboratory duplicate
B-3 Pond	B-116	70.2	N43500	W43300	Regular
B-3 Pond	B-118	48.7	N43500	W43400	Regular
B-3 Pond	B-119	55.7	N43800	W43400	Laboratory duplicate

Zinc (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3 Pond	B-119	53.8	N43800 W43400	Laboratory duplicate
B-3 Pond	B-128	48.5	N43600 W43000	Field duplicate
B-3 Pond	B-129	57.0	N43600 W43000	Field duplicate
B-3 Pond	B-130	111.8	N43500 W42900	Regular
B-3 Pond	B-131	82.1	N43400 W42800	Regular
B-3 Pond	B-132	73.5	N43300 W42900	Regular
B-3 Pond	B-134	66.8	N43100 W42800	Field duplicate
B-3 Pond	B-135	70.4	N43100 W42800	Field duplicate
B-3 Pond	B-136	43.3	N43100 W42600	Regular
B-3 Pond	B-138	63.6	N43400 W42500	Laboratory duplicate
B-3 Pond	B-138	60.6	N43400 W42500	Laboratory duplicate
B-3 Pond	B-139	48.4	N43500 W42500	Regular
B-3 Pond	B-140	53.0	N43700 W42100	Regular
B-3 Pond	B-143	48.3	N42800 W42000	Regular
B-3 Pond	B-145	83.2	N43200 W42000	Field duplicate
B-3 Pond	B-146	84.5	N43200 W42000	Field duplicate
B-3 Pond	B-147	84.5	N43200 W41900	Laboratory duplicate
B-3 Pond	B-147	92.5	N43200 W41900	Laboratory duplicate
B-3 Pond	B-148	57.0	N43300 W42000	Regular
B-3 Pond	B-149	54.9	N43500 W42000	Regular
B-3 Pond	B-164	70.3	N43175 W43150	Select-Field duplicate
B-3 Pond	B-165	65.1	N43175 W43150	Select-Field duplicate
B-3 Pond	B-166	50.4	N43100 W42200	Regular
B-3 Pond	B-168	52.9	N43090 W42000	Select
B-3-3 Ditch	B-153	43.0	1,279' from A-29	Field duplicate
B-3-3 Ditch	B-154	74.1	1,200' from A-29	Regular
B-3-3 Ditch	B-158	58.5	950' from A-29	Field duplicate, Laboratory duplicate
B-3-3 Ditch	B-158	51.1	950' from A-29	Field duplicate, Laboratory duplicate
B-3-3 Ditch	B-159	46.3	950' from A-29	Field duplicate
B-3-3 Ditch	B-160	45.7	300' from A-29	Regular
B-3-3 Ditch	B-161	58.4	At A-29 junction	Select
B-3-3 Ditch	B-184	65.6	2,300' from head end	Field duplicate
B-3-3 Ditch	B-185	57.7	2,300' from head end	Field duplicate
B-3-3 Ditch	B-187	47.1	2,000' from head end	Regular
B-3-3 Ditch	B-188	76.9	1,400' from head end	Regular
B-3-3 Ditch	B-189	70.5	1,000' from head end	Regular
B-3-3 Ditch	B-191	111.3	30' from head end	Select
Cont. Bkg.	B-103	43.3	N44800 W43500	Regular
Cont. Bkg.	B-105	44.0	N45400 W42500	Laboratory duplicate

Zirconium--Threshold value: maximum of five background values, 23.1 µg/g
(Alternate background maximum: 28.7 µg/g)

Area	Sample	µg/g	Coordinates	Type
3A Pond	B-196	27.9	N42700 W41525	Field duplicate
3A Pond	B-197	24.8	N43000 W41475	Regular
3A Pond	B-200	25.0	N43250 W41625	Regular
3A Pond	B-201	29.8	N43100 W41400	Regular
3A Pond	B-202	29.5	N43150 W41300	Regular
3A Pond	B-203	29.0	N43200 W42500	Regular
3B Pond	B-106	28.2	N42300 W40550	Regular
3B Pond	B-107	26.5	N42300 W40650	Regular
3B Pond	B-108	27.3	N42800 W40650	Field duplicate
3B Pond	B-109	26.8	N42800 W40650	Field duplicate
3B Pond	B-110	27.6	N42850 W40650	Regular
3B Pond	B-111	26.4	N42850 W40950	Regular
3C Pond	B-176	25.8	Ditch 5, 1800'	Regular
3C Pond	B-180	26.2	Ditch 1, 1300'	Laboratory duplicate
3C Pond	B-180	23.3	Ditch 1, 1300'	Laboratory duplicate
B-3 Pond	B-115	25.0	N43500 W43200	Laboratory duplicate
B-3 Pond	B-115	24.1	N43500 W43200	Laboratory duplicate
B-3 Pond	B-116	24.9	N43500 W43300	Regular
B-3 Pond	B-118	26.7	N43500 W43400	Regular
B-3 Pond	B-119	29.8	N43800 W43400	Laboratory duplicate
B-3 Pond	B-119	27.6	N43800 W43400	Laboratory duplicate
B-3 Pond	B-128	30.1	N43600 W43000	Field duplicate
B-3 Pond	B-129	33.7	N43600 W43000	Field duplicate
B-3 Pond	B-130	26.0	N43500 W42900	Regular
B-3 Pond	B-131	30.7	N43400 W42800	Regular
B-3 Pond	B-132	39.5	N43300 W42900	Regular
B-3 Pond	B-134	28.5	N43100 W42800	Field duplicate
B-3 Pond	B-135	31.2	N43100 W42800	Field duplicate
B-3 Pond	B-138	36.1	N43400 W42500	Laboratory duplicate
B-3 Pond	B-138	33.4	N43400 W42500	Laboratory duplicate
B-3 Pond	B-139	32.6	N43500 W42500	Regular
B-3 Pond	B-140	30.5	N43700 W42100	Regular
B-3 Pond	B-143	25.9	N42800 W42000	Regular
B-3 Pond	B-145	34.6	N43200 W42000	Field duplicate
B-3 Pond	B-146	37.0	N43200 W42000	Field duplicate
B-3 Pond	B-147	29.1	N43200 W41900	Laboratory duplicate
B-3 Pond	B-147	31.2	N43200 W41900	Laboratory duplicate
B-3 Pond	B-148	30.9	N43300 W42000	Regular
B-3 Pond	B-149	28.1	N43500 W42000	Regular
B-3 Pond	B-164	24.2	N43175 W43150	Select-Field duplicate
B-3 Pond	B-165	25.7	N43175 W43150	Select-Field duplicate
B-3 Pond	B-166	26.4	N43100 W42200	Regular
B-3 Pond	B-168	29.5	N43090 W42000	Select
B-3-3 Ditch	B-152	26.0	1,279' from A-29	Field duplicate
B-3-3 Ditch	B-153	26.8	1,279' from A-29	Field duplicate
B-3-3 Ditch	B-158	24.9	950' from A-29	Field duplicate, Laboratory duplicate*
B-3-3 Ditch	B-161	27.8	At A-29 junction	Select

Zirconium (Cont)

Area	Sample	µg/g	Coordinates	Type
B-3-3 Ditch	B-188	26.1	1,400' from head end	Regular
B-3-3 Ditch	B-189	25.5	1,000' from head end	Regular
B-3-3 Ditch	B-191	26.8	30' from head end	Select
Cont. Bkg.	B-102	23.8	N45100 W42600	Regular
Cont. Bkg.	B-103	28.7	N44800 W43500	Regular
Cont. Bkg.	B-104	27.8	N44600 W43200	Regular
Cont. Bkg.	B-105	28.5	N45400 W42500	Laboratory duplicate
Cont. Bkg.	B-105	27.8	N45400 W42500	Laboratory duplicate

VOLATILE ORGANICS

Acetone--Threshold value: 218 µg/kg
(Alternate background limit: acetone nondetectable)
SW-846 PQL = 100 µg/kg

Area	Sample	µg/kg	Coordinates	Type
B-3 Pond	B-115	333	N43500 W43200	Regular

Carbon Disulfide--Threshold value: <CDL
Default to CDL, 10 µg/kg
Observed in a single sample; <1/2 SW-846 PQL
SW-846 PQL = 100 µg/kg

Area	Sample	µg/kg	Coordinates	Type
B-3 Pond	B-114	34	N43400 W43300	Regular

1,3 Dichlorobenzene--Threshold value: 26 µg/kg; maximum of five background sites.
(Alternate background limit: nondetectable)
No observations above threshold

Methylene chloride--Threshold value: <CDL
Default to CDL, 5 µg/kg
1 of 8 sites in 3C Pond >CDL (1 of 9 observations)
3 of 22 sediment sites in B-3 Pond >CDL, (3 of 25 observations)
1 of 11 sites in the B-3-3 ditch >CDL (1 of 13 observations)
1 of 5 sites in the contingency pond >nondetect, (3 µg/kg), but <CDL
2 of 11 silica sand blanks >nondetect, (3,4 µg/kg), but <CDL
SW-846 PQL = 5 µg/kg

Methylene chloride (Cont)

Area	Sample	µg/kg	Coordinates	Type
3C Pond	B-178	6	Ditch 4, 1,200'	Regular
B-3 Pond	B-115	92	N43500 W43200	Regular
B-3 Pond	B-131	7	N43400 W42800	Regular
B-3 Pond	B-143	6	N42800 W42000	Regular
B-3-3 Ditch	B-154	14[b]	1,200' from A-29	Regular

Methyl ethyl ketone--Threshold value: <CDL
(Alternate background limit: 12.5 µg/kg)
Default to CDL, 10 µg/kg
SW-846 PQL 100 µg/kg

Area	Sample	µg/kg	Coordinates	Type
B-3 Pond	B-114	34	N43400 W43300	Regular
3C Pond	B-177	12[b]	Ditch 3, 300'	Regular
B-3 Pond	B-114	13	N43400 W43300	Regular
B-3 Pond	B-115	74	N43500 W43200	Regular
B-3 Pond	B-147	19[b]	N43200 W41900	Regular
B-3-3 Ditch	B-191	11	30' from head end	Select

SEMIVOLATILES

Bis (2-ethylhexyl) phthalate--Threshold Value: NC
Background not tested for semivolatiles
All observations >CDL (1.0 µg/g) are listed. All observations >CDL are qualified due to problems with their associated laboratory reagent blanks

Area	Sample	µg/g	Type
B-3 Pond	B-169	2.4[a]	Composite of B-164, 166, 168
3C Pond	B-181	3.5[b]	Composite of B-175, 176
3C Pond	B-182	6.7[b]	Composite of B-171, 173, 177 to 180

OTHER ORGANIC ANALYTES

Herbicides--Threshold value: NC, all values nondetectable.

Pesticides, Enhanced--Threshold value: NC, all values nondetectable.

Pesticides, Phosphorous--Threshold value: NC, all values nondetectable.

Polychlorinated Biphenyls--Threshold value: NC, all values nondetectable.

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[a]Associated laboratory reagent blank not identifiable for this sample.
[b]Denotes qualification as a nondetect due to the occurrence of the analyte at least 1/10th the listed concentration in an associated blank.

APPENDIX B

ELEMENTS BY ICP

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Table B-1. Elements by ICP (EPA Method 3050/6010) 3A Pond.

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Magnesium	Manganese
B-194	4953 D20	7.0	5200	5.4 B	6.6	12.8	19530 D20	4296 D20	517.8
B-196	6750 D20	8.7	5948	6.1 B	7.8	17.2	26441 D20	4641 D20	335.9
B-197	4789 D20	8.0	9463 D20	3.9 B	6.4	14.8	21457 D20	3838 D20	308.6
B-198	5299 D20	7.3	4739	5.6 B	6.7	15.6	21656 D20	3760 D20	212.7
B-200	7091 D20	7.2	16510 D20	7.1 B	8.4	15.1	26363 D20	6546 D20	426.8
B-201	9741 D20	7.6	9684 D20	9.4 B	9.4	18.6	28566 D20	6113 D20	856.4
B-202	10339 D20	7.8	11808 D20	9.7 B	9.4	20.1	27854 D20	6026 D20	342.1
B-203	9404 D20	7.3	8265 D20	9.0 B	8.5	14.9	28470 D20	6088 D20	294.3

	Nickel	Potassium	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-194	10.5	643.3	200.0 B	25.6	1458 D20	40.9	41.7	18.5
B-196	7.6	673.1	256.1 B	28.9	2101 D20	56.3	51.6	27.9
B-197	5.2	498.9	236.0 B	30.6	1767 D20	43.4	49.5	24.8
B-198	6.0	579.2	265.3 B	18.4	1694 D20	45.9	46.5	21.8
B-200	8.3	1099.1	243.3 B	46.1	2119 D20	53.7	42.7	25.0
B-201	11.4	1637.1	240.9 B	31.0	1955 D20	52.1	47.7	29.8
B-202	10.6	1541.7	464.6 B	31.7	1938 D20	55.5	55.0	29.5
B-203	9.7	1492.9	231.1 B	29.8	2279 D20	57.5	45.4	29.0

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-194	9/21/89	03/06	03/07/90	167	Fdup
B-196	9/21/89	03/06	03/07/90	167	Fdup
B-197	9/21/89	03/06	03/07/90	167	Reg
B-198	9/21/89	03/06	03/07/90	167	Reg +
B-200	9/21/89	03/06	03/07/90	167	Reg
B-201	9/21/89	03/06	03/07/90	167	Reg
B-202	9/21/89	03/06	03/07/90	167	Reg
B-203	9/21/89	03/06	03/07/90	167	Reg

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Chromium	3/07/90	1.1	1	3	1.0
Sodium	3/07/90	26.7	2	2	20.0
Sodium	3/07/90	24.1	-	-	

B = A reagent blank was greater than (GT) the contract detection limit (CDL).
Dx = Sample further diluted by x when analyzed.
Fdup = Field Duplicate.
Reg = Regular sample.
+ = Chosen by lab for matrix spike.

Table B-2. Elements by ICP (EPA Method 3050/6010) 3B Pond.

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Magnesium	Manganese
B-106	5428 D20	6.3	9331 D20	4.7	9.4	15.3	27397 D20	4721 D20	319.8
B-107	5269 D20	6.2	7683	5.6	8.4	14.4	26473 D20	4365 D20	290.6
B-108	6211 D20	7.0	7704	6.5	8.9	16.1	29081 D20	4902 D20	332.0
B-109	5735 D20	5.9	7366	5.3	8.8	15.0	25847 D20	4699 D20	301.8
B-110	6265 D20	6.5	9099 D20	5.5	8.9	13.9	27210 D20	5206 D20	342.5
B-111	5062 D20	5.8	6986	6.2	8.2	13.7	23855 D20	4245 D20	293.2

	Nickel	Potassium	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-106	7.1	780.6 HM	249.2	27.1	2599 D20	71.1	41.4	28.2
B-107	6.9	771.9 HM	206.1	23.8	2515 D20	68.1	39.0	26.5
B-108	8.3	1068.2 HM	207.3	26.4	2354 D20	70.9	41.1	27.3
B-109	6.8	879.0 HM	198.5	24.6	2211 D20	63.6	41.0	26.8
B-110	6.6	1071.7 HM	223.3	27.3	2402 D20	63.5	41.2	27.6
B-111	6.6	842.8 HM	210.4	25.9	2324 D20	61.8	38.5	26.4

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-106	8/4/89	02/20	02/23/90	203 H	Reg
B-107	8/4/89	02/20	02/23/90	203 H	Reg
B-108	8/4/89	02/20	02/23/90	203 H	Fdup
B-109	8/4/89	02/20	02/23/90	203 H	Fdup
B-110	8/4/89	02/20	02/23/90	203 H	Reg +
B-111	8/4/89	02/20	02/23/90	203 H	Reg

B = Sample further diluted by x when analyzed.
Fdup = Field duplicate.
HM = Associated matrix recovery high; see Table B-9.
H = Holding time exceeded (6 months).
Reg = Regular sample.
+ = Chosen by lab for matrix spike.

Table B-3. Elements by ICP (EPA Method 3050/6010) 3C Pond.

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Magnesium	Manganese
B-171	3920 D20	5.2	5154	3.3	8.4	16.3	20759 D20	3649 D20	253.9
B-172	6850 D20	4.2	5326	7.2	6.2	17.9	17097 D20	4403 D20	305.8
B-174	4925 D20	5.1	4641	4.3	7.5	12.5	21496 D20	4280 D20	287.7
B-175	4811 D20	5.3	4788	3.5	6.6	13.4	20927 D20	3958 D20	230.8
B-176	6386 D20	6.3	5331	6.1	8.5	15.4	24957 D20	4787 D20	287.4
B-177	4448 D20	2.0	3403	6.1	3.0	18.5	7291 D20	2130 D20	101.4
B-178	4866 D20	4.9	5818	4.5	6.2	13.0	18849 D20	3586 D20	281.9
B-179	3743 D20	4.0	3977	4.3	5.3	11.1 Q	15874 D20	3120 D20	176.1
B-180	4746 D20	5.4	4535	4.0	7.5	16.9	21308 D20	3875 D20	248.6
B-180	5003 D20	5.5	4140	5.5	6.4	16.2	20368 D20	3963 D20	228.9

	Nickel	Potassium	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-171	5.3	480.4	0.0 *	271.3 B	21.0	1521 D20	48.6 HM	43.1	21.2
B-172	7.9	1038.6	0.3 *	224.0 B	26.1	1072 D20	32.5 HM	77.7	15.8
B-174	8.2	559.3	0.1 *	243.0 B	21.0	1965 D20	49.2 HM	38.6	22.3
B-175	5.5	657.5	0.0 *	230.3 B	20.7	1541 D20	46.0 HM	33.6	20.5
B-176	7.8	912.8	0.1 *	282.5 B HM	25.9	1934 D20	53.2 HM	49.4	25.8
B-177	4.9	637.8	1.2 Q	129.5 B HM	14.9	401	12.8 HM	68.6	6.9
B-178	5.5	638.7	0.1 *	229.9 B HM	22.5	1567 D20	41.1 HM	53.8	20.5
B-179	5.0	385.1	0.2 *	198.1 B HM	18.9	1182 D20	32.2 HM	33.9	15.5
B-180	5.9	426.4	0.2 *	246.4 B HM	18.8	1868 D20	47.7 HM	41.7	26.2
B-180	6.7	472.7	0.1 *	270.5 B HM	19.4	1642 D20	45.8 HM	40.3	23.3

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-171	9/8/89	03/08	03/10/90	183	Fdup
B-172	9/8/89	03/08	03/10/90	183	Fdup
B-174	9/8/89	03/08	03/10/90	183	Reg
B-175	9/8/89	03/08	03/10/90	183	Reg +
B-176	9/8/89	03/05	03/12/90	185 H	Reg
B-177	9/8/89	03/05	03/12/90	185 H	Reg
B-178	9/8/89	03/05	03/12/90	185 H	Reg
B-179	9/8/89	03/05	03/12/90	185 H	Reg
B-180	9/8/89	03/05	03/12/90	185 H	Ldup
B-180	9/8/89	03/05	03/12/90	185 H	Ldup

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Sodium	3/10/90	22.8	2	0	20.0
Sodium	3/10/90	22.7	-	-	
Sodium	3/12/90	23.4	1	2	

B = A reagent blank was greater than (GT) the contract detection limit (CDL) on the date of analysis. The number of <CDL blanks on that day is shown in the less than (LT) column above.
Dx = Sample further diluted by x when analyzed.
Fdup = Field duplicate.
H = Holding time exceeded (6 months).
HM = Associated matrix recovery high; see Table B-9.
Ldup = Lab duplicate.
Q = Sample is above the contract detection limit (CDL) but below a limit of quantitation based on reagent blanks.
Reg = Regular sample.
+ = Chosen by lab for matrix spike.
* = Sample is below the laboratory CDL.

Table B-4. Elements by ICP (EPA Method 3050/6010) B-3 Pond. (sheet 1 of 2)

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lithium	Magnesium
B-114	12189 D20	9.9	3587 HM	12.7	7.4	20.4 B	26574 D20	11.8	6406 D20
B-115	9350 D20	8.8	3116 HM	13.6	5.8	19.2 B	23240 D20	8.7 *	4647 D20
B-115	9686 D20	8.6	2801 HM	12.9	5.4	17.3 B	23971 D20	8.8 *	4812 D20
B-116	11229 D20	9.8	3857 HM	13.1	6.7	17.7 B	25277 D20	10.2	5467 D20
B-118	10011 D20	8.8	4089 HM	10.8	8.6	13.0 B	28573 D20	8.1 *	5314 D20
B-119	9966 D20	22.6	3910 HM	10.7	9.3	14.1 B	28345 D20	8.7 *	5505 D20
B-119	10293 D20	20.8	3576 HM	9.8	8.5	14.1 B	28107 D20	9.1 *	5648 D20
B-128	9895 D20	7.5	3510	9.9	8.1	17.9 FB LM	26099 D20 HM	8.8 *	4936 D20
B-129	12327 D20	9.1	3976	11.6	9.0	14.8 FB LM	30750 D20 HM	10.8	6095 D20
B-130	14913 D20	11.7	4773	34.5	7.6	32.9 FB LM	28438 D20 HM	16.1	7494 D20
B-131	10995 D20	11.2	4500	18.5	7.5	25.6 FB LM	30250 D20 HM	11.4	6054 D20
B-132	13370 D30	12.2	4066	18.1	6.9	16.7 FB LM	35716 D30 HM	11.8	5657 D30
B-134	12052 D20	15.8	4077	12.2	7.8	15.9 FB LM	28025 D20 HM	10.6	5697 D20
B-135	12537 D20	16.1	4556	13.5	8.3	17.6 FB LM	29724 D20 HM	11.4	6439 D20
B-136	9026 D20	6.4	2691	9.9	4.8	10.2 Q FB LM	22664 D20 HM	8.5 *	4189 D20
B-138	10676 D20	7.8	4588	13.2	9.7	17.7 FB LM	31085 D20 HM	9.2 *	5511 D20
B-138	10179 D20	7.6	4246	12.9	8.7	16.7 FB LM	29511 D20 HM	8.8 *	5213 D20
B-139	8661 D20	7.1	3715	9.2	5.9	12.8 FB LM	27325 D20 HM	7.2 *	4553 D20
B-140	11044 D20	7.4	3738	11.4	6.1	14.8 FB LM	27136 D20 HM	10.0	5551 D20
B-143	9841 D20	6.0	3756	10.5	7.3	13.9 FB LM	24567 D20 HM	9.3 *	4996 D20
B-145	11424 D20	7.7	4503	19.5	10.2	18.2 FB LM	29316 D20 HM	9.1 *	5175 D20
B-146	12381 D20	8.8	4906	25.5	10.5	20.4 FB LM	30006 D20 HM	9.9 *	5499 D20
B-147	14119 D20	11.1	5315	26.2	9.8	25.2	32099 D20	13.0	6553 D20
B-147	16699 D20	12.3	5400	29.1	10.6	27.7	36021 D20	13.9	7423 D20
B-148	11384 D20	7.9	3747	12.2	9.3	17.4	32809 D20	9.4 *	6649 D20
B-149	8803 D20	17.9	3845	9.7	8.8	12.7	27016 D20	8.8 *	5297 D20
B-164	9657 D20	7.9	4373	10.7 LM	9.0	16.9	27295 D20	9.8 *	5885 D20
B-165	9481 D20	7.8	4700	7.9 LM	7.9	15.1	26419 D20	8.7 *	5627 D20
B-166	11231 D20	8.1	3716	12.0 LM	8.6	14.1	27903 D20	9.3 *	5547 D20
B-168	10733 D20	9.1	3841	12.4 LM	8.3	13.3	27460 D20	8.5 *	4944 D20

	Manganese	Nickel	Potassium	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-114	198.6	11.6	1841	1.0 QLM	268.6	27.2	1737 D20	48.5	92.6	21.3
B-115	167.5	9.6	1491	2.5 LM	216.6	21.3	1908 D20	56.5	58.0	25.0
B-115	163.9	8.8	1526	2.1 LM	213.7	21.1	1962 D20	56.9	55.9	24.1
B-116	174.5	10.1	1732	1.7 QLM	261.9	26.2	1968 D20	56.7	70.2	24.9
B-118	274.0	10.6	1442	0.2 *LM	289.0	27.4	2312 D20	65.0	48.7	26.7
B-119	233.3	9.7	1608	0.3 *LM	235.5	24.1	2390 D20	67.2	55.7	29.8
B-119	238.4	10.0	1616	0.6 *LM	230.5	22.6	2291 D20	60.7	53.8	27.6
B-128	203.1	9.7	1684	0.0 *LM	225.1	21.1	2353 D20	61.0	48.5	30.1
B-129	225.1	11.0	2019	0.3 *LM	245.3	23.9	2620 D20	69.3	57.0	33.7
B-130	233.7	14.6	2021	4.6 LM	302.2	34.7	1633	51.0	111.8	26.0
B-131	214.4	10.6	1358	3.6 LM	262.3	26.8	2473 D20	66.3	82.1	30.7
B-132	255.8	11.2	2276 D30	2.2 LM	302.2	28.0	2848 D30	81.8	73.5	39.5
B-134	212.4	10.7	1851	0.8 *LM	328.9	27.7	2299 D20	65.3	66.8	28.5
B-135	226.7	12.1	1939	1.2 QLM	296.4	29.8	2445 D20	68.8	70.4	31.2
B-136	185.9	7.7	1521	0.4 *LM	219.3	20.1	1732	52.0	43.3	22.1
B-138	257.0	10.6	1699	1.0 QLM	293.4	23.8	2864 D20	76.8	63.6	36.1
B-138	232.8	9.5	1637	1.2 QLM	256.3	21.5	2821 D20	72.5	60.6	33.4
B-139	195.7	7.3	1235	2.1 LM	254.8	18.3	2917 D20	73.5	48.4	32.6
B-140	189.2	9.0	1827	0.8 *LM	258.9	23.0	2431 D20	65.6	53.0	30.5
B-143	206.2	8.2	1569	0.7 *LM	263.0	22.0	2079	59.4	48.3	25.9
B-145	241.3	11.6	1649	2.0 LM	289.3	23.2	2748 D20	70.6	83.2	34.6
B-146	257.3	11.6	1884	2.0 LM	328.2	26.8	2668 D20	72.6	84.5	37.0
B-147	353.1	13.7	2522 HM	3.5	243.0	31.5	2196 D20	65.5	84.5	29.1
B-147	353.5	15.0	2867 HM	5.1	290.4	33.7	2462 D20	67.7	92.5	31.2
B-148	252.3	10.5	1678 HM	1.1 Q	181.7	20.4	2646 D20	60.5	57.0	30.9
B-149	248.0	10.0	1455 HM	0.3 *	193.6	21.0	2242 D20	62.2	54.9	28.1
B-164	291.6	11.0	1140 HM	0.7 *	308.9 HM	26.7	2226 D20	58.9 HM	70.3	24.2
B-165	267.2	9.5	1142 HM	0.0 *	336.9 HM	25.8	2248 D20	60.0 HM	65.1	25.7
B-166	229.5	11.1	1580 HM	0.7 *	281.7 HM	25.8	2283 D20	58.5 HM	50.4	26.4
B-168	220.8	10.0	1580 HM	1.0 Q	261.8 HM	24.0	2279 D20	59.0 HM	52.9	29.5

Table B-4. Elements by ICP (EPA Method 3050/6010) B-3 Pond. (sheet 2 of 2)

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-114	8/10/89	02/22	03/06/90	208 H	Reg
B-115	8/10/89	02/22	03/06/90	208 H	Ldup
B-115	8/10/89	02/22	03/06/90	208 H	Ldup
B-116	8/10/89	02/22	03/06/90	208 H	Reg
B-118	8/11/89	02/22	03/06/90	207 H	Reg
B-119	8/11/89	02/22	03/06/90	207 H	Ldup
B-119	8/11/89	02/22	03/06/90	207 H	Ldup
B-128	8/17/89	02/19	02/20/90	187 H	Fdup
B-129	8/17/89	02/19	02/20/90	187 H	Fdup
B-130	8/17/89	02/19	02/20/90	187 H	Reg
B-131	8/17/89	02/19	02/20/90	187 H	Reg
B-132	8/17/89	02/19	02/20/90	187 H	Reg
B-134	8/18/89	02/19	02/20/90	186 H	Fdup
B-135	8/18/89	02/19	02/20/90	186 H	Fdup
B-136	8/18/89	02/19	02/20/90	186 H	Reg
B-138	8/18/89	02/19	02/20/90	186 H	Ldup
B-138	8/18/89	02/19	02/20/90	186 H	Ldup
B-139	8/18/89	02/19	02/20/90	186 H	Reg
B-140	8/18/89	02/19	02/20/90	186 H	Reg
B-143	8/25/89	02/19	02/20/90	179	Reg
B-145	8/25/89	02/19	02/20/90	179	Fdup
B-146	8/25/89	02/19	02/20/90	179	Fdup
B-147	8/25/89	02/20	02/23/90	182	Ldup
B-147	8/25/89	02/20	02/23/90	182	Ldup
B-148	8/25/89	02/20	02/23/90	182	Reg
B-149	8/25/89	02/20	02/23/90	182	Reg
B-164	9/07/89	02/24	03/07/90	181	Select-Fdup
B-165	9/07/89	02/24	03/07/90	181	Select-Fdup
B-166	9/07/89	02/24	03/07/90	181	Reg
B-168	9/07/89	02/24	03/07/90	181	Select

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Copper	3/06/90	1.3	1	1	1.0

B = A reagent blank was greater than (GT) the contract detection limit (CDL) on the date of analysis. The number of <CDL blanks on that day is shown in the less than (LT) column above.
Dx = Sample further diluted by x when analyzed.
FB = Field blank high collected &/or analyzed on the same date; see Table B-8.
Fdup = Field duplicate.
HM = Associated matrix recovery high; see Table B-9.
H = Holding time exceeded (6 months).
Ldup = Lab duplicate.
LM = Associated matrix recovery low; see Table B-9.
Q = Sample is above the contract detection limit (CDL) but below a limit of quantitation based on reagent blanks.
Reg = Regular sample.
Select = A nonrandomly selected sample.
* = Sample is below the laboratory contract detection limit.

Table B-5. Elements by ICP (EPA Method 3050/6010) B-3-3 Ditch. (sheet 1 of 2)

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lithium	Magnesium
B-152	4906 D20	7.0	5090	4.4	11.2	12.8	26106 D20	4.2 *	4128 D20
B-153	5906 D20	7.5	7211 D20	5.0	9.3	14.3	27866 D20	5.2 *	5110 D20
B-154	9823 D20	9.4	9381 D20	11.0	9.1	23.5	26168 D20	10.8	6635 D20
B-158	6978 D20	7.3	5419 FB	6.5	7.6	15.7	25207 D20	6.1 *	4705 D20 FB
B-158	5965 D20	6.5	4885 FB	6.1	7.4	14.5	20943 D20	6.5 *	4616 D20 FB
B-159	6456 D20	6.2	4889 FB	7.5	6.6	12.4	21672 D20	6.6 *	4536 D20 FB
B-160	6060 D20	6.6	4107 FB	5.2	6.1	11.7	20979 D20	6.2 *	4041 D20 FB
B-161	7439 D20	9.2	3703 FB	8.4	6.9	19.7	25511 D20	6.4 *	4088 D20 FB
B-184	6409 D20	5.4	4253	7.9	7.2	14.7	20904 D20	7.4 *	5340 D20
B-185	6379 D20	5.2	4112	5.5	6.4	14.7	21743 D20	6.6 *	4549 D20
B-187	5306 D20	5.2	3925	8.4	6.1	12.1	20482 D20	6.3 *	4166 D20
B-188	9024 D20	6.5	4674	8.7	9.1	17.5	26393 D20	9.6 *	5930 D20
B-189	6780 D20	6.2	5259	9.4	9.9	17.6	27627 D20	6.9 *	4881 D20
B-190	6158 D20	5.2	3900	9.3	6.6	19.4	20563 D20	6.9 *	4611 D20
B-191	11747 D20	9.5	5064	18.6	10.3	43.1	37479 D20	10.8	6072 D20

	Manganese	Nickel	Potassium	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-152	426.7	7.3	519.0	249.0	22.1	2491 D20	65.6	40.1	26.0
B-153	309.1	7.8	616.6	291.7	25.5	2560 D20	63.0	43.0	26.8
B-154	336.8	11.8	1388.3	307.3	34.8	1881 D20	53.0	74.1	22.5
B-158	282.0	7.4	845.7	291.3	25.9	2266 D20	60.9	58.5	24.9
B-158	273.8	7.5	731.4	242.1	23.6	1739 D20	48.5	51.1	20.6
B-159	262.9	7.4	878.6	240.6	23.7	1885 D20	50.1	46.3	19.6
B-160	254.1	6.5	671.3	216.5	21.3	1706 D20	48.5	45.7	20.2
B-161	340.4	7.3	832.8	273.2	21.6	2411 D20	56.9	58.4	27.8
B-184	381.1	13.5	767.4	227.3 BHM	23.4	1647 D20	44.4 HM	65.6	17.8
B-185	270.1	6.9	645.0	269.0 BHM	21.8	1648 D20	42.3 HM	57.7	19.4
B-187	263.6	8.0	471.4	183.6 BHM	17.8	1390 D20	40.4 HM	47.1	20.6
B-188	426.6	9.9	1032.6	308.9 BHM	28.0	2042 D20	52.5 HM	76.9	26.1
B-189	395.1	8.5	749.3	281.5 BHM	23.3	2291 D20	69.4 HM	70.5	25.5
B-190	570.1	11.0	721.6	185.8 BHM	22.9	1379 D20	40.9 HM	41.3	15.2
B-191	262.0	19.2	1584.1	292.9 BHM	30.0	1863 D20	54.1 HM	111.3	26.8

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-152	8/28/89	02/24	03/07/90	191 H	Fdup +
B-153	8/28/89	02/24	03/07/90	191 H	Fdup
B-154	8/28/89	02/24	03/07/90	191 H	Reg
B-158	8/31/89	02/24	03/07/90	188 H	Fdup,Ldup
B-158	8/31/89	02/24	03/07/90	188 H	Fdup,Ldup
B-159	8/31/89	02/24	03/07/90	188 H	Fdup
B-160	8/31/89	02/24	03/07/90	188 H	Reg
B-161	8/31/89	02/24	03/07/90	188 H	Select
B-184	9/18/89	03/05	03/12/90	175	Fdup
B-185	9/18/89	03/05	03/12/90	175	Fdup
B-187	9/18/89	03/05	03/12/90	175	Reg +
B-188	9/18/89	03/05	03/12/90	175	Reg
B-189	9/18/89	03/10	03/12/90	175	Reg
B-190	9/18/89	03/05	03/12/90	175	Reg
B-191	9/18/89	03/05	03/12/90	175	Select

Table B-5. Elements by ICP (EPA Method 3050/6010) B-3-3 Ditch. (sheet 2 of 2)

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Sodium	3/12/90	23.4	1	2	20.0

B = A reagent blank was greater than (GT) contract detection limit (CDL) on the date of analysis. The number of <CDL blanks on that day is shown in the less than (LT) column above.
Dx = Sample further diluted by x when analyzed.
FB = Field blank high collected &/or analyzed on the same date; see Table B-8.
Fdup = Field duplicate.
H = Holding time exceeded (6 months).
HM = Associated matrix recovery high; see Table B-9.
Ldup = Lab duplicate.
Reg = Regular sample.
+ = Chosen by lab for matrix spike.
* = Sample is below the laboratory contract detection limit.

Table B-6. Elements by ICP (EPA Method 3050/6010)
Background 1 - Contingency Pond.

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lithium	Magnesium	Manganese
B-101	5118 D20	5.3	6830	4.1	6.8	14.1	21232 D20	5.7 *	4284 D20	243.7
B-102	6120 D20	6.2	9831 D20	5.2	8.9	14.1	26085 D20	7.1 *	6308 D20	377.0
B-103	7650 D20	7.3	9923 D20	6.3	9.4	18.1	29671 D20	8.7 *	6260 D20	397.7
B-104	5925 D20	6.7	7328	5.8	8.9	16.4	27853 D20	6.1 *	5154 D20	313.5
B-105	5590 D20	6.7	9764 D20	5.4	8.8	16.2	28433 D20	6.0 *	5715 D20	336.6
B-105	5682 D20	6.7	9416 D20	5.0	8.8	15.0	29369 D20	6.1 *	5108 D20	318.6

	Nickel	Potassium	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-101	5.4	899.9	0.0 *	331.6	21.1	1884 D20	53.3	33.1	21.9
B-102	13.9	1216.8	0.2 *	383.5	25.1	2312 D20	60.6	38.7	23.8
B-103	8.5	1350.0	0.0 *	378.2	23.6	2714 D20	68.7	43.3	28.7
B-104	7.5	999.9	0.0 *	331.9	25.4	2310 D20	62.5	42.1	27.8
B-105	11.0	970.3	0.1 *	405.5	24.9	2806 D20	72.4	42.1	28.5
B-105	6.8	961.1 HM	0.3 *	388.8	28.0	2762 D20	73.2	44.0	27.8

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-101	8/04/89	02/20	02/21/90[1]	201 H	Reg
B-102	8/04/89	02/20	02/21/90	201 H	Reg
B-103	8/04/89	02/20	02/21/90	201 H	Reg
B-104	8/04/89	02/20	02/21/90	201 H	Reg
B-105	8/04/89	02/20	02/21/90	201 H	Ldup
B-105	8/04/89	02/20	02/23/90	203 H	Ldup

Dx = Sample further diluted by x when analyzed.
H = Holding time exceeded (6 months.)
HM = Associated matrix recovery high; see Table B-9.
Ldup = Lab duplicate.
Reg = Regular sample.
* = Sample is below the laboratory contract detection limit.

[1] No matrix spike (nor matrix spike duplicate) was reported for samples analyzed on 02/21/90. One of the B-105 lab duplicates was analyzed on 2/23/90 and supported by MS/MSD data.

Table B-7. Elements by ICP (EPA Method 3050/6010)
Background 2 - Undisturbed Native Area.

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lithium	Magnesium	Manganese
B-121	8076 D20	6.4	3138 HM	8.2	7.2	9.6 QB	22324 D20	7.3 *	4334 D20	312.2
B-122	8162 D20	6.5	3206 HM	9.7	7.3	10.6 QB	22231 D20	7.4 *	4692 D20	318.9
B-123	7695 D20	7.2	3872 HM	6.8	7.1	9.9 QB	24131 D20	6.4 *	4577 D20	309.5
B-124	9204 D20	7.0	3726 HM	9.1	8.3	11.8 B	25620 D20	7.5 *	4970 D20	345.8
B-125	7948 D20	6.4	3354 HM	7.4	6.9	8.7 QB	22676 D20	6.0 *	4142 D20	306.7
B-126	9027 D20	6.8	3649 HM	9.1	7.5	11.7 B	24242 D20	7.8 *	5193 D20	331.5

	Nickel	Potassium	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-121	8.8	1445	0.3 *LM	185.2	19.9	1799 D20	49.9	37.5	21.4
B-122	10.0	1505	0.2 *LM	188.7	20.6	1755 D20	48.6	37.6	21.3
B-123	7.8	1443	0.5 *LM	196.4	21.7	2143 D20	52.9	37.5	21.6
B-124	9.5	1538	0.4 *LM	226.2	23.9	2032 D20	56.3	37.8	23.1
B-125	8.2	1404	0.3 *LM	188.4	24.0	1870 D20	50.1	37.9	21.5
B-126	9.5	1561	0.2 *LM	219.6	24.1	1888 D20	50.7	41.3	21.2

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-121	8/10/89	02/22	03/06/90	208 H	Fdup
B-122	8/10/89	02/22	03/06/90	208 H	Fdup
B-123	8/10/89	02/22	03/06/90	208 H	Reg +
B-124	8/10/89	02/22	03/06/90	208 H	Reg
B-125	8/10/89	02/22	03/06/90	208 H	Reg
B-126	8/10/89	02/22	03/06/90	208 H	Reg

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Copper	3/06/90	1.3	1	1	1.0

B = A reagent blank was greater than (GT) CDL on the date of analysis. The number of <CDL blanks on that day is shown in the less than (LT) column above.
Dx = Sample further diluted by x when analyzed.
Fdup = Field duplicate.
H = Holding time exceeded.
HM = Associated matrix recovery high; see Table B-9.
LM = Associated matrix recovery low; see Table B-9.
Q = Sample is above the contract detection limit (CDL) but below a limit of quantitation based on reagent blanks.
Reg = Regular sample.
* = Sample is below the laboratory CDL.
+ = Chosen by lab for matrix spike.

Table B-8. Elements by ICP (EPA Method 3050/6010)
Silica Sand Field Blanks. (sheet 1 of 2)

Sample	Aluminum	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lithium	Magnesium	Manganese
B-113	227.8	0.2 *	43.2 QHM	0.3 *	0.2 *	1.3 Q B LD	302.0	0.2 *	35.6	5.9
B-117	159.5	0.0 *	28.0 QHM	0.0 *	0.0 *	0.5 * B	205.4	0.1 *	17.9	5.8
B-142	159.9	0.0 *	25.4 Q	0.1 *	0.0 *	5.7 Q FB LM	186.7 HM	0.1 *	15.9	4.4
B-151	131.9	0.4 Q	27.0 Q	0.0 *	0.3 *	0.4 *	924.0	0.1 *	15.3	25.3
B-156	202.4	0.7 Q	37.7 Q	0.4 *LM	0.1 *	0.3 *	517.7	0.3 *	23.9	10.5
B-163	158.2	0.5 Q	346.4 FB	0.4 *LM	0.1 *	0.3 *	212.2	0.2 *	86.0 FB	5.1
B-170	165.0	0.8 Q	35.0 Q	0.4 *LM	0.4 *	0.4 *	845.2	0.2 *	19.7	92.6
B-170	152.8	0.1 *	32.6 Q	0.3 *LM	0.0 *	0.2 *	188.6	0.1 *	17.5	4.4
B-193	165.3	0.0 *	38.0 Q	0.1 *	0.0 *	0.3 *	203.6	0.1 *	19.8	5.4
B-193	147.0	0.0 *	28.4 Q	0.2 *	0.1 *	0.2 *	194.1	0.0 *	16.8	4.9
B-205	152.3	0.1 *	31.9 Q	0.1 *LM	0.3 *	0.9 *	613.1	0.1 *	18.8	4.0

	Nickel	Potassium	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc	Zirconium
B-113	0.4 *	44.6	0.2 *LM	14.9 *	0.7 *	4.9 *	0.6 Q	1.3 Q	1.2 *
B-117	0.3 *	42.9	0.0 *LM	16.7 *	0.5 *	4.1 *	0.0 *	0.9 Q	0.7 *
B-142	0.1 *	38.2	0.0 *	9.0 *	0.4 *	4.1 *	0.1 *	1.0 Q	0.8 *
B-151	0.3 *	30.8	0.2 *	14.8 *	0.5 *	40.8 *	0.8 Q	1.0 Q	0.6 *
B-156	0.8 *	43.9 HM	0.0 *	13.8 *HM B	0.7 *	5.7 *	0.4 *HM	1.0 Q	0.9 *
B-163	0.8 *	40.1 HM	0.0 *	10.4 *HM B	0.6 *	4.5 *	0.3 *HM	0.8 Q	0.8 *
B-170	0.8 *	40.0 HM	0.0 *	11.7 *HM B	0.7 *	5.5 *	0.4 *HM	1.7 Q	0.9 *
B-170	0.5 *	34.4 HM	0.1 *	11.3 *HM B	0.5 *	4.3 *	0.2 *HM	0.7 QLD	0.7 *
B-193	0.2 *	38.5	0.0 *	20.1 QHM B	0.5 *	4.6 *	0.5 *HM	5.7	0.7 *
B-193	0.3 *	34.8	0.3 *	23.2 QHM B	0.6 *	4.0 *	0.5 *HM	0.9 Q	0.3 *
B-205	0.0 *	31.8 HM	0.1 *	32.5 QHM B	0.6 *	4.0 *	0.4 *HM	2.0 Q	0.7 *

Sampling Parameters

Sample	Collect date	Digest date	Analysis date	Days elapsed	Type
B-113	8/04/89	2/22	3/06/90	214 H	Blk
B-117	8/10/89	2/22	3/06/90	208 H	Blk
B-142	8/18/89	2/19	2/20/90	186 H	Blk +
B-151	8/25/89	2/20	2/21/90[2]	180	Blk
B-156	8/28/89	2/24	3/07/90	191 H	Blk
B-163	8/31/89	2/24	3/07/90	188 H	Blk
B-170	9/07/89	2/24	3/07/90	181	Blk-Ldup
B-170	9/07/89	2/24	3/07/90	181	Blk-Ldup
B-193	9/18/89	3/05	3/12/90	175	Blk-Ldup
B-193	9/18/89	3/05	3/12/90	175	Blk-Ldup
B-205	9/21/89	3/06	3/07/90	167	Blk

Table B-8. Elements by ICP (EPA Method 3050/6010)
Silica Sand Field Blanks. (sheet 2 of 2)

Reagent Blanks Greater than CDL

Analyte	Date	Value µg/g	GT	LT	CDL µg/g
Copper	3/06/90	1.3	1	1	1.0
Sodium	3/07/90	26.7	2	2	20.0
Sodium	3/07/90	24.1	-	-	
Sodium	3/12/90	23.4	1	2	

B = A reagent blank was greater than (GT) CDL on date of analysis. The number of <CDL blanks on that day is shown on the following page in the less than (LT) column.
Blk = Silica sand field blank.
FB = Field blank high--exceeds 99th percentile of the distribution.
H = Holding time exceeded (6 months).
HM = Associated matrix recovery high; see Table B-9.
LD = Sample is above CDL but below a limit of detection, (avg + 3s), based on reagent blanks.
Ldup = Lab duplicate.
LM = Associated matrix recovery low; see Table B-9.
Q = Sample is above contract detection limit (CDL) but below a limit of quantitation, (avg + 10s), based on reagent blanks.
* = Sample is below CDL limit.
+ = Chosen by lab for matrix spike.

[2] No matrix spike (nor matrix spike duplicate) was reported for samples analyzed on 02/21/90.

Table B-9. Matrix Spike/Matrix Spike Duplicate Anomally Summary for ICP Analytes.

Sample	Digest Date	Analysis Date	Analyte Low Recovery[a]	Analyte High Recovery[a]	Spike Level Inappropriate	Sample Spikes Site/Source
B-133 S1	2/19	2/20/90	Ag(72%)		Al, Fe, Mg, Ti	Composite fr. B-3 Pond
B-133 S2	2/19	2/20/90			Al, Fe, Ti	
B-142 S1	2/19	2/20/90	Cu(73%)			Silica sand blank
B-142 S2	2/19	2/20/90	Cu(75%)	Fe(181%)		
B-110 S1	2/20	2/23/90			Ca, Al, Fe, Mg, Ti	3B Pond
B-110 S2	2/20	2/23/90		K(128%)	Ca, Al, Fe, Mg, Ti	
B-123 S1	2/22	3/06/90	Ag(71%)	Ca(128%)	Al, Mn, Fe, Mg, Ti	Background (Sage. site)
B-123 S2	2/22	3/06/90	Ag(74%)	Ca(129%)	Al, Mn, Fe, Ti	
B-152 S1	2/24	3/07/90			Ca, Al, Mn, Fe, Mg, Ti	B-3-3 Ditch
B-152 S2	2/24	3/07/90			Ca, Al, Mn, Fe, Mg, Ti	
B-162 S1	2/24	3/07/90	Cr(73%)	Cd(130%), Na(130%), V(152%), K(131%)	Ca, Al, Fe, Mg, Ti	Composite fr. B-3-3 Ditch
B-162 S2	2/24	3/07/90		Cd(130%), Na(128%), V(147%), K(143%)	Ca, Al, Mn, Fe, Mg, Ti	
B-198 S1	3/06	3/07/90			Ca, Al, Mn, Fe, Mg, Ti	3A Pond
B-198 S2	3/06	3/07/90			Ca, Al, Fe, Mg, Ti	
B-175 S1	3/08	3/10/90		V(134%)	Ca, Al, Mn, FE, Mg, Ti	3C Pond (dry site)
B-175 S2	3/08	3/10/90		V(131%)	Ca, Al, Mn, Fe, Mg, Ti	
B-187 S1	3/05	3/12/90		Na(126%), V(141%)	Ca, Al, Mn, Fe, Mg, Ti	B-3-3 Ditch
B-187 S2	3/05	3/12/90		V(147%)	Ca, Al, Mn, Fe, Mg, Ti	

[a] = Acceptable guideline recoveries are 75 to 125%.

APPENDIX C

SELECTED DATA OTHER THAN ICP ANALYSES

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APPENDIX C

SELECTED DATA OTHER THAN ICP ANALYSES

Appendix C contains tabulations of total metals by atomic absorption, ammonium, common anions by liquid chromatography, volatile organics by gas chromatography/mass spectrometry, and radioactivity measurements. Many analytes investigated in Phase 1 were below concentrations measurable by the referenced procedures. Those selected for display in this appendix generally include analytes reported above the contract detection limit (CDL) in at least some samples and not listed in the previous appendix. Analytes are presented in the following order: arsenic, lead, mercury, ammonium, chloride, fluoride, nitrate, nitrite, phosphate, sulfate, volatile organics, gross alpha, gross beta, strontium-90, and radionuclides by gamma scan.

Key to sample type abbreviations of Appendix C

Fdup = Field duplicate
Ldup = Laboratory duplicate
Reg = Regular sample
Select = Nonrandomly selected sample
Blk = Silica sand field blank
H_2O = Pond water sample
MS = Matrix spike sample
MSD = Matrix spike duplicate sample.

Table C-1. Arsenic Data (EPA Method 7060)
Soil CDL = 0.5 µg/g. (sheet 1 of 2)

Site	Sample	Arsenic (µg/g)	QC-flags	Collect date	Digest date	Analysis date	Type
3A Pond	B-194	1.10		9/21	9/25	9/26	Fdup
3A Pond	B-196	0.97		9/21	9/25	9/26	Fdup
3A Pond	B-197	0.84		9/21	9/25	9/26	Ldup
3A Pond	B-197	0.89		9/21	9/25	9/26	Ldup
3A Pond	B-198	1.07		9/21	9/25	9/26	Reg
3A Pond	B-200	4.69		9/21	9/25	9/26	Reg
3A Pond	B-201	2.66		9/21	9/25	9/26	Reg
3A Pond	B-202	1.35		9/21	9/25	9/26	Reg
3A Pond	B-203	2.12		9/21	9/25	9/26	Reg
3B Pond	B-106	1.64		8/04	8/31	9/05	Ldup
3B Pond	B-106	2.54		8/04	8/31	9/05	Ldup
3B Pond	B-107	1.92		8/04	8/31	9/05	Reg
3B Pond	B-108	1.87		8/04	8/31	9/05	Fdup
3B Pond	B-109	2.26		8/04	9/05	9/08	Fdup
3B Pond	B-110	3.43		8/04	9/05	9/08	Reg
3B Pond	B-111	1.78		8/04	9/05	9/08	Reg
3C Pond	B-171	0.97		9/08	9/13	9/15	Fdup
3C Pond	B-172	2.20		9/08	9/13	9/15	Fdup
3C Pond	B-174	0.99		9/08	9/13	9/15	Reg
3C Pond	B-175	1.95		9/08	9/13	9/15	Reg
3C Pond	B-176	1.14		9/08	9/13	9/15	Ldup
3C Pond	B-176	1.32		9/08	9/13	9/15	Ldup
3C Pond	B-177	0.94		9/08	9/13	9/15	Reg
3C Pond	B-178	0.83		9/08	9/13	9/15	Reg
3C Pond	B-179	1.13		9/08	9/13	9/15	Reg
3C Pond	B-180	0.84		9/08	9/13	9/15	Reg
B-3 Pond	B-114	2.24		8/10	9/05	9/08	Reg
B-3 Pond	B-115	1.75		8/10	9/05	9/08	Reg
B-3 Pond	B-116	1.57		8/10	9/05	9/08	Reg
B-3 Pond	B-118	2.67		8/11	9/15	9/18	Reg
B-3 Pond	B-119	2.17		8/11	9/15	9/18	Reg
B-3 Pond	B-128	1.54		8/17	9/15	9/18	Fdup
B-3 Pond	B-129	1.60		8/17	9/15	9/18	Fdup
B-3 Pond	B-130	2.32		8/17	9/15	9/18	Reg
B-3 Pond	B-131	2.36		8/17	9/15	9/18	Reg
B-3 Pond	B-132	2.46		8/17	9/15	9/18	Reg
B-3 Pond	B-134	2.18		8/18	9/21	9/22	Fdup
B-3 Pond	B-135	3.10		8/18	9/21	9/22	Fdup
B-3 Pond	B-136	2.32		8/18	9/21	9/22	Reg
B-3 Pond	B-138	1.38		8/18	9/21	9/22	Reg
B-3 Pond	B-139	1.13		8/18	9/21	9/22	Reg
B-3 Pond	B-140	1.52		8/18	9/21	9/22	Ldup
B-3 Pond	B-140	1.40		8/18	9/21	9/22	Ldup
B-3 Pond	B-143	1.15		8/25	8/29	8/30	Reg
B-3 Pond	B-145	1.32		8/25	8/29	8/30	Fdup
B-3 Pond	B-146	1.23		8/25	8/29	8/30	Fdup
B-3 Pond	B-147	2.05		8/25	8/29	8/30	Reg
B-3 Pond	B-148	3.34		8/25	8/29	8/30	Reg
B-3 Pond	B-149	2.65		8/25	8/29	8/30	Reg
B-3 Pond	B-164	2.63		9/07	9/13	9/15	Select-Fdup
B-3 Pond	B-165	2.91		9/07	9/13	9/15	Select-Fdup
B-3 Pond	B-166	1.45		9/07	9/13	9/15	Reg
B-3 Pond	B-168	1.56		9/07	9/13	9/15	Select
B-3-3 Dit.	B-152	1.59		8/28	8/31	9/05	Fdup
B-3-3 Dit.	B-153	1.22		8/28	8/31	9/05	Fdup
B-3-3 Dit.	B-154	3.09		8/28	8/31	9/05	Reg
B-3-3 Dit.	B-158	2.56		8/31	9/05	9/08	Fdup
B-3-3 Dit.	B-159	1.86		8/31	9/05	9/08	Fdup
B-3-3 Dit.	B-160	1.28		8/31	9/05	9/08	Reg
B-3-3 Dit.	B-161	1.29		8/31	9/05	9/08	Select

Table C-1. Arsenic Data (EPA Method 7060)
Soil CDL = 0.5 µg/g. (sheet 2 of 2)

Site	Sample	Arsenic (µg/g)	QC-flags	Collect date	Digest date	Analysis date	Type
B-3-3 Dit.	B-184	2.99		9/18	9/21	9/22	Fdup
B-3-3 Dit.	B-185	2.93		9/18	9/21	9/22	Fdup
B-3-3 Dit.	B-187	1.84		9/18	9/21	9/22	Reg
B-3-3 Dit.	B-188	4.45		9/18	9/21	9/22	Reg
B-3-3 Dit.	B-189	3.69		9/18	9/21	9/22	Ldup
B-3-3 Dit.	B-189	2.16		9/18	9/21	9/22	Ldup
B-3-3 Dit.	B-190	2.63		9/18	9/21	9/22	Reg
B-3-3 Dit.	B-191	2.85		9/18	9/21	9/22	Select
Cont Bkg	B-101	3.51		8/04	8/31	9/05	Reg
Cont Bkg	B-102	4.75		8/04	8/31	9/05	Reg
Cont Bkg	B-103	3.45		8/04	8/31	9/05	Reg
Cont Bkg	B-104	2.14		8/04	8/31	9/05	Reg
Cont Bkg	B-105	2.45		8/04	8/31	9/05	Reg
Sage Bkg	B-121	1.90		8/10	9/05	9/08	Fdup
Sage Bkg	B-122	2.56		8/10	9/15	9/18	Ldup, Fdup
Sage Bkg	B-122	2.51		8/10	9/15	9/18	Ldup, Fdup
Sage Bkg	B-123	1.87		8/10	9/15	9/18	Reg
Sage Bkg	B-124	1.68		8/10	9/15	9/18	Reg
Sage Bkg	B-125	1.58		8/10	9/15	9/18	Reg
Sage Bkg	B-126	3.22		8/10	9/15	9/18	Reg
Silica sand	B-113	0.04 *+		8/04	9/05	9/08	Blk
Silica sand	B-117	0.01 *		8/10	9/05	9/08	Blk
Silica sand	B-1288	0.08 *+		8/11	9/15	9/18	Blk
Silica sand	B-142	0.00 *+		8/18	9/21	9/22	Blk
Silica sand	B-151	0.02 *+		8/25	8/29	8/30	Blk
Silica sand	B-156	0.00 *+		8/28	8/31	9/05	Blk
Silica sand	B-163	0.00 *		8/31	9/05	9/08	Blk
Silica sand	B-170	0.04 *+		9/07	9/13	9/15	Blk
Silica sand	B-183	0.00 *		9/08	9/13	9/15	Blk
Silica sand	B-193	0.08 *		9/18	9/21	9/22	Blk
Silica sand	B-205	0.03 *+		9/21	9/25	9/26	Blk
WATER SAMPLES (µg/L)[1]							
B-3 Pond	B-206	1 *+		9/28	10/09	10/13	Fdup-H_2O
B-3 Pond	B-207	2 *		9/28	10/09	10/13	Fdup-H_2O
B-3 Pond	B-208	1 *		9/28	10/09	10/13	Reg-H_2O
B-3 Pond	B-209	1 *		9/28	10/09	10/13	Reg-H_2O
B-3 Pond	B-210	1 *		9/28	10/09	10/13	Reg-H_2O

[1]CDL for water = 5 µg/L

SPIKE RECOVERIES (%-Rec.)

Sample	MS	MSD
B-151	79	79
B-156	78	82
B-113	84	84
B-170	82	82
B-128	94	92
B-142	86	90
B-205	82	78
B-206 (Water)	88	92

* = Estimated value <CDL.
\+ = Sample chosen by laboratory for MS/MSD.

Table C-2. Lead Data (EPA Method 7421)
Soil CDL = 0.5 µg/g. (sheet 1 of 2)

Site	Sample	Lead (µg/g)	QC-flags	Collect date	Digest date	Analysis date	Type
3A Pond	B-194	4.41		9/21	9/25	9/26	Fdup
3A Pond	B-196	4.29		9/21	9/25	9/26	Fdup
3A Pond	B-197	2.97		9/21	9/25	9/26	Ldup
3A Pond	B-197	4.01		9/21	9/25	9/26	Ldup
3A Pond	B-198	5.22		9/21	9/25	9/26	Reg
3A Pond	B-200	6.28		9/21	9/25	9/26	Reg
3A Pond	B-201	7.29		9/21	9/25	9/26	Reg
3A Pond	B-202	3.76		9/21	9/25	9/26	Reg
3A Pond	B-203	6.36		9/21	9/25	9/26	Reg
3B Pond	B-106	2.63		8/04	8/31	9/06	Ldup
3B Pond	B-106	3.11		8/04	8/31	9/06	Ldup
3B Pond	B-107	2.92		8/04	8/31	9/06	Reg
3B Pond	B-108	3.12		8/04	8/31	9/06	Fdup
3B Pond	B-109	3.84	FB	8/04	9/05	9/07	Fdup
3B Pond	B-110	3.03	FB	8/04	9/05	9/07	Reg
3B Pond	B-111	2.07	FB	8/04	9/05	9/07	Reg
3C Pond	B-171	3.37		9/08	9/13	9/14	Fdup
3C Pond	B-172	5.22		9/08	9/13	9/14	Fdup
3C Pond	B-174	2.92		9/08	9/13	9/14	Reg
3C Pond	B-175	4.65		9/08	9/13	9/14	Reg
3C Pond	B-176	3.48		9/08	9/13	9/14	Ldup
3C Pond	B-176	3.31		9/08	9/13	9/14	Ldup
3C Pond	B-177	6.09		9/08	9/13	9/14	Reg
3C Pond	B-178	3.30		9/08	9/13	9/14	Reg
3C Pond	B-179	3.84		9/08	9/13	9/14	Reg
3C Pond	B-180	3.04		9/08	9/13	9/14	Reg
B-3 Pond	B-114	16.20	D10 FB	8/10	9/05	9/09	Reg
B-3 Pond	B-115	50.50	D50 FB E	8/10	9/05	9/09	Reg
B-3 Pond	B-116	58.20	D10 FB	8/10	9/05	9/09	Reg
B-3 Pond	B-118	8.14		8/11	9/15	9/18	Reg
B-3 Pond	B-119	9.60	D10 E	8/11	9/15	9/18	Reg
B-3 Pond	B-128	13.50	D10	8/17	9/15	9/18	Fdup
B-3 Pond	B-129	13.00	D10	8/17	9/15	9/18	Fdup
B-3 Pond	B-130	356.00	D100	8/17	9/15	9/20	Reg
B-3 Pond	B-131	618.00	D100	8/17	9/15	9/20	Reg
B-3 Pond	B-132	112.00	D100 E	8/17	9/15	9/20	Reg
B-3 Pond	B-134	14.50	D10	8/18	9/21	9/22	Fdup
B-3 Pond	B-135	19.10	D10	8/18	9/21	9/22	Fdup
B-3 Pond	B-136	16.90	D10	8/18	9/21	9/22	Reg
B-3 Pond	B-138	46.60	D10	8/18	9/21	9/22	Reg
B-3 Pond	B-139	286.00	D100	8/18	9/21	9/23	Reg
B-3 Pond	B-140	25.10	D10	8/18	9/21	9/22	Ldup
B-3 Pond	B-140	23.90	D10	8/18	9/21	9/22	Ldup
B-3 Pond	B-143	67.00	D10	8/25	8/29	8/31	Reg
B-3 Pond	B-145	59.00	D10	8/25	8/29	8/31	Fdup
B-3 Pond	B-146	226.00	D100	8/25	8/29	9/01	Fdup
B-3 Pond	B-147	163.00	D100	8/25	8/29	9/01	Reg
B-3 Pond	B-148	116.00	D100	8/25	8/29	9/01	Reg
B-3 Pond	B-149	17.00	D10	8/25	8/29	8/31	Reg
B-3 Pond	B-164	16.60	D10	9/07	9/13	9/16	Select-Fdup
B-3 Pond	B-165	13.00	D10	9/07	9/13	9/16	Select-Fdup
B-3 Pond	B-166	76.90	D10	9/07	9/13	9/16	Reg
B-3 Pond	B-168	74.40	D10	9/07	9/13	9/16	Select
B-3-3 Dit.	B-152	3.22		8/28	8/31	9/06	Fdup
B-3-3 Dit.	B-153	2.38		8/28	8/31	9/06	Fdup
B-3-3 Dit.	B-154	8.65		8/28	8/31	9/06	Reg
B-3-3 Dit.	B-158	5.69	FB	8/31	9/05	9/07	Fdup
B-3-3 Dit.	B-159	4.51	FB	8/31	9/05	9/07	Fdup
B-3-3 Dit.	B-160	5.62	FB	8/31	9/05	9/07	Reg

Table C-2. Lead Data (EPA Method 7421)
Soil CDL = 0.5 µg/g. (sheet 2 of 2)

Site	Sample	Lead (µg/g)	QC-flags		Collect date	Digest date	Analysis date	Type
B-3-3 Dit.	B-161	31.00	D10 FB		8/31	9/05	9/09	Select
B-3-3 Dit.	B-184	7.42			9/18	9/21	9/22	Fdup
B-3-3 Dit.	B-185	7.84			9/18	9/21	9/22	Fdup
B-3-3 Dit.	B-187	3.38			9/18	9/21	9/22	Reg
B-3-3 Dit.	B-188	10.80	D10		9/18	9/21	9/22	Reg
B-3-3 Dit.	B-189	5.15			9/18	9/21	9/22	Ldup
B-3-3 Dit.	B-189	4.15			9/18	9/21	9/22	Ldup
B-3-3 Dit.	B-190	3.75			9/18	9/21	9/22	Reg
B-3-3 Dit.	B-191	2.36			9/18	9/21	9/22	Select
Cont Bkg	B-101	4.84			8/04	8/31	9/06	Reg
Cont Bkg	B-102	3.80			8/04	8/31	9/06	Reg
Cont Bkg	B-103	5.04			8/04	8/31	9/06	Reg
Cont Bkg	B-104	3.55			8/04	8/31	9/06	Reg
Cont Bkg	B-105	3.69			8/04	8/31	9/06	Reg
Sage Bkg	B-121	3.96	FB		8/10	9/05	9/07	Fdup
Sage Bkg	B-122	7.30	FB		8/10	9/15	9/18	Fdup,Ldup
Sage Bkg	B-122	7.13	FB		8/10	9/15	9/18	Fdup,Ldup
Sage Bkg	B-123	6.81	FB		8/10	9/15	9/18	Reg
Sage Bkg	B-124	4.70	FB		8/10	9/15	9/18	Reg
Sage Bkg	B-125	6.81	FB		8/10	9/15	9/18	Reg
Sage Bkg	B-126	9.96	FB		8/10	9/15	9/18	Reg
Silica sand	B-113	0.52	E Q	+	8/04	9/05	9/07	Blk
Silica sand	B-117	1.58	FB		8/10	9/05	9/07	Blk
Silica sand	B-128B	0.32 *		+	8/11	9/15	9/18	Blk
Silica sand	B-142	0.23 *		+	8/18	9/21	9/22	Blk
Silica sand	B-151	0.31 *		+	8/25	8/29	8/31	Blk
Silica sand	B-156	0.30 *		+	8/28	8/31	9/06	Blk
Silica sand	B-163	0.71	E Q		8/31	9/05	9/07	Blk
Silica sand	B-170	0.26 *		+	9/07	9/13	9/14	Blk
Silica sand	B-183	0.25 *			9/08	9/13	9/14	Blk
Silica sand	B-193	0.24 *			9/18	9/21	9/22	Blk
Silica sand	B-205	0.39 *		+	9/21	9/25	9/26	Blk
WATER SAMPLES (µg/L)[1]								
B-3 Pond	B-206	1 *			9/28	-	10/11	Fdup-H_2O
B-3 Pond	B-207	0 *			9/28	-	10/11	Fdup-H_2O
B-3 Pond	B-208	1 *		+	9/28	-	10/11	Reg-H_2O
B-3 Pond	B-209	1 *			9/28	-	10/11	Reg-H_2O
B-3 Pond	B-210	0 *			9/28	-	10/11	Reg-H_2O

[1]CDL for water = 5 µg/L

SPIKE RECOVERIES

Sample	MS	MSD	Sample	MS	MSD
B-151	89	93	B-205	100	104
B-113	84	84	B-156	96	98
B-142	94	96	B-128	96	104
B-128	96	104	B-170	98	96
			B-208 (Water)	94	96

Dx = Sample diluted during analysis by an extra factor of x.
E = Estimate is greater than a dilution-adjusted CDL, but <3 times the standard deviation of the field blanks multiplied by any additional dilution factor.
FB = Assoc. field blank high -- exceeds 99th percentile of the t distribution.
Q = Estimate is greater than a dilution-adjusted CDL, but below an LOQ derived from the mean and standard deviation of reagent blanks, (avg. + 10s), and adjusted for nominal sample size/dilution; LOQ = 0.73 µg/g.
+ = Sample chosen by laboratories for MS/MSD.
* = Estimated value below CDL.

Table C-3. Mercury Data (EPA Methods 7470 and 7471)
Soil CDL = 0.2 µg/g. (sheet 1 of 2)

Site	Sample	Mercury (µg/g)	QC-flags	Collect date	Analysis date	Days elapsed	Type
3A Pond	B-194	< 0.2 *		9/21	9/26	5	Fdup
3A Pond	B-196	< 0.2 *		9/21	9/26	5	Fdup
3A Pond	B-197	< 0.2 *		9/21	9/26	5	Reg
3A Pond	B-198	< 0.2 *		9/21	9/26	5	Reg
3A Pond	B-200	< 0.2 *		9/21	9/26	5	Reg
3A Pond	B-201	< 0.2 *		9/21	9/26	5	Reg
3A Pond	B-202	< 0.2 *		+ 9/21	9/26	5	Reg
3A Pond	B-203	< 0.2 *		9/21	9/26	5	Reg
3B Pond	B-106	< 0.2 *		8/04	8/11	7	Reg
3B Pond	B-107	< 0.2 *		8/04	8/11	7	Reg
3B Pond	B-108	< 0.2 *		8/04	8/11	7	Fdup
3B Pond	B-109	< 0.2 *		8/04	8/11	7	Fdup
3B Pond	B-110	< 0.2 *		8/04	8/11	7	Reg
3B Pond	B-111	< 0.2 *		8/04	8/11	7	Reg
3C Pond	B-171	< 0.2 *		9/08	9/14	6	Fdup
3C Pond	B-172	< 0.2 *		9/08	9/14	6	Fdup
3C Pond	B-174	< 0.2 *		9/08	9/14	6	Reg
3C Pond	B-175	< 0.2 *		9/08	9/14	6	Reg
3C Pond	B-176	< 0.2 *		+ 9/08	9/14	6	Reg
3C Pond	B-177	< 0.2 *		9/08	9/18	10	Reg
3C Pond	B-178	< 0.2 *		9/08	9/18	10	Reg
3C Pond	B-179	< 0.2 *		9/08	9/18	10	Reg
3C Pond	B-180	< 0.2 *		9/08	9/18	10	Reg
B-3 Pond	B-114	1.4	Q	8/10	8/24	14	Ldup
B-3 Pond	B-114	1.7	Q	8/10	8/24	14	Ldup
B-3 Pond	B-115	2.4	D2 Q	+ 8/10	8/29	19	Reg
B-3 Pond	B-116	3.2		8/10	8/24	14	Reg
B-3 Pond	B-118	< 0.2 *		8/11	8/24	13	Reg
B-3 Pond	B-119	< 0.2 *		8/11	8/24	13	Reg
B-3 Pond	B-128	< 0.2 *		8/17	8/24	7	Fdup
B-3 Pond	B-129	< 0.2 *		8/17	8/24	7	Fdup
B-3 Pond	B-130	11.6	D4 Q	8/17	8/29	12	Reg
B-3 Pond	B-131	7.0	D2	8/17	8/29	12	Reg
B-3 Pond	B-132	15.6	D4	8/17	8/29	12	Reg
B-3 Pond	B-134	0.7	Q	8/18	8/24	6	Fdup
B-3 Pond	B-135	1.1	Q	8/18	8/24	6	Fdup
B-3 Pond	B-136	1.7	Q	8/18	8/24	6	Reg
B-3 Pond	B-138	1.7	Q	8/18	8/24	6	Reg
B-3 Pond	B-139	1.4	Q	8/18	8/24	6	Reg
B-3 Pond	B-140	0.7	Q	8/18	8/24	6	Reg
B-3 Pond	B-143	1.0	Q	8/25	8/29	4	Ldup
B-3 Pond	B-143	1.2	Q	8/25	8/29	4	Ldup
B-3 Pond	B-145	1.6	Q	8/25	8/29	4	Fdup
B-3 Pond	B-146	< 0.2 *		8/25	8/29	4	Fdup
B-3 Pond	B-147	3.7	D2 Q	8/25	8/30	5	Reg
B-3 Pond	B-148	1.2	Q	8/25	8/29	4	Reg
B-3 Pond	B-149	< 0.2 *		8/25	8/29	4	Reg
B-3 Pond	B-164	0.8	Q	9/07	9/14	7	Select-Fdup
B-3 Pond	B-165	0.3	Q LD	9/07	9/14	7	Select-Fdup
B-3 Pond	B-166	0.6	Q	9/07	9/14	7	Reg
B-3 Pond	B-168	0.7	Q	9/07	9/14	7	Select
B-3-3 Dit.	B-152	< 0.2 *		8/28	8/30	2	Fdup
B-3-3 Dit.	B-153	< 0.2 *		8/28	8/30	2	Fdup
B-3-3 Dit.	B-154	0.2	Q LD	8/28	8/30	2	Reg
B-3-3 Dit.	B-158	< 0.2 *		8/31	9/05	5	Ldup, Fdup
B-3-3 Dit.	B-158	< 0.2 *		8/31	9/05	5	Ldup, Fdup
B-3-3 Dit.	B-159	< 0.2 *		8/31	9/05	5	Fdup
B-3-3 Dit.	B-160	< 0.2 *		8/31	9/05	5	Reg
B-3-3 Dit.	B-161	0.6	Q	8/31	9/05	5	Select
B-3-3 Dit.	B-184	< 0.2 *		9/18	9/22	4	Fdup
B-3-3 Dit.	B-185	< 0.2 *		9/18	9/22	4	Fdup

Table C-3. Mercury Data (EPA Method 7470)
Soil CDL = 0.2 µg/g. (sheet 2 of 2)

Site	Sample	Mercury (µg/g)	QC-flags	Collect date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-187	< 0.2 *		9/18	9/22	4	Reg
B-3-3 Dit.	B-188	0.4	Q LD	9/18	9/22	4	Reg
B-3-3 Dit.	B-189	< 0.2 *		9/18	9/22	4	Reg
B-3-3 Dit.	B-190	< 0.2 *		9/18	9/22	4	Reg
B-3-3 Dit.	B-191	< 0.2 *		9/18	9/22	4	Select
Cont Bkg	B-101	< 0.2 *		8/04	8/11	7	Ldup
Cont Bkg	B-101	< 0.2 *		8/04	8/11	7	Ldup
Cont Bkg	B-102	< 0.2 *		+ 8/04	8/11	7	Reg
Cont Bkg	B-103	< 0.2 *		8/04	8/11	7	Reg
Cont Bkg	B-104	< 0.2 *		8/04	8/11	7	Reg
Cont Bkg	B-105	< 0.2 *		8/04	8/11	7	Reg
Sage Bkg	B-121	< 0.2 *		8/10	8/24	14	Fdup
Sage Bkg	B-122	< 0.2 *		8/10	8/24	14	Fdup
Sage Bkg	B-123	< 0.2 *		8/10	8/24	14	Reg
Sage Bkg	B-124	< 0.2 *		8/10	8/24	14	Reg
Sage Bkg	B-125	< 0.2 *		8/10	8/24	14	Reg
Sage Bkg	B-126	< 0.2 *		8/10	8/24	14	Reg
Silica sand	B-113	< 0.2 *		8/04	8/11	7	Blk
Silica sand	B-117	< 0.2 *		8/10	8/24	14	Blk
Silica sand	B-128B	< 0.2 *		8/11	8/24	13	Blk
Silica sand	B-142	< 0.2 *		8/18	8/24	6	Blk
Silica sand	B-151	< 0.2 *		8/25	8/29	4	Blk
Silica sand	B-156	< 0.2 *		+ 8/28	8/30	2	Blk
Silica sand	B-163	< 0.2 *		+ 8/31	9/05	5	Blk
Silica sand	B-170	< 0.2 *		9/07	9/14	7	Blk
Silica sand	B-183	< 0.2 *		+ 9/08	9/18	10	Blk
Silica sand	B-193	< 0.2 *		+ 9/18	9/22	4	Blk
Silica sand	B-205	< 0.2 *		9/21	9/26	5	Blk
WATER SAMPLES µg/L[1]							
B-3 Pond	B-206	< 0.1 *		9/28	10/03	5	Fdup-H_2O
B-3 Pond	B-207	< 0.1 *		9/28	10/04	6	Fdup-H_2O
B-3 Pond	B-208	< 0.1 *		9/28	10/04	6	Reg-H_2O
B-3 Pond	B-209	< 0.1 *		9/28	10/04	6	Reg-H_2O
B-3 Pond	B-210	< 0.1 *		9/28	10/04	6	Reg-H_2O

[1] CDL for water = 0.1 µg/L

SPIKE RECOVERIES

Sample	%-Rec. MS	%-Rec. MSD	Sample	%-Rec. MS	%-Rec. MSD
B-102	120	100	B-176	120	100
B-115	100	120	B-183	100	120
B-156	120	120	B-193	100	100
B-163	110	110	B-202	110	110

Dx = Sample size reduced in analysis by an extra factor of x.
LD = Estimate is greater than a dilution adjusted CDL, but below a limit of detection, (LOD), derived from the mean and standard deviation of reagent blanks, (avg. + 3s), and adjusted for nominal sample size/dilution. LOD = 0.4 µg/g
Q = Estimate is greater than a dilution adjusted CDL, but below a limit of quantification, (LOQ), derived from the mean and standard deviation of reagent blanks, (avg. + 10s), and adjusted for nominal sample size/dilution. LOQ = 2.9 µg/g
+ = Sample chosen by lab for matrix spike MS/MSD.
* = Estimated value below CDL.

Table C-4. Ammonium Data (ASTM-D-1426 C/D)
Soil CDL = 0.5 µg/g. (sheet 1 of 2)

Site	Sample	Ammonium (µg/g)	QC-flags	Collect date	Analysis date	Days elapsed	Type
3A Pond	B-194	2.96		9/21	9/26	5	Fdup
3A Pond	B-196	1.46		9/21	9/26	5	Fdup
3A Pond	B-197	2.09		9/21	9/26	5	Reg
3A Pond	B-198	7.59		9/21	9/26	5	Reg
3A Pond	B-200	0.25 *		9/21	9/26	5	Reg
3A Pond	B-201	3.47		9/21	9/26	5	Reg
3A Pond	B-202	3.17		9/21	9/26	5	Reg
3A Pond	B-203	7.79		9/21	9/26	5	Reg
3B Pond	B-106	1.00	H	8/04	9/18	45	Reg
3B Pond	B-107	0.90	H	8/04	9/18	45	Reg
3B Pond	B-108	0.40 *	H	8/04	9/18	45	Fdup
3B Pond	B-109	0.40 *	H	8/04	9/18	45	Fdup
3B Pond	B-110	-0.04 *	H	8/04	9/18	45	Reg
3B Pond	B-111	0.00 *	H	8/04	9/18	45	Reg
3C Pond	B-171	3.00		9/08	9/11	3	Fdup
3C Pond	B-172	3.50		9/08	9/11	3	Fdup
3C Pond	B-174	-0.01 *		9/08	9/11	3	Reg
3C Pond	B-175	5.60		9/08	9/11	3	Reg
3C Pond	B-176	0.80		9/08	9/11	3	Reg
3C Pond	B-177	0.20 *		9/08	9/11	3	Reg
3C Pond	B-178	0.20 *		9/08	9/11	3	Reg
3C Pond	B-179	2.70		9/08	9/11	3	Reg
3C Pond	B-180	0.20 *		9/08	9/11	3	Reg
B-3 Pond	B-114	7.39	H LM	8/10	9/23	44	Reg
B-3 Pond	B-115	8.31	H LM	8/10	9/23	44	Reg
B-3 Pond	B-116	9.62	H LM	8/10	9/23	44	Reg
B-3 Pond	B-118	9.46	H LM	8/11	9/23	43	Reg
B-3 Pond	B-119	6.91	H LM	8/11	9/23	43	Reg
B-3 Pond	B-128	7.33	H	8/17	9/27	41	Fdup
B-3 Pond	B-129	11.77	H	8/17	9/27	41	Fdup
B-3 Pond	B-130	9.61	H	8/17	9/27	41	Reg
B-3 Pond	B-131	10.28	H	8/17	9/27	41	Reg
B-3 Pond	B-132	9.23	H	8/17	9/27	41	Reg
B-3 Pond	B-134	10.41	H	8/18	9/27	40	Fdup
B-3 Pond	B-135	11.26	H	8/18	9/27	40	Fdup
B-3 Pond	B-136	3.83	H	8/18	9/27	40	Reg
B-3 Pond	B-138	15.59	H	8/18	9/27	40	Reg
B-3 Pond	B-139	8.44	H	8/18	9/27	40	Reg
B-3 Pond	B-140	10.23	H	8/18	9/27	40	Reg
B-3 Pond	B-143	9.90	LM	8/25	9/01	7	Reg
B-3 Pond	B-145	16.20	LM	8/25	9/01	7	Fdup
B-3 Pond	B-146	15.40	LM	8/25	9/01	7	Fdup
B-3 Pond	B-147	14.50	LM	8/25	9/01	7	Reg
B-3 Pond	B-148	11.60	LM	8/25	9/01	7	Reg
B-3 Pond	B-149	7.00	LM	8/25	9/01	7	Reg
B-3 Pond	B-164	4.40		9/07	9/11	4	Select-Fdup
B-3 Pond	B-165	6.70		9/07	9/11	4	Select-Fdup
B-3 Pond	B-166	10.20		9/07	9/11	4	Reg
B-3 Pond	B-168	15.70		9/07	9/11	4	Select
B-3-3 Dit.	B-152	0.40 *	LM	8/28	9/01	4	Fdup
B-3-3 Dit.	B-153	0.20 *	LM	8/28	9/01	4	Fdup
B-3-3 Dit.	B-154	0.40 *	LM	8/28	9/01	4	Reg
B-3-3 Dit.	B-158	0.30 *	LM	8/31	9/01	1	Fdup
B-3-3 Dit.	B-159	0.00 *	LM	8/31	9/01	1	Fdup

Table C-4. Ammonium Data (ASTM-D-1426 C/D)
Soil CDL = 0.5 µg/g. (sheet 2 of 2)

Site	Sample	Ammonium (µg/g)	QC-flags	Collect date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-160	0.00 *	LM	8/31	9/01	1	Reg
B-3-3 Dit.	B-161	0.10 *	LM	8/31	9/01	1	Select
B-3-3 Dit.	B-184	0.72		9/18	9/23	5	Fdup
B-3-3 Dit.	B-185	0.79		9/18	9/23	5	Fdup
B-3-3 Dit.	B-187	0.73		9/18	9/23	5	Reg
B-3-3 Dit.	B-188	0.62		9/18	9/23	5	Reg
B-3-3 Dit.	B-189	0.70		9/18	9/23	5	Reg
B-3-3 Dit.	B-190	0.56		9/18	9/23	5	Reg
B-3-3 Dit.	B-191	0.89		9/18	9/23	5	Select
Cont Bkg	B-101	0.40 *	H	8/04	9/18	45	Reg
Cont Bkg	B-102	0.40 *	H	8/04	9/18	45	Reg
Cont Bkg	B-103	0.70	H	8/04	9/18	45	Reg
Cont Bkg	B-104	0.30 *	H	8/04	9/18	45	Reg
Cont Bkg	B-105	2.00	H	8/04	9/18	45	Reg
Sage Bkg	B-121	2.04	H LM	8/10	9/23	44	Fdup
Sage Bkg	B-122	1.11	H LM	8/10	9/23	44	Fdup
Sage Bkg	B-123	0.48 *	H LM	8/10	9/23	44	Reg
Sage Bkg	B-124	0.62	H LM	8/10	9/23	44	Reg
Sage Bkg	B-125	0.75	H LM	8/10	9/23	44	Reg
Sage Bkg	B-126	0.61	H LM+	8/10	9/23	44	Reg
Silica sand	B-113	0.20 *	H +	8/04	9/18	45	Blk
Silica sand	B-117	0.15 *	H	8/10	9/23	44	Blk
Silica sand	B-128B	-0.05 *	H LM	8/17	9/23	37	Blk
Silica sand	B-142	0.16 *	H +	8/18	9/27	40	Blk
Silica sand	B-151	0.20 *		8/25	9/01	7	Blk
Silica sand	B-156	0.30 *	LM+	8/28	9/01	4	Blk
Silica sand	B-163	0.20 *	LM+	8/31	9/01	1	Blk
Silica sand	B-170	0.04 *		9/07	9/11	4	Blk
Silica sand	B-183	0.10 *		9/08	9/11	3	Blk
Silica sand	B-193	0.04 *	+	9/18	9/23	5	Blk
Silica sand	B-205	0.64	+	9/21	9/26	5	Blk
WATER SAMPLES	µg/L[1]						
B-3 Pond	B-206	<50 *		9/28	10/02	4	Fdup-H_2O
B-3 Pond	B-207	<50 *		9/28	10/02	4	Fdup-H_2O
B-3 Pond	B-208	<50 *		9/28	10/02	4	Reg-H_2O
B-3 Pond	B-209	<50 *	+	9/28	10/02	4	Reg-H_2O
B-3 Pond	B-210	<50 *		9/28	10/02	4	Reg-H_2O

[1]CDL for water = 50 µg/L

SPIKE RECOVERIES

Sample	%-Rec. MS	MSD
B-176	87.0	80.0
B-126	56.5	58.5
B-113	78.0	81.0
B-142	103.0	102.0
B-156	69.5	72.0
B-163	73.0	73.5
B-193	97.5	100.0
B-205	85.5	91.0
B-209(Water)	109.0	108.0

H = Holding time exceeded, (28 days)
LM = Associated matrix spike recovery low -- outside CLP guidelines (+/- 25%).
+ = Sample chosen by lab for MS/MSD.
* = Estimated value below CDL.

Table C-5. Chloride Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 1 of 2)

Site	Sample	Chloride (µg/g)	Collect date	Digest date	Analysis date	Days elapsed	Type
3A Pond	B-194	0.94 *	9/21	9/28	9/28	7	Fdup
3A Pond	B-196	1.21	9/21	9/28	9/28	7	Fdup
3A Pond	B-197	1.08	9/21	9/28	9/28	7	Reg
3A Pond	B-198	1.49	9/21	9/28	9/28	7	Reg
3A Pond	B-200	0.51 *	9/21	9/28	9/28	7	Reg
3A Pond	B-201	3.71	9/21	9/28	9/28	7	Reg
3A Pond	B-202	0.79 *	9/21	9/28	9/28	7	Reg
3A Pond	B-203	1.67	9/21	9/28	9/28	7	Reg
3B Pond	B-106	0.00 *	8/04	8/31	8/31	27	Reg
3B Pond	B-107	0.08 *	8/04	8/31	8/31	27	Reg
3B Pond	B-108	0.08 *	8/04	8/31	8/31	27	Fdup
3B Pond	B-109	0.08 *	8/04	8/31	8/31	27	Fdup
3B Pond	B-110	0.14 *	8/04	8/31	8/31	27	Reg
3B Pond	B-111	0.10 *	8/04	8/31	8/31	27	Reg
3C Pond	B-171	0.52 *	9/08	9/14	9/14	6	Fdup
3C Pond	B-172	0.39 *	+ 9/08	9/14	9/14	6	Fdup
3C Pond	B-174	1.31	9/08	9/14	9/14	6	Reg
3C Pond	B-175	0.46 *	9/08	9/14	9/14	6	Reg
3C Pond	B-176	0.07 *	9/08	9/14	9/14	6	Reg
3C Pond	B-177	7.90 D5	9/08	9/14	9/18	10	Reg
3C Pond	B-178	0.70 *	9/08	9/14	9/14	6	Reg
3C Pond	B-179	1.27	9/08	9/14	9/14	6	Reg
3C Pond	B-180	0.46 *	9/08	9/14	9/14	6	Reg
B-3 Pond	B-114	4.04 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-115	1.63 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-116	2.01 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-118	0.56 * H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-119	2.05 H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-128	0.85 * H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-129	1.12 H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-130	2.56 H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-131	5.58 H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-132	3.60 H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-134	1.81 H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-135	3.80 H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-136	4.22 H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-138	1.27 H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-139	1.46 H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-140	2.13 H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-143	1.51	8/25	8/31	8/31	6	Reg
B-3 Pond	B-145	1.25	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-146	1.34	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-147	4.74	8/25	8/31	8/31	6	Reg
B-3 Pond	B-148	1.20	+ 8/25	8/31	8/31	6	Reg
B-3 Pond	B-149	0.76 *	8/25	8/31	8/31	6	Reg
B-3 Pond	B-164	0.61 *	9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-165	0.59 *	9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-166	0.95 *	9/07	9/14	9/14	7	Reg
B-3 Pond	B-168	1.93	9/07	9/14	9/14	7	Select
B-3-3 Dit.	B-152	0.28 *	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-153	0.63 *	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-154	1.84	8/28	9/08	9/09	12	Reg
B-3-3 Dit.	B-158	1.19	+ 8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-159	0.65 *	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-160	0.43 *	8/31	9/08	9/09	9	Reg
B-3-3 Dit.	B-161	1.83	8/31	9/08	9/09	9	Select
B-3-3 Dit.	B-184	0.56 *	9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-185	0.33 *	9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-187	0.82 *	9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-188	0.92 *	9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-189	1.10	9/18	9/22	9/22	4	Reg

Table C-5. Chloride Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 2 of 2)

Site	Sample	Chloride (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-190	0.80 *		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-191	2.00		9/18	9/22	9/22	4	Select
Cont Bkg	B-101	21.70	D10 HM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-102	1.08		8/04	8/31	8/31	27	Reg
Cont Bkg	B-103	18.30	MIR D10 HM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-104	17.60	D10 HM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-105	5.79	MIR HM +	8/04	8/31	8/31	27	Reg
Sage Bkg	B-121	0.00 *	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-122	0.00 *	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-123	0.28 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-124	0.00 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-125	0.35 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-126	0.69 *	H	8/10	9/22	9/22	43	Reg
Silica sand	B-113	1.52		8/04	8/31	8/31	27	Blk
Silica sand	B-117	0.78 *	H+	8/10	9/22	9/22	43	Blk
Silica sand	B-128B	0.67 *	H+	8/11	9/22	9/22	42	Blk
Silica sand	B-142	1.74	H+	8/18	10/05	10/05	48	Blk
Silica sand	B-151	1.05		8/25	8/31	8/31	6	Blk
Silica sand	B-156	1.03		8/28	9/08	9/09	12	Blk
Silica sand	B-163	1.17		8/31	9/08	9/09	9	Blk
Silica sand	B-170	1.05		9/07	9/14	9/14	7	Blk
Silica sand	B-183	0.94 *	+	9/08	9/14	9/14	6	Blk
Silica sand	B-193	1.37 *	+	9/18	9/22	9/22	4	Blk
Silica sand	B-205	1.10	+	9/21	9/28	9/28	7	Blk
WATER SAMPLES	mg/L[1]							
B-3 Pond	B-206	2.64	+	9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-207	2.71		9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-208	1.61		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-209	2.77		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-210	2.87		9/28	-	9/29	1	Reg-H_2O

[1]CDL for water = .5 mg/L

SPIKE RECOVERIES

Sample	%-Rec. MS	%-Rec. MSD	Sample	%-Rec. MS	%-Rec. MSD
B-105	-	-	B-206(Water)	104	103
B-148	113	99			
B-158	113	120			
B-172	102	104			
B-183	116	104			
B-117	112	102			
B-128	99	110			
B-193	96	103			
B-205	118	106			
B-142	102	96			

Dx = Sample diluted during analysis by an extra factor of x.
HM = Associated matrix spike recovery high--outside CLP guidelines (+/-25%).
H = Holding time exceeded, (28 days)
+ = Sample chosen by lab for MS/MSD.
* = Estimated value below CDL.
MIR = Matrix effect, indeterminate result. A matrix effect inhibits accurate quantification of the analyte according to laboratory chemist.

Table C-6. Fluoride Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 1 of 2)

Site	Sample	Fluoride (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
3A Pond	B-194	0.2 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-196	0.2 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-197	0.2 *		9/21	9/28	9/28	7	Reg
3A Pond	B-198	0.2 *		9/21	9/28	9/28	7	Reg
3A Pond	B-200	0.1 *		9/21	9/28	9/28	7	Reg
3A Pond	B-201	1.4	MIR	9/21	9/28	9/28	7	Reg
3A Pond	B-202	0.2 *		9/21	9/28	9/28	7	Reg
3A Pond	B-203	0.2 *		9/21	9/28	9/28	7	Reg
3B Pond	B-106	0.3 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-107	0.2 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-108	0.4 *	LM	8/04	8/31	8/31	27	Fdup
3B Pond	B-109	0.5 *	LM	8/04	8/31	8/31	27	Fdup
3B Pond	B-110	0.5 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-111	0.3 *	LM	8/04	8/31	8/31	27	Reg
3C Pond	B-171	0.9 *	LM	9/08	9/14	9/14	6	Fdup
3C Pond	B-172	1.3	MIR LM +	9/08	9/14	9/14	6	Fdup
3C Pond	B-174	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-175	0.2 *		9/08	9/14	9/14	6	Reg
3C Pond	B-176	0.0 *		9/08	9/14	9/14	6	Reg
3C Pond	B-177	19.0	MIR D10 LM	9/08	9/14	9/15	7	Reg
3C Pond	B-178	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-179	0.3 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-180	0.1 *	LM	9/08	9/14	9/14	6	Reg
B-3 Pond	B-114	-	MIR H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-115	-	MIR H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-116	-	MIR H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-118	0.2 *	H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-119	0.2 *	H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-128	0.2 *	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-129	0.3 *	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-130	0.4 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-131	0.5 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-132	0.2 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-134	0.0 *	H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-135	0.0 *	H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-136	0.4	MIR H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-138	0.2	MIR H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-139	0.2	MIR H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-140	0.7	MIR H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-143	0.4 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-145	0.5 *	LM	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-146	0.5 *	LM	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-147	0.9 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-148	0.3 *	LM +	8/25	8/31	8/31	6	Reg
B-3 Pond	B-149	0.2 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-164	0.2 *		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-165	0.2 *		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-166	0.3 *		9/07	9/14	9/14	7	Reg
B-3 Pond	B-168	0.7 *		9/07	9/14	9/14	7	Select
B-3-3 Dit.	B-152	0.2 *	LM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-153	0.1 *	LM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-154	0.2 *	LM	8/28	9/08	9/09	12	Reg
B-3-3 Dit.	B-158	0.2 *	LM +	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-159	0.2 *	LM	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-160	0.1 *	LM	8/31	9/08	9/09	9	Reg
B-3-3 Dit.	B-161	1.3	LM	8/31	9/08	9/09	9	Select
B-3-3 Dit.	B-184	0.2 *		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-185	0.2 *		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-187	0.1 *		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-188	0.1 *		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-189	0.1 *		9/18	9/22	9/22	4	Reg

Table C-6. Fluoride Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 2 of 2)

Site	Sample	Fluoride (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-190	0.2 *		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-191	0.3 *		9/18	9/22	9/22	4	Select
Cont Bkg	B-101	0.6 MIR		8/04	8/31	9/01	28	Reg
Cont Bkg	B-102	0.3 *		8/04	8/31	8/31	27	Reg
Cont Bkg	B-103	2.3 MIR		8/04	8/31	9/01	28	Reg
Cont Bkg	B-104	0.7 MIR		8/04	8/31	9/01	28	Reg
Cont Bkg	B-105	0.7 *	+	8/04	8/31	9/01	28	Reg
Sage Bkg	B-121	0.2 *	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-122	0.2 *	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-123	0.2 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-124	0.2 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-125	0.2 *	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-126	0.2 *	H	8/10	9/22	9/22	43	Reg
Silica sand	B-113	0.2 *		8/04	8/31	8/31	27	Blk
Silica sand	B-117	0.1 *	H+	8/10	9/22	9/22	43	Blk
Silica sand	B-128B	0.2 *	H+	8/11	9/22	9/22	42	Blk
Silica sand	B-142	0.2 *	H+	8/18	10/05	10/05	48	Blk
Silica sand	B-151	0.3 *		8/25	8/31	8/31	6	Blk
Silica sand	B-156	0.1 *	LM	8/28	9/08	9/09	12	Blk
Silica sand	B-163	0.2 *	LM	8/31	9/08	9/09	9	Blk
Silica sand	B-170	0.2 *		9/07	9/14	9/14	7	Blk
Silica sand	B-183	0.1 *	+	9/08	9/14	9/14	6	Blk
Silica sand	B-193	0.2 *	+	9/18	9/22	9/22	4	Blk
Silica sand	B-205	0.2 *	+	9/21	9/28	9/28	7	Blk
WATER SAMPLES (mg/L)[1]								
B-3 Pond	B-206	0.1 *	+	9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-207	0.1 *		9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-208	0.1 *		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-209	0.1 *		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-210	0.1 *		9/28	-	9/29	1	Reg-H_2O

[1]CDL for water = 500 mg/L

SPIKE RECOVERIES

Sample	%-Rec. MS	%-Rec. MSD	Sample	%-Rec. MS	%-Rec. MSD
B-105	85	79	B-205	81	79
B-148	37	40	B-142	71	72
B-158	71	72	B-206 (Water)	94.8	96.5
B-172	49	55			
B-183	85	83			
B-117	89	85			
B-128	80	83			
B-193	81	85			

Dx = Sample diluted during analysis by an extra factor of x.
H = Holding time exceeded, (28 days)
LM = Associated matrix spike recovery low--outside CLP guidelines (+/- 25%).
+ = Sample chosen by lab for MS/MSD.
* = Estimated value below CDL.
MIR = Matrix effect, indeterminate result. A matrix effect inhibits accurate quantification of the analyte according to lab.

Table C-7. Nitrate-Nitrite Data (EPA Method 300)
Soil CDL = 1.0 µg/g each. (sheet 1 of 3)

Site	Sample	Nitrite (µg/g)	QC-flags nitrite	Nitrate (µg/g)	QC-flags nitrate	Collect date	Digest date	Analysis date	Days elapsed	Type
3A Pond	B-194	0.00 *		0.00 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-196	0.00 *		0.00 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-197	0.00 *		0.00 *		9/21	9/28	9/28	7	Reg
3A Pond	B-198	0.00 *		0.00 *		9/21	9/28	9/28	7	Reg
3A Pond	B-200	0.57 *		0.50 *		9/21	9/28	9/28	7	Reg
3A Pond	B-201	0.00 *		0.00 *		9/21	9/28	9/28	7	Reg
3A Pond	B-202	0.00 *		0.00 *		9/21	9/28	9/28	7	Reg
3A Pond	B-203	0.00 *		0.00 *		9/21	9/28	9/28	7	Reg
3B Pond	B-106	0.00 *	LM, HM	1.21		8/04	8/31	8/31	27	Reg
3B Pond	B-107	0.00 *	LM, HM	0.77 *		8/04	8/31	8/31	27	Reg
3B Pond	B-108	0.00 *	LM, HM	1.05		8/04	8/31	8/31	27	Fdup
3B Pond	B-109	0.00 *	LM, HM	0.82 *		8/04	8/31	8/31	27	Fdup
3B Pond	B-110	0.00 *	LM, HM	1.56		8/04	8/31	8/31	27	Reg
3B Pond	B-111	0.00 *	LM, HM	1.58		8/04	8/31	8/31	27	Reg
3C Pond	B-171	0.16 *		0.12 *		9/08	9/14	9/14	6	Fdup
3C Pond	B-172	0.08 *+		0.00 *+		9/08	9/14	9/14	6	Fdup
3C Pond	B-174	0.00 *		0.27 *		9/08	9/14	9/14	6	Reg
3C Pond	B-175	0.17 *		5.01		9/08	9/14	9/14	6	Reg
3C Pond	B-176	0.25 *		4.67		9/08	9/14	9/14	6	Reg
3C Pond	B-177	0.00 *		0.00 *		9/08	9/14	9/14	6	Reg
3C Pond	B-178	0.00 *		0.00 *		9/08	9/14	9/14	6	Reg
3C Pond	B-179	0.00 *		0.00 *		9/08	9/14	9/14	6	Reg
3C Pond	B-180	0.00 *		0.14 *		9/08	9/14	9/14	6	Reg
B-3 Pond	B-114	0.00 *	H	0.00 *	H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-115	0.00 *	H	0.00 *	H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-116	0.00 *	H	0.00 *	H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-118	0.00 *	H	0.00 *	H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-119	0.00 *	H	0.00 *	H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-128	0.00 *+	H	0.00 *+	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-129	0.00 *	H	0.00 *	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-130	0.00 *	H	0.00 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-131	0.00 *	H	0.00 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-132	0.00 *	H	0.00 *	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-134	0.00 *	H	0.14 *	H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-135	0.00 *	H D1.3	0.00 *	H D1.3	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-136	0.00 *	H	0.00 *	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-138	0.00 *	H	0.00 *	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-139	0.00 *	H	0.00 *	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-140	0.00 *	H	0.13 *	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-143	0.00 *	LM,HM	0.00 *		8/25	8/31	8/31	6	Reg
B-3 Pond	B-145	0.00 *	LM,HM	0.00 *		8/25	8/31	8/31	6	Fdup
B-3 Pond	B-146	0.00 *	LM,HM	0.00 *		8/25	8/31	8/31	6	Fdup
B-3 Pond	B-147	0.00 *	LM,HM D1.1	0.00 *	D1.1	8/25	8/31	8/31	6	Reg
B-3 Pond	B-148	0.00 *+	LM,HM	0.00 *+		8/25	8/31	8/31	6	Reg
B-3 Pond	B-149	0.00 *	LM,HM	0.47 *		8/25	8/31	8/31	6	Reg
B-3 Pond	B-164	0.00 *		0.00 *		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-165	0.00 *		0.00 *		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-166	0.00 *		0.00 *		9/07	9/14	9/14	7	Reg
B-3 Pond	B-168	1.00 *		0.00 *		9/07	9/14	9/14	7	Select

Table C-7. Nitrate-Nitrite Data (EPA Method 300)
Soil CDL = 1.0 µg/g each. (sheet 2 of 3)

Site	Sample	Nitrite (µg/g)	QC-flags nitrite	Nitrate (µg/g)	QC-flags nitrate	Collect date	Digest date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-152	0.00 *		0.14 *	HM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-153	0.00 *		0.90 *	HM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-154	0.00 *		0.52 *	HM	8/28	9/08	9/09	12	Reg
B-3-3 Dit.	B-158	0.00 *+		0.38 *+	HM	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-159	0.00 *		0.29 *	HM	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-160	0.00 *		0.61 *	HM	8/31	9/08	9/09	9	Reg
B-3-3 Dit.	B-161	0.00 *		0.00 *	HM	8/31	9/08	9/09	9	Select
B-3-3 Dit.	B-184	0.00 *		0.98		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-185	0.00 *		1.01		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-187	0.08 *		1.50		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-188	0.00 *		0.78		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-189	0.00 *		0.61 *		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-190	0.00 *		1.67		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-191	0.00 *		0.00 *		9/18	9/22	9/22	4	Select
Cont Bkg	B-101	0.00 *	LM, HM	2.97		8/04	8/31	8/31	27	Reg
Cont Bkg	B-102	0.00 *	LM, HM	1.12		8/04	8/31	8/31	27	Reg
Cont Bkg	B-103	0.00 *	LM, HM	0.71 *		8/04	8/31	8/31	27	Reg
Cont Bkg	B-104	0.00 *	LM, HM	0.66 *		8/04	8/31	8/31	27	Reg
Cont Bkg	B-105	0.00 *+	LM, HM	1.29 +		8/04	8/31	8/31	27	Reg
Sage Bkg	B-121	0.30 *	H	2.51	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-122	0.36 *	H	2.69	H	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-123	0.72 *	H	1.65	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-124	0.20 *	H	3.46	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-125	0.85 *	H	4.68	H	8/10	9/22	9/22	43	Reg
Sage Bkg	B-126	1.25	H	12.22	H	8/10	9/22	9/22	43	Reg
Silica sand	B-113	0.00 *	LM, HM	0.25 *		8/04	8/31	8/31	27	Blk
Silica sand	B-117	0.00 *+	H	0.12 *+	H	8/10	9/22	9/22	43	Blk
Silica sand	B-128B	0.00 *	H	0.00 *	H	8/11	9/22	9/22	42	Blk
Silica sand	B-142	0.00 *+	H	0.45 *+	H	8/18	10/05	10/05	48	Blk
Silica sand	B-151	0.00 *	LM, HM	0.00 *		8/25	8/31	8/31	6	Blk
Silica sand	B-156	0.00 *		0.16 *	HM	8/28	9/08	9/09	12	Blk
Silica sand	B-163	0.00 *		0.15 *	HM	8/31	9/08	9/09	9	Blk
Silica sand	B-170	0.23 *		0.24 *		9/07	9/14	9/14	7	Blk
Silica sand	B-183	0.00 *+		0.13 *+		9/08	9/14	9/14	6	Blk
Silica sand	B-193	0.00 *+		0.14 *+		9/18	9/22	9/22	4	Blk
Silica sand	B-205	0.00 *+		0.16 *+		9/21	9/28	9/28	7	Blk
WATER SAMPLES (mg/L)[1]										
B-3 Pond	B-206	0.00 *		0.13 *+		9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-207	0.00 *		0.34 *		9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-208	0.00 *		0.89		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-209	0.00 *		0.19 *		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-210	0.00 *		0.00 *		9/28	-	9/29	1	Reg-H_2O

[1] CDL for water = 0.5 mg/L

Table C-7. Nitrate-Nitrite Data (EPA Method 300)
Soil CDL = 1.0 µg/g each. (sheet 3 of 3)

Site	Sample	Nitrite (µg/g)	QC-flags nitrite	Nitrate (µg/g)	QC-flags nitrate	Collect date	Digest date	Analysis date	Days elapsed	Type

SPIKE RECOVERIES

Sample	%Rec NO3 MS	%Rec NO3 MSD	%Rec NO2 MS	%Rec NO2 MSD
B-105	109.0	99.8	0.0	0.0
B-148	93.8	97.8	148.0	137.0
B-158	125.3	121.8	115.0	120.0
B-172	82.8	81.0	116.0	115.0
B-183	98.0	95.8	98.0	99.0
B-117	96.0	93.0	103.0	100.0
B-128	94.3	94.5	95.0	100.0
B-193	91.8	92.5	97.0	102.0
B-205	97.8	95.8	100.0	99.0
B-146	91.5	89.5	102.0	103.0
B-206(Water)	97.5	97.0	103.4	101.3

Dx = Sample diluted during analysis by an extra factor of x.
H = Holding time, (28 days), for combined reporting of Nitrate, Nitrite exceeded.
HM = Associated matrix spike recovery high -- outside CLP guidelines (+/- 25%).
LM = Associated matrix spike recovery low -- outside CLP guidelines (+/- 25%).
+ = Sample chosen by lab for matrix spike MS/MSD.
* = Estimated value below CDL.

Table C-8. Phosphate Data (EPA Method 300)
Soil CDL = 2.0 µg/g. (sheet 1 of 2)

Site	Sample	Phosphate (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
3A Pond	B-194	0.0 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-196	0.0 *		9/21	9/28	9/28	7	Fdup
3A Pond	B-197	0.0 *		9/21	9/28	9/28	7	Reg
3A Pond	B-198	0.0 *		9/21	9/28	9/28	7	Reg
3A Pond	B-200	0.0 *		9/21	9/28	9/28	7	Reg
3A Pond	B-201	0.0 *		9/21	9/28	9/28	7	Reg
3A Pond	B-202	0.0 *		9/21	9/28	9/28	7	Reg
3A Pond	B-203	0.0 *		9/21	9/28	9/28	7	Reg
3B Pond	B-106	0.0 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-107	0.0 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-108	0.0 *	LM	8/04	8/31	8/31	27	Fdup
3B Pond	B-109	0.0 *	LM	8/04	8/31	8/31	27	Fdup
3B Pond	B-110	0.0 *	LM	8/04	8/31	8/31	27	Reg
3B Pond	B-111	0.0 *	LM	8/04	8/31	8/31	27	Reg
3C Pond	B-171	0.0 *	LM	9/08	9/14	9/14	6	Fdup
3C Pond	B-172	0.0 *	LM+	9/08	9/14	9/14	6	Fdup
3C Pond	B-174	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-175	0.7 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-176	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-177	0.0 *	LM	9/08	9/14	9/18	10	Reg
3C Pond	B-178	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-179	0.0 *	LM	9/08	9/14	9/14	6	Reg
3C Pond	B-180	0.0 *	LM	9/08	9/14	9/14	6	Reg
B-3 Pond	B-114	0.0 *H	LM	8/10	9/22	9/22	43	Reg
B-3 Pond	B-115	0.0 *H	LM	8/10	9/22	9/22	43	Reg
B-3 Pond	B-116	0.0 *H	LM	8/10	9/22	9/22	43	Reg
B-3 Pond	B-118	0.0 *H	LM	8/11	9/22	9/22	42	Reg
B-3 Pond	B-119	0.0 *H	LM	8/11	9/22	9/22	42	Reg
B-3 Pond	B-128	0.0 *H	LM	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-129	0.0 *H	LM	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-130	0.0 *H	LM	8/17	9/22	9/22	36	Reg
B-3 Pond	B-131	0.0 *H	LM	8/17	9/22	9/22	36	Reg
B-3 Pond	B-132	0.0 *H	LM	8/17	9/22	9/22	36	Reg
B-3 Pond	B-134	0.0 *H		8/18	10/05	10/05	48	Fdup
B-3 Pond	B-135	0.0 *H		8/18	10/05	10/05	48	Fdup
B-3 Pond	B-136	0.0 *H		8/18	10/05	10/05	48	Reg
B-3 Pond	B-138	0.0 *H		8/18	10/05	10/05	48	Reg
B-3 Pond	B-139	0.0 *H		8/18	10/05	10/05	48	Reg
B-3 Pond	B-140	0.0 *H		8/18	10/05	10/05	48	Reg
B-3 Pond	B-143	0.0 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-145	0.0 *	LM	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-146	0.0 *	LM	8/25	8/31	8/31	6	Fdup
B-3 Pond	B-147	0.0 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-148	0.0 *	LM+	8/25	8/31	8/31	6	Reg
B-3 Pond	B-149	0.0 *	LM	8/25	8/31	8/31	6	Reg
B-3 Pond	B-164	0.0 *	LM	9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-165	0.0 *	LM	9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-166	0.0 *	LM	9/07	9/14	9/14	7	Reg
B-3 Pond	B-168	0.0 *	LM	9/07	9/14	9/14	7	Select
B-3-3 Dit.	B-152	0.0 *	LM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-153	0.0 *	LM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-154	0.0 *	LM	8/28	9/08	9/09	12	Reg
B-3-3 Dit.	B-158	0.0 *	LM+	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-159	0.0 *	LM	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-160	0.0 *	LM	8/31	9/08	9/09	9	Reg
B-3-3 Dit.	B-161	0.0 *	LM	8/31	9/08	9/09	9	Select
B-3-3 Dit.	B-184	0.0 *	LM	9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-185	0.0 *	LM	9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-187	0.0 *	LM	9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-188	0.0 *	LM	9/18	9/22	9/22	4	Reg

Table C-8. Phosphate Data (EPA Method 300)
Soil CDL = 2.0 µg/g. (sheet 2 of 2)

Site	Sample	Phosphate (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-189	0.0 *	LM	9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-190	0.0 *	LM	9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-191	0.0 *	LM	9/18	9/22	9/22	4	Select
Cont Bkg	B-101	0.0 *	LM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-102	0.8 *	LM	8/04	8/31	8/31	27	Reg
Cont Bkg	B-103	0.0 *	LM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-104	0.0 *	LM	8/04	8/31	9/01	28	Reg
Cont Bkg	B-105	0.0 *	LM+	8/04	8/31	8/31	27	Reg
Sage Bkg	B-121	2.6 H	LM	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-122	1.0 *H	LM	8/10	9/22	9/22	43	Fdup
Sage Bkg	B-123	0.7 *H	LM	8/10	9/22	9/22	43	Reg
Sage Bkg	B-124	0.9 *H	LM	8/10	9/22	9/22	43	Reg
Sage Bkg	B-125	2.2 H	LM	8/10	9/22	9/22	43	Reg
Sage Bkg	B-126	2.2 H	LM	8/10	9/22	9/22	43	Reg
Silica sand	B-113	0.0 *	LM	8/04	8/31	8/31	27	Blk
Silica sand	B-117	0.0 *H	+	8/10	9/22	9/22	43	Blk
Silica sand	B-128B	0.0 *H	+	8/11	9/22	9/22	42	Blk
Silica sand	B-142	0.0 *H	+	8/18	10/05	10/05	48	Blk
Silica sand	B-151	0.0 *	LM	8/25	8/31	8/31	6	Blk
Silica sand	B-156	0.0 *	LM	8/28	9/08	9/09	12	Blk
Silica sand	B-163	0.4 *	LM	8/31	9/08	9/09	9	Blk
Silica sand	B-170	0.0 *	LM	9/07	9/14	9/14	7	Blk
Silica sand	B-183	0.0 *	+	9/08	9/14	9/14	6	Blk
Silica sand	B-193	0.0 *	LM+	9/18	9/22	9/22	4	Blk
Silica sand	B-205	0.0 *	+	9/21	9/28	9/28	7	Blk
WATER SAMPLES (mg/L)[1]								
B-3	B-206	0.0 *	+	9/28	-	9/29	1	Fdup-H_2O
B-3	B-207	0.0 *		9/28	-	9/29	1	Fdup-H_2O
B-3	B-208	0.0 *		9/28	-	9/29	1	Reg-H_2O
B-3	B-209	0.0 *		9/28	-	9/29	1	Reg-H_2O
B-3	B-210	0.0 *		9/28	-	9/29	1	Reg-H_2O

[1] CDL for water = 1.0 mg/L

SPIKE RECOVERIES

Sample	%-Rec. MS	%-Rec. MSD	Sample	%-Rec. MS	%-Rec. MSD
B-105	36	36	B-206(Water)	90	93
B-148	0	0			
B-158	23	23			
B-172	28	25			
B-183	78	80			
B-117	78	75			
B-128	75	75			
B-193	70	75			
B-205	83	80			
B-142	77	78			

* = Estimated value below CDL.
H = Holding time exceeded, (28 days).
LM = Associated matrix spike recovery low--outside CLP guidelines (+/-25%).
\+ = Sample chosen by lab for MS/MSD.

Table C-9. Sulfate Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 1 of 2)

Site	Sample	Sulfate (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
3A Pond	B-194	22.3		9/21	9/28	9/28	7	Fdup
3A Pond	B-196	36.9	D10	9/21	9/28	9/28	7	Fdup
3A Pond	B-197	14.5		9/21	9/28	9/28	7	Reg
3A Pond	B-198	7.7		9/21	9/28	9/28	7	Reg
3A Pond	B-200	4.1		9/21	9/28	9/28	7	Reg
3A Pond	B-201	6.8		9/21	9/28	9/28	7	Reg
3A Pond	B-202	5.6		9/21	9/28	9/28	7	Reg
3A Pond	B-203	12.6		9/21	9/28	9/28	7	Reg
3B Pond	B-106	0.8 *		8/04	8/31	8/31	27	Reg
3B Pond	B-107	1.0		8/04	8/31	8/31	27	Reg
3B Pond	B-108	1.2		8/04	8/31	8/31	27	Fdup
3B Pond	B-109	1.2		8/04	8/31	8/31	27	Fdup
3B Pond	B-110	1.8		8/04	8/31	8/31	27	Reg
3B Pond	B-111	1.5		8/04	8/31	8/31	27	Reg
3C Pond	B-171	3.0		9/08	9/14	9/14	6	Fdup
3C Pond	B-172	2.6		+ 9/08	9/14	9/14	6	Fdup
3C Pond	B-174	5.4		9/08	9/14	9/14	6	Reg
3C Pond	B-175	2.3		9/08	9/14	9/14	6	Reg
3C Pond	B-176	1.7		9/08	9/14	9/14	6	Reg
3C Pond	B-177	3.8		9/08	9/14	9/14	6	Reg
3C Pond	B-178	6.0		9/08	9/14	9/14	6	Reg
3C Pond	B-179	16.3		9/08	9/14	9/14	6	Reg
3C Pond	B-180	5.6		9/08	9/14	9/14	6	Reg
B-3 Pond	B-114	141.2	D10 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-115	172.4	D10 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-116	208.8	D10 H	8/10	9/22	9/22	43	Reg
B-3 Pond	B-118	35.8	D5 H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-119	8.8	H	8/11	9/22	9/22	42	Reg
B-3 Pond	B-128	9.7	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-129	11.6	H	8/17	9/22	9/22	36	Fdup
B-3 Pond	B-130	27.7	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-131	14.9	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-132	8.2	H	8/17	9/22	9/22	36	Reg
B-3 Pond	B-134	88.7	D10 H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-135	126.2	D10 H	8/18	10/05	10/05	48	Fdup
B-3 Pond	B-136	1.7	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-138	11.3	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-139	20.0	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-140	29.1	H	8/18	10/05	10/05	48	Reg
B-3 Pond	B-143	11.2		8/25	8/31	8/31	6	Reg
B-3 Pond	B-145	8.3		8/25	8/31	8/31	6	Fdup
B-3 Pond	B-146	10.4		8/25	8/31	8/31	6	Fdup
B-3 Pond	B-147	31.5		8/25	8/31	8/31	6	Reg
B-3 Pond	B-148	8.2		+ 8/25	8/31	8/31	6	Reg
B-3 Pond	B-149	6.9		8/25	8/31	8/31	6	Reg
B-3 Pond	B-164	3.5		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-165	3.1		9/07	9/14	9/14	7	Select-Fdup
B-3 Pond	B-166	3.2		9/07	9/14	9/14	7	Reg
B-3 Pond	B-168	5.9		9/07	9/14	9/14	7	Select
B-3-3 Dit.	B-152	1.6	HM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-153	2.0	HM	8/28	9/08	9/09	12	Fdup
B-3-3 Dit.	B-154	4.7	HM	8/28	9/08	9/09	12	Reg
B-3-3 Dit.	B-158	3.1	HM	+ 8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-159	2.2	HM	8/31	9/08	9/09	9	Fdup
B-3-3 Dit.	B-160	2.7	HM	8/31	9/08	9/09	9	Reg
B-3-3 Dit.	B-161	6.9	HM	8/31	9/08	9/09	9	Select
B-3-3 Dit.	B-184	3.3		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-185	2.3		9/18	9/22	9/22	4	Fdup
B-3-3 Dit.	B-187	3.2		9/18	9/22	9/22	4	Reg

Table C-9. Sulfate Data (EPA Method 300)
Soil CDL = 1.0 µg/g. (sheet 2 of 2)

Site	Sample	Sulfate (µg/g)	QC flags	Collect date	Digest date	Analysis date	Days elapsed	Type
B-3-3 Dit.	B-188	3.3		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-189	3.5		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-190	3.2		9/18	9/22	9/22	4	Reg
B-3-3 Dit.	B-191	7.1		9/18	9/22	9/22	4	Select
Cont Bkg	B-101	84.2	D10	8/04	8/31	9/01	28	Reg
Cont Bkg	B-102	5.0		8/04	8/31	8/31	27	Reg
Cont Bkg	B-103	1664.0	D100	8/04	8/31	9/01	28	Reg
Cont Bkg	B-104	281.0	D10	8/04	8/31	9/01	28	Reg
Cont Bkg	B-105	192.0	D10	+ 8/04	8/31	9/01	28	Reg
Sage Bkg	B-121	0.8	*	H 8/10	9/22	9/22	43	Fdup
Sage Bkg	B-122	1.0		H 8/10	9/22	9/22	43	Fdup
Sage Bkg	B-123	1.7		H 8/10	9/22	9/22	43	Reg
Sage Bkg	B-124	1.0		H 8/10	9/22	9/22	43	Reg
Sage Bkg	B-125	2.3		H 8/10	9/22	9/22	43	Reg
Sage Bkg	B-126	3.0		H 8/10	9/22	9/22	43	Reg
Silica sand	B-113	2.2		8/04	8/31	8/31	27	Blk
Silica sand	B-117	1.5		H+ 8/10	9/22	9/22	43	Blk
Silica sand	B-128B	1.4		H+ 8/11	9/22	9/22	42	Blk
Silica sand	B-142	2.5		H+ 8/18	10/05	10/05	48	Blk
Silica sand	B-151	1.6		8/25	8/31	8/31	6	Blk
Silica sand	B-156	1.7	HM	8/28	9/08	9/09	12	Blk
Silica sand	B-163	1.6	HM	8/31	9/08	9/09	9	Blk
Silica sand	B-170	1.4		9/07	9/14	9/14	7	Blk
Silica sand	B-183	1.3		+ 9/08	9/14	9/14	6	Blk
Silica sand	B-193	1.8		+ 9/18	9/22	9/22	4	Blk
Silica sand	B-205	1.5		+ 9/21	9/28	9/28	7	Blk
WATER SAMPLES (ppm)[1]								
B-3 Pond	B-206	10.9		+ 9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-207	10.9		9/28	-	9/29	1	Fdup-H_2O
B-3 Pond	B-208	10.6		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-209	10.9		9/28	-	9/29	1	Reg-H_2O
B-3 Pond	B-210	10.8		9/28	-	9/29	1	Reg-H_2O

[1] CDL for water = 0.5 ppm

SPIKE RECOVERIES

Sample	%-Rec. MS	%-Rec. MSD	Sample	%-Rec. MS	%-Rec. MSD
B-105	-	-	B-206(Water)	99.2	99.1
B-148	108	97			
B-158	128	130			
B-172	98	98			
B-183	100	100			
B-117	95	93			
B-128	88	90			
B-193	90	93			
B-205	100	95			
B-142	88	82			

Dx = Sample diluted during analysis by an extra factor of x.
HM = Associated matrix spike recovery high--outside CLP guidelines (+/-25%).
H = Holding time exceeded, (28 days).
* = Estimated value below CDL.
+ = Sample chosen by lab for MS/MSD.

Table C-10. Volatile Organic Analysis Summary[1] (EPA Method 8240) µg/kg. (sheet 1 of 2)

Site	Sample	Analyte Codes Methone	Acetone	Collect date	Analysis date	Type
3A Pond	B-194	ND	26 PB	9/21	9/22	Fdup
3A Pond	B-196	8 *P	42 PB	9/21	9/22	Fdup
3A Pond	B-197	6 *P	29 PB	9/21	9/22	Reg
3A Pond	B-198	8 *P	20 PB	9/21	9/22	Reg
3A Pond	B-200	7 *P	11 PB	9/21	9/22	Reg
3A Pond	B-201 +	5 *P	13 PB	9/21	9/22	Reg
3A Pond	B-203	ND	13 PB	9/21	9/22	Reg
3A Pond	(1 other sample -- all analytes ND)					

		Methone	Acetone	(13DCLBV)			
3B Pond	B-107 SOL	ND	8 *P	ND	8/04	8/11	Reg
3B Pond	B-108	ND	ND	11	8/04	8/11	Fdup
3B Pond	B-109	6 *P	16 P	ND	8/04	8/10	Fdup
3B Pond	B-110	ND	ND	11	8/04	8/11	Reg
3B Pond	B-111	ND	18 P	ND	8/04	8/11	Reg
3B Pond	(1 other sample -- all analytes ND)						

		Methone	Acetone	Methlch			
3C Pond	B-171	ND	8 *PB	ND	9/08	9/15	Fdup
3C Pond	B-172	ND	12 PB	ND	9/08	9/15	Fdup
3C Pond	B-175	ND	12 P	ND	9/08	9/18	Reg
3C Pond	B-177	12 PL	20 P	ND	9/08	9/19	Reg
3C Pond	B-178	ND	ND	6 *P	9/08	9/16	Reg
3C Pond	(4 other samples -- all analytes ND)						

		Methone	Carbide	Methych	Acetone			
B-3 Pond	B-114	13 *P	34 P	ND	21 P	8/10	8/16	Reg
B-3 Pond	B-115 +	74 P	ND	92	333	8/10	8/22	Reg
B-3 Pond	B-128	ND	ND	ND	10 P	8/17	8/29	Fdup
B-3 Pond	B-129 +	ND	ND	ND	160	8/17	8/29	Fdup
B-3 Pond	B-130	ND	ND	ND	10 P	8/17	8/29	Reg
B-3 Pond	B-131	ND	ND	7 *P	8 *P	8/17	8/23	Reg
B-3 Pond	B-134	ND	ND	ND	8 *PB	8/18	8/29	Fdup
B-3 Pond	B-135	ND	ND	ND	6 *PB	8/18	8/30	Fdup
B-3 Pond	B-136	6 *P	ND	ND	ND	8/18	8/30	Reg
B-3 Pond	B-138	ND	ND	ND	8 *PB	8/18	8/29	Reg
B-3 Pond	B-139	ND	ND	ND	6 *PB	8/18	8/30	Reg
B-3 Pond	B-143	9 *PB	ND	6 *P	27 PBL	8/25	9/01	Reg
B-3 Pond	B-146	ND	ND	ND	11 PB	8/25	8/31	Fdup
B-3 Pond	B-147 SOL	19 PB	ND	ND	82 PBL	8/25	9/01	Reg
B-3 Pond	B-148 SOL	7 *PB	ND	ND	42 PBL	8/25	9/01	Reg
B-3 Pond	B-149	9 *PB	ND	ND	54 PBL	8/25	9/01	Reg
B-3 Pond	(9 other sediment samples -- all analytes ND)							
B-3 Pond	B-210	ND	ND	ND	10 PB	9/28	10/04	Reg-H_2O
B-3 Pond	(4 other water samples -- all analytes ND)							

		Methone	Methych	Acetone	(DMDS)			
B-3-3 Dit.	B-152 H7	ND	ND	11 PB	19	8/28	9/18	Reg
B-3-3 Dit.	B-154 H4	ND	14 B	ND B	ND	8/28	9/15	Reg
B-3-3 Dit.	B-158	ND	ND	29 PB	ND	8/31	9/06	Fdup
B-3-3 Dit.	B-160	ND	ND	28 PB	ND	8/31	9/06	Reg
B-3-3 Dit.	B-161	7 *PB	ND	54 PB	ND	8/31	9/06	Select

		Contract Detection Limit	SW-846 PQL
Acetone	Acetone	10 µg/kg	100 µg/kg
Carbide	Carbon disulfide	10 µg/kg	100 µg/kg
Methone	Methyl ethyl ketone	10 µg/kg	100 µg/kg
Methlch	Methyl chloride	10 µg/kg	10 µg/kg
(13DCLBV)	1,3-Dichlorobenzene	N/A	A tentatively identified compound.
(DMDS)	Dimethyldisulfide	N/A	A tentatively identified compound.

Table C-10. Volatile Organic Analysis µg/kg
Summary (EPA Method 8240). (sheet 2 of 2)

Site	Sample	Analyte Codes Methone	Acetone	Collect date	Analysis date	Type
B-3-3 Dit.	B-184	ND	39 PB	9/18	9/21	Fdup
B-3-3 Dit.	B-185	ND	41 PB	9/18	9/21	Fdup
B-3-3 Dit.	B-187	ND	8 *PB	9/18	9/21	Reg
B-3-3 Dit.	B-189	ND	31 PBL	9/18	9/22	Reg
B-3-3 Dit.	B-191	11 PBL	90 PBL	9/18	9/22	Select
B-3-3 Dit.	(3 other samples -- all analytes ND)					
		Methone	Methych			
Cont Bkg	B-102	ND	3 *P	8/04	8/10	Reg
Cont Bkg	B-105	6 *P	ND	8/04	8/10	Reg
Cont Bkg	(3 other samples -- all analytes ND)					
		Methone	Tricene	14BDEN	Acetone	
Sage Bkg	B-121	ND	ND	ND	8 *P	8/10	8/18	Fdup
Sage Bkg	B-122	ND	ND	ND	6 *P	8/10	8/22	Fdup
Sage Bkg	B-123 H8	7 *PB	53	ND	40 PBL	8/10	9/01	Reg
Sage Bkg	B-125	ND	ND	5	14 P	8/10	8/23	Reg
Sage Bkg	(1 other sample -- all analytes ND)							
		Methone	Methych	Acetone			
Silica sand	B-128B	ND	3 *P	ND	8/11	8/23	Blk
Silica sand	B-142 +	ND	ND	5 *P	8/18	8/30	Blk
Silica sand	B-151	7 *P	ND	16 PL	8/25	9/01	Blk
Silica sand	B-156 H4	ND	4 *P	8 *P	8/28	9/15	Blk
Silica sand	B-163 +	6 *P	ND	52 P	8/31	9/06	Blk
Silica sand	B-170	ND	ND	7 *P	9/07	9/15	Blk
Silica sand	B-193	ND	ND	25 PL	9/18	9/22	Blk
Silica sand	(4 other samples -- all analytes ND)						

		Contract Detection Limit	SW-846 PQL
Acetone	Acetone	10 µg/kg	100 µg/kg
Carbide	Carbon disulfide	10 µg/kg	100 µg/kg
Methone	Methyl ethyl ketone	10 µg/kg	100 µg/kg
Methych	Methylene chloride	5 µg/kg	5 µg/kg
Tricene	Trichloroethylene	5 µg/kg	5 µg/kg
14DBEN	p-Dichlorobenzene	5 µg/kg	--

B = Analyte >ND in a field blank collected and/or analyzed on the listed day.
Hx = Holding time, (14 days), exceeded by x days for all analytes.
L = Lab reagent blank contamination noted by chemist (see Table C-12).
ND = Non-detectable.
P = Result is below SW-846 (December 1987) Practical Quantitation Limit (PQL) guidelines. PQLs listed in SW-846 for soil/sediment are based on wet weight sample size. PQLs for comparison were adjusted upward based on sample moisture since results shown are on a dry weight basis.
SOL = Surrogate out of limits (see Table C-12).
* = Estimated value below CDL, (adjusted for dry sample size).
+ = Sample chosen by lab for MS/MSD.

[1]Only samples with an analyte >ND displayed)

Table C-11. Volatile Organic Analysis
Lab Reagent Blanks for the Period 8/89 - 9/89.

Analysis Date	Constituent Identified	Result (ppb)
8/03/89	Methylene chloride	3
8/09/89	None	-
8/10/89	None	-
8/11/89	None	-
8/16/89	None	-
8/17/89	None	-
8/21/89	None	-
8/22/89	None	-
8/23/89	None	-
8/28/89	None	-
8/29/89	None	-
8/30/89	None	-
8/31/89	None	-
9/01/89	Acetone	8
9/06/89	None	-
9/16/89	None	-
9/18/89	None	-
9/19/89	Methyl ethyl ketone	6
9/20/89	None	-
9/21/89	None	-
9/22/89	Methyl ethyl ketone	6
--	Acetone	6
9/22/89	None	-
9/28/89	None	-

Table C-12. Volatile Organic Analysis Holding Times and Surrogate Recoveries. (sheet 1 of 2)

Lobe	Sample	Collect date	Analysis date	Elapsed days	% - Rec. 12DCAD4	TOLUD8	BFB	Type
3A Pond	B-194	9/21	9/22	1	98	100	92	Fdup
3A Pond	B-196	9/21	9/22	1	96	100	94	Fdup
3A Pond	B-197	9/21	9/22	1	92	100	96	Reg
3A Pond	B-198	9/21	9/22	1	108	102	92	Reg
3A Pond	B-200	9/21	9/22	1	90	100	96	Reg
3A Pond	B-201	9/21	9/22	1	94	100	96	Reg
3A Pond	B-202	9/21	9/28	7	90	98	94	Reg
3A Pond	B-203	9/21	9/22	1	96	100	96	Reg
3B Pond	B-106	8/04	8/11	7	104	112	107	Reg
3B Pond	B-107	8/04	8/11	7	95	85	104	Reg
3B Pond	B-108	8/04	8/11	7	92	107	102	Fdup
3B Pond	B-109	8/04	8/10	6	87	103	99	Fdup
3B Pond	B-110	8/04	8/11	7	88	105	104	Reg
3B Pond	B-111	8/04	8/11	7	90	107	97	Reg
3C Pond	B-171	9/08	9/15	7	118	100	104	Fdup
3C Pond	B-172	9/08	9/15	7	110	102	102	Fdup
3C Pond	B-174	9/08	9/15	7	112	98	104	Fdup
3C Pond	B-175	9/08	9/18	10	100	108	112	Reg
3C Pond	B-176	9/08	9/18	10	100	108	112	Reg
3C Pond	B-177	9/08	9/19	11	88	106	96	Reg
3C Pond	B-178	9/08	9/16	8	118	106	108	Reg
3C Pond	B-179	9/08	9/18	10	118	106	114	Reg
3C Pond	B-180	9/08	9/16	8	106	104	106	Reg
B-3 Pond	B-114	8/10	8/16	6	103	92	102	Reg
B-3 Pond	B-115	8/10	8/22	12	111	113	95	Reg
B-3 Pond	B-116	8/10	8/22	12	150	112	102	Reg
B-3 Pond	B-118	8/11	8/23	12	96	98	88	Reg
B-3 Pond	B-119	8/11	8/23	12	115	103	94	Reg
B-3 Pond	B-128	8/17	8/29	12	101	100	97	Fdup
B-3 Pond	B-129	8/17	8/29	12	114	100	101	Fdup
B-3 Pond	B-130	8/17	8/29	12	107	97	101	Reg
B-3 Pond	B-131	8/17	8/31	14	93	108	84	Reg
B-3 Pond	B-132	8/17	8/23	6	135	111	123	Reg
B-3 Pond	B-134	8/18	8/29	11	109	103	104	Fdup
B-3 Pond	B-135	8/18	8/30	12	74	100	98	Fdup
B-3 Pond	B-136	8/18	8/30	12	102	96	112	Reg
B-3 Pond	B-138	8/18	8/29	11	116	105	103	Reg
B-3 Pond	B-139	8/18	8/30	12	94	100	100	Reg
B-3 Pond	B-140	8/18	8/29	11	109	99	102	Reg
B-3 Pond	B-143	8/25	9/01	7	118	100	92	Reg
B-3 Pond	B-145	8/25	8/31	6	110	104	100	Fdup
B-3 Pond	B-146	8/25	8/31	6	114	104	108	Fdup
B-3 Pond	B-147	8/25	9/01	7	130	104	104	Reg
B-3 Pond	B-148	8/25	9/01	7	128	106	110	Reg
B-3 Pond	B-149	8/25	9/01	7	118	102	106	Reg
B-3 Pond	B-165	9/07	9/15	8	112	102	102	Select
B-3 Pond	B-166	9/07	9/15	8	112	100	102	Fdup
B-3 Pond	B-168	9/07	9/15	8	106	102	104	Select
B-3 Pond	B-206	9/28	10/04	6	95	102	105	Fdup-H_2O
B-3 Pond	B-207	9/28	10/04	6	93	100	105	Fdup-H_2O
B-3 Pond	B-208	9/28	10/04	6	91	100	106	Reg-H_2O
B-3 Pond	B-209	9/28	10/04	6	93	101	105	Reg-H_2O
B-3 Pond	B-210	9/28	10/04	6	88	101	102	Reg-H_2O
B-3-3 Dit.	B-152	8/28	9/18	21	102	101	102	Fdup
B-3-3 Dit.	B-154	8/28	9/15	18	102	102	102	Reg
B-3-3 Dit.	B-158	8/31	9/06	6	106	100	90	Fdup
B-3-3 Dit.	B-159	8/31	9/06	6	102	104	98	Fdup
B-3-3 Dit.	B-160	8/31	9/06	6	110	98	102	Reg
B-3-3 Dit.	B-161	8/31	9/06	6	106	102	94	Select

Table C-12. Volatile Organic Analysis Holding Times and Surrogate Recoveries. (sheet 2 of 2)

Lobe	Sample	Collect date	Analysis date	Elapsed days	% - Rec. 12DCAD4	TOLUD8	BFB	Type
B-3-3 Dit.	B-184	9/18	9/21	3	100	98	102	Fdup
B-3-3 Dit.	B-185	9/18	9/21	3	98	98	100	Fdup
B-3-3 Dit.	B-187	9/18	9/21	3	106	100	106	Reg
B-3-3 Dit.	B-188	9/18	9/21	3	112	96	100	Reg
B-3-3 Dit.	B-189	9/18	9/22	4	116	96	112	Reg
B-3-3 Dit.	B-190	9/18	9/22	4	94	100	98	Reg
B-3-3 Dit.	B-191	9/18	9/22	4	100	96	92	Select
Cont Bkg.	B-101	8/04	8/09	5	95	99	108	Reg
Cont Bkg.	B-102	8/04	8/10	6	99	97	99	Reg
Cont Bkg.	B-103	8/04	8/09	5	100	106	96	Reg
Cont Bkg.	B-104	8/04	8/10	6	88	91	94	Reg
Cont Bkg.	B-105	8/04	8/10	6	85	101	97	Reg
Sage Bkg.	B-121	8/10	8/18	8	101	105	109	Fdup
Sage Bkg.	B-122	8/10	8/22	12	115	103	105	Fdup
Sage Bkg.	B-123	8/10	9/01	22	116	112	78	Reg
Sage Bkg.	B-124	8/10	8/23	13	115	103	111	Reg
Sage Bkg.	B-125	8/10	8/23	13	117	115	110	Reg
Sage Bkg.	B-126	8/10	8/23	13	97	106	84	Reg
Silica sand	B-113	8/04	8/17	13	119	104	107	Blk
Silica sand	B-117	8/10	8/17	7	101	106	110	Blk
Silica sand	B-128B	8/11	8/23	12	100	104	104	Blk
Silica sand	B-142	8/18	8/30	12	100	102	98	Blk
Silica sand	B-151	8/25	9/01	7	104	104	96	Blk
Silica sand	B-156	8/28	9/15	18	108	102	104	Blk
Silica sand	B-163	8/31	9/06	6	106	100	98	Blk
Silica sand	B-170	9/07	9/15	8	108	104	106	Blk
Silica sand	B-183	9/08	9/18	10	98	108	106	Blk
Silica sand	B-193	9/18	9/22	4	102	100	102	Blk
Silica sand	B-205	9/21	9/28	7	92	88	104	Blk

12DCAD4 = 1,2-Dichloroethane-D4.
TOLUD8 = Toluene-D8.
BFB = 4-Bromofluorobenzene.

Table C-13. Volatile Organic Analysis Spike and Surrogate Recoveries.

Sample		Matrix Spike Recoveries (%)					Analysis	Surrogate Recoveries (%)		
		Benzene	Toluene	Trichloroethene	Chlorobenzene	1,1-Dichloroethene	Date	1,2-Dichloroethane-D4	Toluene-D8	4-Bromofluorobenzene
B-103	MS	95.8	100.4	105.8	101.6	102.6	8/09/89	95.8	103.2	101.6
	MSD	117.4	109.2	109.4	116.6	111.8	8/09/89	90.6	95	89.6
B-115	MS	115	115	115	130	105	8/16/89	106	94	106
	MSD	100	95	105	115	85	8/16/89	98	92	96
B-121	MS	96	101.5	86	104	85.5	8/18/89	99.2	109.6	107.6
	MSD	106.5	109	107.5	118.5	107	8/21/89	115.4	99.4	98.6
B-129	MS	90	90	88	98	52	8/28/89	98	100	100
	MSD	83	87	81	96	53	8/28/89	100	100	100
B-142	MS	84	92	88	102	70	8/30/89	112	104	118
	MSD	98	102	96	112	74	8/30/89	98	100	108
B-163	MS	100	62	88	94	74	9/06/89	114	66	96
	MSD	86	78	76	84	62	9/06/89	112	94	110
B-174	MS	88	96	84	102	54	9/15/89	112	100	102
	MSD	84	94	84	98	44	9/18/89	110	104	108
B-190	MS	78	84	84	94	40	9/22/89	108	94	94
	MSD	92	90	88	94	76	9/22/89	102	98	96
B-201	MS	88	90	82	96	74	9/23/89	94	100	96
	MSD	92	92	86	98	72	9/23/89	96	98	94
Average		94.1	93.7	91.9	103.0	74.6				
Std. Dev.		10.8	12.2	11.5	11.3	21.8				
%CV		11.5	13.0	12.5	11.0	29.2				
B-206	MS	141	135	133	130	138	10/4/89	93.8	99.2	106
(Water)	MSD	131	121	122	117	121	10/4/89	88.4	100	106

Table C-14. Radioactivity, pCi/g. (sheet 1 of 2)

Site lobe	Sample number	Gross alpha	Gross beta	Type
3A Pond	B-194	3.3	51.8	Fdup
3A Pond	B-196	4.6	55.5	Fdup
3A Pond	B-197	5.3	42.7	Reg
3A Pond	B-198	6.3	68.1	Reg
3A Pond	B-200	4.8	23.6	Reg
3A Pond	B-201	1.0 *	21.6	Reg
3A Pond	B-202	3.9	18.8	Reg
3A Pond	B-203	4.1	18.5	Reg
3B Pond	B-106	2.5	16.8	Reg
3B Pond	B-107	1.3 *	20.2	Reg
3B Pond	B-108	3.2	18.4	Fdup
3B Pond	B-109	0.6 *	18.3	Fdup
3B Pond	B-110	4.4	17.1	Reg
3B Pond	B-111	6.4	18.6	Reg
3C Pond	B-171	6.5	399.0	Fdup
3C Pond	B-172	7.6	393.0	Fdup
3C Pond	B-174	7.8	31.2	Reg
3C Pond	B-175	6.2	139.0	Reg
3C Pond	B-176	4.7	153.0	Reg
3C Pond	B-177	18.4	488.0	Reg
3C Pond	B-178	13.5	718.0	Reg
3C Pond	B-179	10.4	343.0	Reg
3C Pond	B-180	3.3	159.0	Reg
B-3 Pond	B-114	13.1	84.5	Reg
B-3 Pond	B-115	11.2	36.1	Reg
B-3 Pond	B-116	13.4	66.9	Reg
B-3 Pond	B-118	4.3	24.8	Reg
B-3 Pond	B-119	7.9	36.3	Reg
B-3 Pond	B-128	3.0	33.9	Fdup
B-3 Pond	B-129	11.5	34.0	Fdup
B-3 Pond	B-130	17.7	334.0	Reg
B-3 Pond	B-131	14.1	71.8	Reg
B-3 Pond	B-132	13.2	91.9	Reg
B-3 Pond	B-134	8.3	35.4	Fdup
B-3 Pond	B-135	9.7	43.0	Fdup
B-3 Pond	B-136	10.4	31.7	Reg
B-3 Pond	B-138	8.6	34.4	Reg
B-3 Pond	B-139	6.1	55.0	Reg
B-3 Pond	B-140	9.6	30.1	Reg
B-3 Pond	B-143	5.4	161.0	Reg
B-3 Pond	B-145	11.3	222.0	Fdup
B-3 Pond	B-146	11.5	208.0	Fdup
B-3 Pond	B-147	5.8	194.0	Reg
B-3 Pond	B-148	2.9	167.0	Reg
B-3 Pond	B-149	5.0	181.0	Reg
B-3 Pond	B-164	8.6	270.0	Select-Fdup
B-3 Pond	B-165	10.1	271.0	Select-Fdup
B-3 Pond	B-166	6.6	155.0	Reg
B-3 Pond	B-168	2.9	190.0	Select
B-3-3 Dit.	B-152	2.3	29.9	Fdup
B-3-3 Dit.	B-153	2.0	25.4	Fdup
B-3-3 Dit.	B-154	5.8	64.4	Reg
B-3-3 Dit.	B-158	7.8	57.7	Fdup
B-3-3 Dit.	B-159	8.6	58.0	Fdup
B-3-3 Dit.	B-160	6.4	73.3	Reg
B-3-3 Dit.	B-161	11.8	69.3	Select
B-3-3 Dit.	B-184	9.8	76.3	Fdup
B-3-3 Dit.	B-185	8.3	80.4	Fdup
B-3-3 Dit.	B-187	4.6	35.6	Reg
B-3-3 Dit.	B-188	6.2	67.6	Reg
B-3-3 Dit.	B-189	2.3 *	93.4	Reg
B-3-3 Dit.	B-190	7.8	77.1	Reg
B-3-3 Dit.	B-191	5.0	493.0	Select

Table C-14. Radioactivity, pCi/g. (sheet 2 of 2)

Site lobe	Sample number	Gross alpha	Gross beta	Type
Cont Bkg	B-101	3.2	20.8	Reg
Cont Bkg	B-102	2.2 *	17.0	Reg
Cont Bkg	B-103	1.7 *	17.9	Reg
Cont Bkg	B-104	3.9	18.2	Reg
Cont Bkg	B-105	2.7	14.9	Reg
Sage Bkg	B-121	5.6	22.6	Fdup
Sage Bkg	B-122	5.9	22.4	Fdup
Sage Bkg	B-123	3.4	19.9	Reg
Sage Bkg	B-124	6.2	20.5	Reg
Sage Bkg	B-125	3.7	21.8	Reg
Sage Bkg	B-126	5.1	20.3	Reg
Silica sand	B-113	1.2 *	8.0	Blk
Silica sand	B-117	1.4 *	9.6	Blk
Silica sand	B-128B	0.3 *	6.0	Blk
Silica sand	B-142	0.8 *	9.0	Blk
Silica sand	B-151	3.3	30.0	Blk
Silica sand	B-156	1.9	19.7	Blk
Silica sand	B-163	2.0	0.7	Blk
Silica sand	B-170	1.1 *	49.7	Blk
Silica sand	B-183	1.1 *	48.6	Blk
Silica sand	B-193	0.0 *	9.7	Blk
Silica sand	B-205	-0.7 *	9.7	Blk
	WATER SAMPLES (pCi/L)			
B-3 Pond	B-206	2.1	0.6 *	Reg-H_2O
B-3 Pond	B-207	1.3	3.7	Fdup-H_2O
B-3 Pond	B-208	0.5 *	5.1	Reg-H_2O
B-3 Pond	B-209	0.4 *	4.5	Reg-H_2O
B-3 Pond	B-210	1.4	4.2	Reg-H_2O

* = Result less than the lab-estimated analytical error, (2 sigma). (All samples met 6 month holding time limits.)

Table C-15. Radionuclides SR-90** and Gamma Scan pCi/g.

Site lobe	Sample number	Reported Constituents							
		Sr-90	K-40	Nb-95	ZrNb-95	Zr-95	Cs-137DA	Na-22	Ru-106DA
3A Pond	B-199	0.359	11.2	0.10	ND	ND	9.78	ND	ND
3A Pond	B-204	0.191	13.9	ND	ND	ND	1.50	ND	ND
3B Pond	B-112	0.040	10.6	ND	ND	ND	0.01 *	ND	ND
3C Pond	B-181	0.354	10.5	ND	0.31	ND	1.24	ND	ND
3C Pond	B-182	0.317	12.2	ND	ND	ND	10.90	ND	ND
B-3 Pond	B-127	0.714	13.6	ND	ND	ND	15.90	ND	ND
B-3 Pond	B-133	2.48	19.7	ND	ND	ND	290.00	ND	ND
B-3 Pond	B-141	1.74	16.2	0.15	ND	0.05	20.80	ND	ND
B-3 Pond	B-150	1.06	16.5	-0.03 *	ND	0.03 *	11.40	ND	ND
B-3 Pond	B-169	1.04	14.0	ND	ND	ND	25.60	ND	ND
B-3-3 Dit.	B-162	0.169	12.5	ND	ND	ND	33.40	ND	ND
B-3-3 Dit.	B-192	4.03	11.8	ND	0.47	ND	183.00	0.21	ND
			WATER SAMPLE (pCi/L)						
B-3 Pond	B-211	0.088 *	ND	ND	ND	ND	1.66 *	ND	35.00 *

		Reported Constituents						
		Cs-134	Ce-144	CePr-144	Co-57	Co-60	Pb-212	Pb-214
3A Pond	B-199	0.08	2.03	ND	ND	ND	0.65	0.37
3A Pond	B-204	ND	ND	ND	ND	ND	0.75	0.56
3B Pond	B-112	ND	ND	ND	ND	ND	0.39	0.37
3C Pond	B-181	ND	ND	1.58	ND	ND	0.52	0.47
3C Pond	B-182	ND	ND	10.50	ND	ND	0.67	0.51
B-3 Pond	B-127	ND	ND	0.38	ND	ND	0.76	0.66
B-3 Pond	B-133	ND	ND	ND	ND	ND	0.72	ND
B-3 Pond	B-141	ND	0.62	ND	ND	ND	0.92	0.74
B-3 Pond	B-150	ND	0.13	ND	ND	ND	0.87	0.75
B-3 Pond	B-169	ND	ND	0.97	ND	ND	0.84	0.69
B-3-3 Dit.	B-162	0.14	1.34	ND	ND	ND	0.49	0.54
B-3-3 Dit.	B-192	0.31	2.25	ND	0.33	ND	0.44	ND
B-3 Pond	B-211	ND	ND	ND	ND	2.84 *	ND	ND

* = Denotes result less than lab-estimated 2 sigma.
** = Strontium-90 is determined separately.
ND = Non-detectable.
DA = May include unresolved daughters.

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APPENDIX D

FIELD DUPLICATE GRAPHS

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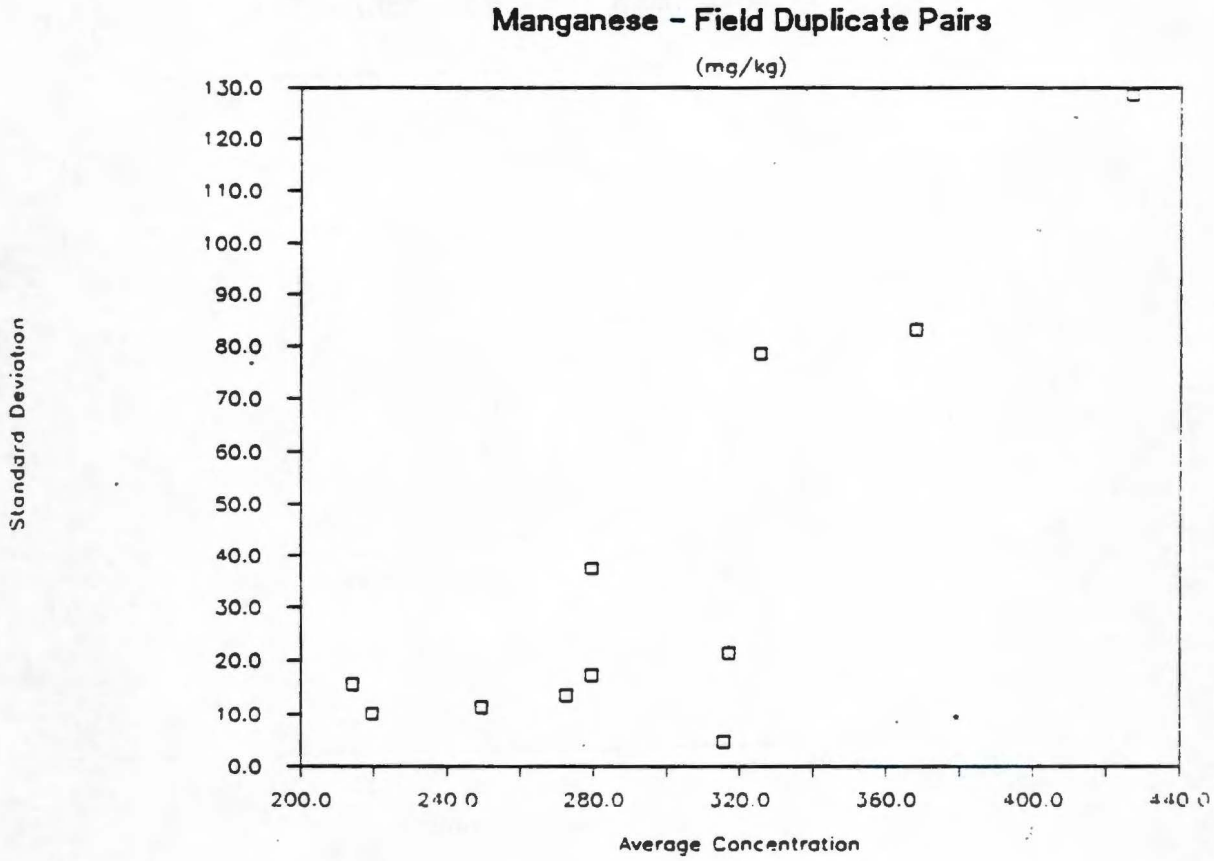
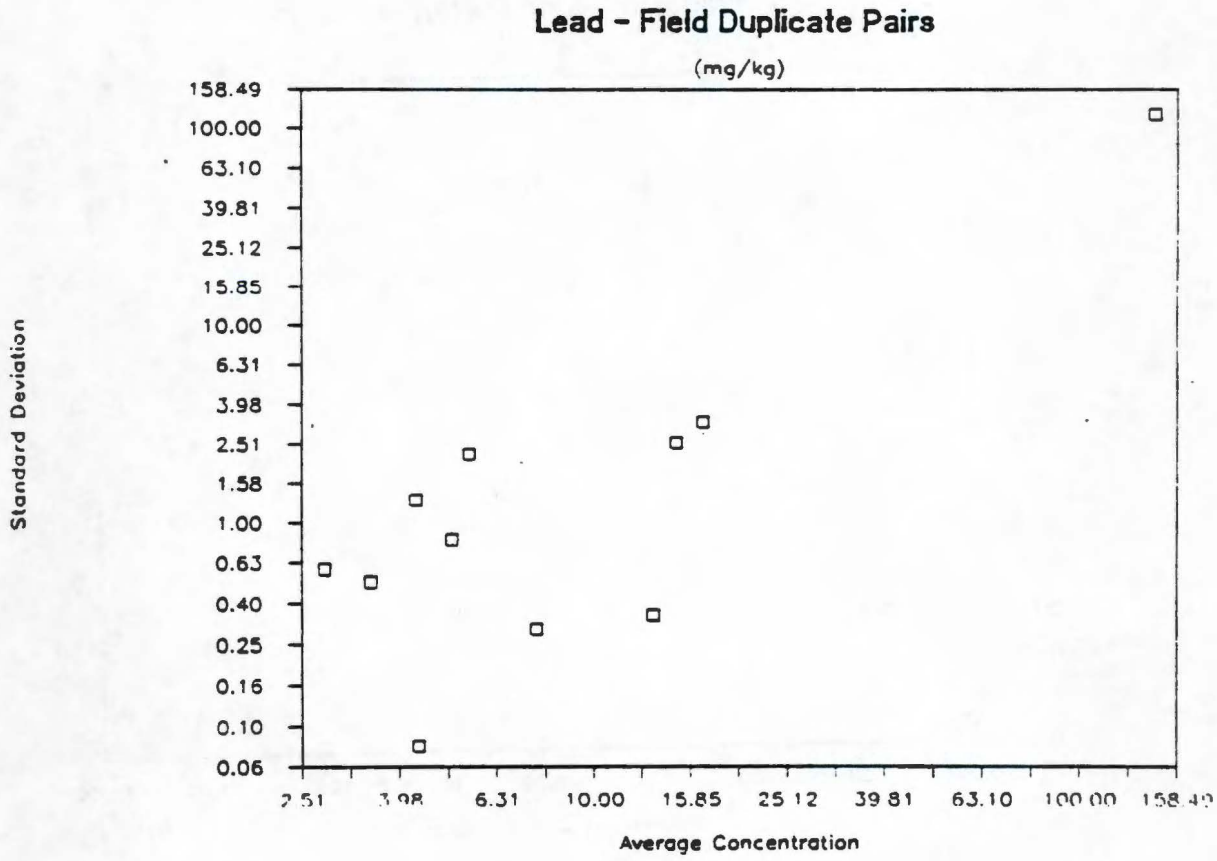
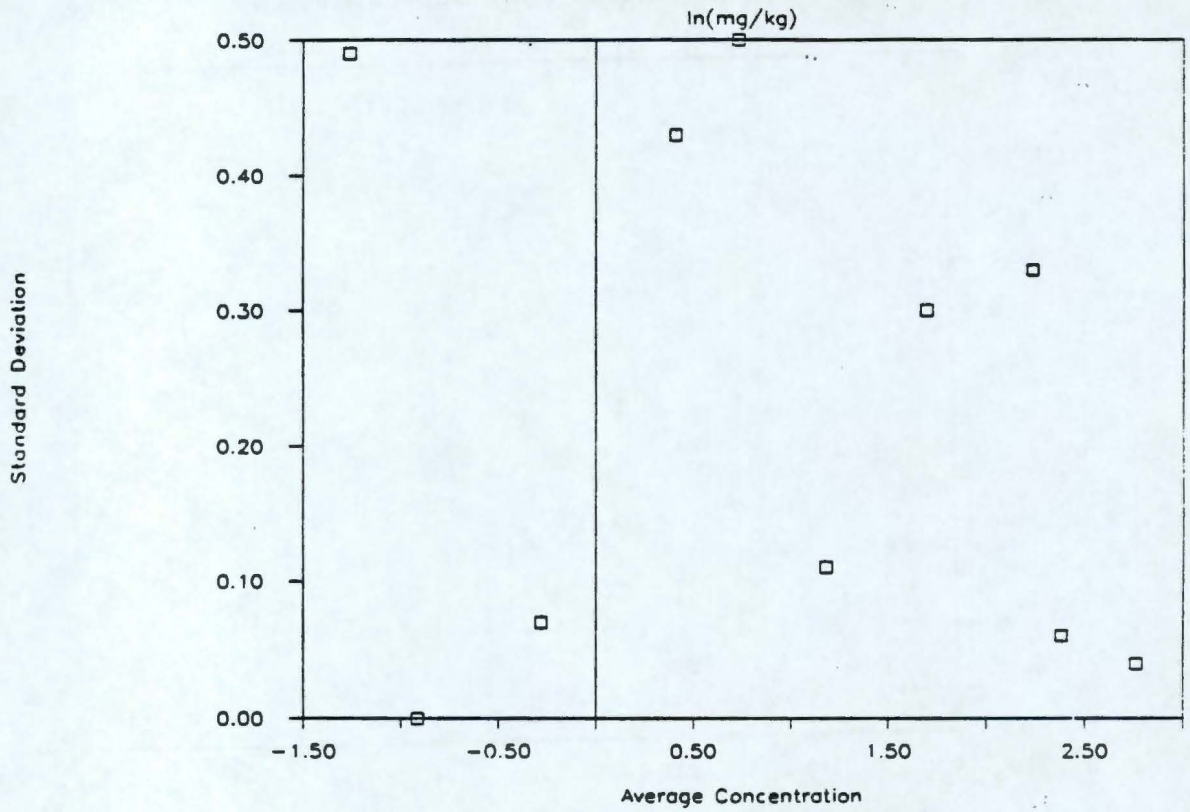
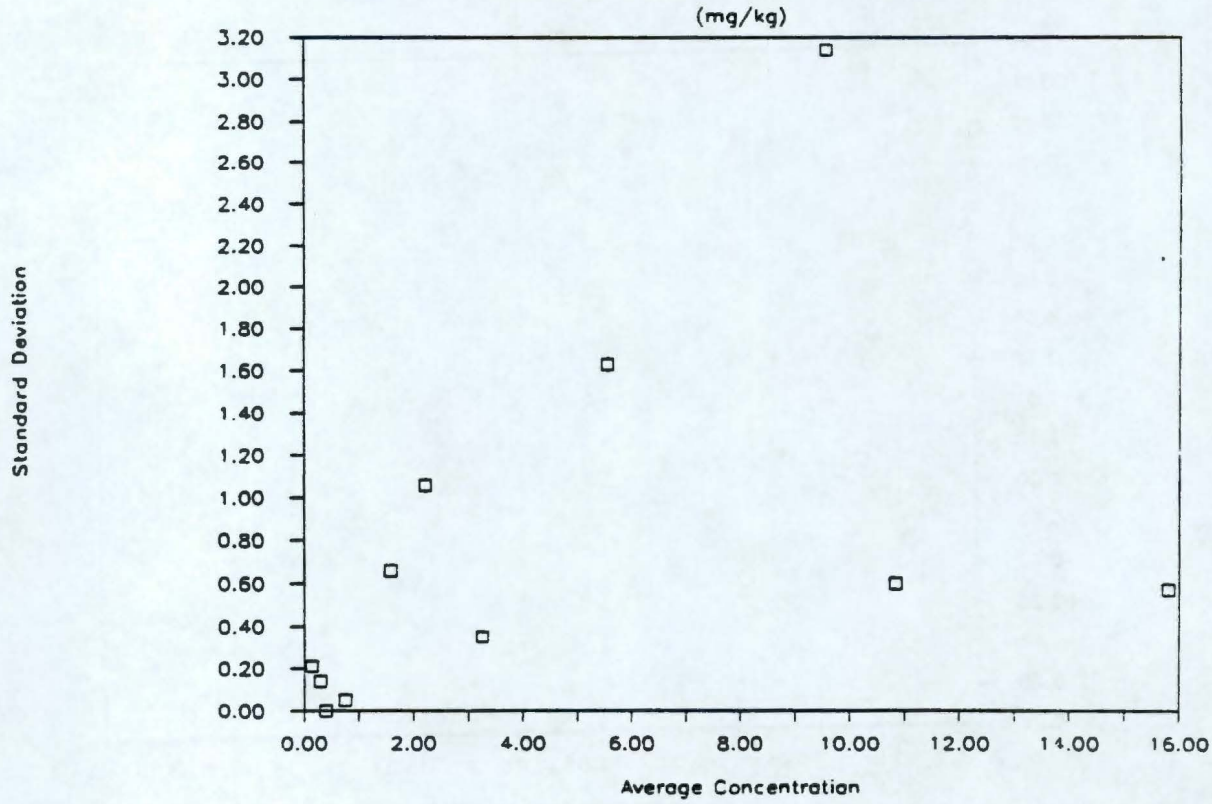

Manganese - Field Duplicate Pairs
(mg/kg)
Standard Deviation
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
200.0
240.0
280.0
320.0
360.0
400.0
440.0
Average Concentration

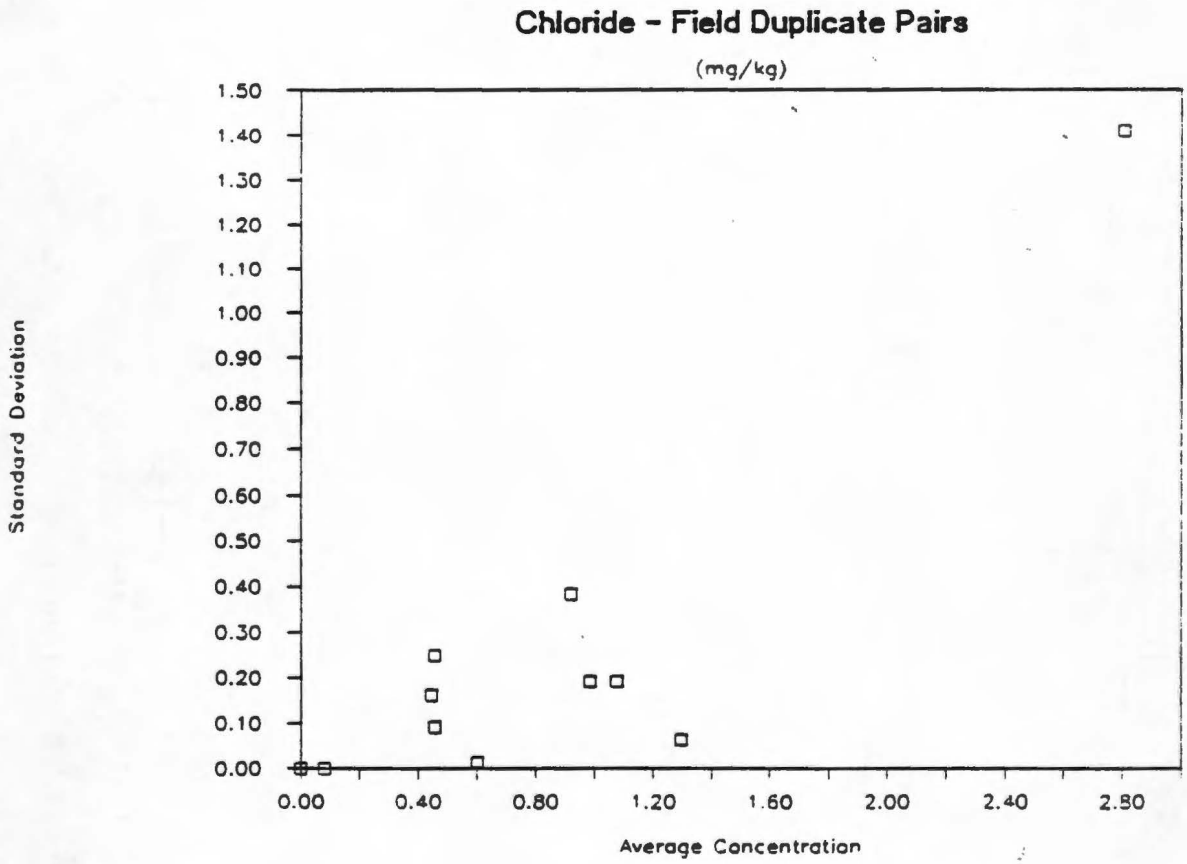

Lead - Field Duplicate Pairs
(mg/kg)
Standard Deviation
158.49
100.00
63.10
39.81
25.12
15.85
10.00
6.31
3.98
2.51
1.58
1.00
0.63
0.40
0.25
0.16
0.10
0.06
2.51
3.98
6.31
10.00
15.85
25.12
39.81
63.10
100.00
158.49
Average Concentration

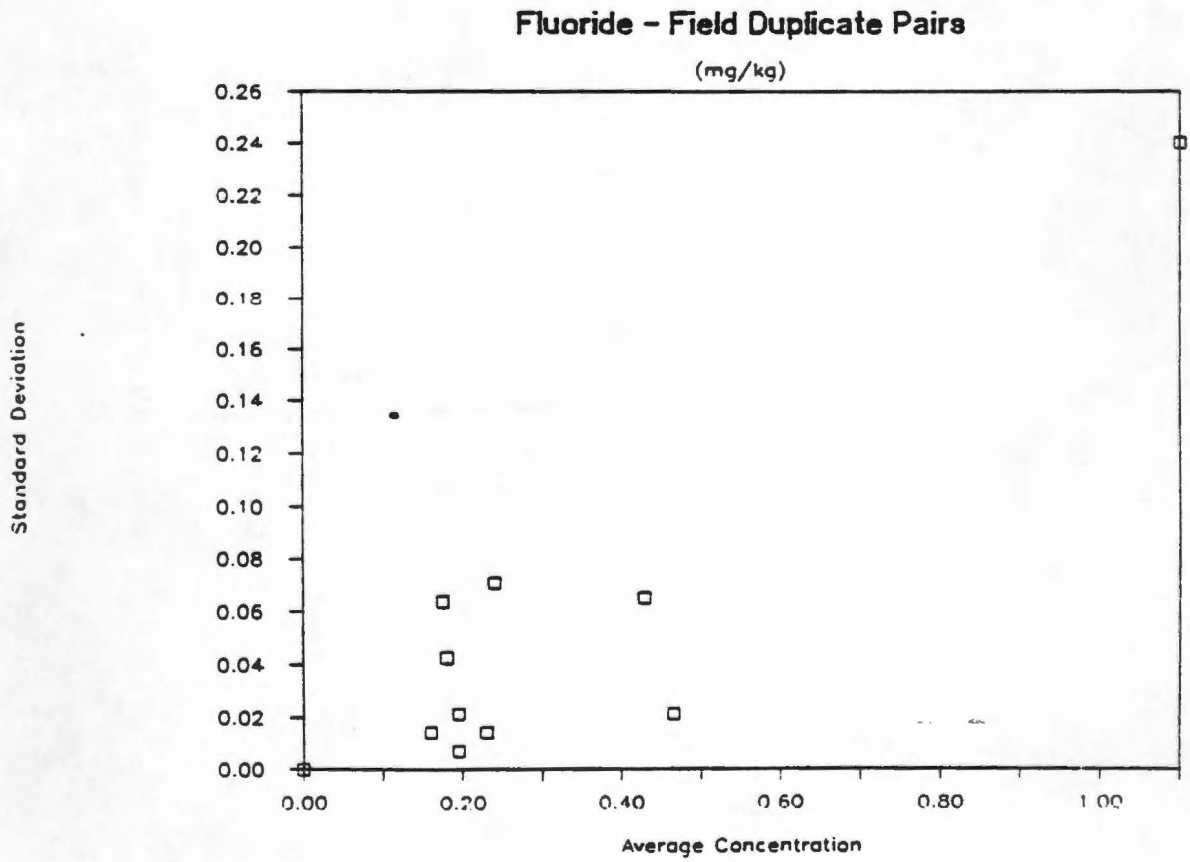
Ammonium - Ln(x) Transformed Data



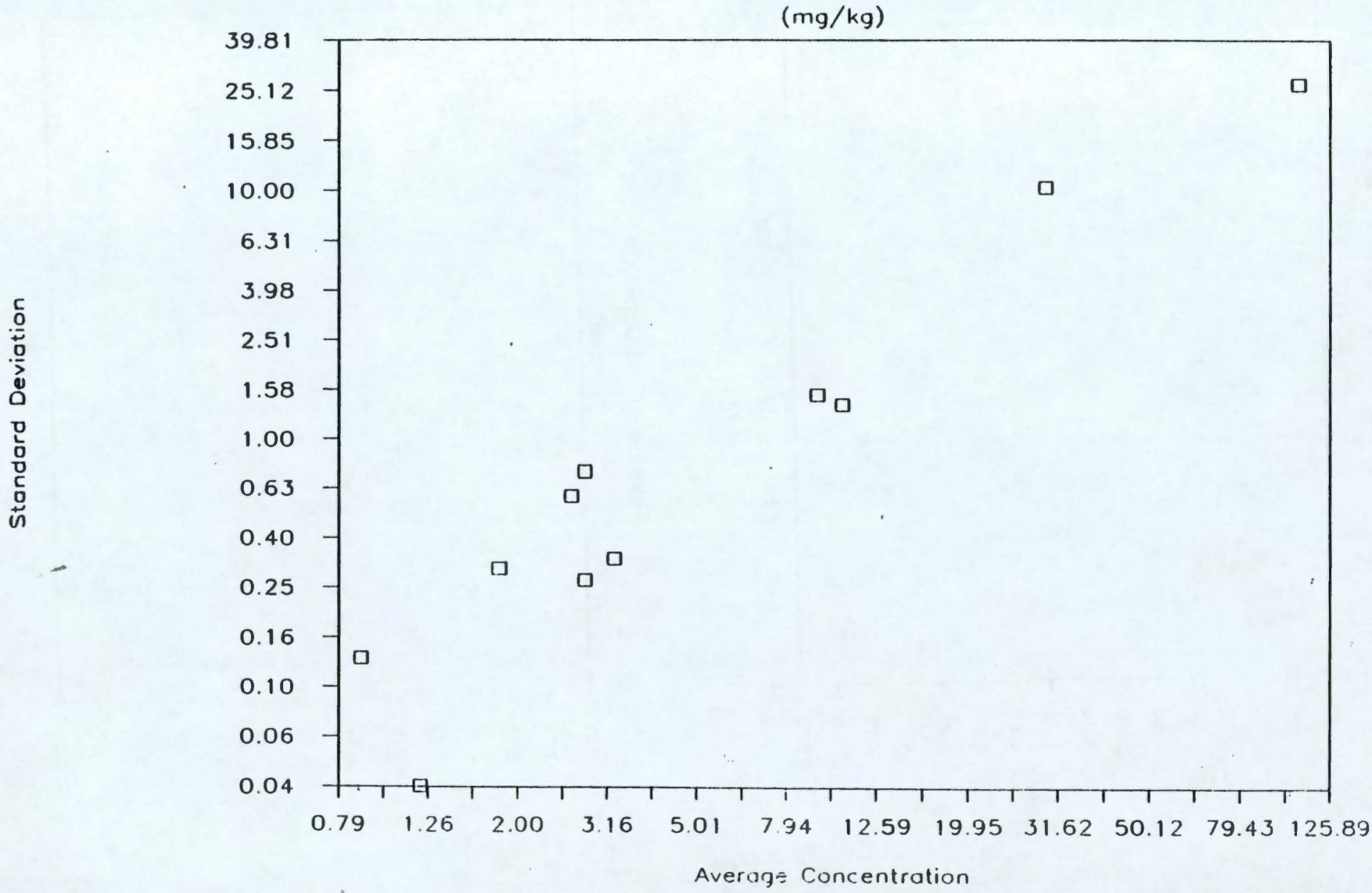
Ammonium - Untransformed Data




Chloride - Field Duplicate Pairs
(mg/kg)
Standard Deviation
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
Average Concentration


Fluoride - Field Duplicate Pairs
(mg/kg)
Standard Deviation
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0.00
0.20
0.40
0.60
0.80
1.00
Average Concentration

Sulfate - Field Duplicate Pairs



APPENDIX D

216-B-3 POND SYSTEM PHASE 2 SOIL AND SEDIMENT SAMPLING OF A, B, AND C LOBES

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ACRONYMS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CLP	Contract Laboratory Program
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HEIS	Hanford Environmental Information System
ICP	inductively coupled plasma
LOD	Limit of Detection
LOQ	Limit of Quantification
MTCA	*Model Toxics Control Act*
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RPD	relative percent difference
SOW	statement of work
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
VOA	volatile organics analysis
WAC	*Washington Administrative Code*

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1.0 INTRODUCTION

This report summarizes the sampling activities undertaken and the analytical results obtained in a soil and sediment sampling study performed at the three Expansion Ponds in the 216-B-3 Pond (B Pond) System. This sampling effort, referred to as the Phase 2 characterization study, was performed to confirm the results of previous sampling efforts at the B Pond system. Results were compared to Hanford Site Background thresholds for soils and the *Model Toxics Control Act* (MTCA) residential limits. No organic compounds or inorganic constituents were found in sufficient concentrations to cause the investigated soil and sediment to be regulated as dangerous waste. The results of the Phase 2 study are consistent with the earlier findings.

While this sampling event focused on soil and sediments at the 216-B-3 Pond System, at the request of the Washington State Department of Ecology (Ecology), liquid samples were taken from the two Expansions Ponds that contained water and the results also are reported in this document.

1.1 REGULATORY BACKGROUND

The U.S. Environmental Protection Agency (EPA) and Ecology jointly administer the *Resource Conservation and Recovery Act of 1976* (RCRA) in the State of Washington. The EPA retains oversight authority while delegating to Ecology enforcement of a state program that is consistent with or more stringent than the corresponding federal program. The implementing regulations can be found in the Washington Administrative Code (WAC) 173-303, "Dangerous Waste Regulations," and Title 40, *Code of Federal Regulations* (CFR), Parts 260-270. Ecology's authorization includes administering treatment, storage, and/or disposal (TSD) closures. However, the state currently is not authorized to enforce the federal *Hazardous and Solid Waste Amendments of 1984*, which includes RCRA corrective-action provisions.

The U.S. Department of Energy (DOE), EPA, and Ecology have entered into an agreement called the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1994), commonly referred to as the Tri-Party Agreement. This agreement affects environmental regulation at the Hanford Site. One purpose of this agreement is to ensure environmental impacts associated with past activities are investigated and appropriate response actions taken as necessary to protect human health and the environment. The agreement seeks to promote this goal, in part, by identifying TSD units, identifying which units will undergo closure, and promoting compliance with relevant RCRA permitting requirements.

B Pond is identified as a RCRA TSD unit that will be closed in accordance with applicable laws and regulations. B Pond is considered an interim status, surface impoundment disposal unit (DOE-RL 1990). Clean closure is the planned option for the portion of B Pond addressed by this report: the 216-B-3A Expansion Pond, the 216-B-3B Expansion Pond, and the 216-B-3C Expansion Pond (DOE-RL 1990).

1.2 BACKGROUND

The B Pond is undergoing evaluation to characterize the potential hazards that may be present in the soil and sediments. The potential dangerous chemical and radionuclide inventory of the soils and sediments is known only from information about past discharges to the ponds and previous sampling efforts. Information gathered will assist in evaluating closure options. B Pond is part of the 200-BP-11 operable unit (WHC 1989b).

A sampling plan, *216-B-3 Pond Characterization of the Hazardous Waste Inventory in the Near-Surface Soil and Sediments* (Roos and Woodworth 1989), governs the characterization effort. The sampling plan sets forth a phased approach toward characterizing the soils and sediments of B Pond. Phase 1 was an initial sampling effort assessing near-surface soil contamination within the 216-B-3 Pond, the 216-B-3-3 Ditch, and the three Expansion Ponds (216-B-3A, 216-B-3B, and 216-B-3C). This phase includes the estimation of background soil concentrations in the vicinity of the site. Phase 2 is an extension of the characterization work using data and knowledge from Phase 1. Phase 3 examined the vertical distribution of contaminants beneath the surface soil.

1.3 SETTING

B Pond is located adjacent to the 200 East Area on the Hanford Site in southeast Washington State (Figure D-1). B Pond is composed of the following units (Figure D-2):

- Open section of the 216-B-3-3 Ditch, approximately 3,700 ft
- 216-B-3 Pond (B-3 Pond), approximately 35 acres
- 216-B-3A Pond (3A Pond), approximately 11 acres
- 216-B-3B Pond (3B Pond), approximately 11 acres
- 216-B-3C Pond (3C Pond), approximately 41 acres.

The B-3 Pond is the oldest pond in the system. It contains the largest volume of water. The level of the pond and the inflow have changed with time. Originally the pond was supplied through the 216-B-3-1 Ditch. In 1964, this ditch was replaced by the 216-B-3-2 Ditch. This second ditch was replaced in 1970 by the present 216-B-3-3 Ditch. Both the 216-B-3-1 and 216-B-3-2 Ditches were removed from service due to radioactive contamination and were filled with soil to reduce contaminant mobility. The three Expansion Ponds, 216-B-3A (3A), 216-B-3B (3B), and 216-B-3C (3C), were placed in service in 1983, 1984, and 1985, respectively. The 3B Pond has not been used since taken out of service in May 1985. Several feet of material were subsequently removed from the former pond bottom in an attempt to increase percolation should the pond be used again.

The B Pond area has received liquid effluent from activities in the 200 East Area since 1945. B Pond primarily has received steam condensate, cooling water, chemical sewer discharges, and process wastewater. Some mixed waste also has been discharged to B Pond. Administrative and physical controls have been implemented to eliminate dangerous waste discharges.

B Pond is still in use for nondangerous wastewater disposal. With respect to hazardous waste, it is undergoing closure in accordance with RCRA. The *216-B-3 Pond System Closure/Postclosure Plan* (DOE-RL 1990) provides a broader perspective of this closure and includes chapters on process information and waste characteristics (Chapters 3-4, pp. 3-1 to 4-14).

Water flows into the B-3 Pond through the 216-B-3-3 Ditch. Flow from the B-3 Pond to the 3A Pond is controlled at the east end of the B-3 Pond. The B-3 Pond and the 3A Pond normally contain water. Water from the 3A Pond currently is directed to the 3C Pond. The 3B Pond currently is not in use. The 3C Pond has a series of eight parallel infiltration trenches into which water usually is channelled. The water in the 3C Pond has never been above the tops of the trenches, which cover a much smaller total area than the pond itself. The trenches usually are not wet along their entire length. The wet area varies with water level.

The Contingency Pond, 216-E-28, was constructed in 1987 to provide emergency overflow capability for B Pond. It lies north and slightly west of the B-3 Pond. The area is dry and has not been used for waste disposal. Both the unused contingency pond area and an area of native desert vegetation (sagebrush and native plants) were used in Phase 1 as sources for background soil samples. For the purposes of this study, only the 3A, 3B, and 3C Ponds underwent sampling during Phase 2. Although this document uses the term 'pond', the reader should keep in mind that the 3B Pond and the Contingency Pond are actually dry basins.

2.0 SAMPLING ACTIVITIES

Characterization of the B Pond System was accomplished by a three-phase sampling approach. Phase 1 was conducted from August through September 1989. Phase 1 results are described in *Phase 1 Characterization of the 216-B-3 Pond System* (WHC 1991). Phase 3, examination of the vadose zone, was conducted from February through March 1991. Phase 3 sample results are described in *Vadose Zone Investigation of the 216-B-3A, 216-B-3B, and 216-B-3C Ponds* (WHC 1992b). The following provides the reader with a brief overview of the phased sampling approach and describes the need for initiating Phase 2 for the B Pond characterization effort.

2.1 PHASE 1

Phase 1 was an initial sampling effort assessing near-surface soil contamination within the B-3 Pond, the 216-B-3-3 Ditch, and the three Expansion Ponds. The objectives of Phase 1 also included estimating background values, identifying constituents of concern, and estimating contamination variability. All but four sample locations within the TSD unit were selected randomly. Randomly allocated sample locations included sites in the 216-B-3-3 Ditch, the B-3 Pond, the 3A Pond, the 3B Pond, and the 3C Pond. Randomly allocated sample locations included sites in the closest possible

point to the head end of the 216-B-3-3 Ditch, the intersection of the 216-B-3-3 and 216-A-29 Ditches, the present inlet area of the B-3 Pond, and the deepest area of the B-3 Pond. Sample collection methods are detailed in WHC-SD-EN-AP-042, *Phase 1 Characterization of the 216-B-3 Pond System* (WHC 1991).

Phase 1 also included measuring constituents in two types of background areas in the vicinity of the site. This involved taking five samples from the never-used 216-E-28 Contingency Pond and five samples from the area of native desert vegetation.

Characterization of the soils during the Phase 1 study focused on inorganic analytes. Table D-1 summarizes the analyses requested for soil/sediment samples. In February 1990 it was decided that comparison to background would be more appropriate if the strong acid digestion method 3050 (EPA 1986) was employed for background and onsite samples instead of the acetic acid digestion used for EP-toxicity determinations. This analysis was requested at that time on samples still held in storage by the laboratory. The method yielded higher concentrations of analytes for the comparisons.

Analytical results for site samples were compared to threshold values derived from the two limited background sampling efforts. Contractually defined detection limits, as set forth in the quality assurance (QA) project plan (Roos and Woodworth 1989), were used for some comparisons. In these cases, the constituents were not found in concentrations great enough to calculate threshold values. Organic constituents were not found in reliably measurable quantities. Background soil composition in the undisturbed native area surrounding the facility was different than an adjacent background area of anthropic influence. Many analytes exceed threshold values derived from the native background, but not those derived from an unused contingency pond area. Reference to typical soil concentrations suggests lead, mercury, and cadmium are the most significant exceedances. Even these are far below hazardous levels as defined by the characteristic of EP-toxicity. The data suggest that the soil or sediment at any sampled location would <u>not</u> be classified as dangerous waste under any of the WAC-173-303 Dangerous Waste Regulations.

2.2 PHASE 3

The objective of Phase 3 characterization sampling was to collect data addressing the issue of potential vadose zone chemical contamination with dangerous waste and examine the vertical distribution of potential contaminants beneath the surface soil. Efforts focused on the subsurface of the three Expansion Ponds. The investigation was limited to the vadose zone; it did not address groundwater. The investigation involved the construction of three temporary characterization boreholes, designated as 699-43-41H, 699-42-41B, and 699-41-41 in the 3A, 3B, and 3C Ponds, respectively. Samples were collected as described in WHC-SD-EN-AP-104, *Vadose Zone Investigation of the 216-B-3A, 216-B-3B, and 216-B-3C Ponds* (WHC 1992b).

Table D-2 summarizes the analyses requested for borehole soil/sediment samples.

The B Pond Phase 3 vadose zone investigation did not indicate that hazardous levels of waste constituents exist in the vadose zone of the 216-B-3A, 216-B-3B, or 216-B-3C Ponds. No organic compounds or inorganic constituents were found in sufficient concentrations to cause the investigated vadose soils to be regulated as a dangerous waste.

2.3 PHASE 2

Phase 2 soil and sediment sampling was initiated to assess the possibility of surface soil contamination in the B Pond Expansion Ponds. In addition, Ecology expressed concern over the quality control (QC) and data validation associated with the Phase 1 soil and sediment sampling results. Documentation received from the laboratory was not sufficient to perform the level of data validation requested by Ecology. This Phase 2 sampling effort is, in part, to substantiate the conclusions that were based on the Phase 1 sampling effort.

2.3.1 Sample Location

Because of the different nature of the 3A, 3B, and 3C Ponds, each pond was sampled as a separate entity. However, the same basic sampling pattern was used for each of the three Expansion Ponds (WHC 1992a). All sample points are referenced in Figure D-3. The sampling strategy identified the following three sample points for each pond.

- One sample was collected at the influent point of each pond. This location would be expected to be contaminated with any heavy solids, should any contamination be present.

- A second sample was collected from the deepest point in the pond. Should any contamination be present, light materials and fines would be expected to settle at this point.

- A third sample was collected at a point expected to contain high levels of the analytes of concern (relative to other locations), as determined by an evaluation of Phase 1 sample results (WHC 1991) and by field observation.

In the 3A and 3C Ponds, which are wet ponds, the location of the second sample point (deepest point) was determined by measuring the water depth visually and then confirming the relative depth with a probe. The probe consisted of conduit pipe with marks at 1-ft increments.

Additionally, while this sampling event focused on soil and sediments at the 216-B-3 Pond System, at the request of Ecology water samples were taken from the two wet ponds.

In the 3A Pond, the first sample point was located at the influent point at which water from the 216-3-B (main) Pond entered the 3A Pond. Water samples also were taken at this point. A second soil/sediment sample was taken from the deepest portion of the pond. This point was located at the north end of the underwater trench running through the 3A Pond. A water sample also was taken in this vicinity. The third soil/sediment sample point was located at the east side of the pond near the outfall to the dry 3B Pond. Sedimentation was found to be unusually heavy at this location.

The "deep point" of the 3B Pond was not sampled because stabilization of the pond had made it impractical. The location of the "deep point" of the 3B Pond could not be determined. A sample of soil/sediments was taken near the pond influent gates, approximately 10 ft east of the surface contamination area. The next sample point was a location approximately 100 ft east and 15 ft south of the influent gates. The gradual downslope of the terrain suggested that settleable contaminants would have been likely to deposit at this point while the pond was in use. Discrete samples of surface soils and underlying soils were taken at this point.

Three sample points were identified for the 3C Pond. The first point sampled was located 70 ft downstream and 15 ft north of the 3C Pond influent pipe. This area was characterized by heavy sedimentation. A water sample also was taken at this location. The high flowrate of the influent made sampling in the direct vicinity of the influent pipe impractical. Soil/sediment samples were taken at the intersection of the third north/south trench and the main east/west feed trench. A visual inspection of the pond determined this location to be the deepest point in the pond. A final sample was taken of dry sediments located approximately 100 ft down (south of the feed trench) the fourth trench.

2.3.2 Sample Collection

Samples were collected in the same manner as for the Phase 1 sampling effort. The sampling equipment used included a long pole and a 3.25-in. by 12-in. soil recovery auger. Multiple borings were necessary to obtain sufficient quantities of material for all the requested analyses. These were always commingled in a stainless steel bowl prior to allocation to the individual sample analysis containers sent to the laboratories. Stainless steel shovels were used to collect samples in the northern portion of 3C Pond, near the influent point. Stainless steel scoopulas, spoons, bowls, shovels, and augers were prepared for use in accordance with the laboratory decontamination of field equipment specified in Environmental Investigations Instruction 5.5, "Decontamination of Equipment for RCRA/CERCLA Sampling" (WHC 1989a). Cleaned equipment was wrapped in aluminum foil by the cleaning personnel and maintained wrapped until used. Precleaned sample containers were purchased and used for all samples. The containers come presealed from the manufacturer with tamper-indicating seals affixed to the packaging. Personnel collecting the samples wore disposable vinyl gloves in addition to other clean protective clothing. These gloves were shed after each sample in an effort to minimize the potential for cross-contamination between samples.

Only the large stainless steel shovels were decontaminated in the field and reused. Sample media were monitored for radiation. Work was performed according to the applicable description of work (WHC 1992b).

For samples collected in the 3A Pond, samplers were permitted to sample from a flat-bottom aluminum boat. Health Physics coverage was supplied from a similar adjacent boat. The two boats were stabilized by securing the oar locks together with rope.

2.3.3 Field Quality Assurance/Quality Control

Field QA/QC is used to provide the sampler with a basis by which laboratory accuracy and reproducibility can be measured. Field duplicates and equipment blanks are used to assess precision and bias of sampling. The estimated precision and bias will contain components of the laboratory's precision and bias, but alone cannot be used to assess those factors for the laboratory. Field splits are used to assess laboratory reproducibility. Additional information with regards to laboratory cleanliness and sample handling protocol can be inferred by the results to blank analysis. Trip blanks are used to provide information with regards to sample handling and shipping prior to receipt by the laboratory. Field duplicates, splits, and blanks were prepared to address issues related to laboratory QA/QC.

A water sample duplicate was taken and a split was made at the 3A Pond. A soil/sediment sample duplicate was taken and a split was made at the 3B Pond for chemical and radiological analyses. Two equipment blanks were prepared, one for the water matrix and one for the soil matrix. Trip blanks in the water matrix were shipped with all sample shipping containers. All shipping containers containing soil/sediment samples were shipped with trip blanks of clean silica sand. Table D-3 summarizes sample identification, location, and QA/QC designation.

2.3.4 Sample Analysis

Table D-4 summarizes the analyses requested for water and soil/sediment samples.

For each sample, Table D-3 lists the laboratory that performed the analyses and the analyses performed on each sample. Trip blanks were analyzed for volatile organics only. The majority of the samples were analyzed by Roy F. Weston, Inc., Lionville Analytical Laboratory (Weston) in Lionville, Pennsylvania. TMA/NORCAL (TMA) in Richmond, California, was used as a split laboratory. Appendix A lists all analytes for each specific analytical method as well as the detection limits reported for each laboratory.

3.0 DATA VALIDATION

Analytical results underwent data validation by the Hanford Analytical Services Management organization. Data validation activities were performed in accordance with the RCRA procedure (Level B) contained within the *Sample Management and Administration Manual*, WHC-CM-5-3 (WHC 1990). This section summarizes procedures used for validation of data received from the laboratories. Further information on the procedures and details of how these procedures are applied are available in WHC-CM-5-3 (WHC 1990).

The data validation process included a review of the following QC elements performed by the laboratories and reported in the associated data deliverables:

- Holding times
- Blank analyses
- Surrogates
- Matrix spikes
- Duplicates.

The validation procedure establishes the following qualifiers and definitions to describe the associated data:

U The material was analyzed for, but was not detected. The associated value is the detection/quantitation limit.

UJ The material was analyzed for, but was not detected. The associated detection/quantitation limit is an estimated value.

J The associated value is estimated.

R The data are unusable.

Phase 2 sample results with appropriate data qualifiers are displayed in Chapter 3.0.

3.1 WESTON LABORATORIES

After completion of the validation process, all data received from Weston were determined to be acceptable with the exception of the initial semi-volatile organic analysis of sample B06D80. Initial results for sample B06D80 were qualified as unusable due to very low surrogate recoveries. Because of the problems with the initial analysis, results from a re-extraction of sample B06D80 are reported in Chapter 3.0. Based on the results of B06D81 and sampling done in Phase 1, it is unlikely that semivolatile organic compounds are present in detectable levels in the 3B Pond.

All holding time criteria were met for both water and soil samples analyzed by Weston with the exception of semivolatile and pesticide/PCB extraction criteria (exceeded by 1 day) for sample B06D58. No holding times

were established for the semivolatile analysis of soils. This is considered to have a minimal impact on the analysis, and the results were qualified accordingly.

Weston prepared and analyzed laboratory blanks for both the soil and water sample matrices. Analyses of the blanks identified some potential laboratory contamination for the following compounds:

- Volatile organics
  - Acetone (soil blanks only)
  - Methylene chloride
- Semivolatile organics
  - Di-n-butylphthalate
  - Bis-(2-ethylhexyl)-phthalate
- Metals
  - Copper, lead, and zinc.

Compounds detected in the organics blanks were below the contract required quantitation limit and are estimated values. Analytes detected in the metals blanks were at levels less than the contractually required detection limit. When evidence of blank contamination was present, blank validation criteria were applied to determine appropriate qualification for associated sample results.

Weston prepared and analyzed matrix spike samples and reported the results as percent recovery as an indication of accuracy. Matrix spike recovery is used as a general correlation for all samples in the analytical batch based on the fact that the samples are related to the same site and have relatively similar analyte concentrations. Spiked sample results generally were within control limits for percent recovery. Matrix spike recovery for thallium, lead, and silver were low in one or more of the Weston delivery groups. Weston also analyzed surrogate compounds for organics analyses and reported results in terms of percent recovery as another indication of accuracy. Surrogate recoveries provide an indication of accuracy for laboratory sample preparation and determinative procedures. Reported surrogate recoveries were outside control limits for several volatile, semivolatile, and pesticide/PCB samples in one or more of the Weston delivery groups. Results that fell outside of the applicable control limits were qualified according to the validation procedure. No indication of significant matrix effects were observed in the sample results.

Duplicate samples were prepared and analyzed, and data were reported as relative percent difference (RPD) by Weston as an indication of laboratory precision. For organics analyses, RPD calculations were made between matrix spike/matrix spike duplicate samples. For inorganics analyses, RPD calculations were made between initial and duplicate sample results. Reported RPDs for duplicate samples were high for aluminum, magnesium, and zinc in one or more of the Weston delivery groups. Results that fell outside of the applicable control limits were qualified according to the validation procedure.

Weston used Contract Laboratory Program (CLP 3/90) protocols to perform sample analyses instead of the requested SW-846 methods. The use of CLP protocols is expected to have minimal impact on the data. The detection levels achieved using CLP were adequate for making decisions regarding B Pond closure. It is concluded that the data are acceptable with the qualifiers listed. These qualifiers were taken into account in further evaluations of the data set performed by project personnel.

3.2 TMA LABORATORIES

After completion of the validation process, all data received from TMA were determined to be acceptable with the exception of the antimony result for sample B06D84. The antimony result for the subject sample was qualified as unusable due to a very low matrix spike recovery.

Holding time criteria were met for the analysis of soil and water samples with the following exception of cyanide for samples B06D61 and B06D84. Based on criteria established for water samples, the holding times for these cyanide analyses were exceeded by 42 days. The reported results have been qualified accordingly. In addition, both cyanide samples were split samples, and cyanide data, from the samples analyzed within holding time, exist in the Weston data for both sampling locations. Therefore, any limitations on the use of the cyanide results for these samples are expected to have minimal impact on data interpretation.

TMA prepared and analyzed laboratory blanks for both the soil and water sample matrices. Analyses of the blanks identified some potential laboratory contamination for the following compounds:

- Volatile organics
  - Acetone
  - Benzene
- Semivolatile organics
  - Butylbenzylphthalate
- Metals
  - Aluminum, calcium, copper, iron, magnesium, mercury, silver, sodium, vanadium, and zinc.

Target compounds and tentatively identified compounds detected in the organics blanks were below the contract required quantitation limit and are estimated values. Analytes detected in metals blanks were at levels less than the contractually required detection limit. When evidence of blank contamination was present, blank validation criteria were applied to determine appropriate qualification for associated sample results.

TMA prepared and analyzed matrix spike samples and reported the results as percent recovery as an indication of accuracy. Spiked sample results were generally within control limits for percent recovery. Aluminum, cadmium, iron, thallium, antimony, and zinc matrix spike recoveries were outside

control limits in one or more of the TMA QC samples. TMA also analyzed surrogate compounds for organics analyses and reported results in terms of percent recovery as another indication of accuracy. Results that fell outside of the applicable control limits were qualified according to the validation procedure. No indication of significant matrix effects was observed in the sample results.

Duplicate samples were prepared and analyzed, and data were reported as RPD by TMA as an indication of laboratory precision. For organics analyses, RPD calculations were made between matrix spike/matrix spike duplicate samples. For inorganics analyses, RPD calculations were made between initial and duplicate sample results. Reported RPDs for duplicate samples were high for aluminum, barium, iron, arsenic, lead, and sodium in one or more of the TMA QC samples. Results that fell outside of the applicable control limits were qualified according to the validation procedure.

TMA analyzed samples using SW-846 protocols.

4.0 ANALYTICAL RESULTS AND DATA TABULATION

Analytical results are summarized and evaluated in this chapter. Analytical results were compared to background levels and health-based limits. For background, both the Hanford Site Background threshold values and the local background concentrations determined during the Phase 1 sampling effort were used. Hanford Site Background threshold values are from the *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 1 (DOE-RL 1993), and are listed in Appendix B. For health-based levels WAC 173-340, the MTCA Cleanup Regulations, was used. Calculations for these health-based levels are described in Appendix D.

Hanford Site Background is a Site-wide approach to determining background levels and was developed as an alternative to local unit-based background determinations at the Hanford Site. Using local backgrounds for each unit can lead to different definitions of contamination and different assessments of remediation goals and risk for different units. The Hanford Site Background approach is based on the premise that all of the waste management units are part of a common sequence of vadose zone sediments, and that the basic characteristics that control the chemical composition of these sediments are similar throughout the Hanford Site. The range of natural soil compositions is then used to establish a single set of soil background data. Use of the Hanford Site Background for environmental restoration at the Hanford Site is technically preferable to the use of the unit-based background because it more accurately represents the range of natural variability in soil composition, and also provides a more consistent, credible, and efficient basis for evaluating contamination in soil.

The Hanford Site Background threshold values are summarized in Appendix B of this report. The background threshold is the concentration level defining the upper limit of what is considered part of the background population.

Background thresholds are based on a tolerance interval approach. The calculated threshold levels depend on the confidence interval and percentile used in the calculation. The WAC 173-340-708(11)(d) specifies a tolerance coefficient of 95% and a coverage of 95%. The Hanford Site Background threshold values are based on a 95/95 confidence interval. Statistical calculations are described in the source document.

Tables D-5 and D-6 summarize results from the analyses performed on samples from Phase 2 sampling. Table D-6 also provides the range of concentrations detected in soils from the Phase 1 sampling of the three Epansion Ponds, the contingency pond, and the local background area. Table D-6 includes the MTCA cleanup levels (Appendix D) for reference. Appendix C provides a quick reference table indicating common elemental concentration ranges in soils (Dragun 1988). An examination of the results indicates that none of the analytes detected were present at levels regulated by the Washington State Administrative Code. The data suggest that the soil or sediment at any sampled location would <u>not</u> be classified as dangerous waste under any of the WAC-173-303 Dangerous Waste Regulations.

4.1 DATA SUMMARY

Detectable analyte concentrations were not observed for most samples. The organic analytes detected were dismissed due to their low concentrations and status as common laboratory contaminants. Metal analytes found in levels detectable by the laboratory instrumentation were compared to the Hanford Site Background (DOE-RL 1993), to previously determined local background levels (from Phase 1 sampling), and to health-based standards. Of the analyses that showed levels above detection limits, none are considered to indicate contamination. Appendix D provides the MTCA cleanup levels for reference.

4.1.1 Organic Analytes

No volatile organic compounds were detected in any of the water samples. Of the compounds found in the soil samples, all the compounds found only in the trip blank were disregarded with respect to determining contamination. The remaining analytes detected, toluene, methylene chloride, and acetone, are considered to be common laboratory contaminants and, with the exception of two toluene hits, were found only in very low concentrations. The two toluene values of possible concern, greater than 100 µg/kg, were found in very dry surface soils samples of the 3B Pond. These values can be compared to the MTCA cleanup levels, WAC-173-340-740 (3) (Appendix D); all reported values are significantly below the cleanup levels.

No semivolatile organic compounds were detected in any of the soil samples. All semivolatile organic compounds found in the water samples were at very low levels. The methoxyethoxyethanol was found in two routine samples at concentrations less than or equal to that found in the trip blanks. Therefore, this compound was attributed to contamination after sampling. The methylcyclopentanol was found in a duplicate sample but was not reported in the original analyses.

No pesticides or polychlorinated biphenyls (PCB) were detected in any samples.

Volatile and semivolatile organic compounds as well as PCBs and pesticides typically were not detected in the Hanford Site Background samples; therefore, sample result comparison to Hanford Site Background values is not possible.

4.1.2 Metal Analytes

Metal analyses reported above-laboratory instrument detection limits were first compared to Hanford Site Background values [(DOE-RL 1993) (Appendix B)]. In the calculation of threshold values, certain soil classes such as topsoil and volcanic ash were excluded. Results exceeding Hanford Site Background threshold values are summarized in Table D-7. Only copper, lead, zinc, antimony, and cadmium were found in concentrations exceeding the Hanford Site Background threshold. These analytes then were compared to the local area background determined during the Phase 1 study, to common concentrations found in soils, and to MTCA Method B cleanup levels, except for lead, which was compared to the more stringent Method A cleanup level. MTCA Method A levels were used for comparison to lead concentrations because data for the Method B cleanup level calculation were not available. It is concluded that none of these analytes are present in concentrations of concern. In addition, copper, lead, and zinc do not meet the designation criteria for dangerous waste according to WAC 173-303-9904.

4.1.2.1 Copper. Two analytical results for copper, 59.6 mg/kg and 67.3 mg/kg (Table D-7), are above the Hanford Site Background threshold. Both of these values were found in the 3C Pond. The highest value found in **topsoil** during the Hanford Site Background study was 40.3 mg/kg. The highest value found in all types of soil analyzed during the Hanford Site Background study was 61 mg/kg. The highest value reported during the Phase 1 study for the 3C Pond was 18.5 mg/kg. The threshold value calculated in Phase 1 was 15.96 mg/kg (WHC 1991). The common range for copper for soils throughout the world is 2 to 100 mg/kg (Dragun 1988). In addition, the MTCA Method B cleanup level is 3,200 mg/kg, which is far greater than the highest reported value in this study, 67.3 mg/kg.

4.1.2.2 Lead. Two analytical results for lead, 29.6 mg/kg and 32.3 mg/kg (Table D-7), are above the Hanford Site Background threshold. Both values were derived for 3C Pond samples, which also contained elevated concentrations of copper. The highest reported value for lead during the Hanford Site Background study was 74.1 mg/kg, found in topsoil. Other exceedances of the Hanford Site Background threshold limit for lead in topsoil reported in the Hanford Site Background document ranged from 19.9 mg/kg to 74.1 mg/kg, with the majority being greater than 35 mg/kg. The threshold value calculated in Phase 1 was 15.16 mg/kg (WHC 1991). The common range for lead for soils throughout the world is 2 to 200 mg/kg (Dragun 1988). In addition, the MTCA Method A cleanup level for lead is 250 mg/kg, which is far greater than the

highest reported value in this study, 32.3 mg/kg. Because they are well below commonly found concentrations of lead or levels of concern, the reported values should not be considered an indication of contamination.

4.1.2.3 Zinc. Three values for zinc concentration, 450 mg/kg, 515 mg/kg, and 293 mg/kg (Table D-7), are above the Hanford Site Background threshold. All of these samples were collected from the 3C Pond. The highest value reported for zinc in topsoil in the Hanford Site Background study was 366 mg/kg. The highest value reported during the Phase 1 study for the 3C Pond was 77.7 mg/kg. The threshold value calculated in Phase 1 was 41.3 mg/kg (WHC 1991). The common range for zinc for soils throughout the world is 10 to 300 mg/kg (Dragun 1988). The MTCA Method B cleanup level for zinc is 16,000 mg/kg, which is much higher than the highest concentration reported for the 3C Pond, 515 mg/kg.

4.1.2.4 Antimony. The concentration of antimony is 18.9 mg/kg, which is only slightly above the Hanford Site Background Limit of Detection (LOD) at 15.7 mg/kg. The associated Limit of Quantitation (LOQ) is 52.2 mg/kg. For analytical results reported between the LOD and LOQ, detection is considered reliable; however, the concentration value is in question. The maximum reported value for antimony collected from topsoil during the Hanford Site Background study was 29.1 mg/kg. The MTCA Method B cleanup level for antimony is 32 mg/kg, which is higher than the 18.9 mg/kg value found in this study. Because there is only one detected concentration reported for antimony and this value is only slightly above the LOD, it should not be considered an indication of contamination.

4.1.2.5 Cadmium. Values found for cadmium is this study ranged from 3.3 mg/kg to 7.9 mg/kg. The Hanford Site Background LOD value for cadmium is 0.24 mg/kg and the LOQ value is 0.79 mg/kg. The highest cadmium value reported for topsoil during the Hanford Site Background study was 3.1 mg/kg. The local backgrounds reported in the B Pond Phase 1 study were 8.23 mg/kg for the sagebrush site and 9.58 mg/kg for the contingency pond. The threshold value calculated in Phase 1 was 8.23 mg/kg (WHC 1991). Several local backgrounds described in the Hanford Site Background document showed values of cadmium above the values reported here. The 1324-N local background ranged from 6.1 to 7.9 mg/kg. The 183-H local background ranged from 4.7 to 5.9 mg/kg. The common range for cadmium for soils throughout the world is 0.01 to 7 mg/kg (Dragun 1988). The MTCA Method B cleanup level for cadmium is 80 mg/kg, which is again much higher than the concentrations found in this study.

4.1.3 Radionuclide Analyses

Radionuclide analyses were performed on several samples. A report describing the results of the radionuclide analysis will be prepared separately.

5.0 CONCLUSIONS

Most analytes were reported undetected in the sample results. The organic analytes detected were dismissed due to their low concentrations and status as common laboratory contaminants. Metals analytes detected by the laboratories were compared to the Hanford Site Background, to previously determined local background levels (from Phase 1 sampling), and to health-based standards. Of the analyses that showed levels above detection limits, none are considered to indicate contamination relative to local background levels.

All detected analytes were compared to the MTCA cleanup standards. Method B was used to calculate the appropriate soil cleanup levels (Appendix D). In cases where sufficient information for calculating cleanup levels was not available, MTCA Residential (Method A) standards were used instead. MTCA Residential standards may be considered inappropriate for the closure of the B Pond Expansion Ponds. The cleanup levels will depend on the eventual land use. This area may not be released for residential use. However, the MTCA Residential standards used here are meant to illustrate the relatively low levels of metals when compared to regulatory standards.

Beryllium results were reported at levels that exceeded the MTCA Method B cleanup standards but below the Hanford Site Background threshold value. In this case, beryllium concentration was compared to the soil cleanup level for carcinogens (0.2 mg/kg). Based on the regional background beryllium concentration and the limited number of sample data, there is insubstantial evidence to conclude that the B Pond Expansion Ponds contain regulated levels of beryllium.

Of all the organic compounds or inorganic constituents detected within the samples from the B Pond Expansion Ponds, none were found in levels regulated under the Washington Administrative Codes. The findings of Phase 2 are consistent with the findings of Phase 1 and Phase 3. No organic compounds or inorganic constituents were found in sufficient concentrations to cause the investigated soil to be regulated as dangerous waste.

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40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

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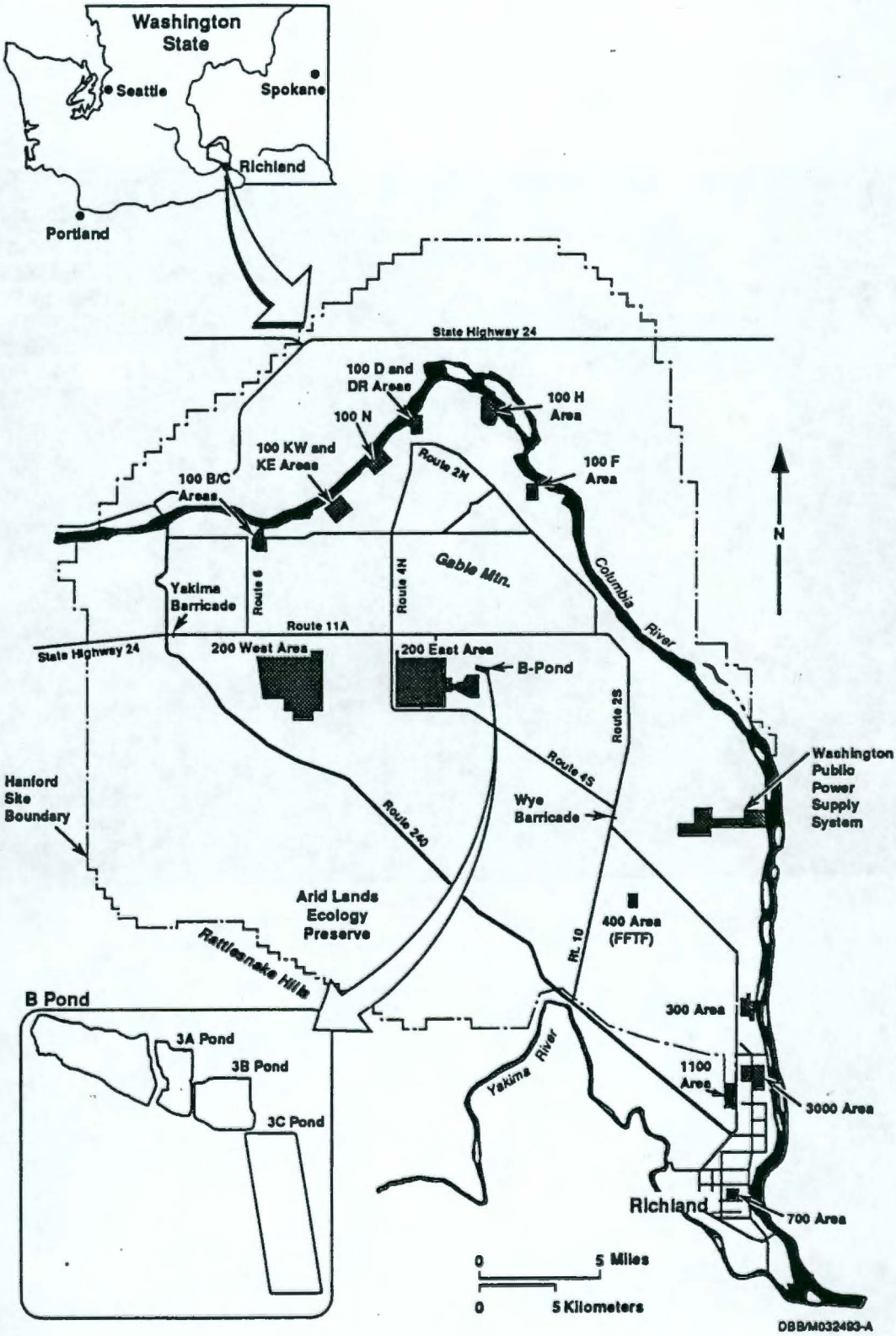

1 Figure D-1. Map of the Hanford Site.

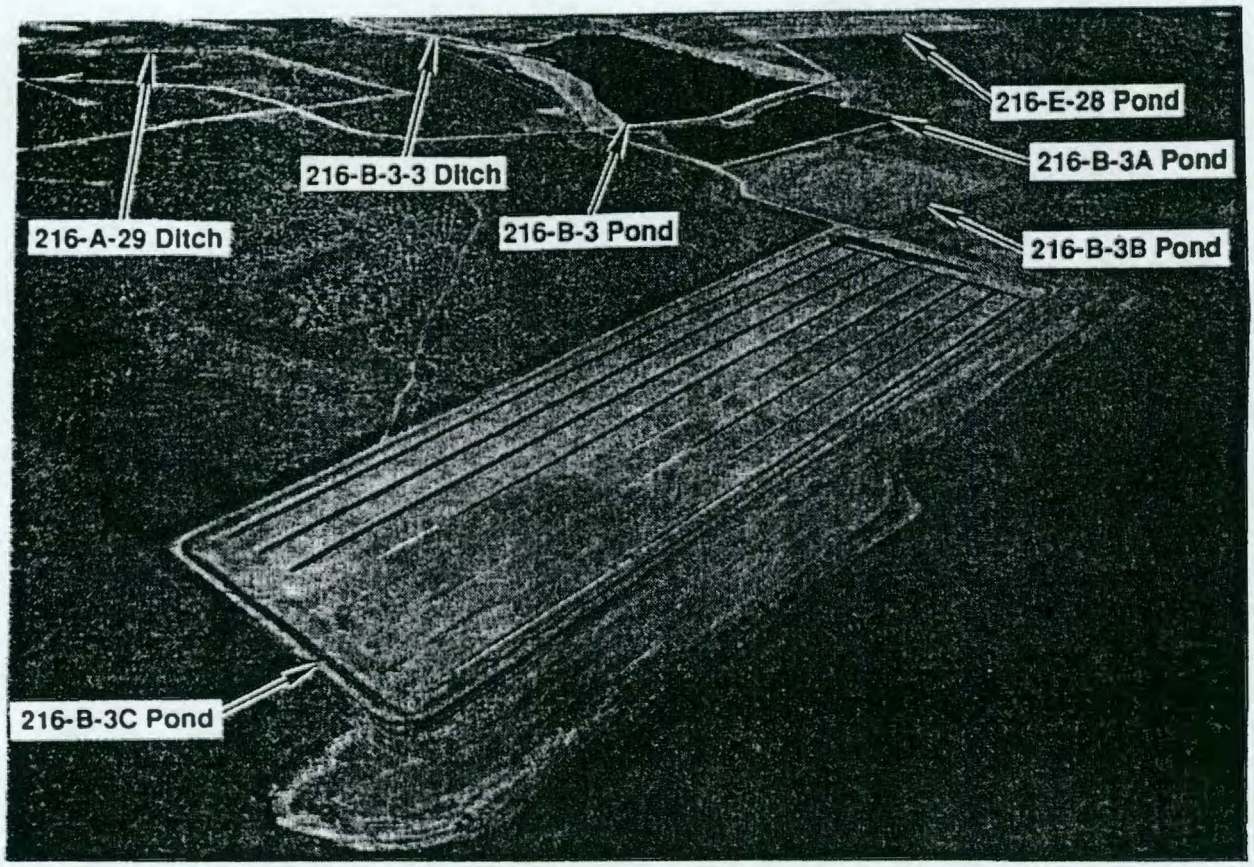

Figure D-2. Aerial Photograph of the 216-B-3 Pond System and Surrounding Areas (1988).

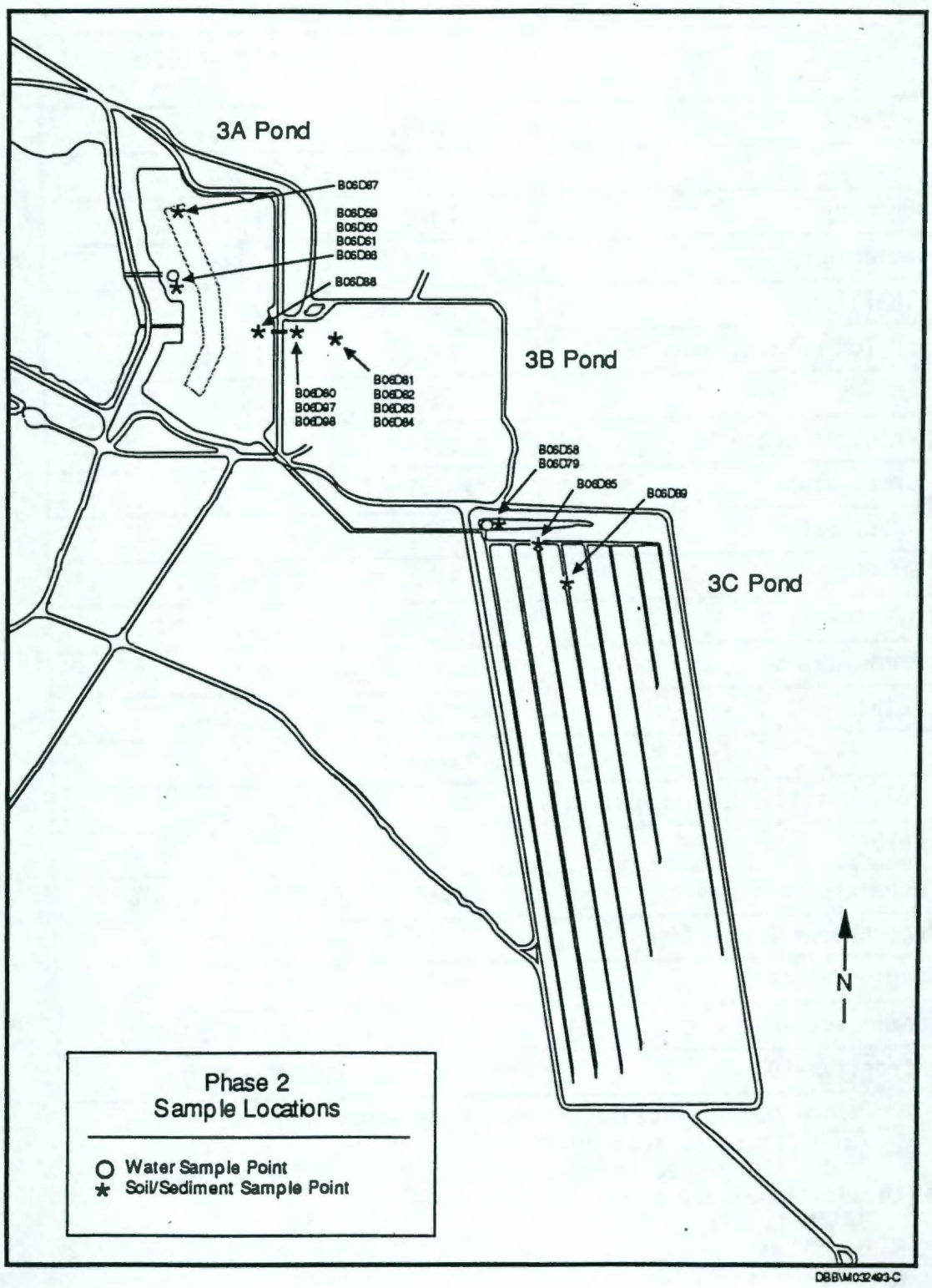

Figure D-3. Phase 2 Sample Locations.

Table D-1. Phase 1 Analytical Methods.

Constituent Individual Samples	Method[a]	Contract Detection Limit
Arsenic	7060	0.5 µg/g
Lead	7421	0.5 µg/g
Mercury	7470	0.2 µg/g
Selenium	7740	0.5 µg/g
Thallium	7841	1.0 µg/g
EP-Tox metals, enhanced[b]	1310	.02-1.5 µg/L
Anions	300	1.0 µg/g
Volatile organics	8240	5-500 ng/g
Gross alpha	A-703[c]	N/A
Gross beta	A-703[c]	N/A
Sulfide	9030	10.0 µg/g
Cyanide	9010	.5 µg/g
Ammonium	D 1426-C/D[c]	.5 µg/g
Metals	3050/6010	.5-300 µg/g
Composite Samples		
Polychlorinated Biphenyl	8080	1.0 µg/g
Herbicides	8150	1.0 µg/g
Enhanced Pesticides	8080	0.01 - 1.0 µg/g
Phosphorus Pesticides	8140	0.2 - 1.0 µg/g
Semivolatiles	8270	1.0 µg/g
gamma scan		0.02 - 0.35 pCi/g
strontium-90		0.005 pCi/g

N/A = not applicable (standard reference not available).
[a]EPA (1986), unless noted.
[b]Laboratory-specific method consisting of EP-Tox analysis with additional analyses.
[c]ASTM (1987).

Table D-2. Phase 3 Analytical Methods.

Constituent	Method[a]
Arsenic	7060
Lead	7421
Mercury	7470
Selenium	7740
Thallium	7841
Ammonia	350.1
Cyanide	9010
Sulfide	376.1
Anions[b]	300
Metals[c]	6010
Gross alpha	EPA-900[d]
Gross gamma	EPA-900[d]
Pesticides/polychlorinated biphenyls	8080
Herbicides	8150
Organophosphorous pesticides	8140
Dioxins/furans	8280
Volatile organic compounds	ACD 2440[e]
Base/neutral/acid compounds	ACD 2470[f]
Strontium-90	906
Gross beta	EPA-900[d]

[a]EPA (1986), unless noted.
[b]Excluding bromide, nitrate, and phosphate.
[c]Excluding tin, titanium, and zirconium.
[d]Analyses were conducted using EPA-900 series procedures.
[e]Laboratory-specific, volatile organics analysis method based on Contract Laboratory Program protocol.
[f]Laboratory-specific, base/neutral/acid analysis method based on Contract Laboratory Program protocol.

Table D-3. Phase 2 Sample Inventory and Analyses. (sheet 1 of 2)

HEIS Number	Location	Matrix	Field QA/QC designation	Laboratory	Analysis requested
B06D58	Influent to 3C Pond	Water	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D59	Influent to 3A Pond	Water	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D60	Influent to 3A Pond	Water	Duplicate of B06D59	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D61	Influent to 3A Pond	Water	Split of B06D59	TMA	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D62	N/A	Water	Equipment blank	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D63	N/A	Water	Trip blank	Weston	VOA
B06D64	N/A	Water	Trip blank	Weston	VOA
B06D76	N/A	Water	Trip blank	Weston	VOA
B06D77	N/A	Water	Trip blank	TMA	VOA
B06D78	N/A	Water	Trip blank	Weston	VOA
B06D79	Influent to 3C Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D80	Influent to 3B Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D81	3B Pond, surface	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D82	3B Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D83	3B Pond	Soil	Duplicate of B06D82	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D84	3B Pond	Soil	Split of B06D82	TMA	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D85	3C Pond, dry sediment	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN

1 Table D-3. Phase 2 Sample Inventory and Analyses. (sheet 2 of 2)

HEIS Number	Location	Matrix	Field QA/QC designation	Laboratory	Analysis requested
B06D86	Influent to 3A Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D87	Deep point of 3A Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN, rad
B06D88	3A Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D89	Deep point of 3C Pond	Soil	Routine	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D91	N/A	Soil	Equipment blank	Weston	VOA, Semi-VOA, PCB/Pest, ICP, GFAA, Hg, CN
B06D92	N/A	Soil	Trip blank	Weston	VOA
B06D94	N/A	Soil	Trip blank	TMA	VOA
B06D95	N/A	Soil	Trip blank	Weston	VOA
B06D96	N/A	Soil	Trip blank	Weston	VOA
B06D97	Influent to 3B Pond	Soil	Duplicate of B06D80	Weston	rad
B06D98	Influent to 3B Pond	Soil	Split of B06D80	TMA	rad

GFAA = graphite furnace atomic absorption.
ICP = inductively coupled plasma.
N/A = not applicable.
PCB/Pest = polychlorinated biphenyls/pesticides.
VOA = volatile organics analysis.

QA/QC blanks shipped as follows:

B06D63 shipped with B06D58
B06D64 shipped with B06D62
B06D76 shipped with B06D59
B06D77 shipped with B06D61, B06D84, B06D94, B06D98
B06D78 shipped with B06D60
B06D92 shipped with B06D79, B06D85, B06D89
B06D94 shipped with B06D61, B06D77, B06D84, B06D98
B06D95 shipped with B06D86, B06D87, B06D88
B06D96 shipped with B06D80, B06D81, B06D91

Table D-4. Phase 2 Analytical Methods.

Constituent	Method[a]
Volatile organics	8240
Pesticides/polychlorinated biphenyls	8080
Inductively coupled plasma metals	6010
Strontium-90	b
Gross alpha	b
Gross gamma	b
Semivolatile organics	8270
Graphite furnace atomic absorption metals	7000[c]
Mercury	7471
Cyanide	9010
Gross beta	b

[a]EPA (1986).

[b]Laboratory-specific. (No standard methods have been established.)

[c]Analyses were conducted using EPA-7000 series procedures.

Table D-5. Results of Phase 2 Organics Analyses: Target Compound List. (sheet 1 of 2)

HEIS Number	Organic constituents		Pesticides and PCBs
	Volatile organics	Semivolatile organics	
B06D58	ND	5 Methoxyethoxyethanol[J]	ND
B06D59	ND	3 Methoxyethoxyethanol[J]	ND
B06D60	ND	3 Methylcyclopentanol[J]	ND
B06D61	ND	ND	ND
B06D62	ND	4 Methoxyethoxyethanol[J]	ND
B06D63	ND	NR	NR
B06D64	ND	NR	NR
B06D76	ND	NR	NR
B06D77	ND	NR	NR
B06D78	ND	NR	NR
B06D79	ND	ND	ND
B06D80	ND	ND	ND
B06D81	370 Toluene[D]	ND	ND
B06D82	2 Toluene[J]	ND	ND
B06D83	2 Toluene[J]	ND	ND
B06D84	ND	ND	ND
B06D85*	150 Methylene chloride[J], 86 Acetone[J], 120 Toluene[J]	ND	ND
B06D85RE*	140 Methylene chloride[J], 77 Acetone[J], 160 Toluene[J]	--	--
B06D86	8 Toluene[J]	ND	ND
B06D87	ND	ND	ND
B06D88	ND	ND	ND
B06D89	ND	ND	ND
B06D91	ND	ND	ND
B06D92	ND	NR	NR
B06D94	1 Chloroform[J], 1 111-TCA[J], 5 Toluene, 3 Chlorobenzene[J], 2 Xylene[J], 2 Trichloroethane[J]	NR	NR
B06D95	ND	NR	NR
B06D96	ND	NR	NR

Table D-5. Results of Phase 2 Organics Analyses: Target Compound List. (sheet 2 of 2)

HEIS Number	Organic constituents		Pesticides and PCBs
	Volatile organics	Semivolatile organics	
B06D97	NR	NR	NR
B06D98	NR	NR	NR

Note: Concentrations in µg/L (water matrix) and µg/kg (soil matrix); TICs (Tentatively Identified Compounds) are not listed.

[A]For VOA analysis: sample B06D85 internal standards were outside of limits. Sample was reanalyzed. Results from the reanalysis, B06D85RE, were qualified as estimated due to poor surrogate recoveries.

ND = non-detect.

NR = not requested.

[J]Estimated concentration.

[D]Sample dilution was required, surrogate recoveries unavailable.

Table D-6. Results of Phase 2 Inorganics Analyses. (sheet 1 of 2)

HEIS Number	Constituent											
	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead
B06D58	102	60^{U}	2^{U}	29.8	1^{U}	7^{U}	17700	9^{U}	9^{U}	8^{U}	144	2.3^{U}
B06D59	49^{U}	60^{U}	2^{U}	29.2	1^{U}	7^{U}	19100	9^{U}	9^{U}	8^{U}	154	2^{U}
B06D60	49^{U}	60^{U}	2^{U}	30.7	1^{U}	7^{U}	20100	9^{U}	9^{U}	8^{U}	15^{U}	2.6^{U}
B06D61	165.2^{UJ}	18^{U}	1	10.7^{J}	1^{U}	10^{U}	12120	7^{U}	7^{U}	4^{U}	291.5^{UJ}	1^{U}
B06D62	49^{U}	60^{U}	2^{U}	14^{U}	1^{U}	7^{U}	334	9^{U}	9^{U}	8^{U}	15^{U}	2^{U}
B06D79	8540^{J}	68.9^{U}	4.7	106	1.15^{U}	8.04^{U}	5460	19.4	15.7	59.6	19200	29.6^{J}
B06D80	3910^{J}	12.3^{U}	3.7	76.8	0.37	1.43^{U}	8800	3.1	9.7	10.3	18400	4.4^{J}
B06D81	5520^{J}	12.2^{U}	7	103	0.47	1.42^{U}	11900	7.1	11.4	10.9	19300	6.2^{J}
B06D82	3310^{J}	12.2^{U}	4.7	64.4	0.26	1.42^{U}	8730	5	7.2	8.3	12900	5^{J}
B06D83	4480^{J}	12.1^{U}	3.9	93.9	0.3	1.41^{U}	11200	5.2	9.1	11.9	17900	4.5^{J}
B06D84	5443	1.8^{R}	3.3^{J}	83.6	0.1	1^{UJ}	12710	8.2	6.8	15	21360	4.4^{J}
B06D85	9480^{J}	18.9	3.4	111	0.62	3.3	6720	19.5	12.6	67.3	18600	32.3^{J}
B06D86	2310^{J}	14.4^{U}	1.8	67.2	0.24^{U}	3.4	2620	2.4^{U}	4.9	7.4	9890	5.2^{J}
B06D87	2600^{J}	15.7^{U}	1.2	54.2	0.26^{U}	4.9	2670	4.4	5.3	11.3	11300	4.6^{J}
B06D88	3370^{J}	15.1^{U}	3.9	62.7	0.25^{U}	1.76^{U}	5460	3	7.5	8.8	12300	6.6^{J}
B06D89	5660^{J}	25.6^{U}	3.2^{B}	74.1	0.43^{U}	7.9	4160	10.8	10.1	29.4	15500	9.6^{J}
B06D91	49.6^{J}	12^{U}	0.40^{U}	2.8^{U}	0.2^{U}	1.4^{U}	67.6	1.6^{U}	1.8^{U}	1.6^{U}	231	0.4^{UJ}
Phase 1 Result Summary												
3A Pond	4789-10339	NA	0.84-4.69	NA	NA	7.0-8.0	5200-16510	3.9-9.7	6.4-9.4	12.8-20.1	19530-28566	2.97-7.29
3B Pond	5062-6265	NA	1.64-3.43	NA	NA	5.8-7.0	7366-9331	4.7-6.5	8.2-9.4	13.7-16.1	23855-29081	2.07-3.84
3C Pond	3743-6850	NA	0.83-2.20	NA	NA	2.0-6.3	4140-5818	3.3-7.2	3.0-8.5	11.1-18.5	7291-24957	3.04-6.09
Contingency pond	5118-7650	NA	2.14-4.75	NA	NA	5.3-7.3	6830-9923	4.1-6.3	6.8-9.4	14.1-18.1	21232-29671	3.80-5.04
Performance Standards												
Background	7695-9204	NA	1.58-3.22	NA	NA	6.4-7.2	3138-3872	6.8-9.7	6.9-8.3	8.7-11.8	22231-25620	3.96-9.96
MTCA	NA	24	32	5600	0.2	80	NA	400	NA	3200	NA	250

Table D-6. Results of Phase 2 Inorganics Analyses. (sheet 2 of 2)

HEIS Number	Constituent											
	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc	Cyanide
B06D58	4120	4^{U}	0.1^{U}	20^{U}	1340^{U}	2^{U}	10^{U}	2350	2^{UJ}	8^{U}	36.3^{U}	20^{U}
B06D59	4380	4^{U}	0.1^{U}	20^{U}	1340^{U}	2^{U}	10^{U}	2540	2^{UJ}	8^{U}	15.6^{U}	10^{U}
B06D60	4570	4^{U}	0.1^{U}	20^{U}	1340^{U}	2^{U}	10^{U}	2520	2^{UJ}	8^{U}	20.9^{U}	10^{U}
B06D61	3100	2^{U}	0.8^{U}	12^{U}	1260^{U}	2^{U}	7.4^{U}	2086	2^{UJ}	4^{U}	4^{UJ}	0.02^{UJ}
B06D62	68^{U}	4^{U}	0.1^{U}	20^{U}	1340^{U}	2^{U}	10^{U}	562	2^{UJ}	8^{U}	14.6^{U}	10^{U}
B06D79	6270	148^{J}	0.31	23^{U}	1810	2.3^{U}	11.5^{UJ}	173^{U}	2.3^{U}	31.1	450^{J}	5.74^{U}
B06D80	4350	319^{J}	0.05^{U}	4.5	1050	0.41^{U}	2.05^{UJ}	99.9	0.41^{U}	32.1	35.5^{J}	1.02^{U}
B06D81	5600	369^{J}	0.05^{U}	9	1750	0.4^{U}	2.02^{UJ}	149	0.4^{U}	33.6^{J}	41.9^{J}	1.01^{U}
B06D82	3380	249^{J}	0.05^{U}	4.6	1110	0.41^{U}	2.03^{UJ}	111	0.41^{U}	20.7	27.6^{J}	1.02^{U}
B06D83	4600	333^{J}	0.05^{U}	4.04^{U}	1230	0.4^{U}	2.02^{UJ}	171	0.4^{U}	27.7	35.9^{J}	1.01^{U}
B06D84	3959	324.5	0.02	19.1	1000	0.2^{U}	0.3^{U}	724^{J}	0.2^{UJ}	47	40.9	0.8^{UJ}
B06D85	5680	142^{J}	0.61	16.3	1820	4.97^{U}	2.49^{UJ}	228	1.2^{B}	32.1	515^{J}	1.24^{U}
B06D86	1940	144^{J}	0.6^{U}	4.81^{U}	367	0.48^{U}	2.4^{UJ}	82.6	0.48^{U}	15.8	28.7^{J}	1.2^{U}
B06D87	2180	173^{J}	0.08^{B}	7.3	350^{U}	0.52^{U}	2.62^{UJ}	80.4	0.52^{U}	17.9	49^{J}	1.31^{U}
B06D88	3070	157^{J}	0.06^{U}	7.6	668	0.5^{U}	2.51^{UJ}	91.9	0.5^{U}	20.9	30.3^{J}	1.26^{U}
B06D89	4110	125^{J}	0.27	8.6	1060	0.85^{U}	4.27^{UJ}	135	0.85^{U}	30.5	293^{J}	2.13^{U}
B06D91	30.8	1.5^{J}	0.05^{U}	4^{U}	268^{U}	0.4^{U}	2^{UJ}	30.2^{U}	0.4^{U}	1.6^{U}	2.2^{J}	1^{U}
Phase 1 Result Summary												
3A Pond	3760-6546	212.7-856.4	0.2^{U}	5.2-11.4	498.9-1637.1	NA	NA	200.0-464.6	NA	40.9-57.5	41.7-55.0	NA
3B Pond	4245-5206	290.6-342.5	NA	6.6-8.3	771.9-1071.7	NA	NA	198.5-249.2	NA	61.8-71.1	38.5-41.4	NA
3C Pond	2130-4787	101.4-305.8	NA	4.9-8.2	426.4-1038.6	NA	NA	129.5-282.5	NA	12.8-53.2	33.6-77.7	NA
Contingency pond	4284-6308	243.7-397.7	NA	5.4-13.9	899.9-1350.0	NA	NA	331.6-405.5	NA	53.3-73.5	33.1-44.0	NA
Performance Standards												
Background	4142-5193	306.7-345.8	ND	7.8-10.1	1404-1561	NA	NA	185.2-226.2	NA	48.6-56.3	37.5-41.3	NA
MTCA	NA	11200	1.0	1600	4000	400	400	NA	72	560	16000	1600

NOTES:
1. Phase 1 results added for comparison.
2. Concentrations in mg/L (water matrix) and mg/kg (soil matrix).

U Material was analyzed for but not detected. Associated value is the detection/quantitation limit. [Also applied to data reported as non-detect (ND).]
J Material was analyzed for but not detected. Associated detection/quantitation limit is an estimated value.
R Associated value is estimated.
Data are not useable.
NA = not available.

Table D-7. Sample Results Exceeding Hanford Site Background Threshold Values.

HEIS Number	Analyte of concern	Concentration[a] (mg/kg)	Background threshold value (mg/kg)
B06D79	Copper	59.6	30
	Lead	29.6	14.9
	Zinc	450	79
B06D85	Antimony	18.9	15.7/52.2[b]
	Cadmium	3.3	0.24/0.79[b]
	Copper	67.3	30
	Lead	32.3	14.9
	Zinc	515	79
B06D86	Cadmium	3.4	0.24/0.79[b]
B06D87	Cadmium	4.9	0.24/0.79[b]
B06D88	Cadmium	1.76	0.24/0.79[b]
B06D89	Zinc	293	79

[a]Data qualifiers listed in Table D-6.

[b]Threshold values not calculated; numbers represent statistically calculated "Limit of Detection"/"Limit of Quantification."

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APPENDIX A

METHOD-SPECIFIC ANALYTE LIST AND ASSOCIATED TYPICAL DETECTION LIMITS

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APPENDIX A

METHOD-SPECIFIC ANALYTE LIST AND ASSOCIATED TYPICAL DETECTION LIMITS

The following table lists detection/quantitation limits typically reported by each laboratory. Detection/quantitation limits listed for organic analytes are sample quantitation limits. Detection/quantitation limits listed for inorganic analytes are instrument detection limits. More specific information such as the effects of data qualifiers on detection/quantitation limits of a particular sample may be found in the source documentation along with the specific justification of such qualifiers.

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
8240 Volatile Organics (water & soil matrices)	Chloromethane	10	10	µg/L or µg/kg
	Bromomethane	10	10	"
	Vinyl Chloride	10	10	"
	Chloroethane	10	10	"
	Methylene Chloride	10	5	"
	Acetone	10	100	"
	Carbon Disulfide	10	5	"
	1,1-Dichloroethene	10	5	"
	1,1-Dichloroethane	10	5	"
	1,2-Dichloroethene (total)	10	5	"
	Chloroform	10	5	"
	1,2-Dichloroethane	10	5	"
	2-Butanone	10	100	"
	1,1,1-Trichloroethane	10	5	"
	Carbon Tetrachloride	10	5	"
	Vinyl Acetate	NA[a]	50	"
	Bromodichloromethane	10	5	"
	1,2-Dichloropropane	10	5	"
	cis-1,3-Dichloropropene	10	5	"
	Trichloroethene	10	5	"
	Dibromochloromethane	10	5	"
	1,1,2-Trichloroethane	10	5	"
	Benzene	10	5	"
	trans-1,3,-Dichloropropene	10	5	"
	Bromoform	10	5	"
	2-Chloroethyl Vinyl Ether	NA	10	"
	4-Methyl-2-pentanone	10	50	"
	2-Hexanone	10	50	"
	Tetrachloroethene	10	5	"
	1,1,2,2-Tetrachloroethane	10	5	"
	Toluene	10	5	"
	Chlorobenzene	10	5	"
	Ethylbenzene	10	5	"
	Styrene	10	5	"
	Xylene (total)	10	5	"
8270 Semivolatile Organics (water matrix only)	Phenol	10	10	µg/L
	bis(2-Chloroether) Ether	10	10	"
	2-Chlorophenol	10	10	"
	1,3-Dichlorobenzene	10	10	"
	1,4-Dichlorobenzene	10	10	"

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
	Benzyl Alcohol	NA	20	µg/L
	1,2-Dichlorobenzene	10	10	"
	2-Methylphenol	10	10	"
	bis(2-Chloroisopropyl) Ether	10	10	"
	4-Methylphenol	10	10	"
	N-Nitroso-Di-n-Propylamine	10	10	"
	Hexachloroethane	10	10	"
	Nitrobenzene	10	10	"
	Isophorone	10	10	"
	2-Nitrophenol	10	10	"
	2,4-Dimethylphenol	10	10	"
	Benzoic Acid	NA	50	"
	bis(2-Chloroethoxy)methane	10	10	"
	Napthalene	10	10	"
	4-Chloroaniline	10	20	"
	Hexachlorobutadiene	10	10	"
	4-Chloro-3-methylphenol	10	10	"
	2-Methylnapthalene	10	10	"
	Hexachlorocyclopentadiene	10	10	"
	2,4,6-Trichlorophenol	10	10	"
	2,4,5-Trichlorophenol	26	50	"
	2-Chloronaphthalene	10	10	"
	2-Nitroaniline	26	50	"
	Dimethylphthalate	10	10	"
	Acenaphthylene	10	10	"
	1,2,4-Trichlorobenzene	10	10	"
	3-Nitroaniline	26	50	"
	Acenaphthene	10	10	"
	2,4-Dinitrophenol	26	50	"
	4-Nitrophenol	26	50	"
	Dibenzofuran	10	10	"
	2,4-Dinitrotoluene	10	10	"
	2,6-Dinitrotoluene	10	10	"
	Diethylphthalate	10	10	"
	4-Chlorophenylphenylether	10	10	"
	Fluorene	10	10	"
	4-Nitroanaline	26	50	"
	4,6-Dinitro-2-methylphenol	26	50	"
	N-Nitrosodiphenylamine[b]	10	10	"
	4-Bromophenyl-phenylether	10	10	"
	Hexachlorobenzene	10	10	"
	Pentachlorophenol	26	50	"
	Phenanthrene	10	10	"
	Anthracene	10	10	"
	Carbazole	10	NA	"
	Di-N-Butylphthalate	10	10	"
	Fluoranthene	10	10	"
	Pyrene	10	10	"
	Butylbenzylphthalate	10	10	"
	3,3'-Dichlorobenzidine	10	20	"
	Benzo(a)anthracene	10	10	"
	bis(2-Ethylhexyl)phthalate	10	10	"
	Chrysene	10	10	"
	Di-n-octyl Phthalate	10	10	"
	Benzo(b)fluoranthene	10	10	"
	Benzo(k)fluoranthene	10	10	"
	Benzo(a)pyrene	10	10	"
	Indeno(1,2,3-cd) Pyrene	10	10	"
	Dibenz(a,h) Anthracene	10	10	"
	Benzo(g,h,i)perylene	10	10	"

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
8270	Phenol	330-1900[c]	330	µg/kg
Semivolatile	bis(2-Chloroether) Ether	330-1900	330	"
Organics	2-Chlorophenol	330-1900	330	"
(soil matrix only)	1,3-Dichlorobenzene	330-1900	330	"
	1,4-Dichlorobenzene	NA	330	"
	Benzyl Alcohol	330-1900	650	"
	1,2-Dichlorobenzene	330-1900	330	"
	2-Methylphenol	330-1900	330	"
	bis(2-Chloroisopropyl) Ether	330-1900	330	"
	4-Methylphenol	330-1900	330	"
	N-Nitroso-Di-n-Propylamine	330-1900	330	"
	Hexachloroethane	330-1900	330	"
	Nitrobenzene	330-1900	330	"
	Isophorene	330-1900	330	"
	2-Nitrophenol	330-1900	330	"
	2,4-Dimethylphenol	330-1900	330	"
	Benzoic Acid	NA	1600	"
	bis(2-Chloroethoxy)methane	330-1900	330	"
	Napthalene	330-1900	330	"
	4-Chloroaniline	330-1900	650	"
	Hexachlorobutadiene	330-1900	330	"
	4-Chloro-3-methylphenol	330-1900	650	"
	2-Methylnapthalene	330-1900	330	"
	Hexachlorocyclopentadiene	330-1900	330	"
	2,4,6-Trichlorophenol	330-1900	330	"
	2,4,5-Trichlorophenol	830-4600	1600	"
	2-Chloronaphthalene	330-1900	330	"
	2-Nitroaniline	830-4600	1600	"
	Dimethylphthalate	330-1900	330	"
	Acenaphthylene	330-1900	330	"
	1,2,4-Trichlorobenzene	330-1900	330	"
	3-Nitroaniline	830-4600	1600	"
	Acenaphthene	330-1900	330	"
	2,4-Dinitrophenol	830-4600	1600	"
	4-Nitrophenol	830-4600	1600	"
	Dibenzofuran	330-1900	330	"
	2,4-Dinitrotoluene	330-1900	330	"
	2,6-Dinitrotoluene	330-1900	330	"
	Diethylphthalate	330-1900	330	"
	4-Chlorophenylphenylether	330-1900	330	"
	Fluorene	330-1900	330	"
	4-Nitroanaline	830-4600	1600	"
	4,6-Dinitro-2-methylphenol	830-4600	1600	"
	N-Nitrosodiphenylamine[b]	330-1900	330	"
	4-Bromophenyl-phenylether	330-1900	330	"
	Hexachlorobenzene	330-1900	330	"
	Pentachlorophenol	830-4600	1600	"
	Phenanthrene	330-1900	330	"
	Anthracene	330-1900	330	"
	Carbozole	330-1900	NA	"
	Di-N-Butylphthalate	330-1900	330	"
	Fluoranthene	330-1900	330	"
	Pyrene	330-1900	330	"
	Butylbenzylphthalate	330-1900	330	"
	3,3'-Dichlorobenzidine	330-1900	1600	"
	Benzo(a)anthracene	330-1900	330	"
	bis(2-Ethylhexyl)phthalate	330-1900	330	"
	Chrysene	330-1900	330	"

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
	Di-n-octyl Phthalate	330-1900	330	µg/kg
	Benzo(b)fluoranthene	330-1900	330	"
	Benzo(k)fluoranthene	330-1900	330	"
	Benzo(a)pyrene	330-1900	330	"
	Indeno(1,2,3-cd) Pyrene	330-1900	330	"
	Dibenz(a,h) Anthracene	330-1900	330	"
	Benzo(g,h,i)perylene	330-1900	330	"
8080 PCBs and Pesticides (water matrix only)	Alpha-BHC	0.05-0.10	0.05	µg/L
	Beta-BHC	0.05-0.10	0.05	"
	Delta-BHC	0.05-0.10	0.05	"
	Gamma-BHC (Lindane)	0.05-0.10	0.05	"
	Heptachlor	0.05-0.10	0.05	"
	Aldrin	0.05-0.10	0.05	"
	Heptachlor epoxide	0.05-0.10	0.05	"
	Endosulfan I	NA	0.05	"
	Dieldrin	0.10-0.20	0.10	"
	4,4'-DDE	0.10-0.20	0.10	"
	Endrin	0.10-0.20	0.10	"
	Endosulfan II	0.10-0.20	0.10	"
	4,4'-DDD	0.10-0.20	0.10	"
	Endosulfan Sulfate	NA	0.10	"
	4,4'-DDT	NA	0.10	"
	Methoxychlor	0.50-1.0	0.50	"
	Endrine Ketone	0.10-0.20	0.10	"
	Endrin Aldehyde	0.10-0.20	0.10	"
	Chlordane	NA	1.0	"
	alpha-Chlordane	0.05-0.10	NA	"
	gamma-Chlordane	0.05-0.10	NA	"
	Toxaphene	5.0-10.0	5.0	"
	Aroclor 1016	1.0-2.0	1.0	"
	Aroclor 1221	2.0-4.0	1.0	"
	Aroclor 1232	1.0-2.0	1.0	"
	Aroclor 1242	1.0-2.0	1.0	"
	Aroclor 1248	1.0-2.0	1.0	"
	Aroclor 1254	1.0-2.0	1.0	"
	Aroclor 1260	1.0-2.0	1.0	"
8080 PCBs and Pesticides (soil matrix only)	Alpha-BHC	1.7-9.6	1.7	µg/L
	Beta-BHC	1.7-9.6	1.7	"
	Delta-BHC	1.7-9.6	1.7	"
	Gamma-BHC (Lindane)	1.7-9.6	1.7	"
	Heptachlor	1.7-9.6	1.7	"
	Aldrin	1.7-9.6	1.7	"
	Heptachlor epoxide	1.7-9.6	1.7	"
	Endosulfan I	NA	1.7	"
	Dieldrin	3.4-19	3.3	"
	4,4'-DDE	3.4-19	3.3	"
	Endrin	3.4-19	3.3	"
	Endosulfan II	3.4-19	3.3	"
	4,4'-DDD	3.4-19	3.3	"
	Endosulfan Sulfate	NA	3.3	"
	4,4'-DDT	NA	3.3	"
	Methoxychlor	17-96	17.0	"
	Endrine Ketone	3.4-19	3.3	"
	Endrin Aldehyde	3.4-19	3.3	"
	Chlordane	NA	33.0	"
	alpha-Chlordane	1.7-9.6	NA	"
	gamma-Chlordane	1.7-9.6	NA	"

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
	Toxaphene	170-960	170	µg/L
	Aroclor 1016	34-190	33.0	"
	Aroclor 1221	68-380	33.0	"
	Aroclor 1232	34-190	33.0	"
	Aroclor 1242	34-190	33.0	"
	Aroclor 1248	34-190	33.0	"
	Aroclor 1254	34-190	33.0	"
	Aroclor 1260	34-190	33.0	"
Inorganics per CLP SOW 3/90 (Weston) and 6010 (TMA) (water matrix only)	Aluminum	49.0	5	"
	Antimony	60.0	18	"
	Arsenic	2.0	1	"
	Barium	14.0	1	"
	Beryllium	1.0	1	"
	Boron	NA	52	"
	Cadmium	7.0	10	"
	Calcium	57.0	6	"
	Chromium	9.0	7	"
	Cobalt	9.0	7	"
	Copper	10.1	4	"
	Iron	15.0	4	"
	Lead	2.4	1	"
	Magnesium	68.0	53	"
	Manganese	4.0	2	"
	Mercury	0.10	0.2	"
	Molybdenum	NA	4	"
	Potassium	1340.0	1260	"
	Selenium	2.0	2	"
	Silver	10.0	3	"
	Sodium	151.0	53	"
	Thallium	2.0	2	"
	Vanadium	16.4	4	"
	Zinc	10.0	4	"
	Cyanide	10.0	2	"
Inorganics per CLP SOW 3/90 (Weston) and 6010 (TMA) (soil matrix only)	Aluminum	49.0	0.5	mg/kg
	Antimony	60.0	1.8	"
	Arsenic	2.0	0.1	"
	Barium	14.0	0.1	"
	Beryllium	1.0	0.1	"
	Boron	NA	5.2	"
	Cadmium	7.0	1	"
	Calcium	57.0	0.6	"
	Chromium	9.0	0.7	"
	Cobalt	9.0	0.7	"
	Copper	8.0	0.4	"
	Iron	15.0	0.4	"
	Lead	2.0	0.1	"
	Magnesium	68.0	5.3	"
	Manganese	4.0	0.2	"
	Mercury	0.10	0.005	"
	Molybdenum	NA	0.4	"
	Nickel	20.0	1.2	"
	Potassium	1340.0	126	"
	Selenium	2.0	0.2	"
	Silver	10.0	0.3	"
	Sodium	151.0	5.3	"
	Thallium	2.0	0.2	"

Analytical Method	Analyte	Weston Detection/ Quantitation Limits	TMA Detection/ Quantitation Limits	Units
	Vandium	8.0	0.4	mg/kg
	Zinc	4.0	0.4	"
[9010 (TMA)]	Cyanide	20.0	0.08	"

[a]Not included in analysis.
[b]Cannot be separated from diphenylamine.
[c]Detection limits typically fell within this range.

APPENDIX B

MAXIMA AND 95/95 REFERENCE THRESHOLD VALUES FOR HANFORD SITE SOIL BACKGROUND

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APPENDIX B

MAXIMA AND 95/95 REFERENCE THRESHOLD VALUES FOR HANFORD SITE SOIL BACKGROUND[1]

The 95/95 thresholds values represent the upper 95% confidence interval of the 95th percentile of the distribution. Information on the statistics is provided in the source document.

Analyte	LOD	LOQ	95/95 Threshold (mg/kg)	Maximum concentration (mg/kg)	Sample with maximum concentration
Aluminum	21.8	66.1	15100	28800	TOPSOIL, PLAYA, E-7
Antimony	15.7	52.2	NC	31	VOLCANIC ASH*
Arsenic	N/A	N/A	9.0	27.7	TOPSOIL,JUNIPER, E-3
Barium	0.87	2.7	175	480	VOLCANIC ASH*
Beryllium	N/A	N/A	1.8	10	VOLCANIC ASH*
Cadmium	0.24	0.79	NC	11	VOLCANIC ASH*
Calcium	175	470	24600	105000	TOPSOIL, GREASEWOOD, E-2
Chromium	1.1	3.0	28	320	RINGOLD FM*
Cobalt	0.88	2.9	19	110	VOLCANIC ASH*
Copper	2.1	6.2	30	61	VOLCANIC ASH*
Iron	75.7	236	38200	68100	RINGOLD FM
Lead	N/A	N/A	14.9	74.1	TOPSOIL,JUNIPER, E-3
Magnesium	18.4	57.9	9160	32300	TOPSOIL, GREASEWOOD, E-2
Manganese	0.63	1.8	583	1110	TOPSOIL, PLAYA, E-7
Mercury	N/A	N/A	1.3	3.8	RANDOM SAMPLES, #15
Nickel	2.4	7.7	25	200	RINGOLD FM*
Potassium	135	451	3090	7900	TOPSOIL, PLAYA, E-7
Selenium	N/A	N/A	NC	6	RANDOM SAMPLES, #15
Silver	2.1	4.5	2.1	14.6	RANDOM SAMPLES, #6
Sodium	50.6	140	1390	6060	RANDOM SAMPLES, #12
Thallium	N/A	N/A	NC	3.7	LAB DETECTION LIMIT
Vanadium	1.8	5.9	107	140	VOLCANIC ASH*
Zinc	6.4	15.6	79	366	TOPSOIL, JUNIPER, E-3
Molybdenum	1.4	4.8	NC	6	RINGOLD FM
Lithium	N/A	N/A	37	38.2	RANDOM SAMPLES, #14*
Titanium	N/A	N/A	3307	3180	RANDOM SAMPLES, #6
Zirconium	N/A	N/A	53	84.8	RANDOM SAMPLES,#10
Ammonia	N/A	N/A	27.4	26.4	RANDOM SAMPLES, #14
Alkalinity	N/A	N/A	20100	150000	TOPSOIL, GREASEWOOD, E-2
Silicon	N/A	N/A	239	1202.9	TOPSOIL, PLAYA, E-7
Fluoride	N/A	N/A	13	73.3	RANDOM SAMPLES, #10
Chloride	N/A	N/A	783	1480	RANDOM SAMPLES, #11

Analyte	LOD	LOQ	95/95 Threshold (mg/kg)	Maximum concentration (mg/kg)	Sample with maximum concentration
Nitrite	N/A	N/A	NC	36.5	TOPSOIL, GREASEWOOD, E-2
Nitrate	N/A	N/A	208	906	HANFORD FM JUDGEMENT,
O-Phosphate	N/A	N/A	12.7	225	RANDOM SAMPLES, #10
Sulfate	N/A	N/A	931	12600	TOPSOIL, GREASEWOOD, E-2

[1]Adapted from DOE-RL, 1993, Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes, DOE/RL-92-24, Rev. 1.

N/A = Not available.

NC = Not calculated.

* = Offsite.

APPENDIX C

TYPICAL RANGES FOR METALS IN SOILS

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APPENDIX C

TYPICAL RANGES FOR METALS IN SOILS

Element	Common Range in Soils (mg/kg)		
Aluminum	10,000	to	300,000
Antimony	0.2	to	10
Barium	100	to	3,000
Beryllium	0.1	to	40
Boron	2	to	100
Cadmium	0.01	to	7
Calcium	7,000	to	500,000
Chromium	1	to	1,000
Cobalt	1	to	40
Copper	2	to	100
Iron	7,000	to	550,000
Lead	2	to	200
Lithium	5	to	200
Magnesium	500	to	10,200
Manganese	20	to	3,000
Mercury	0.01	to	0.3
Molybdemum	0.2	to	5
Nickel	5	to	500
Potassium	400	to	30,000
Selenium	0.1	to	2
Silicon	230,000	to	350,000
Silver	0.01	to	5
Sodium	750	to	7,500
Strontium	50	to	1,000
Thallium	0.1	to	0.8
Titanium	1,000	to	10,000
Tin	2	to	200
Vanadium	20	to	500
Zinc	10	to	300
Zirconium	60	to	2,000

Adapted from Dragun, James, 1988, *The Soil Chemistry of Hazardous Materials*, The Hazardous Materials Research Institute, Silver Springs, Maryland.

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APPENDIX D

WASHINGTON ADMINISTRATIVE CODE MODEL TOXICS CONTROL ACT CLEANUP STANDARDS

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APPENDIX D

MODEL TOXICS CONTROL ACT CLEANUP STANDARDS* (sheet 1 of 2)

The following cleanup standards are derived from MTCA Method A and Method B. MTCA Method B was used to calculate the appropriate soil cleanup levels. In cases where sufficient information for calculating cleanup levels was not available, MTCA Method A standards were used.

Compound	RfD[a]	Cleanup level (mg/kg)	CPF[a]	Cleanup level (mg/kg)	Carcinogenic classifi-cation[a]
Acetone	0.1	8000.0		NA	D
Chlorobenzene	0.02	1600.0		NA	D
Chloroform	0.01	800.0	0.0061	163.9	B2
Methylene chloride	0.06	4800.0	0.0075	133.3	B2
Toluene	0.2	16000.0		NA	D
1,1,1-TCA[b]		20.0[c]		NA	D
Trichloroethene[b]		0.5[c]		NA	D
Xylenes	2	160000.0		NA	D
Aluminum[d]	Data Inadequate for Quantitative Risk Analysis				
Arsenic	0.0003	24.0		NA	A
Antimony[d]	0.0004[e]	32.0		NA	
Barium[g]	0.07	5600.0		NA	
Beryllium	0.005	400.0	4.3	0.2	B2
Cadmium	0.001	80.0		NA	B1
Calcium[d]		NA		NA	D
Chromium (III)	1	80000.0		NA	D
Chromium (VI)	0.005	400.0		NA	A
Cobalt[b,g]		NA		NA	
Copper[d,g]	0.04[f]	3200.0		NA	
Cyanide	0.02	1600.0		NA	D
Iron[d]	Data Inadequate for Quantitative Risk Analysis				
Lead[b]		250.0[c]		NA	
Magnesium[d]		NA		NA	
Manganese	0.14	11200.0		NA	D
Mercury		1.0[c]		NA	D
Nickel[g]	0.02[e]	1600.0		NA	
Potassium[d]	0.05[e]	4000.0		NA	
Selenium	0.005	400.0		NA	D
Silver	0.005	400.0		NA	D
Sodium[d]		NA		NA	
Thallium[d]	0.0009[e]	72.0		NA	
Vanadium[b,g]	0.007[e]	560.0		NA	
Zinc	0.2	16000.0		NA	D

*See footnotes on page D-4.
NA = not available.

MODEL TOXICS CONTROL ACT CLEANUP STANDARDS* (sheet 2 of 2)

FOOTNOTES:

[a]RfD = Reference Dose
CPF = Carcinogenic Potency Factor
A = Human carcinogen.
B = Probable human carcinogen:
B1 indicates limited human evidence;
B2 indicates sufficient evidence in animals and inadequate or no evidence in humans.
D = Not classifiable as to human carcinogenicity.

[b]Undergoing EPA RfD Work Group Review at the time of the IRIS Dbase check.

[c]Cleanup levels obtained from MTCA Method A Cleanup Standards for soil.

[d]IRIS did not contain entries.

[e]RfD values were taken from the Health Effect Summary Tables.

[f]Taken from the Superfund Technical Support Center.

[g]IRIS did not contain any carcinogenic data.

IRIS, Integrated Risk Information System, is part of the Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland.

MTCA Method B Soil Cleanup Level Calculations:

Soil Cleanup Level (mg/kg)
= (RfD * ABW * UCF * HQ)/(SIR * AB1 * FOC) = 80,000 * Rfd

Soil Cleanup Level for Carcinogens (mg/kg)
= (RISK * ABW * LIFE * UCF)/(CPF * SIR * AB1 * DUR * FOC) = 1/CPF

where:

RfD = Reference Dose (mg/kg/day)
ABW = Average Body Weight (16 kg)
UCF = Unit Conversion Factor (10e+6 mg/kg)
SIR = Soil Ingestion Rate (200 mg/day)
AB1 = Gastrointestinal Adsorption Rate (1.0)
FOC = Frequency of Contact (1.0)
HQ = Hazard Quotient (1)
RISK = Acceptable Cancer Risk (10e-6)
LIFE = Lifetime (75 years)
CPF = Carcinogenic Potency Factor (Slope Factor) (kg-day/mg)
DUR = Duration of Exposure (6 years).

WAC 173-340, 1992, "The Model Toxics Control Act Cleanup Regulations," *Washington Administrative Code*, as amended.

APPENDIX E

216-B-3 POND SYSTEM PHASE 3 VADOSE ZONE SAMPLING

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LIST OF TERMS

BNA	base/neutral/acid
CBEC	concentration-based exemption criteria
CDL	contractual detection limit
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
CLP	contract laboratory program
CMS	corrective measures study
CRDL	contract-required detection limit
CRQL	contract-required quantitation limit
DOE	U.S. Department of Energy
DW	dangerous waste
Ecology	Washington State Department of Ecology
EHW	extremely hazardous waste
EII	Environmental Investigation Instruction
EPA	U.S. Environmental Protection Agency
FR	Federal Register
HSWA	*Hazardous and Solid Waste Amendments of 1984*
OSM	Office of Sample Management
PCB	polychlorinated biphenyls
PID	photoionization detector
PQL	practical quantitation limit
PUREX	Plutonium/Uranium Extraction (Plant)
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
SOW	statement of work
SQL	sample quantitation limit
TIC	tentatively identified compound
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage or disposal
VOA	volatile organic analysis
WAC	Washington Administrative Code
Westinghouse Hanford	Westinghouse Hanford Company

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1.0 INTRODUCTION

A number of waste management units located on the Hanford Site in south-central Washington State are being physically and/or procedurally closed in accordance with applicable laws, regulations, and agreements. One unit, the 216-B-3 Pond System (B-Pond), consists of one main pond area, three expansion ponds (often referred to as lobes) and the 216-B-3-3 Ditch. This series of ponds lies immediately east of the Hanford Site's 200 East Area (Figure 1-1). The B-Pond has been considered a *Resource Conservation and Recovery Act of 1976* (RCRA) treatment, storage, or disposal (TSD) unit (Ecology et al. 1989, p B-2) comprised of the following:

- Open section of the 216-B-3-3 Ditch, approximately 3,700 ft
- 216-B-3 Pond (main pond), approximately 35 acres
- 216-B-3A Pond (hereafter referred to as the 3A Pond), approximately 11 acres
- 216-B-3B Pond (hereafter referred to as the 3B Pond), approximately 11 acres
- 216-B-3C Pond (hereafter referred to as the 3C Pond), approximately 41 acres.

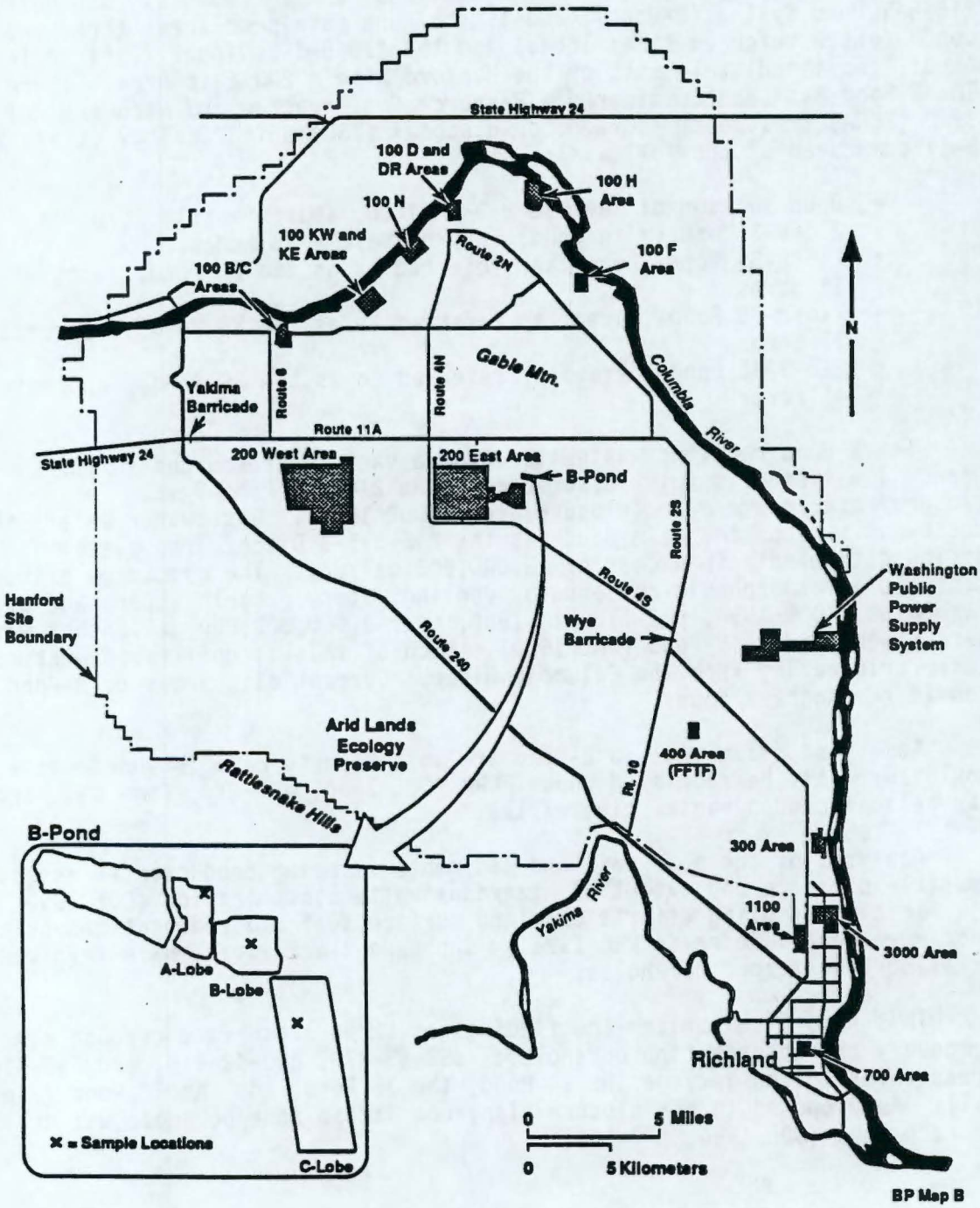
The B-Pond receives wastewater from a variety of sources in the 200 East Area. The system is fully described in the *216-B-3 Pond System Closure/Postclosure Plan* (closure plan) (DOE 1990). Wastewater enters the southwest side of the main pond via the 216-B-3-3 Ditch. The system is designed to handle in excess of 28,000,000 gal/day. The discharge primarily consists of atmospheric condensate, cooling water, potable water, and steam condensate (DOE 1990, p 3-1). In 1989, over 3,000,000,000 gallons of water were discharged to B-Pond (WHC 1990). Much of this is unfiltered, untreated water originating from the Columbia River. Current discharges to B-Pond are considered nonhazardous.

Some past discharges to B-Pond are suspected to have included waste that would currently be regulated under RCRA (DOE 1990, p 1-1). Some discharges have also included radioactive wastes.

Analysis of the pond soil and sediments is being conducted to assess the possible presence and extent of hazardous waste contamination (DOE 1990, p 7-1). Initial sampling efforts examined surface soil and sediment composition. (For more detail refer to WHC 1991.) Subsequent activities have involved drilling vadose zone boreholes.

This report summarizes the findings of three subsurface (vadose zone) temporary characterization boreholes: 699-43-41H, 699-42-41B, and 699-41-41. Areas investigated include the 3A Pond, the 3B Pond, and the 3C Pond (Figure 1-1). As proposed in the closure plan, one vadose zone borehole was drilled in each lobe (DOE 1990, p 7-16).

Figure 1-1. The Hanford Site and the Study Borehole Locations.



1.1 REGULATORY BACKGROUND

The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) jointly administer RCRA in the State of Washington. The EPA retains oversight authority while delegating to Ecology enforcement of a state program consistent with or more stringent than the corresponding federal program. The implementing regulations can be found in the Washington Administrative Code (WAC) 173-303, "Dangerous Waste Regulations", and Title 40, Code of Federal Regulations (CFR), Parts 260-270. Ecology's authorization includes administering TSD closures. However, the state is currently not authorized to enforce the federal *Hazardous and Solid Waste Amendments of 1984* (HSWA), which includes RCRA corrective-action provisions.

The U.S. Department of Energy (DOE), EPA, and Ecology have entered into an agreement called the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989), commonly referred to as the Tri-Party Agreement. This agreement affects environmental regulation at the Hanford Site. One of purposes of this agreement was to ensure environmental impacts associated with past activities are investigated, and appropriate response actions taken as necessary to protect human health and the environment. The agreement seeks to promote this goal in part, by identifying TSD units, identifying which units will undergo closure and promote compliance with relevant RCRA permitting requirements. The agreement also establishes "operable units" for addressing potential environmental contamination from past practices.

The B-Pond is identified as a RCRA TSD unit that will be closed in accordance with applicable laws and regulations (Ecology et al. 1989, Appendix B). The B-Pond is considered an interim status, surface impoundment disposal unit (DOE 1990, p 1-1).

Although current liquid discharges to the pond are not considered hazardous or dangerous, RCRA closure has been necessitated by the concern that B-Pond soil and sediments may "contain" hazardous or dangerous waste from past activities. Environmental media such as water, soil, or sediments may be managed as a hazardous waste when they contain a *listed* waste (EPA Office of Solid Waste and Emergency Response memorandum, Cannon to Jorling, 1989, refer to Appendix C). Generally, regulated hazardous *characteristic* wastes, for instance wastes that are hazardous solely due to corrosivity, are no longer regulated hazardous wastes when they loose the characteristic that caused them to be managed as such (40 CFR 261.3 (a)(2)(i)). Dilution and neutralization for instance, can render a corrosive hazardous waste as nonhazardous.

Clean closure requires the demonstration that all dangerous and/or hazardous wastes or waste constituents posing any significant hazard to human health or the environment have been removed. The Tri-Party Agreement describes three types of closure: closure as a landfill, clean closure, and procedural closure (Ecology et al. 1989, Action Plan-Section 6.3). Clean closure is the planned option for the portion of B-Pond addressed by this report: the 3A, 3B, and 3C Ponds (DOE 1990, p 1-2). If a unit no longer contains significant hazardous waste or constituents, no physical closure action may be required.

According to the WAC 173-303, a specific scheme must be followed in determining whether or not a solid waste is a regulated hazardous waste. This

scheme requires knowledge of the process by which the waste was generated and the attributes of the waste. Current Washington State designation procedures (WAC 173-303-070), require generators to check their waste per specified criteria in a specific order.

Under the "Dangerous Waste Regulations," a dangerous waste means a solid waste designated via WAC 173-303-070 through 173-303-103 as either dangerous waste (DW) or extremely hazardous waste (EHW). Those regulations use the words "hazardous waste" to mean those solid wastes designated by 40 CFR 261, and regulated as hazardous by the EPA. This document will henceforth be consistent with existing state regulations by using the term "dangerous waste" to mean waste regulated by WAC 173-303, including DW, EHW, and EPA hazardous wastes.

Normally TSD units will have all hazardous *substances* addressed as part of the TSD closure. However, disposal units such as B-Pond being closed in conjunction with an operable unit may have hazardous substances (including radioactive constituents) addressed under the *Comprehensive Environmental Response, Compensation and Liability Act of 1980* (CERCLA) past-practice authority (Ecology et al. 1989, Action Plan p 6-4). "Hazardous substances" are defined in CERCLA Section 101(14). When investigation shows that a unit no longer contains substantial dangerous waste or constituents, any remaining CERCLA-only materials would be addressed as part of the past-practice process designated for that operable unit (Ecology et al. 1989, Action Plan p 6-4).

The B-Pond is part of the 200-BP-11 operable unit (Ecology et al. 1989, Appendix C).

1.2 PHYSICAL AND HISTORICAL SETTING

The B-Pond lies on an arid isolated tract of land near the center of the Hanford Site. Water is supplied to the pond system through a series of lines exiting the Site's 200 East Area. Water presently flows into the approximately 35-acre main pond through the 216-B-3-3 Ditch.

The vicinity of the main pond has received liquid effluent from activities in the 200 East Area since 1945. The level of the pond and the inflow have changed over time. Originally the pond was supplied through the 216-B-3-1 Ditch. In 1964 this ditch was replaced by the 216-B-3-2 Ditch. In 1970 the 216-B-3-2 Ditch was replaced by the 216-B-3-3 Ditch. The 216-B-3-3 Ditch is currently operative. Both the 216-B-3-1 and 216-B-3-2 Ditches were radioactively contaminated and were removed from service and filled with soil to reduce potential radioactive contaminant mobility.

The three expansion ponds, the 3A, 3B, and 3C Ponds, were placed in service much later than the main pond. Flow from the main pond is directed to the 3A Pond and then either to the 3B Pond or the 3C Pond. Flow is controlled. Use of the 3A Pond commenced in October 1983 (DOE 1990, p 2-19). The 3B Pond was in service from January 1984 until May 1985. The 3C Pond became operational in 1985.

The 3A Pond is a shallow pond approximately 11 acres and 12 ft deep. It was constructed using a cut-and-fill method. In January of 1984 the dike between the 3A and the 3B Ponds and adjacent to the connecting spillway failed

(DOE 1990, p 2-19). Overflow from the 3A Pond was contained in the previously unused 3B Pond. Flow to B-Pond was reduced, and the 3A and 3B Ponds were removed from service for repairs. A trench approximately 30 ft wide and 5 ft deep was excavated along part of the 3A Pond bottom to increase the pond's infiltration capacity. Discharge was resumed to 3A Pond at a temporarily reduced rate in the newly excavated area. A new spillway was constructed to connect 3B Pond. Debris from the dike failure was removed from 3B Pond. A system of infiltration trenches were excavated in 3B Pond. Both ponds were fully operational by June 1984.

The 3B Pond, which is currently dry, is also approximately 11 acres. It has not been used since being removed from service in May 1985 (DOE 1990, p 2-32). After being removed from service, the area was excavated to a depth below the bottom of the former trenches. According to the closure plan, up to 7 ft of material was excavated from the pond bottom (DOE 1990, p 2-32).

The 3C Pond, approximately 41 acres in total size, has a series of eight partially filled, parallel infiltration trenches into which water from 3A Pond is usually channelled. The water in 3C Pond has never risen above the tops of the trenches, which cover a much smaller total area than the pond itself. The trenches are not usually wet along their entire length. The water level and, therefore, the area wetted longitudinally vary with time.

A contingency pond, 216-E-28, was constructed in 1987 to provide emergency overflow capability for B-Pond. This contingency pond lies north and slightly west of the main pond. The area is dry and has never been used. The contingency pond is mentioned in this report only because it was one of two sites used to generate background values for earlier comparisons (WHC 1991).

Sagebrush and native plants populate the undisturbed areas around B-Pond. Typical littoral vegetation is naturally developing along the edge of the 3A Pond and the trenches of the 3C Pond. Each of the three expansion ponds is circumscribed by graveled and/or unimproved roads. Some adjacent areas disturbed by spillway construction, etc. have been revegetated.

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2.0 DISCUSSION OF RECENT WASTE HISTORY

This section summarizes dangerous waste releases to B-Pond since October 1983 as described in the closure plan (DOE 1990). The general period of operation for the expansion ponds was as follows:

3A Pond: October 1983 -- present
3B Pond: January 1984 -- May 1985
3C Pond: May 1985 -- present.

B-Pond had two points of inflow during the period from 1983 through 1992. Water continuously flowed into the 216-B-3-3 Ditch via a pipe at the headend. In addition, midway to the main pond, flow was supplemented by effluent from the 216-A-29 Ditch. Wastewater discharged at the headend of the 216-B-3-3 Ditch since October 1983 has included raw water, sanitary (potable) water, cooling water, steam condensate, filter backwash from the water treatment plant, etc. (DOE 1990, p 3-2). No contributing source has been identified as a dangerous waste.

The unlined 216-A-29 Ditch is a separate TSD unit. It had been used as an open ditch conveying wastewater to B-Pond. In 1991 it was decommissioned and backfilled. Wastewater from the PUREX chemical sewer line had been routinely released to the 216-A-29 Ditch before entering B-Pond. The open 216-A-29 Ditch extended over 2,000 ft before discharging into the 216-B-3-3 Ditch of B-Pond.

The closure plan (Rev. 0) lists the Plutonium/Uranium Extraction (PUREX) Plant chemical sewer line as the most likely contributor of any dangerous waste to B-Pond while the expansion ponds were operable (DOE 1990, p 4-3). Documented releases were assessed (DOE 1990, p 4-6). The following chemicals were traceable components of the chemical sewer line wastewater: potassium hydroxide, sodium hydroxide, cadmium nitrate, hydrazine, nitric acid, and sulfuric acid (DOE 1990, Table 4-3). A single documented release to the PUREX chemical sewer of solution containing ammonium fluoride and ammonium nitrate occurred in July 1985 (DOE 1990, p 4-7).

The chemical sewer line wastewater was conservatively judged to be a regulated dangerous waste during some of those documented releases. Applicable designation codes are D002, WT02, U133, WT01 and D006. These constitute all dangerous waste numbers listed on Revision 3 of the *Part A, Form 3, Dangerous Waste Permit Application* submitted for B-Pond (DOE 1990, p 1-10). The last chemical sewer discharge suspected of being a dangerous waste occurred in 1986 (DOE 1990, Table 4-3).

Each of the above releases to the 216-A-29 Ditch was designated as a dangerous waste based on characteristics or criteria, except for those releases containing hydrazine, a "listed" discarded chemical product (U133) (DOE 1990, Table 4-3). Wastes designated D002 are deemed hazardous based on corrosivity; D006, WT01 and WT02 wastes are regulated because of their toxicity. These designations were not made on the average or representative flow, but were based on specific incidences when high concentrations of chemicals were documented to have been released from the chemical sewer line to the 216-A-29 ditch.

The chemical sewer line wastewater attributes were estimated based on process knowledge, and were not measured nor estimated at the point that the 216-A-29 Ditch empties into the 216-B-3-3 Ditch of B-Pond. The closure plan specifically states that these designations were "at the point the chemical sewer line enters the environment" (DOE 1990, p 4-6). Further attenuation would occur as the liquid waste stream flowed the full length of the 216-A-29 Ditch, mixed with the additional flow of the 216-B-3-3 Ditch, and dispersed in the main lobe before any flow to 3A, 3B, or 3C Ponds.

3.0 SAMPLING ACTIVITIES

A Westinghouse Hanford Company (Westinghouse Hanford) sampling plan, *216-B-3 Pond Characterization of the Hazardous Waste Inventory in the Near-Surface Soil and Sediments* (WHC 1989a), in conjunction with approved modifications and procedures, has been used in the B-Pond site characterization effort. The sampling plan sets forth a phased approach toward characterizing the soils and sediments of B-Pond.

Phase 1 was an initial sampling effort assessing near-surface soil contamination within the main pond, the 216-B-3-3 Ditch, and the three expansion ponds. Phase 1 included measuring constituents in two types of background areas in the vicinity of the site. Phase 1 activities are summarized in *Phase 1 Characterization of the 216-B-3 Pond System* (WHC 1991).

Phase 2 is planned as an extension of the Phase 1 characterization work using data and knowledge gathered from Phase 1 and Phase 3.

Phase 3, the subject of this report, examines the vertical distribution of potential contaminants beneath the surface soil. Field activities involved drilling one vadose zone borehole in each of the expansion ponds. Soil samples were collected and submitted for chemical analyses similar to those performed in Phase 1. Additionally, some nonchemical data were collected in conjunction with the drilling effort. Each hole was logged by a qualified geologist as drilling was performed. Some samples were submitted for physical analyses, such as grain size. Gross gamma logging was also performed on each borehole.

3.1 OBJECTIVE AND SCOPE

The objective of Phase 3 characterization sampling was to collect data addressing the issue of potential vadose zone chemical contamination with dangerous waste. Efforts focused on the subsurface of the three expansion ponds. The current closure plan has proposed to address potential subsurface contamination in the main pond with the remedial activities of the operable unit, 200-BP-11. This report summarizes Phase 3 activities and findings.

This investigation was limited to the vadose zone, the portion of the earth's crust above the water table. "Soil" is meant to be understood in the context of environmental cleanup regulations. This report does not address groundwater.

3.2 ANALYTES INVESTIGATED

Although B-Pond was declared a RCRA TSD unit, current discharge to the unit is nondangerous waste. Although releases from the PUREX chemical sewer line to the 216-A-29 Ditch TSD have been documented, existence of the regulated characteristics or criteria in the downstream TSD (B-Pond) have been postulated, but not demonstrated. Substances of concern are concentrations of a potential waste residual that could cause the water, soil/(sediment), or subsoil to be managed as a dangerous waste under Ecology's "Dangerous Waste Regulations," (WAC 173-303).

Constituents and/or attributes not regulated under the "Dangerous Waste Regulations" are reported as part of the site characterization. It should not be inferred that all analytes are pertinent to determining whether or not a RCRA dangerous waste is present. For instance, the characteristic of radioactivity is not a criterion for determining whether or not a waste is a RCRA dangerous waste; however this information may be applicable to later CERCLA work at the site. With regard to listed waste, generally detection in an environmental media such as soil or sediment is sufficient to be of regulatory concern. However, the EPA has allowed hazardous waste management to cease when the constituents are less than de minimis levels--most commonly those posing no health threat when directly ingested.

Inorganic parameters measured in Phase 3 include those listed in Table 3-1.

Table 3-1. Inorganic Parameters.

Analyte	EPA Method	Analyte	EPA Method
Aluminum	6010	Magnesium	6010
Ammonia	350.3	Manganese	6010
Antimony	6010	Mercury	7471
Arsenic	7060	Molybdenum	6010
Barium	6010	Nickel	6010
Beryllium	6010	Nitrate	300.0
Boron	6010	Potassium	6010
Cadmium	6010	Selenium	7740
Calcium	6010	Silicon	6010
Chloride	300.0	Silver	6010
Chromium	6010	Sodium	6010
Cobalt	6010	Sulfate	300.0
Copper	6010	Sulfide	376.1
Cyanide	9010	Thallium	7841
Fluoride	300.0	Vanadium	6010
Iron	6010	Zinc	6010
Lead	7421		

Split samples were analyzed and reported according to Contract Laboratory Program (CLP) protocol found in the March 1990 Statement of Work (SOW) for Inorganic Analysis. The following inorganic analytes were reported for split samples: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

Organic compounds evaluated at the primary laboratory include those listed in Table 3-2.

Table 3-2. Organic Parameters.

Analytical Class	EPA/Other Method	Analytical Class	EPA/Other Method
Pesticides/Polychlorinated biphenyls (PCBs)	8080	Dioxins/Furans	8280
Herbicides	8150	Volatile Organic Compounds	ACD 2440[1]
Organophosphorous Pesticides	8140	Base/Neutral/Acid (BNA) Compounds	ACD 2470[2]

[1] Laboratory-specific, volatile organic analysis (VOA) method based on CLP protocol.
[2] Laboratory-specific, base/neutral/acid (BNA) analysis method based on CLP protocol.

The specific chemicals reported for each of the above categories can be found in Appendix A. These lists contain only those routinely reported compounds in each class. Additional volatile and semivolatile compounds could be reported as tentatively identified compounds (TICs).

Some split samples were also analyzed and reported according to CLP protocol for the following organic analytes:

Target Compound List Volatiles (CLP SOW 2/88--Rev. 5/89)
Target Compound List Semivolatiles (CLP SOW 2/88--Rev. 5/89)
Pesticide and PCB Target Compounds (CLP SOW)

One split, sample B00GW5, was analyzed for semivolatiles by EPA 8270.

Radioactivity measurements were also made on Phase 3 soil samples. Gross alpha, beta activity, ^{90}Sr, and gamma activity radiochemical analyses were conducted using EPA-900 series procedures.

A sample key showing sample identification numbers and associated field data can be found in Table 3-3.

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth[a]	Collection Date	Interval[b]		Classification from Borehole Log
B00FK6	Reg	3A	6.5	2/7/91	4.95	7.55	Silty Sand
B00FK7	Reg	3A	8.5	2/7/91	6.9	10.2	"
B00FK8	Reg	3A	10.5	2/7/91	9.6	11.75	Sand
B00FK9	Reg	3A	13	2/7/91	11.8	14.0	Sandy Gravel
B00FL0	Reg	3A	14.5	2/7/91	13.5	15.7	"
B00FL1	Reg	3A	16	2/8/91	14.7	17.0	"
B00FL2	Phys	3A	21.5	2/11/91	20.4	23	"
B00FL3	Blank	3A	---	2/11/91	NA		(Silica Sand Control Sample)
B00FL4	Reg	3A	28	2/11/91	26.4	29.3	Sandy Gravel
B00GR9	Fdup	3A	28	2/11/91	26.4	29.3	"
B00GS0	Reg	3A	31.5	2/11/91	30.5	32.6	"
B00GS1	Reg	3A	36.5	2/12/91	35.55	37.71	Sandy Gravel/ Slightly Silty Sand/ Sand
B00GS2	Reg	3A	42	2/13/91	40.4	43.25	Sand
B00GS3	Reg	3A	46.5	2/13/91	45.45	48.0	"
B00GS6	Phys	3A	52[c]	2/14/91	51.13	54.10	Silty Sand
B00GS4	Reg	3A	52.5	2/14/91	51.13	54.10	Sandy Silt
B00GS5	Split	3A	52.5	2/14/91	51.13	54.10	"
B00GS7	Phys	3A	54.5	2/14/91	53.0	55.6	Sandy Silt/ Sand
B00GS8	Reg	3A	57	2/14/91	56	58.4	Sand
B00GS9	Reg	3A	66.5	2/15/91	65.35	67.65	Sandy Gravel
B00GT0	Phys	3A	68.5	2/15/91	67.5	69.65	Sand
B00GT1	Reg	3A	77	2/19/91	75.7	77.90	"
B00GT2	Phys	3A	77	2/19/91	75.7	77.90	"
B00GT3	Blank	3A	---	2/20/91	NA		(Silica Sand Control Sample)
B00GT4	Reg	3A	85.5	2/21/91	84.1	86.68	Sand
B00GT5	Fdup	3A	85.5	2/21/91	84.1	86.68	"
B00GT6	Split	3A	85.5	2/21/91	84.1	86.68	"
B00GT7	Reg	3A	97	2/21/91	95.7	98.3	Sandy Gravel
B00GT8	Reg	3A	102	2/22/91	101.6	102.2	Slightly Silty, Slightly Gravelly Sand
B00GT9	Phys	3A	102	2/22/91	101.6	102.2	"
B00GV0	Reg	3A	122	2/26/91	120.7	123.2	Sandy Gravel
B00GV1	Blank	3A	---	2/27/91	NA		(Silica Sand Control Sample)
B00GV2	Reg	3A	131	2/27/91	129.9	132.05	Sandy Gravel
B00GV3	Fdup	3A	131	2/27/91	129.9	132.05	"
B00GV4	Split	3A	131	2/27/91	129.9	132.05	"
B00GV5	Reg	3A	143.5	2/28/91	142.75	143.85	"
B00GV6	Reg	3B	1	3/4/91	0	2	Silty Sandy Gravel
B00GV7	Reg	3B	3.5	3/4/91	2.5	4.5	"
B00GV8	Reg	3B	5.5	3/4/91	4	6.55	"

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth[a]	Collection Date	Interval[b]		Classification from Borehole Log
B00GV9	Blank	3B	---	3/5/91	NA		(Silica Sand Control Sample)
B00GW0	Reg	3B	7.5	3/5/91	6.2	8.4	Sand
B00GW1	Reg	3B	9.5	3/5/91	8.2	10.85	"
B00GW2	Phys	3B	9.5	3/5/91	8.2	10.85	"
B00GW3	Reg	3B	13	3/5/91	11.4	14.1	Sandy Gravel
B00GW4	Fdup	3B	13	3/5/91	11.4	14.1	"
B00GW5	Split	3B	13	3/5/91	11.4	14.1	"
B00GW6	Reg	3B	16	3/5/91	14.4	17.1	Silty Sandy Gravel
B00GW7	Phys	3B	16	3/5/91	14.4	17.1	"
B00GW8	Reg	3B	21	3/6/91	19.2	22.5	"
B00GW9	Reg	3B	28	3/6/91	25.9	29.6	"
B00GX0	Phys	3B	28	3/6/91	25.9	29.6	"
B00GX1	Phys	3B	28	3/6/91	25.9	29.6	"
B00GX2	Reg	3B	31	3/6/91	29.5	32.2	"
B00GX3	Reg	3B	35.5	3/7/91	34.0	36.8	"
B00GX4	Reg	3B	40	3/7/91	38.8	41.4	"
B00GX5	Reg	3B	52	3/8/91	50.8	52.95	Silty Sandy Gravel/ Silty Gravel
B00GX6	Reg	3B	61.5	3/8/91	60.0	62.6	Silty Sandy Gravel/ Sand
B00GX7	Phys	3B	61.5	3/8/91	60.0	62.6	"
B00GX8	Reg	3B	70.5	3/8/91	69.6	71.8	Silty Sandy Gravel
B00GX9	Phys	3B	73	3/11/91	72.25	74.15	"
B00GY0	Blank	3B	---	3/12/91	NA		(Silica Sand Control Sample)
B00GY1	Reg	3B	80.5	3/12/91	79.75	81.5	Gravelly Sand
B00GY2	Fdup	3B	80.5	3/12/91	79.75	81.5	"
B00GY9	Split	3B	80.5	3/12/91	79.75	81.5	"
B00GZ0	Phys	3B	84.5	3/12/91	83.0	85.9	Silty Sandy Gravel
B00GZ1	Phys	3B	84.5	3/12/91	83.0	85.9	"
B00GZ2	Reg	3B	90.5	3/12/91	89.	91.85	"
B00GZ3	Reg	3B	105	3/14/91	103.9	106.35	"
B00GZ4	Phys	3B	105	3/14/91	103.9	106.35	"
B00GZ5	Phys	3B	105	3/14/91	103.9	106.35	"
B00GZ6	Reg	3B	118.5	3/15/91	117.5	119.3	Silt
B00GZ7	Phys	3B	118.5	3/15/91	117.5	119.3	"
B00GZ8	Reg	3B	123.5	3/18/91	122.3	124.7	"
B00H00	Reg	3C	1	3/15/91	0	2	Sandy Gravel
B00H01	Reg	3C	3	3/15/91	1.5	4	"
B00H02	Reg	3C	5	3/15/91	3.87	5.8	"
B00H03	Reg	3C	7	3/18/91	5.93	7.95	"
B00H04	Reg	3C	9	3/18/91	7.93	9.73	"
B00H05	Fdup	3C	9	3/18/91	7.93	9.73	"

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth[a]	Collection Date	Interval[b]		Classification from Borehole Log
B00H06	Reg	3C	11.5	3/18/91	10.6	11.93	Sandy Gravel/ Sand
B00H07	Split	3C	11.5	3/18/91	10.6	11.93	"
B00H08	Phys	3C	12.5	3/19/91	11.7	13.7	Sand
B00H09	Reg	3C	16	3/19/91	15.0	17.0	Gravelly Sand
B00H10	Blank	3C	---	3/20/91	NA		(Silica Sand Control Sample)
B00H11	Reg	3C	20.5	3/20/91	19.5	21.5	Sandy Gravel
B00H12	Phys	3C	26.5	3/20/91	25.6	27.8	Gravel
B00H13	Phys	3C	26.5	3/21/91	25.6	27.8	"
B00H14	Reg	3C	30	3/21/91	29	31	Slightly Gravelly Sand
B00H15	Reg	3C	36	3/25/91	34.8	37.6	Sandy Gravel
B00H16	Reg	3C	40.5	3/25/91	39	41.8	"
B00H17	Fdup	3C	40.5	3/25/91	39	41.8	"
B00H18	Reg	3C	50	3/25/91	48.8	50.8	"
B00H19	Reg	3C	60	3/26/91	59.3	61.1	"
B00H20	Reg	3C	70.5	3/27/91	69.3	71.5	"
B00H21	Blank	3C	---	3/27/91	NA		(Silica Sand Control Sample)
B00H22	Phys	3C	78	3/27/91	76.9	79.4	Sandy Gravel
B00H23	Reg	3C	80	3/27/91	79.4	80.9	"
B00H24	Split	3C	80	3/27/91	79.4	80.9	"

[a] Logbook interval midpoint rounded to the closest 1/2-ft.
[b] Source: Project Field Logbook.
[c] Sample collected from liners 51.6-52.1 ft below surface.

Type:
- Reg = Regular sample for chemical analysis
- Phys = Sample for physical analysis
- Blank = Field originated, equipment "blank" silica sand sample for chemical analysis
- Fdup = Field duplicate sample for chemical analysis
- Split = Split sample for independent chemical analysis

3.3 DESCRIPTION OF FIELD ACTIVITIES

3.3.1 The 3A Pond

Several months before drilling, clean fill was used to construct a pad extending over a small portion of 3A Pond. This pad was located along the north shore of the pond, approximately 25 yd from the east corner.

Field sampling was initiated at the 3A Pond. The borehole, BH 3A-1, (later designated 699-43-411) penetrated the former pond bottom. The first sample submitted for chemical analysis was collected February 7, 1991. Samples were planned at 2-ft intervals for the first 10 ft below the former pond bottom and at decreasing intervals thereafter until reaching groundwater. All depths were referenced to the ground surface. The pond bottom was encountered at approximately 6.5 ft.

A cable tool drilling rig was used to drill the borehole. Drill rigs are decontaminated before use. Samples were collected using a 5-in. outside diameter stainless steel split tube with stainless steel liners. A 10-in. outside diameter, schedule 40 casing was first used, followed by 8- then 6-in. The 10-in. casing string was set at 20.4 ft. The 8-in. casing was set at 77.7 ft. Samples were collected per procedures of the *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7 (WHC 1989b). Samples for chemical analysis were placed in supplier-cleaned glass bottles.

Samples were screened for radioactivity using hand-held instruments. A field photoionization detector (PID) was used to monitor for organic vapors. No evidence of radioactive or organic contamination was found. Aliquots submitted to an onsite laboratory also revealed no evidence of radioactive contamination. All aliquots were found to be below applicable administrative limits for release from all radiologic controls. Applicable limits during the project were detectable readings above background with field instruments or laboratory results exceeding either 60 ρCi/g alpha or 200 ρCi/g total activity, including beta/gamma.

Gross gamma logging was performed on three separate days:

DATE	LOG INTERVAL (FT)
February 8, 1991	5-19
February 20, 1991	4-79
March 1, 1991	45-142.

Larger cobbles and boulders made drilling difficult at approximately the 100-ft level. After samples B00GT8 and B00GT9 were collected (101.0-102.2 ft), hardtooling was first employed. This required the addition of some raw (Columbia River) water to the borehole. Drilling improved below 105 ft, and hardtooling was discontinued. A small amount (approximately 0.5 gal) of raw water was required at 112 ft to get recovery in the core barrel. The next sample interval was 120.7-123.2 ft, sample B00GV0.

The final sample from the 3A Pond borehole was collected February 28, 1991 from a recorded depth of 142.75-143.85 ft. Recovery in the split spoon

was estimated at only 50 percent. Observations in the field log note the sample as "very wet." The water level was measured at 142.75 ft from the surface. Later, the casing was removed, and the borehole was backfilled, abandoned, and marked according to standard procedures--*Plugging and Abandoning Characterization Boreholes* Environmental Investigation Instruction (EII) 6.5 (WHC 1989b).

3.3.2 The 3B Pond

A cleaned cable tool drilling rig was set up at 3B Pond in late February 1991. The borehole, BH 3B-1, (later designated 699-42-41B) was located in the center of the dry lobe. Drilling equipment was routinely cleaned per EII 5.4 (WHC 1989b) before delivery/use at the site. Likewise, direct contact sampling equipment (split tube assemblies, bowls, spoons, etc.) is specially cleaned before use per EII 5.5, *1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment*, (WHC 1989b).

Sampling was initiated March 4, 1991. The first sample, B00GV6, was collected with a split tube over the 0 to 2-ft interval. Recovery of sample B00GV6 and the next two samples was estimated at 50 percent because of the coarse gravelly nature of the soil. Finer material was found below a depth of 7 ft.

Drilling method and sampling frequency were similar to the other two boreholes. Samples were planned at 2-ft intervals for the first 10 ft and at decreasing intervals thereafter until reaching groundwater. Samples were collected as previously described for the 3A Pond, except that there was no fill material overlying the area to be investigated. All depths were referenced to the ground surface. The 10-in. casing string was set at 21.1 ft. The 8-in. casing was set at 78.2 ft. Samples were screened with field instruments for radioactivity and/or hazardous organic vapors. No evidence of radioactivity or organic vapors was found.

Gross gamma logging of the 3B Pond borehole was also performed on the following three separate days:

DATE	LOG INTERVAL (FT)
March 6, 1991	5-21
March 11, 1991	4-79
March 19, 1991	45-122.

The borehole was advanced by drive barrel to approximately 74 ft before it was necessary to add any water. Only 1 gal of raw water was added to progress drilling. This was about 6 ft above the next sample interval, 79.8 - 81.5 ft. Two samples, B00GY1 and B00GY2, were taken for chemical analysis from the bottom two liners at this next interval.

A sample for physical analysis, B00GZ0, was collected from an interval beginning at 83.0 ft. Although recovery in the split tube was good (est. 75 percent), there was insufficient volume for a representative grain size analysis because of the amount of cobble. Sample B00GZ1 was subsequently

collected from the 5-in-diameter drive-barrel cleanout and submitted for grain size.

Hard-tool drilling was required at 95-103 ft and at 109-113 ft. Thirty gallons of raw water were used. Samples for chemical analysis potentially affected by added raw water are B00GZ3, B00GZ4, and B00GZ6. In each case, several feet of soil remained above the respective intervals when the last of the water was added.

The final sample, B00GZ8, a wet silt, was collected March 18, 1991. Final depth of the borehole was 124.7 ft. The casing was later pulled and the borehole abandoned per standard procedures (WHC 1989b, EII 6.5).

3.3.3 The 3C Pond

Sampling in 3C Pond began on March 15, 1991. The borehole, BH 3C-1, (later designated 699-41-4) was located on dry ground between trenches in the northwest quadrant of the lobe. The water surface in the adjacent trench was several feet below ground level at the borehole. The 3C Pond (a series of trenches) was in active use at the time of this investigation, similar to 3A Pond.

Drilling and sampling methods were identical to those previously described. As with boreholes drilled earlier, sampling was more frequent in the top portion of the borehole. Field monitoring of the samples showed no radioactivity or hazardous organic vapors. Five samples were collected in the first 10 ft. Samples for chemical analysis were collected using a 5-in. outside-diameter split tube sampler. The 10-in. casing string was set at 32.1 ft. An 8-in. casing was used for the remainder of the borehole.

Most of the borehole was wet. Early samples were damp, but moisture appeared to increase at about 18 ft. When drilling started at 19 ft, March 20, there was no standing water in the hole. However, some difficulty was experienced keeping material in the drive barrel. Moisture was a factor. Poor sample recovery limited planned analyses in the 20-25 ft range. On the morning of March 21, there was standing water in the hole. The starting depth was 27.8 ft. Moist conditions abated, but did not cease for the remainder of the borehole.

Gross gamma logging at the 3C Pond was performed on two days as follows:

DATE	LOG INTERVAL (FT)
March 22, 1991	5-32
March 28, 1991	0-77.

Soil below 74 ft was noticeably wetter. Intermittent saturated zones were experienced to 80 ft. It was decided to terminate the borehole at this level because of continuing high moisture conditions. Final depth of the borehole was 80.9 ft.

The casing was removed and the borehole filled and abandoned in accordance with standard procedures (WHC 1989b, EII 6.5). As with previous sites, a brass survey marker was placed at the location.

Sample B00GS5, originating from the borehole at the 3C Pond, was later reported by the laboratory as sample B00GS. Based on date of submittal, analyses requested, and review of documentation associated with the sample this was determined to be simply a typographical error on the part of the laboratory and will not affect interpretation of the results.

4.0 SUMMARY OF RESULTS

4.1 ORGANIC CHEMICAL RESULTS

Organic analyses were performed on a subset of project samples in accordance with project plans. All regular samples identified below were analyzed for pesticides/PCBs, herbicides, organophosphorous pesticides, volatile organic compounds, and BNA compounds.

3A Pond: B00FK6, B00FK7, B00FK8, B00FK9, B00FL0, B00FL1, B00FL4, B00GS4, B00GS9, B00GT7, B00GV5

3B Pond: B00GV6, B00GV7, B00GV8, B00GW0, B00GW1, B00GW3, B00GW8, B00GX6, B00GZ2, B00GZ6, B00GZ8

3C Pond: B00H00, B00H01, B00H02, B00H03, B00H04, B00H06, B00H14, B00H19, B00H23

A subset of the above were analyzed for dioxin and furan homologs. This included all samples except B00GX6, B00GZ2, B00GZ6, B00GZ8, B00H01, B00H04, B00H06, B00H14, B00H19, and B00H23. More analyses were performed than were requested by Westinghouse Hanford. One planned dioxin analysis (sample B00H01 from 1.5- to 4-ft level of 3C Pond) was inadvertently omitted by the laboratory. An examination of the Sample Analysis Request forms shows the primary laboratory did not correctly forward requests/samples to their subcontracted laboratory.

Results of silica sand samples (B00FL3, B00GV9, B00H10), field duplicates (B00GW4, B00H05, B00GR9) and split samples (B00H07, B00GW5, B00GS5) are discussed with each group summary appearing below.

Results of all regular samples analyzed for organic compounds are summarized in Table 4-1. Organic constituents of interest were generally undetected.

Nearly all results have been qualified as estimated, flagged with a "J" by Westinghouse Hanford's Office of Sample Management (OSM). The most common reason is the comparison of sample (soil) holding times before extraction to holding times applicable to water matrices. Compounds not on routine target lists may have been reported as TICs. All TICs were routinely qualified as estimated, "J", by the reporting laboratory.

Table 4-1. Summary of Phase 3 Organic Analyses.

Analytical Class	Protocol Used	Pond	Number of Reg. Samples	All Analytes < Detection Limit	Remarks
Pesticides/PCB	EPA 8080	3A	11	Yes	
		3B	11	Yes	
		3C	9	Yes	
Herbicides	EPA 8150	3A	11	Yes	
		3B	11	Yes	
		3C	9	Yes	
Organophosphorous Pesticides	EPA 8140	3A	11	Yes	List A (App. C)
		3B	11	Yes	List A, List B for 4 lowermost
		3C	9	Yes	List B (App. C)
Dioxins/Furans	Modified EPA 8280	3A	11	Yes	(More analyses than requested)
		3B	7	Yes	
		3C	3	Yes	
Volatile Organic Compounds	ACD 2440 (CLP VOA Protocol)	3A	11	No	Low level Acetone, Methylene Chloride, and 4-Methyl-2-pentanone
		3B	11	No	Low level 4-Methyl-2-pentanone
		3C	8	No	Low level Acetone
Base/Neutral/Acid Compounds (Semivolatiles)	ACD 2470 (CLP BNA Protocol)	3A	11	No	Multiple compounds reported
		3B	11	No	Multiple compounds reported
		3C	9	No	Multiple compounds reported

4.1.1 Pesticides/PCBs

Tables 4-2 and 4-3 summarize results of the pesticides/PCB analyses. Table 4-2 is based on the results of the 31 regular soil samples sent to the primary laboratory. Table 4-3 shows the numerical results of each of the three samples sent to the split laboratory. All regular, field duplicate, field split, and silica sand sample results are provided in Appendix A.

All pesticides and PCB results were reported as nondetectable by the laboratory, or were qualified as nondetected upon validation. Some laboratory reagent blanks at the primary laboratory contained traces of target analytes (Arochlor-1254, beta-BHC, and Lindane). Some immediately associated B-Pond soil samples also contained those analytes at very low levels--less than the valid sample quantitation limit (SQL). Consistent with established data validation protocol, OSM qualified some data as undetected at the SQL based upon results of laboratory reagent blanks. No other analytes were reported by the laboratory without an undetected ("U") laboratory qualification.

All samples, including silica sand and field duplicates, were extracted outside the 7-day criterion applicable to certain water analyses, and were thus qualified "J" by Westinghouse Hanford. All extracts were analyzed within the allotted 40 days following extraction. High surrogate recovery on sample B00H01 also contributed to Westinghouse Hanford's "J" qualification for all analytes of that sample, although no target compounds were found. Recovery was 193 percent, slightly outside the laboratory-reported quality control (QC) limits of 20-150 percent for a 105-μg/Kg nominal spike.

Results of each of the three silica sand and field duplicate samples were consistent with the above. All values were reported as undetected by the laboratory or were qualified as undetected at the SQL. All six samples were reported with sub-SQL concentrations of arochlor-1254, and were qualified as undetected at the SQL. Two silica sand field blanks (B00FL3 and B00H10) and one field duplicate (B00GR9) reported by the laboratory with less than SQL traces of lindane were subsequently qualified as undetected at the SQL based on laboratory reagent blank results. The field duplicate B00GR9 contained a trace of beta-BHC (0.77J μg/Kg) that was qualified as undetected at the SQL (13 μg/Kg). No trace of beta-BHC was found in the associated regular sample, B00FL3; laboratory reported value, 13 U μg/Kg.

Split samples were analyzed according to criteria set forth in the CLP for pesticide and PCB target compounds. Validated results are shown in Table 4-3. Results confirm those of the primary laboratory. Targeted compounds were undetectable in site samples. Compounds for which there were trace contamination problems at the primary laboratory were undetected in samples analyzed at the split laboratory. One split sample, B00GS5, was also associated with a high surrogate spike recovery. This was attributed to a co-eluting interference. Seven of 12 matrix spike recoveries were outside EPA QC limits. Although all analytes were undetected, results for B00GS5 were consequently qualified "J" by Westinghouse Hanford.

Table 4-2. Pesticides/PCB Sample Result Summary
-- 31 Regular Samples.

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE µg/Kg	MEDIAN µg/Kg
4,4'-DDE	72-55-9	Yes	25 UJ - 310 UJ	120 UJ
4,4'-DDD	72-54-8	Yes	25 UJ - 310 UJ	120 UJ
4,4'-DDT	50-29-3	Yes	25 UJ - 310 UJ	120 UJ
Aldrin	309-00-2	Yes	13 UJ - 160 UJ	62 UJ
alpha BHC	319-84-6	Yes	13 UJ - 160 UJ	62 UJ
beta BHC	319-85-7	Yes	13 UJ - 160 UJ	62 UJ
delta BHC	319-86-8	Yes	13 UJ - 160 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	Yes	13 UJ - 160 UJ	62 UJ
alpha-Chlorodane	5103-71-9	Yes	130 UJ - 1600 UJ	620 UJ
gamma-Chlorodane	5103-74-2	Yes	130 UJ - 1600 UJ	620 UJ
Dieldrin	60-57-1	Yes	25 UJ - 310 UJ	120 UJ
Endosulfan I	959-98-8	Yes	13 UJ - 160 UJ	62 UJ
Endosulfan II	33213-65-9	Yes	25 UJ - 310 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	Yes	25 UJ - 310 UJ	120 UJ
Endrin	72-20-8	Yes	25 UJ - 310 UJ	120 UJ
Endrin Ketone	53494-70-5	Yes	25 UJ - 310 UJ	120 UJ
Heptachlor	76-44-8	Yes	13 UJ - 160 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	Yes	13 UJ - 160 UJ	62 UJ
Methoxychlor	72-43-5	Yes	130 UJ - 1600 UJ	620 UJ
Toxaphene	8001-35-2	Yes	250 UJ - 3100 UJ	1200 UJ
Arochlor 1016	12674-11-2	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1221	11104-28-2	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1232	11141-16-5	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1242	53469-21-9	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1248	12672-29-6	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1254	11097-69-1	Yes	240 UJ - 360 UJ	260 UJ
Arochlor 1260	11096-82-5	Yes	240 UJ - 360 UJ	260 UJ

U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.

Table 4-3. Split Sample Results for Pesticides/PCBs.

ANALYTE	CAS #	B00H07 µg/Kg	B00GW5 µg/Kg	B00GS5[a] µg/Kg	Median[b] Regular Sample µg/Kg
4,4'-DDE	72-55-9	17 U	16 UJ	19 UJ	120 UJ
4,4'-DDD	72-54-8	17 U	16 UJ	19 UJ	120 UJ
4,4'-DDT	50-29-3	17 U	16 UJ	19 UJ	120 UJ
Aldrin	309-00-2	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
alpha BHC	319-84-6	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
beta BHC	319-85-7	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
delta BHC	319-86-8	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	8.3 U	8.0 UJ	9.7 UJ	62 UJ
alpha-Chlorodane	5103-71-9	83 UJ	80 UJ	97 UJ	620 UJ
gamma-Chlorodane	5103-74-2	83 UJ	80 UJ	97 UJ	620 UJ
Dieldrin	60-57-1	17 U	16 U	19 UJ	120 UJ
Endosulfan I	959-98-8	8.3 U	8.0 UJ	9.7 UJ	62 UJ
Endosulfan II	33213-65-9	17 U	16 U	19 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	17 U	16 UJ	19 UJ	120 UJ
Endrin	72-20-8	17 UJ	16 U	19 UJ	120 UJ
Endrin Ketone	53494-70-5	17 U	16 U	19 UJ	120 UJ
Heptachlor	76-44-8	8.3 U	8.0 U	9.7 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	8.3 U	8.0 U	9.7 UJ	62 UJ
Methoxychlor	72-43-5	83 U	80 U	97 UJ	620 UJ
Toxaphene	8001-35-2	170 U	160 U	190 UJ	1200 UJ
Arochlor 1016	12674-11-2	83 U	80 U	97 UJ	130 UJ
Arochlor 1221	11104-28-2	83 U	80 U	97 UJ	130 UJ
Arochlor 1232	11141-16-5	83 U	80 U	97 UJ	130 UJ
Arochlor 1242	53469-21-9	83 U	80 U	97 UJ	130 UJ
Arochlor 1248	12672-29-6	83 U	80 U	97 UJ	130 UJ
Arochlor 1254	11097-69-1	170 U	160 U	190 UJ	260 UJ
Arochlor 1260	11096-82-5	170 U	160 U	190 UJ	260 UJ

[a] Sample misidentified on Form 1 as "B00-GS".
[b] For comparison to split sample results.
U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.
B00H07 and B00GW5 qualified "UJ" for some analytes because of a minor calibration anomaly.
B00GS5 qualified "UJ" because of high surrogate and high matrix spike recoveries.

4.1.2 Herbicides

Analytical results were reported for 2,4-D (CAS # 94-75-7) and 2,4,5-TP, also known as Silvex, (CAS # 93-72-1). Both herbicides were undetected in all regular site samples, field duplicates and field silica sand samples. Sample reporting limits ranged widely. Validated results ranged from 28 UJ - 4900 UJ µg/Kg for 2,4-D, and 3 UJ - 240 UJ µg/Kg for 2,4,5-TP. The median regular sample result for 2,4-D was 150 UJ µg/Kg. The median regular sample result for 2,4,5-TP was 15 UJ µg/Kg. All regular, field duplicate, field split and silica sand sample results are shown in Appendix A.

All values were qualified by Westinghouse Hanford as "J" because the pre-extraction holding time exceeded the 7 day criterion established for water samples. Once extracted, all samples were analyzed within the appropriate 40-day period. 2,4,5-TP was detected in one laboratory reagent blank, but no results were qualified because herbicides were undetected in all site samples.

Split samples were not analyzed for herbicides.

4.1.3 Organophosphorous Pesticides

Organophosphorous pesticides were undetected in all soil samples. All results were qualified by Westinghouse Hanford because extraction was outside the 7-day criterion applicable to certain water analyses. Once extracted, all samples were analyzed within the appropriate 40-day period.

Organopesticide analyses were subcontracted by the primary laboratory. One of the applicable contracts changed during the Phase 3 project. This resulted in an increase in the number of analytes reported for about 40 percent of the samples. All analytes were still undetected. Samples with the increased analyte list include the following:

- All samples from the borehole at the 3C Pond
- Samples B00GX6, B00GZ2, B00GZ6, and B00GZ8 from the 3B Pond
- Silica sand B00H10
- Field duplicate B00H05.

All regular, field duplicate and silica sand sample results are shown in Appendix A.

Tables 4-4a and 4-4b summarize the reporting limits for all regular field samples and analytes. Silica sand and field duplicates were reported to similar limits. No contaminants were reported in laboratory blanks.

Split samples were not analyzed for organophosphorous pesticides.

Table 4-4a. Organophosphorous Pesticide Reporting -- 18 Regular Samples (Short List).

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE mg/Kg	MEDIAN mg/Kg
Dimethoate	60-51-5	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Disulfoton	298-04-4	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Parathion ethyl	156-38-2	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Parathion methyl	298-00-0	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Phorate	298-02-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Famphur	52-85-7	Yes	0.16 UJ - 0.19 UJ	0.16 UJ
Thionazin	297-97-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
o,o,o-Triethyl phosphorothioate	126-68-1	Yes	0.03 UJ - 0.03 UJ	0.03 UJ

U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.

Table 4-4b. Organophosphorous Pesticide Reporting -- 13 Regular Samples (Long List).

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE mg/Kg	MEDIAN mg/Kg
Azinphos methly	86-50-0	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Coumaphos	56-72-4	Yes	0.21 UJ - 0.26 UJ	0.21 UJ
Demeton	8065-48-3	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Diazanon	333-41-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Dimethoate	60-51-5	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Disulfoton	298-04-4	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
EPN	2104-64-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ethion	563-12-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ethoprop	13194-78-4	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Fensulfothion	115-90-2	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Fenthion	55-38-9	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Malathion	121-75-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Merphos	150-50-5	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Mevinphos	7786-34-7	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Monocrotophos	6923-22-4	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Naled	300-76-5	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Parathion, ethyl	56-38-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Parathion, methyl	298-00-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Phorate	298-02-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ronnel	299-84-3	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulprofos	35400-43-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
TEPP	21646-99-1	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	Yes	0.26 UJ - 0.31 UJ	0.26 UJ
Trichloronate	327-98-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ

U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.

4.1.4 Dioxins and Furans

Some Phase 3 soil samples were submitted for the analysis of total tetra through octa dioxin and furan homologs. These highly specialized analyses were planned for the first few samples from each of the vadose zone boreholes. Evidence has shown that dioxins do not readily migrate through soil and dioxins are not suspected to have been disposed of at the site. Sampling and analysis was intended to demonstrate that the vadose zone was not contaminated with such compounds.

Samples were analyzed using a modified version of SW-846 Method 8280, (Rev. 0) (EPA 1986). Dioxin analyses, like organophosphorous pesticide analyses, were subcontracted by the primary laboratory. A 10-g aliquot of each sample and laboratory blank (sodium sulfate) were spiked at the analytical laboratory before extraction with an internal standard solution containing 50 ng each of ^{13}C-2,3,7,8-TCDD, ^{13}C-2,3,7,8-TCDF, ^{13}C-PeCDD, ^{13}C-PeCDF, ^{13}C-HxCDD, ^{13}C-HxCDF, ^{13}C-HpCDD, ^{13}C-HpCDF and ^{13}C-OCDD. A summary of the performance against these internal standards is shown in Table 4-5.

Table 4-5. Internal Standard Percent-Recovery Summary Dioxins and Furans (25 Samples).

	TCDD	PeCDD	HxCDD	HpCDD	OCDD	TCDF	PeCDF	HxCDF	HpCDF
AVERAGE	65.08	66.56	68.08	59.8	63.48	59.72	62.8	79.72	72.76
RANGE- Max	84	98	85	71	98	83	84	103	92
Min	37	36	44	43	44	26	49	61	55

Additional laboratory QC included blank, matrix spike, and duplicate analyses. Results were within established acceptance limits.

All soil aliquots were extracted outside the 7-day criterion applicable to certain water samples. Results shown in Appendix A were conservatively qualified "UJ" by Westinghouse Hanford because of the time between field sampling and extraction. Periods between sampling and extraction ranged from 3 weeks to 50 days. Once extracted, all samples were analyzed within the 40-day criterion established for extracts.

Detection limits were calculated and reported by the laboratory when target compounds were not found. The concentration corresponding to a signal-to-noise ratio of 2.5 was reported as the detection limit for each analyte. All results reflect these limits and are reported with "U" qualifiers in Appendix A.

The result for sample B00H01 (see Section 4.1) is missing; however, this should have minimal impact on the chemical characterization of 3C Pond vadose zone. Samples taken above and below B00H01 were not found to have any detectable dioxin or furan target compounds. (This is also consistent with samples from other areas of B-Pond.)

4.1.5 Volatile Organic Compounds

No volatile organic compounds of significance were found. However, three identifiable compounds were reported in the regular samples: methylene chloride, acetone, and 4-methyl-2-pentanone. Only methylene chloride is known to be a 40 CFR Part 261 Hazardous Constituent and WAC 173-303-9905 Dangerous Waste Constituent. All regular, field duplicate, field split, and silica sand sample results are shown in Appendix A.

Traces of three unidentified compounds were reported in sample B00GV5. This was the deepest 3A Pond borehole sample (~143.5 ft). It was from a saturated zone. (The sample was noted as "very wet" in the field logbook. A percent moisture on the VOA aliquot was not reported.)

Samples were spiked with surrogate compounds to monitor method performance. Recoveries are summarized in Table 4-6. Performance on matrix spike and matrix spike duplicates was also reviewed as part of data validation and found to be within accepted limits. Some VOA results were qualified during data validation based on holding times and laboratory reagent blanks.

Table 4-6. VOA Surrogate Percent-Recovery Summary
(37 Samples--50 μg/Kg Spikes)

SURROGATE	QC LIMITS (%)	MEAN (%)	MAXIMUM (%)	MINIMUM (%)
Toluene-d8	81-117	103.4	115.4	91.2
Bromofluorobenzene	74-121	101.1	109.2	91.0
1,2-Dichlorethane	70-121	102.0	110.7	86.9

Methylene chloride was reported in B00FK7 (4 J μg/Kg) and B00FK8 (3 J μg/Kg). These were the second and third samples, respectively, collected from the 3A Pond borehole. No other suspected traces of this analyte were identified in the 29 other regular site samples, 3 field duplicates, 3 silica sand samples, or 9 laboratory reagent blanks. Methylene chloride in each sample was reported at less than the minimum detection level reported for all other samples. Reporting limits on other samples ranged from 5 U - 8 U μg/Kg, with 5 U μg/Kg being the most common value.

Methylene chloride was reported by the laboratory (before Westinghouse Hanford validation) with a "J" qualifier flag. This indicates an estimated value. According to CLP protocol and given evidence of detection, some analytes may be reported by the laboratory at levels below the CLP contract detection limit and flagged as estimated. The EPA CLP Statement of Work for Organic Analysis has historically used 10 μg/Kg as a contract-required quantitation limit (CRQL) for methylene chloride in soil. This figure is based on wet weight, and must be adjusted upward based on the percent moisture for comparison to results reported on a dry-weight basis. The reporting methods used by the Phase 3 laboratories are based on this protocol. Results were reported on a dry-weight basis.

Although methylene chloride was not reported in blanks, it is a common laboratory contaminant. It can also diffuse through the septum of VOA sample containers in shipment or storage. Acetone, another common volatile solvent,

was also reported in each of the two samples reported with traces of methylene chloride. These samples contained the highest and second highest reported levels of acetone.

Acetone was reported in only 6 of the 37 validated VOA samples analyzed at the primary laboratory. Reported concentrations were 64, 55, 13, 17, 27, and 49 µg/Kg. Five of the incidences were associated with two sampling/shipment days (from 3A Pond) and two analytical batches. Sample numbers were B00FK7, B00FK8, B00FL0, B00FL3 (silica sand blank), and B00GR9 (field duplicate). The sixth occurrence was in sample B00H19 from 3C Pond. Not all samples collected and shipped in common were analyzed on the same day. Eight samples shared the characteristic of having been collected/shipped and analyzed in association with a sample where acetone was reported. None of the three immediately associated laboratory blanks showed traces of acetone, although another laboratory blank during the project was reported at 26 µg/Kg. One of the eight samples was a silica sand field blank. Acetone was reported in the silica sand blank at 17 µg/Kg. The other two silica blanks submitted during the project were not reported to contain acetone. Acetone was also not reported in B00FL4, the regular sample associated with the field duplicate, B00GR9.

All individual sample results for acetone are less than four times the amount reported in one of the three project silica sand blanks. All acetone results are also below the SW-846 (EPA 1986) practical quantitation limit (PQL) discussed below. Acetone is highly soluble in water. If acetone was at a quantifiable concentration and originated from percolating wastewater, there should be a positive correlation between sample moisture and acetone content. The evidence does not support correlation.

The compound 4-methyl-2-pentanone, also known as methyl isobutyl ketone, was reported by the laboratory at 3 J µg/Kg in sample B00GV5, B00GX6, and B00GZ2. (The "J" qualifiers have the same meaning as for methylene chloride.) The contract-required quantitation limit (CRQL) and nominal reporting limit of 4-methyl-2-pentanone is the same as methylene chloride, 10 µg/Kg. For all other 28 regular samples, 3 field duplicates, and 3 silica sand blanks, 4-methyl-2-pentanone was reported as undetected at the adjusted CRQL. Although not reported in either of the two immediately associated laboratory blanks, the compound was reported at precisely the same concentration in one of the nine laboratory VOA blanks reported for the project. This rate of occurrence (as well as concentration) is not significantly different from that found for site soil samples. A related compound, the aldol condensate 4-hydroxy-4-methyl-2-pentanone, was a chronic contaminant in semivolatile analyses at the primary laboratory. (All occurrences of that compound were qualified as undetected TICs caused by prolific laboratory contamination. Because of this they are not shown in Appendix A, but concentrations frequently exceeded 20,000 µg/Kg in many semivolatile analyses.)

The validation procedure used to produce the data listed in Appendix A qualifies data based only on laboratory blanks. Appendix A data have <u>not</u> been qualified based on results of project silica sand field samples. Consistent with EPA validation guidance, the procedure employed to evaluate laboratory blanks uses a 10X rule for evaluating common laboratory contaminants, including acetone. Results less than 10X the concentration in an associated blank are qualified as undetected at the reported concentration.

Frequently instrument capabilities alone are not the primary limitation of measuring low-level organic compounds. Other aspects of the procedure, such as sample preparation and handling, are important parts of the measurement system. For instance, a single VOA aliquot of sample B00H19 was collected and shipped for analysis. It was divided by the laboratory and analyzed in triplicate as a regular, matrix spike, and matrix spike duplicate sample. Acetone was measured at 49 and 47 µg/Kg respectively in two portions, yet undetectable (11 U µg/Kg) in the third.

In recognition of such factors, EPA has established practical quantitation limits (PQLs) for those methods used to determine whether a solid waste is a hazardous waste within the definition of Section 3001 of RCRA. Practical quantitation limits are estimates of the lowest concentrations that can be reliably measured by a given analytical procedure. Washington State "Dangerous Waste Regulations" (WAC 173-303) reference EPA's SW-846 (EPA 1986) manual in setting analytical protocol standards. The EPA has published 5 µg/Kg as a PQL for methylene chloride in soil measured by SW-846 method 8240. The corresponding PQLs for acetone and 4-methyl-2-pentanone are 100 and 50 µg/Kg (EPA 1986). EPA recognizes that PQLs are highly matrix dependent and may not always be achievable. Again, these figures are based on wet weight and must be adjusted when compared to results reported on a dry-weight basis.

Although not currently discussed in the "Dangerous Waste Regulations" (WAC 173-303), regulations under other authority such as Washington State's "Model Toxics Control Act" (WAC 173-340) reference EPA's PQLs in establishing de facto de minimis regulatory limits (see WAC 173-340-707 *Analytical Considerations*). Other factors, including toxicity, are also considered.

The EPA is not known to have issued any general rules on environmental media de minimis levels of 40 CFR Part 261 Appendix VIII hazardous constituents. It has historically been EPA's policy that such levels are determined on a site-specific basis (57 FR 958 et seq.). The EPA's proposed RCRA Corrective Action rules (55 FR 30798 et seq.) give an example of a soil methylene chloride concentration meeting the criteria for a media action level. This action level is a conservative health-based level based on ingestion of contaminated soil. The toxicity of methylene chloride is such that the proposed action level is 90 mg/Kg (equivalent to 90,000 µg/Kg). Likewise, conservative health-based concentration action levels for acetone and 4-methyl-2-pentanone are 8000 mg/Kg and 4000 mg/Kg, respectively.

4.1.6 Base/Neutral/Acid Compounds

Phase 3 soil samples showed no semivolatile target compounds at concentrations above their respective CRQL. Only two target compounds were reported in site samples, benzoic acid and diethylphthalate. Each occurrence was qualified as estimated, "J", by the laboratory because both had less than CRQL concentrations. Both were also reported in at least one laboratory blank, although not the one "associated" with those particular analyses according to the employed data validation procedure. All regular, field duplicate, field split, and silica sand sample results are shown in Appendix A.

Surrogate compounds were used to monitor method performance. All surrogate recoveries were within acceptable limits. A performance summary for

all regular, duplicate, and silica sand samples submitted to the primary laboratory is shown in Table 4-7. All matrix spike and duplicate recoveries met QC specifications.

Table 4-7. Semivolatile Surrogate Percent-Recovery Summary (37 Primary Laboratory Samples).

Surrogate	Nitrobenzene -d5	1,1'-Biphenyl, 2-Fluoro	Terphenyl-d14	Phenol-d6	2-Fluoro phenol	2,4,6-Tribromo phenol
Spike added (µg/Kg)	100	100	100	200	200	200
Mean percent-recovery	57.2	65.8	83.1	54.6	51.8	52.2
Standard deviation	17.2	20.4	14.8	16.1	13.3	17.4
QC limits %	23 - 120	30 - 115	18 - 137	24 - 113	25 - 121	19 - 122

While benzoic acid is not listed as a RCRA Appendix VIII- or WAC 173-303-9905 Dangerous Waste constituent, benzoic acid was reported in 9 of the 37 samples, (regular, field duplicate, and silica sand samples). In each case, it was reported at less-than-one-fifth of the nominal less-than reporting limit of 5000 µg/Kg. Seven occurrences were associated with samples extracted February 24, 1991. All of the samples were from the upper 28 ft of the 3A Pond borehole. The remaining two occurrences were associated with samples extracted March 7, 1991. These were the first two samples from the 3B borehole. Neither immediately associated batch blank was reported with traces of benzoic acid, nor were other site samples in the batches. However, one of seven laboratory blanks reported with Phase 3 samples did contain benzoic acid, estimated at 1500 J µg/Kg, which is below the CRQL. This concentration is greater than that estimated in the nine validated samples.

Diethylphthalate was reported in only three regular samples and one split sample. Diethylphthalate appears on both the RCRA Appendix VIII and WAC 173-303-9905 list. All occurrences of diethylphthalate were qualified as estimated, flagged with a "J", because of low concentration. All occurrences were less than half the less-than reporting limit of 1000 µg/Kg. Reported concentrations were 170 J, 210 J, and 370 J µg/Kg. One of the independently analyzed split samples was reported at 95 J µg/Kg. That sample was collected simultaneously to with the regular sample reported at 210 J µg/Kg by the primary laboratory. Sample numbers and location are as follows:

- B00FK7 (3A Pond-8.5 ft)
- B00GS4 (3A Pond-52.5 ft)
- B00GZ2 (3B Pond-90.5 ft)
- Split B00GS5 (3A Pond-52.5 ft).

No evidence of the phthalate compound was found in the associated laboratory blanks; however traces were suspected in two of the seven blanks at the primary laboratory, (a higher rate than the samples). The phthalate compound was reported at 670 J and 540 J µg/Kg in those laboratory reagent blanks. As a result, some samples were qualified undetected at the CRQL. None of the three split laboratory blanks or three silica sand samples showed traces of this particular phthalate, though both groups contained other

phthalates. Phthalates are commonly found at low levels as field or laboratory contaminants.

The EPA CLP SOW for organic analyses has traditionally defined an acceptable semivolatile analytical method blank as one containing a concentration less than or equal to the CLP CRQL, except for target compound phthalate esters. An acceptable blank may contain a concentration of less than or equal to 5X times the target compound phthalates. This reflects the widespread use of phthalate compounds and the difficulty of avoiding sample cross-contamination bias. The key issue of whether a particular single isolated sample is representative must be considered.

The fact that both the regular sample, B00GS4, and its associated split, B00GS5 were reported with traces of diethylphthalate suggests at least some of the occurrences may have had a field origin (true or artificial). Although the compound sinks in water, phthalate esters are readily sequestered by or adsorbed on organic residues and solid surfaces in environmental water systems. This should lead to accumulation in the near-surface sediments and subsequent long-term low-level release if wastewater disposal activities are the true source of diethylphthalate. Introduced spurious contamination from a common field source is also a possible source, which would cause such samples to actually be unrepresentative of site conditions.

The few and isolated nature of the occurrences, low concentration, and apparent lack of decreasing concentration with depth suggest that the occurrences are an artifact of the measurement system and not a reflection of site conditions. Although trends with depth are opposite of a pond sediment source, the values are too low to be considered reliable indicators of contamination. The overall measurement system is simply not capable of reliably characterizing the mean diethylphthalate concentration at such minute levels. From a single split spoon of soil, the sample standard deviation calculated using the two independently analyzed samples, B00GS4 and B00GS5, is 81.3 μg/Kg. A 90-percent one-sided small sample confidence interval for the true mean of the location encompasses zero. Based only on the demonstrated reproducibility at this one location for which two, supposedly positive, independent analyses were performed, one cannot reliably consider the concentration of diethylphthalate different from zero.

Semivolatile results, in contrast to the Phase 1 study results, showed frequent TICs, averaging approximately 13 per sample for the primary laboratory and slightly more than 3 per sample for the split laboratory. In addition, laboratory batch blanks averaged approximately 14 TICs per blank at the primary laboratory; no TICs were seen for blanks at the split laboratory. Most of the TICs were either unidentifiable or only generically identifiable compounds. The large number of TICs reported by the primary laboratory for both samples and blanks suggest that their occurrence must be interpreted with some skepticism.

The majority of TICs were rejected on validation because identical compounds occurred at similar concentrations in the immediately associated laboratory batch blanks. Nevertheless, some TICs remained after validation. A surprisingly similar number of TICs were present in the average validated sample results from the primary and split laboratories--slightly less than four and slightly greater than three, respectively, after validation. Silica sand field blanks were <u>not</u> considered in the employed validation procedure.

They were submitted only to the primary laboratory. On average, they contained four validated TICs per sample.

One compound identified as a validated TIC is listed on the RCRA Appendix VIII or WAC 173-303-9905 Dangerous Waste Constituents List. The identified compound is dimethylhydrazine (CAS # not reported by laboratory). Three occurrences, (B00FL1, B00GR9, and B00FK9), were associated with a single analytical batch; however, B00FK9 was flagged to indicate the analyte was found in an associated laboratory reagent blank. The laboratory did not specifically report this compound in the identified associated laboratory blank, (lab ID 910225-170). The laboratory has not been able to produce a definitive explanation for this apparent anomaly. Application of validation criteria to TICs resulted in rejection of this particular TIC in sample B00FK9, but not B00FL1 or B00GR9--even though all were supposedly in the same analytical batch. Reported concentrations and qualifiers were 600 JY- and 460 J-µg/Kg, respectively. No other Phase 3 samples contained this compound.

4.2 INORGANIC CHEMICAL RESULTS

All inorganic results with attached data qualifiers are listed in Appendix A. The results are summarized by two tables. Calculated statistics can be confirmed using values listed in Appendix A. Further comparisons of these results are made in Section 5.

All regular samples are summarized in Table 4-8. Values are summarized by showing the total number of samples analyzed, number of less-than-detection-limit values, median, mean, upper 90-percent limit of the mean, standard deviation, percent coefficient of variation, and range for each lobe. A standard deviation, upper confidence limit, and percent-coefficient of variation were not calculated for analytes that were rarely or never at detectable concentrations. For those analytes that were undetected in a minority of samples, analytes were assumed, for summary calculation purposes, to have values equal to their reported "less-than" values. Concentration qualification flags are shown for the minimum and maximum values of each lobe.

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Aluminum	3A	20	0	6100	6160	6584	1427	23	3800	9600
	3B	20	0	6000	6975	7866	3001	43	4500	17000
	3C	15	0	6000	5987	6333	998	17	4600	8300
Ammonia	3A	21	21	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
	3B	17	17	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
	3C	15	15	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
Antimony	3A	20	16	<5.2	<5.8	NC	NC	NC	4.6 U	14
	3B	20	20	<5.1	<5.1	NC	NC	NC	4.9 U	5.8 U
	3C	15	15	<5.2	<5.2	NC	NC	NC	4.8 U	5.3 U
Arsenic	3A	21	0	1.5	1.74	1.97	0.805	46	0.79	4.2
	3B	20	1	<1.35	<2.25	2.90	2.171	96	0.59 U	7.2
	3C	11	0	1.7	1.46	1.76	0.713	49	0.65	2.5
Barium	3A	20	0	71.5	71.1	74.1	10.2	14	53	91
	3B	20	0	78	77.6	80.7	10.4	13	62	96
	3C	15	0	73	80.5	90.6	29.3	36	50	170
Beryllium	3A	20	0	0.35	0.36	0.38	0.073	20	0.23	0.53
	3B	20	0	0.35	0.38	0.42	0.130	34	0.29	0.88
	3C	15	0	0.30	0.31	0.33	0.058	19	0.21	0.41
Boron	3A	20	6	<4.6	<4.52	5.55	3.46	77	0.39 U	9.3
	3B	20	0	7.0	6.99	7.57	1.98	28	3.7	12
	3C	15	2	<7.7	<7.37	8.89	4.38	59	0.42 U	14

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Cadmium	3A	20	4	<0.66	<0.78	0.90	0.42	54	0.28 U	1.6
	3B	20	1	<0.98	<1.06	1.19	0.44	41	0.31 U	1.8
	3C	15	0	1.7	1.72	1.89	0.50	29	1.0	2.5
Calcium	3A	20	0	8000	8305	9055	2524	30	3400	14000
	3B	20	0	7250	7415	7994	1949	26	3000	13000
	3C	15	0	6800	7193	7686	1419	20	5300	11000
Chloride	3A	21	21	<20	<18.2	NC	NC	NC	1 U	20 U
	3B	20	20	<20	<20	NC	NC	NC	20 U	20 U
	3C	15	15	<20	<20	NC	NC	NC	20 U	20 U
Chromium	3A	20	0	7.55	8.17	9.35	3.98	49	3.1	16
	3B	20	0	10.35	12.0	13.6	5.39	45	5.1	25
	3C	15	0	7.30	9.23	11.2	5.64	61	4.1	27
Cobalt	3A	20	0	11	12.0	12.6	2.04	17	7.0	15
	3B	20	0	13	12.2	12.8	2.07	17	7.3	15
	3C	15	0	13	12.4	13.1	1.94	16	8.1	16
Copper	3A	20	0	16	18.3	20.5	7.31	40	10	45
	3B	20	0	19	19.4	20.7	4.44	23	13	33
	3C	15	0	17	17.4	18.6	3.40	20	13	26
Cyanide	3A	11	10	<1	<0.9	NC	NC	NC	0.12 J	1 UJ
	3B	11	11	<1	<0.7	NC	NC	NC	0.1 UJ	1 UJ
	3C	9	8	<0.1	<0.4	NC	NC	NC	0.1 UJ	1 UJ

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Fluoride	3A	21	9	<2	<1.5	NC	NC	NC	0.6	2.2
	3B	20	13	<2	<2.1	NC	NC	NC	2 U	3
	3C	15	12	<2	<2.0	NC	NC	NC	2 U	2.2
Iron	3A	20	0	26000	24700	2.58E+04	3813	15	16000 J	29000
	3B	20	0	26000	25500	2.65E+04	3269	13	17000	30000 J
	3C	15	0	25000	25200	2.64E+04	3590	14	17000	31000
Lead	3A	21	0	3.83	4.89	5.97	3.722	76	2.1	18
	3B	20	0	3.15	5.24	6.58	4.535	87	2.2	20
	3C	11	0	2.5	4.99	8.43	8.316	167	1.8	30
Magnesium	3A	20	0	4900	5035	5385	1178	23	3800	8700
	3B	20	0	4500	4785	5142	1201	25	3600	8400
	3C	15	0	4500	4513	4711	569	13	3700	5800
Manganese	3A	20	0	340	334	350	54.3	16	250 J	440
	3B	20	0	310	322	335	42.5	13	270	410 J
	3C	15	0	300	313	329	44.3	14	250	400
Mercury	3A	21	21	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
	3B	20	20	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
	3C	7	7	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
Molybdenum	3A	20	15	<1.05	<1.18	NC	NC	NC	0.96 U	2.4
	3B	20	8	<1.2	<1.25	1.34	0.30	24	0.99 U	2.0
	3C	15	11	<1.0	<1.18	NC	NC	NC	0.97 U	2.2

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Nickel	3A	20	0	10	10.9	12.2	4.26	39	5.9	24
	3B	20	0	11	11.3	12.2	3.01	27	8.2	21
	3C	15	0	10	10.6	11.6	2.87	27	6.8	18
Nitrate	3A	21	21	<20	<18.2	NC	NC	NC	1 UJ	20 UJ
	3B	20	20	<20	<20	NC	NC	NC	20 UJ	20 UJ
	3C	15	15	<20	<20	NC	NC	NC	20 UJ	20 UJ
pH (Field)	3A	21	0	7.	7.0	7.2	0.42	6	6	7.6
	3B	20	0	7.5	7.3	7.4	0.30	4	7	8
	3C	15	0	7.5	7.5	7.6	0.40	5	7	8.1
Potassium	3A	20	0	820	905	1007	345	38	530	1800
	3B	20	0	780	1013	1181	566	56	660	3000
	3C	15	0	860	863	925	179	21	550	1100
Selenium	3A	12	12	<0.54	<0.70	NC	NC	NC	0.49 U	1.1 UD
	3B	11	11	<0.52	<0.53	NC	NC	NC	0.50 U	0.61 U
	3C	6	6	<0.52	<0.52	NC	NC	NC	0.51 U	0.52 U
Silicon	3A	20	0	445	437.0	478	137	31	270	860
	3B	20	0	300	326.5	347	70	21	240	450
	3C	15	0	300	326.7	349	66	20	250	460
Silver	3A	20	12	<0.64	<0.75	NC	NC	NC	0.56 U	1.5
	3B	20	20	<0.61	<0.62	NC	NC	NC	0.58 U	0.70 U
	3C	15	15	<0.62	<0.62	NC	NC	NC	0.58 U	0.64 U

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Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Sodium	3A	20	0	280	349	404	186	53	170	810
	3B	20	0	405	402	445	146	36	180	710
	3C	15	0	435	479	520	117	24	270	730
Sulfate	3A	21	2	<20	<18.4	NC	NC	NC	1 U	24
	3B	20	5	<20	<22.7	NC	NC	NC	20 U	39
	3C	15	1	<20	<20.4	NC	NC	NC	20 U	26
Sulfide	3A	11	11	<0.1	<0.1	NC	NC	NC	0.1 U	0.1 U
	3B	11	10	<0.1	<0.1	NC	NC	NC	0.1 U	0.1
	3C	9	9	<0.1	<0.1	NC	NC	NC	0.1 U	0.1 U
Thallium	3A	12	12	<1.0	<1.04	NC	NC	NC	0.97 U	1.1 U
	3B	11	11	<1.0	<1.04	NC	NC	NC	1.0 U	1.2 U
	3C	6	6	<1.0	<1.00	NC	NC	NC	1.0 U	1.0 U
Vanadium	3A	20	0	67.5	64.5	68.4	13.3	21	38	86
	3B	20	0	70.5	66.2	70.6	14.9	22	34	87
	3C	15	0	68	66.9	71.1	12.1	18	38	85
Zinc	3A	20	0	49.5	47.8	49.8	6.64	14	34	60
	3B	20	0	47	46.6	47.9	4.67	10	39	56
	3C	15	0	47	46.3	48.5	6.50	14	34	57

NC Not calculated, most or all values undetected. See Appendix A data.
D Dilution.
U Analyte was not detected at the stated limit.
J The associated value is an estimated quantity.

Field duplicates are summarized in Table 4-9. Field duplicate samples aid in evaluating short-term variability of the measurement system processes and of the inherent media variability itself. They provide a second estimate of the representative concentration associated with a particular interval, and thereby allow an estimate of variability within the given measurement system. For the purposes of the Table 4-9 summary, all statistics were calculated only where pairs of values were uncensored by a reporting limit. The following two methods of summarizing variability were used:

- The average sample variance between regular/field duplicate pairs. (The square root of the variance is the standard deviation.)

- The average percent coefficient of variation between regular/field duplicate pairs.

Variability above the detection limit is also graphically displayed in Appendix B for regular/field duplicate and regular/split sample pairs uncensored by a reporting limit. Most analytes show no definitive trend between variability and concentration for results from a single laboratory; however, this is not the case when split samples are considered. This suggests that the coefficient of variation may be the preferred parameter to consider when making interlaboratory comparisons. These comparisons incorporate sources of variability between measurement systems as well as within single-laboratory systems.

Split samples provide an independent analysis to corroborate results of the primary laboratory. Table 4-9 summarizes the average "bias" of the reportable primary laboratory results by assuming that the split laboratory provides the true value. The standard deviation of the bias and number of pairs considered in the calculations are listed. The statistical significance was evaluated by determining if a 95%, two-sided confidence interval around the average also encompassed zero. The interval was based upon the t-distribution, number of bias estimates and their variability. Analyte concentrations were generally lower at the split laboratory than the primary laboratory. Therefore, decisions based on projections from the primary laboratory values should be more conservative and thus be more protective of human health and the environment. If the site is considered sufficiently clean based on these higher values, overestimation of constituents is irrelevant. However, if values suggest that dangerous waste is be present, further evaluation may be in order.

A mean bias and comparison calculations were not made when all values were reported at an undetected censored limit by either laboratory. When values were not censored at a reporting limit, they were considered in the comparisons. Alternatively for arsenic, beryllium, chromium, potassium, sodium, and gross alpha, computations were also made considering all censored concentrations equivalent to the reporting limit, (example 1.0 U = 1). The alternate results are shown in brackets. In the case of sodium, one undetected split was reported at a much higher limit and therefore unduly affected this type of comparison. No comparisons are possible for analytes not measured at both the primary and split laboratories.

Table 4-9. Field Duplicate and Split Comparison Summary[a]

Analyte (µg/g)	Field Duplicate: Regular Sample Pairs				Regular Minus Associated Field Split Sample			
	Computed on x Sample Pairs	Average Variance (s^2)	Standard Deviation (S)	Average Percent Coefficient of Variation	Mean Bias µg/g	Standard Deviation of Bias	Computed on x Sample Pairs	Statistically Significant? (α=.05)
Aluminum	7	250714.3	500.71	6.50	4082.86	1163.50	7	Y
Ammonia	-	NC	NC	NC	NA	NA	-	-
Antimony	-	NC	NC	NC	NC	NC	-	-
Arsenic	6	1.503	1.226	19.9	1.426 [1.14]	2.37 [2.04]	5 [7]	N [N]
Barium	7	126.6	11.25	11.4	28.4429	13.33	7	Y
Beryllium	7	0.0	0.02	6.20	0.07 [-0.04]	0.11 [0.31]	4 [7]	N [N]
Boron	6	1.7	1.32	10.6	NA	NA	-	-
Cadmium	7	0.3	0.51	26.8	NC	NC	-	-
Calcium	7	1465714.3	1210.67	11.4	2761.43	978.48	7	Y
Chloride	-	NC	NC	NC	NA	NA	-	-
Chromium	7	12.4	3.52	27.3	14.17 [11.04]	6.17 [5.50]	3 [7]	N [Y]
Cobalt	7	0.2	0.48	3.09	5.25	2.74	6	Y
Copper	7	3.4	1.85	9.01	9.943	3.25	7	Y
Cyanide	-	NC	NC	NC	NC	NC	-	-
Field pH	7	0.0	0.0	0.0	NA	NA	-	-
Fluoride	-	NC	NC	NC	NA	NA	-	-
Iron	7	2214285.7	1488.05	4.34	14927.1	3962.73	7	Y
Lead	7	8.995	2.999	12.2	2.2	5.45	6	N
Magnesium	7	189285.7	435.07	8.85	2645.71	816.37	7	Y
Manganese	7	464.3	21.55	5.38	145.6	48.27	7	Y
Mercury	-	NC	NC	NC	NC	NC	-	-
Molybdenum	3	0.3	0.57	31.5	NA	NA	-	-
Nickel	7	26.9	5.18	20.3	5.62	2.43	6	Y
Nitrate	-	NC	NC	NC	NA	NA	-	-
Potassium	7	8114.3	90.08	8.76	389.75 [351.28]	74.59 [205.7]	4 [7]	Y [Y]
Selenium	-	NC	NC	NC	NC	NC	-	-
Silicon	7	3828.6	61.88	12.9	NA	NA	-	-

Table 4-9. Field Duplicate and Split Comparison Summary[a]

Analyte (µg/g)	Field Duplicate: Regular Sample Pairs				Regular Minus Associated Field Split Sample			
	Computed on x Sample Pairs	Average Variance (S^2)	Standard Deviation (S)	Average Percent Coefficient of Variation	Mean Bias µg/g	Standard Deviation of Bias	Computed on x Sample Pairs	Statistically Significant? (α=.05)
Silver	-	NC	NC	NC	NC	NC	-	-
Sodium	7	3785.7	61.53	11.6	272.14 [151.1]	177.58 [299.35]	5 [7]	Y [N]
Sulfate	2	18.5	4.30	13.3	NA	NA	-	-
Sulfide	-	NC	NC	NC	NA	NA	-	-
Thallium	-	NC	NC	NC	NC	NC	-	-
Vanadium	7	13.0	3.61	4.17	45.029	14.53	7	Y
Zinc	7	8.6	2.93	4.32	25.829	5.35	7	Y
RADIONUCLIDE DATA (pCi/g)								
Gross Alpha	7	1.21	1.100	NC	-2.7 [-1.4]	1.38 [1.7]	3 [6]	N [N]
Gross Bete	7	18.78	4.334	NC	-18.35	12.88	6	Y
Strontium-90	3	1.60	1.263	NC	NC	NC	-	-
Gamma: Cs-137	2	0.015	0.121	NC	NA	NA	-	-
Gamma: Pa-234m	2	1056.25	32.500	NC	NA	NA	-	-
Gamma: Th-234	2	1.49	1.220	NC	NA	NA	-	-

[a] "U" flagged, less-than values excluded <u>except</u> for bracketed alternate figures computed under the assumption undetected values are equal to the reporting limit, (See text).
NC Not calculated, most or all values undetected--see Appendix A data.
NA Not available.

4.3 RADIOANALYTICAL RESULTS

Radioanalytical work included field screening techniques and both onsite and offsite laboratory determinations. All samples were handled as nonradioactive based on field screening and onsite analyses. Offsite analyses included gross alpha, gross beta, gamma, and ^{90}Sr determinations. The primary laboratory reported EPA 900.0 was used for alpha, beta and gamma, and EPA 906 for ^{90}Srdeterminations. Several samples were submitted to the split laboratory for radiologic analyses. These particular analyses were subcontracted to another laboratory. Methods were identified only by the laboratory-specific procedure numbers PRO-032-15 for total alpha or beta determinations, PRO-042-5 for gamma scans, and PRO-032-25 for strontium-90 assays.

The above parameters are not believed to be regulated under current and applicable RCRA regulations. Unvalidated radiological data are presented in Appendix A for information only. Field duplicate and split summaries are presented at the end of Table 4-9. The results of the gamma spectra analyses were not comparable between the two project laboratories. Different radionuclides were reported by the two measurement systems.

Gross gamma borehole logging did not reveal any obvious anomalies. Without radionuclide-specific detection capabilities, it is not possible to judge whether any areas of slightly elevated gross counts are caused by radionuclide contamination or localized natural background differences.

4.4 GEOLOGY AT THE VADOSE BOREHOLES

The geology at the three boreholes consisted of mixed sands, sandy gravels, and gravelly sands typical of the Hanford formation in this area. Lithologic descriptions of the three boreholes were recorded in the project borehole logs. A general classification associated with each sample has been listed in the sample key, Table 3-4.

Soil from the 3A Pond borehole was somewhat sandier and had less gravels than soil from the other locations reflecting the fining westward character of the Hanford formation in the B-Pond area. The water table at the 3A Pond borehole was in a sandy gravel, probably still in the Hanford formation, while at the 3B Pond borehole, a saturated silt lens at 116.5 ft most likely marks the top of the Ringold formation. The 3C Pond borehole did not penetrate deep enough to pass through the Hanford formation into the Ringold, which also underlies this area.

Undisturbed surface soil surrounding the B-Pond system is predominately eolian-deposited material. It lacks the cobble and coarse gravels common to the flood-deposited Hanford formation. Earlier Phase 1 sampling collected one class of background samples from the upper foot of soil in sagebrush areas surrounding the B-Pond system. Other background samples collected, as part of the same study, were from the surface of an adjacent unused contingency pond excavation. These two groups of samples were treated separately in the Phase 1 analysis when it became evident that the values of the combined set differed significantly from a normal distribution.

4.5 SOIL PHYSICAL PROPERTIES

Characterization work at the three boreholes included a suite of physical properties testing. Samples collected for physical properties testing were not those analyzed for chemical constituents. Testing was performed at an onsite laboratory. Determinations included specific gravity, percent moisture content, grain size distribution by sieve analysis, hydraulic conductivity, and porosity. Deviation from basic theoretical relationships showed moisture retention curve results were not satisfactory.

Six samples were collected from the borehole at the 3A Pond; 11 at the 3B Pond; and 3 at the 3C Pond. Test requests were not the same for each sample, particularly where similar lithologies were present at several sample horizons. Table 4-10 shows physical properties data for the three boreholes. Some determinations were not performed because the samples were unsuitable. Table 4-11 shows sieve data results. A hydrometer analysis was performed for most samples on fractions passing through a number 200 sieve. This additional data was not included in Table 4-11.

Specific gravity of all samples was well within expected values, ranging from 2.69 to 2.82 g/cm^3. Sieve analysis data showed grain size distributions typical of the Hanford formation in this area. Most samples were classified as sandy gravels and were poorly sorted showing a fairly wide range in grain size. Porosity ranged from 20.50 to 37.71 percent. These values are relatively high, but well within the range for the sandy gravels of the Hanford formation, which are relatively uncompacted and uncemented.

Moisture content varied widely between physical property samples and was not correlated with depth of the sample. Moisture contents of 15 to 18 percent in the 3A Pond borehole indicate saturated or nearly saturated sediments at intermediate depths. This borehole was drilled over a filled area on the edge of the 3A Pond. At the 3B Pond borehole, moisture contents were generally lower, between 2.44 and 7.16 percent above the water table and 20.88 percent in the sample taken at the water table. The 3B Pond has not been used for wastewater disposal since 1985. Moisture content in physical samples from the 3C Pond borehole ranged from 1.07 to 9.6 percent.

Hydraulic conductivity values determined in the laboratory reflect the generally coarsening grain size of the Hanford formation from northwest to southeast at the B-Pond area. The 3A Pond borehole, drilled in the northwest, has the finer grain sizes and the lower measured hydraulic conductivity values, around 3 to 5 cm/sec. Hydraulic conductivity measurements on samples from the 3B Pond borehole to the southeast are higher, around 1E-4 to 1E-3 cm/sec. One measurement of 3E-8 was obtained on the clay silt sample taken at the water table from 3B Pond. No measurements were made on the single 3C Pond sample submitted for this determination because the sample was unsuitable.

Table 4-10. Physical Properties B-Pond Phase 3 Soil Samples.

Sample	Pond	Interval	Specific Gravity g/cm^3	Moisture (percent)	Hydraulic Conductivity cm/sec	Porosity (percent)
B00FL2	3A	20.4 - 23	NR	7.19	NR	NR
B00GS6	3A	51.13 - 54.10	2.81	17.13	4.3 E-5	36.14
B00GS7	3A	53.0 - 55.6	2.81	15.4	1.1 E-5	33.46
B00GT0	3A	67.5 - 69.65	2.81	NR	4.8 E-5	30.32
B00GT2	3A	75.7 - 77.90	2.72	18.01	NR	NR
B00GT9	3A	101.6 - 102.2	NR	4.44	NR	NR
B00GW2	3B	8.2 - 10.85	2.82	7.16	9.8 E-4	32.13
B00GW7	3B	14.4 - 17.1	2.81	3.9	7.6 E-4	25.14
B00GX0	3B	25.9 - 29.6	2.82	2.99	2.36 E-4	23.56
B00GX1[a]	3B	25.9 - 29.6	NR	NR	NR	NR
B00GX7	3B	60 - 62.6	No test-sample uncompacted	5.35	No test-sample uncompacted	No test-sample uncompacted
B00GX9	3B	72.25 - 74.15	2.75	4.02	NR	20.50
B00GZ0	3B	83.0 - 85.9	2.76	3.03	5.4 E-3	29.87
B00GZ1	3B	83.0 - 85.9	2.74	NR	NR	NR
B00GZ4	3B	103.9 - 106.35	2.76	2.44	NR	22.64
B00GZ5	3B	103.9 - 106.35	2.75	3.92	NR	NR
B00GZ7	3B	117.5 - 119.3	2.69	20.88	3.0 E-8	35.76
B00H08	3C	11.7 - 13.7	No test-sample uncompacted	9.6	No test-sample uncompacted	No test-sample uncompacted
B00H12	3C	25.6 - 27.8	2.81	1.07	NR	37.71
B00H13[b]	3C	25.6 - 27.8	NR	NR	NR	NR
B00H22	3C	76.9 - 79.4	NR	5.24	NR	No test-sample uncompacted

[a] Sample only submitted for moisture-retention analysis.
[b] Sample only submitted for grain-size analysis.
NR Not requested

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Table 4-11. Grain Size Analysis[a].

			Cumulative Percent Passed Sieve Size -- Opening in Inches or Number of Mesh per Inch												
Sample	Pond	Depth	2.5	2	1.5	1	3/4	1/2	3/8	#4	#10	#40	#60	#100	#200
B00FL2	3A	21.5	100	92.6	82.9	64.4	58	48.7	44.2	37.1	29.5	10.9	7.3	5.5	4.1
B00GS6	3A	52	100	100	100	100	100	100	100	100	99.1	62.7	23.5	11.6	7
B00GS7	3A	54.5	100	100	100	100	100	100	100	100	100	80.7	60.3	43.7	29.7
B00GT2	3A	77	100	100	100	100	100	100	100	100	99.8	91.9	79.3	59.4	31.4
B00GW2	3B	9.5	100	100	100	100	97	94.9	92.1	86.3	81.5	60.8	34.1	15.7	7.8
B00GW7	3B	16	100	100	100	100	100	100	93.1	83.1	68.1	31.1	16.1	9.9	6.6
B00GX7	3B	61.5	100	100	100	100	100	97.7	96.8	93.3	87.3	24.4	12.7	8.4	5.2
B00GX9	3B	73	100	100	100	92.1	85	76.4	70.4	60.9	51.7	28.4	22.3	18.3	14.3
B00GZ0	3B	84.5	100	100	100	100	98	88.2	81.3	66.8	52.3	29.3	23.3	18.9	14.2
B00GZ1	3B	84.5	100	100	96.3	89.6	85.7	80.9	77.9	71.5	61.5	29.4	21.4	16.4	11.7
B00GZ4[b]	3B	105	100	100	81.7	67.2	61.9	54.9	48.1	37.6	NR	NR	NR	NR	NR
B00GZ5	3B	105	100	97.6	94.1	83.7	77.5	69.8	65.5	56.8	46.9	28.4	23.1	19	14.5
B00GZ7	3B	118.5	100	100	100	100	100	100	100	100	100	98.9	98.1	93.3	74.9
B00H08	3C	12.5	100	100	92.8	86.6	81.5	76.4	73.5	68.8	63.1	13.9	8	5.8	4.2
B00H12	3C	26.5	100	57.1	52.3	39	29.3	19.5	15.2	9.8	6.6	2.7	1.9	1.4	1.1
B00H13	3C	26.5	100	88.5	83.6	---	62	---	43	32.2	22.8	12.3	9.7	7.9	5.8
B00H22	3C	78	100	100	92.9	75.4	67.3	57.2	49.2	38.2	28	12.8	9.8	7.6	5.7

[a]Washed fine grading also performed for most samples on material finer than No. 200 sieve.
[b]Sieve analysis not requested but performed to no. 4 for specific gravity determination.

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5.0 DISCUSSION AND COMPARISON TO DANGEROUS WASTE CRITERIA

The demonstration of clean closure requires that no 40 CFR Part 261 Appendix VIII constituents remain in the soils, vadose zone, or groundwater above regulatory agency recommended limits (EPA 1989). These limits include consideration of water quality standards and criteria, health-based limits based on published reference doses or carcinogenic potency factors, or site-specific agency-approved health advisories (52 FR 8706). The scope of analytical requirements may be reduced from all Appendix VIII constituents when it is reasonable to exclude some based on knowledge of past activities at the unit. In consideration of the potential effect of a waste on human health or the environment, EPA's proposed corrective action rules (55 FR 30798) expand the meaning of the term hazardous constituents to include those identified in 40 CFR Part 264 Appendix IX, commonly known as the Groundwater Monitoring List. Washington State's "Dangerous Waste Constituents List" (WAC 173-303-9905) includes additional constituents not found on the 40 CFR Part 261 Appendix VIII list. Clean closure will require that concentrations of such constituents pose no substantial threat to human health or the environment when left unmanaged.

For several years, two published statements have provided the fullest interpretation of EPA policy currently available concerning requirements applicable to units undergoing clean closure. Those two accounts are in the Federal Register (FR) starting at 52 FR 8704 and again starting at 53 FR 9944. The EPA has been working on issuance of a clean closure guidance document, however it is not known to be available at this time. It is anticipated that many aspects will reflect policy expressed in the proposed RCRA Corrective Action Rule issued July 27, 1990, (55 FR 30798). Recent legal rulings regarding the "mixture" and "derived-from" rule have led EPA to propose a concentration-based exemption criteria (CBEC) that would fundamentally change the application of RCRA Subtitle C (see 57 FR 21450). The proposal will also affect soil contaminated with listed waste, which is currently considered hazardous by the "contained-in" policy.

Surface impoundments containing unremoved regulated hazardous waste cannot remain open to receive nonhazardous waste (54 FR 33388). The 3A Pond, 3B Pond, and 3C Pond have been classified part of a RCRA TSD unit; however, no waters, sediments, or soils have demonstrated characteristics or criteria of a dangerous waste. A dangerous waste must meet one or more of the characteristics or criteria described in WAC 173-303.

Compounds listed on the Part A permit as being occasionally discharged into the B-Pond system include common acids and bases. Such chemicals are no longer hazardous when they lose the characteristic that caused them to be a hazard. In the case of corrosivity, a waste is regulated when the pH is less than or equal to 2 or greater than or equal to 12.5. In the case of solids, regulated status is determined on the solution derived by mixing with an equal weight of water. Both field pH data and pH reported in conjunction with BNA analyses at the split laboratory showed pH within criteria. Also, as evidenced by the aquatic life and vegetation at the unit, the soils would not be expected to exceed these criteria.

Cadmium nitrate was known to have been discharged at least twice since 1983 (during the operation of the B-Pond expansion ponds) to a TSD unit

feeding B-Pond (DOE 1990, Table 4-3). In sufficient concentration, this compound may cause a waste to be sufficiently toxic for regulation as a dangerous waste. Earlier Phase 1 studies did not indicate elevated total cadmium concentrations in surface sediments/soils of 3A, 3B, or 3C Ponds (WHC 1991). Phase 3 results found average concentrations at the 3A, 3B, and 3C Ponds boreholes to be <0.78, <1.06, and 1.72 μg/g, respectively. These figures are well below those found at sagebrush sites and contingency-pond Phase 1 backgrounds. Phase 1 background tolerance limits were established at 8.23 and 9.58 μg/g, respectively. No estimate of interlaboratory variability between the laboratories used for Phase 1 and Phase 3 analysis is available. A common cadmium range for soil is 0.1 - 7 μg/g (Shields 1988, p 101). Cadmium was undetected in all seven inorganic split samples. All values were reported $\leq$ 1.0 μg/g.

Several compounds designated in the closure plan as having been disposed of at B-Pond include elements such as sodium and potassium, the compound ammonium, or the common anions nitrate, fluoride, and sulfate. These constituents are not listed hazardous waste constituents. They may cause a waste to be regulated as a dangerous waste only when present in extreme (i.e. toxic or deleterious) concentrations or as indicators of specific listed wastes. Phase 3 data demonstrates this is not the case for vadose zone soils in the 3A, 3B, and 3C Ponds.

Table 5-1 lists Phase 3 inorganic analytes that are listed in Washington State's "Dangerous Waste Constituents List" (WAC 173-303-9905). Concentrations are compared, where available, to two criteria: Phase 1 thresholds and concentrations meeting criteria for action levels under EPA's proposed RCRA Subpart S (Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities--55 FR 30798). Each lobe is characterized by a mean concentration assumed to have a normal distribution of error. (Statistics are based on all regular samples; field and laboratory QC samples were not included in calculating averages or maximum values.) An upper 90 percent confidence limit is compared to Phase 1 threshold values. Thresholds were based on Phase 1 surface samples from areas of natural vegetation surrounding the TSD or an unused excavated dry contingency-pond area. For several constituents all Phase 1 samples for each background were undetected at concentrations greater than the contractual detection limit (CDL). In those cases the respective detection limits were given, as footnoted. Though the *representative* value is clearly defined by regulation and guidance as the *average* (40 CFR 260.10, or SW-846 Ch. 9, [EPA 1986]), a conservative comparison of the maximum reported regular sample value is also compared to EPA's example soil action levels.

Table 5-1. Evaluation of Inorganic Dangerous Waste Constituents in all Regular Samples.

Analyte	Pond	Frequency of Non-detects	Mean	Upper 90% Limit	Maximum Observation	Phase 1 Threshold Concentrations µg/g	Propose RCRA Corrective Action Level-Soil[d] mg/Kg	Typical Soil Range[a] (ppm)	Mean Upper Limit Above Both Phase 1 Thresholds?	Maximum Above EPA Example Soil Action Level?[d]
Antimony	3A	16/20	<5.8	NC	14	<10.0[b]	30	0.6 - 10	--	NO
	3B	20/20	<5.1	NC	5.8 U				--	NO
	3C	15/15	<5.2	NC	5.3 U				--	NO
Arsenic	3A	0/21	1.74	1.97	4.2	4.91 / 7.59	80	0.1 - 40	NO	NO
	3B	1/20	<2.25	2.90	7.2				NO	NO
	3C	0/11	1.46	1.76	2.5				NO	NO
Barium	3A	0/20	71.1	74.1	91	NC[c]	4000	100 - 3500	--	NO
	3B	0/20	77.6	80.7	96				--	NO
	3C	0/15	80.5	90.6	170				--	NO
Beryllium	3A	0/20	0.36	0.38	0.53	<0.5[b]	0.2	0.1 - 40	--	YES
	3B	0/20	0.38	0.42	0.88				--	YES
	3C	0/15	0.31	0.33	0.41				--	YES
Cadmium	3A	1/20	<0.78	0.90	1.6	8.23 / 9.58	40	0.01 - 7	NO	NO
	3B	1/20	<1.06	1.19	1.8				NO	NO
	3C	0/15	1.72	1.89	2.5				NO	NO
Chromium	3A	0/20	8.17	9.35	16	12.86 / 8.78	400 (as Cr VI)	5 - 3000	NO	NO
	3B	0/20	12.0	13.6	25				YES	NO
	3C	0/15	9.23	11.2	27				NO	NO
Cyanide	3A	10/11	<0.9	NC	1 UJ	<0.5[b]	2000	NA	--	NO
	3B	11/11	<0.7	NC	1 UJ				--	NO
	3C	8/9	<0.4	NC	1 UJ				--	NO
Lead	3A	0/21	4.89	5.97	18	15.16 / 7.13	NA	2 - 200	NO	--
	3B	0/20	5.24	6.58	20				NO	--
	3C	0/11	4.99	8.43	30				NO	--

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Table 5-1. Evaluation of Inorganic Dangerous Waste Constituents in all Regular Samples.

Analyte	Pond	Frequency of Non-detects	Mean	Upper 90% Limit	Maximum Observation	Phase 1 Threshold Concentrations µg/g	Propose RCRA Corrective Action Level-Soil[d] mg/Kg	Typical Soil Range[a] (ppm)	Mean Upper Limit Above Both Phase 1 Thresholds?	Maximum Above EPA Example Soil Action Level?[d]
Mercury	3A	21/21	<1.0	NC	1.0 U	<0.2[b]	20	0.01 - 0.8	--	NO
	3B	20/20	<1.0	NC	1.0 U				--	NO
	3C	7/7	<1.0	NC	1.0 U				--	NO
Nickel	3A	0/20	10.9	12.2	24	12.3 / 22.0	2000	5 - 1000	NO	NO
	3B	0/20	11.3	12.2	21				NO	NO
	3C	0/15	10.6	11.6	18				NO	NO
Selenium	3A	12/12	<0.70	NC	1.1 UD	<1.0[b]	NA	0.1 - 2	--	--
	3B	11/11	<0.53	NC	0.61 U				--	--
	3C	6/6	<0.52	NC	0.52 U				--	--
Silver	3A	12/20	<0.75	NC	1.5	<1.0[b]	200	0.01 - 5	--	NO
	3B	20/20	<0.62	NC	0.70 U				--	NO
	3C	15/15	<0.62	NC	0.64 U				--	NO
Thallium	3A	12/12	<1.04	NC	1.1 U	<1.0[b]	NA	0.1 - 0.8	--	--
	3B	11/11	<1.04	NC	1.2 U				--	--
	3C	6/6	<1.00	NC	1.0 U				--	--

[a] Source: Shields 1988 except for thallium from WHC 1991.
[b] All Phase 1 samples less than the stated contract detection limit--no threshold calculated.
[c] Threshold not calculated for total barium. All Phase 1 background values <105 µg/g.
[d] 55 FR 30798
NA Not applicable.
NC Not calculated.

Action levels are established for hazardous constituents for which data are sufficient to establish protective health- or environmental-based limits. "The Agency believes that it will very rarely be necessary to set action levels at background," (55 FR 30820). Action levels for soil generally assume exposure through consumption of soil contaminated with the hazardous constituent. Exposure assumptions are given in the proposed rule, and are based on a residential use pattern, including long-term direct contact and soil ingestion by children.

Action levels serve as rebuttable conservative presumptions that further study is necessary. Concentrations would "typically be measured on the surface (generally the upper two feet of earth)," (55 FR 30819). The EPA intends to use these levels as a presumption that a corrective measures study (CMS) may be necessary for contaminated deep soils, too. The permittee may attempt to rebut this presumption by demonstrating that there is no threat to human health and the environment from such deep soil contamination, either through direct contact or migration to aquifers or surface water.

Concentrations below capabilities of approved measurement methods designed to determine whether or not a sample contains a given dangerous waste constituent are presumed to be adequately protective of human health and the environment, i.e. satisfy the intent of regulation. Mercury, selenium, thallium, and cyanide were below contractual quantitation limits for all Phase 3 samples. Antimony and silver concentrations in all regular samples from the boreholes of 3B and 3C Ponds were also undetected at the stated limits. Likewise, all Phase 1 background measurements for all these analytes were below their respective reporting limits.

Antimony was detected in 4 of the 20 regular Phase 3 samples. The median sample value was undetectable (typically < 6 ppm). For comparison, the March 1990 EPA CLP Statement of Work CRDL for antimony in soil and sediment is 12 ppm. The maximum antimony concentration found in any single Phase 3 sample (14 μg/g), an extreme of the data set, was only slightly above a referenced typical natural range (0.6 - 10 ppm) and less than half the level EPA has proposed as protective of human health and the environment (30 mg/Kg). (No Phase 1 TSD or background soil sample was found at or above the CDL of 10.0 μg/g.) All Phase 3 split and field duplicate samples were consistent with the associated regular samples; each reported antimony as undetected.

Several other elements of Table 5-1 deserve mention. Beryllium was not found in any Phase 1 site or background samples at or above 0.5 μg/g, the CDL. This Phase 3 sampling had lower reporting limits. All regular Phase 3 samples were reported as detects, but values were similar. The vast majority were less than 0.5 μg/g. Split sample results suggested no significant primary laboratory bias. The EPA example action level of 0.2 mg/Kg (55 FR 30798) is frequently exceeded. Concentrations found in the vadose zone samples are entirely within the range of natural concentrations expected in the area based upon ranges found in the *Characterization and Use of Soil and Groundwater Background for the Hanford Site* (WHC-MR-0246, Rev 1).

Chromium Phase 1 threshold concentrations were frequently exceeded in the vadose zone. The highest average was found beneath the least used pond, the 3B Pond. The pond area used longer, the 3C Pond, had an intermediate concentration, and the oldest and most used of the expansion ponds, the 3A Pond, had the lowest average chromium concentration. This casts doubt on the premise

that wastewater disposal deposited hazardous concentrations of chromium to the land. The highest reported concentration (27 μg/g) was in the lowest 3C Pond sample (~80 ft); the associated split (8.5 J μg/g) was also the highest of seven splits. The Phase 3 data imply a slight natural increase in concentration with depth at B-Pond, contrary to the pond and near-surface sediments being a hazardous waste. Naturally occurring typical soil ranges have been referenced at 5-3000 ppm (Shields 1988).

High chromium concentrations in a waste may cause it to be regulated because of toxicity. Chromium is considered more toxic when present as Cr(VI). This is why the action level of Table 5-1 is based on Cr(VI). Chromium is most stable as Cr(III). It is most commonly found in oxidation states 0, III, and VI.

Chromium was analyzed simultaneously with numerous other elements that showed a positive bias against the split laboratory results. A possible interelement correlation may exist because of common measurement system factors, (for example: digestion conditions). Comparisons between laboratories are confounded by left-censored data at the reporting limit. Using only samples that each laboratory found above their respective reporting limits (as if a random sample), insufficient information is available to contradict a null hypothesis of no significant bias; however, most samples at the split laboratory are undetected while corresponding primary laboratory samples are reported much higher. Under the assumption that the true nondetect split sample concentrations equal the reporting limit, the primary positive bias estimate would be minimized. The average bias in this case would be about 11 μg/g, which is substantial when compared to the average reported concentrations.

Although validation did not detect accuracy problems via review of laboratory blanks or matrix spike recoveries, the validation did not consider field silica sand samples. A review of the seven silica sand blanks shows two of the seven were reported positive for Cr; one at 1.3, the other at 7.2 μg/g. The remainder were <1 μg/g. Silica sand was not submitted to the split laboratory. However, all 11 Phase 1 values of similar silica sand were <1 μg/g.

The data suggest a potential positive bias in the concentrations reported by the primary laboratory. These factors should be considered in comparing Phase 1 to Phase 3 chromium concentrations. Nevertheless, the important point is not to promote more study but identify if there is a potential threat to human health or the environment. Acceptance of an inflated characteristic concentration will not change the conclusion of "no threat." The reported concentrations are more than an order of magnitude below limits the EPA has quoted as protective trigger levels for further investigation (upper 90 percent limit = 13.6 μg/g total Cr vs. 400 μg/g all Cr[VI]). Washington State has determined similar levels to be protective of human health and the environment. The state has promulgated environmental regulations setting "Method A" chromium cleanup levels for industrial soil at 500 μg/Kg (WAC 173-340-745). The most critical path is considered to be via inhalation. The level is based on exposure assumptions of breathing contaminated dust at the sites where hazardous chromium compounds were formerly released to the environment.

No designated, listed wastes are known to have been directly discharged to the B-Pond system while the expansion lobes were in service. Hydrazine is the sole designated, listed waste known to have been potentially discharged indirectly to the B-Pond system during operation of any of the B-Pond expansion ponds (DOE 1990). Five releases of this compound were documented to a TSD unit supplying B-Pond, the 216-A-29 Ditch--the latest in 1986 (DOE 1990). Hydrazine is a strong oxygen scavenger and will react with oxygen in water to form NH_4OH and nitrogen gas. It was not specifically addressed in Phase 3 because it was not expected to be present at the expansion ponds because of the extreme dilution and relatively age of the releases. Furthermore, no SW-846 (EPA 1986) method is specified to measure this constituent in soil. Air is the typical medium of concern for this compound. Several studies were found addressing the fate of hydrazine in aquatic environments. In one study, river and pond water were adjusted to the same dissolved oxygen level and temperature, and 5 mg/L of hydrazine was added. Hydrazine residues in river water containing substantial amounts of organic matter were 22.6 percent, 96 percent, and 100 percent degraded after approximately one hour, one day, and two days, respectively. In the pond water, residues were 20 percent, 74 percent, 80 percent, and 81.6 percent degraded after approximately one hr, one day, two days, and three days, respectively (Slonim and Gisclard 1976). Hydrazine has been used experimentally in vitro as medication for sickle cell disease (HSDB 1992[1]). It has been found to be a natural product of nitrogen fixation by azotobacter algae (HSDB 1992[1]). It has also been measured in cigarette smoke (HSDB 1992[1]).

Most Appendix VIII (40 CFR 261) and Dangerous Waste (WAC 173-303) constituents are organic compounds. All investigated organic analytes were undetectable at representative site soil concentrations.

There is no indication that any investigated pesticide, PCB, herbicide, organophosphorous pesticide, dioxin, or furan is present in the vadose zone soil at the borehole sites. Several volatile and semivolatile target compounds were occasionally reported at concentrations less than PQL and/or contract required detection limit (CRDL). Tentatively identified volatile and semivolatile compounds were also noted in site samples, but performance on field duplicates, split, and silica sand samples suggests such occurrences are not representative of site soils.

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6.0 CONCLUSION

The B-Pond Phase 3 vadose zone investigation does not indicate hazardous levels of waste constituents exist in the vadose zone of the 216-B-3A, 216-B-3B, or 216-B-3C Ponds. Furthermore, results do not suggest dangerous, listed wastes exist in detectable, but dilute concentrations in the vadose zone. Nondangerous waste by definition, does not meet the statutory criteria of a "dangerous" or "hazardous" waste. Based on characteristics (ignitability, corrosivity, reactivity, toxicity) or criteria (carcinogenic, persistent, toxic), no compounds, organic or inorganic, were found in sufficient representative concentrations to cause the investigated vadose soils to be reasonably regulated as a dangerous waste.

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APPENDIX A

B-POND PHASE 3 SOIL DATA

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LIST OF TERMS

AAS	atomic absorbtion spectroscopy
CLP	contract laboratory program
CRQL	contract-required detection limit
ICP	inductively coupled plasma
MS	matrix spike
MSD	matrix spike duplicate
PCB	polychlorinated biphenyl
TIC	tentatively identified compound
Westinghouse Hanford-OSM	Westinghouse Hanford Company-Office of Sample Management

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Introduction

Each table in Appendix A typically is several pages long. Samples will be listed along one axis and analytes along the other. Where analytes are listed along the left-hand margin, results from a single group of samples will be visible for several pages before the end of the analyte list is reached. An analyte list appears in the same order for another set of samples until all results are reported and the table ends. In other tables, each analyte is listed along the top of a table and all samples are listed along the left-hand margin for several pages until all are reported and the table ends.

Data appearing in this appendix have been validated by the Westinghouse Hanford Company Office of Sample Management (Westinghouse Hanford-OSM). The primary exceptions are radiological characterization data, which are presented as is for information only. Validation is a systematic review of laboratory performance and execution of protocol that may qualify data based on holding time, matrix spike (MS), matrix spike duplicate (MSD) analysis, surrogate recovery, analytical blank performance, calibration, or any other method-specific requirements. As a result of data validation, qualification flags placed by the reporting laboratory may be replaced, supplemented or deleted. Westinghouse Hanford validation procedures can be found in WHC-CM-5-3 (WHC 1990). Many sample results were qualified according to holding time criteria established for water samples. This represents a conservative approach to validation. It is questionable if these time periods, especially in the case of extraction for organics, for soil matrices affect quality.

Several common concentration flags appear in the following tables. These include:

"U" The analyte was undetected. (The associated number represents an upper bound estimate of an undetected analyte, usually a concentration corresponding to an established sample quantitation limit.)

"J" The associated value is an estimated quantity. (This may be caused by any of a wide number of factors. It should alert the user that the associated value may have a slightly wider than usual *potential* for error.)

The above two flags may be combined and/or appear in conjunction with other qualifiers. The meaning of other flags will be listed at the end of each multipage table, as necessary. Results of inorganic constituents from the primary laboratory were reported to Westinghouse Hanford as "< *x* μg/g" when undetected. For consistency in this report, these inorganic constituents reported by the primary laboratory are presented as the equivalent "*x* U μg/g". The CLP "Q" (quality) flags and "M" (method) flags reported on contract laboratory program (CLP) Form 1 are not shown for split samples because this information was not reported in the same format for those samples analyzed by SW-846 (EPA 1986) methods at the primary laboratory. Concentration or "C" flags are shown. One laboratory-reported concentration flag appearing ONLY with CLP inorganic split sample results is a "B" flag. This indicates when

the corresponding inorganic sample result is above an instrument detection limit but below the CLP contract-required detection limit (CRQL).

After each table, a brief summary of the reasons for Westinghouse Hanford data qualification will appear. Only concentration qualifiers added or altered by Westinghouse Hanford-OSM as a result of data validation will be addressed--not explanations for displayed standard laboratory-reported qualifiers. The explanation will first address samples analyzed at the primary laboratory--regular, field duplicate, and silica sand samples--then, if applicable, the split samples analyzed at an independent laboratory. Split samples were validated to criteria consistent with employed CLP procedure, except for radiological analyses, as already mentioned.

Most tables list some additional information about each reported field sample. Terms used to describe sample type include Regular (Reg), Field Duplicate (FDup), Field Split (Split), and clean Silica Sand (Blank) as described in the attached report. The terms 3A, 3B, and 3C Pond refer to the 216-B-3A Pond, 216-B-3B Pond, and 216-B-3C Pond, respectively. Sample depths are given as depth from the surface at the borehole to a midpoint of the sampled interval. ALL DEPTHS ARE LISTED IN FEET UNLESS SPECIFIED OTHERWISE.

Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
alpha BHC	319-84-6	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
beta BHC	319-85-7	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
delta BHC	319-86-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
gamma BHC (Lindane)	58-89-9	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Heptachlor	76-44-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Aldrin	309-00-2	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Heptachlor Epoxide	1024-57-3	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Endosulfan I	959-98-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Dieldrin	60-57-1	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDE	72-55-9	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endrin	72-20-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endosulfan II	33213-65-9	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDD	72-54-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endosulfan Sulfate	1031-07-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDT	50-29-3	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Methoxychlor	72-43-5	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Endrin Ketone	53494-70-5	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
alpha-Chlorodane	5103-71-9	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
gamma-Chlorodane	5103-74-2	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
Toxaphene	8001-35-2	270 UJ	270 UJ	250 UJ	260 UJ	260 UJ	270 UJ	240 UJ	250 UJ	250 UJ	310 UJ
Arochlor 1016	12674-11-2	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1221	11104-28-2	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1232	11141-16-5	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1242	53469-21-9	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1248	12672-29-6	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1254	11097-69-1	280 UJ	280 UJ	260 UJ	260 UJ	260 UJ	280 UJ	240 UJ	260 UJ	260 UJ	320 UJ
Arochlor 1260	11096-82-5	280 UJ	280 UJ	260 UJ	260 UJ	260 UJ	280 UJ	240 UJ	260 UJ	260 UJ	320 UJ

Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	53	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
alpha BHC	319-84-6	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
beta BHC	319-85-7	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
delta BHC	319-86-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Heptachlor	76-44-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Aldrin	309-00-2	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Endosulfan I	959-98-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Dieldrin	60-57-1	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDE	72-55-9	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endrin	72-20-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endosulfan II	33213-65-9	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDD	72-54-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDT	50-29-3	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Methoxychlor	72-43-5	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ
Endrin Ketone	53494-70-5	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
alpha-Chlorodane	5103-71-9	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ
gamma-Chlorodane	5103-74-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	53	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
Toxaphene	8001-35-2	190 UJ	260 UJ	250 UJ	260 UJ	250 UJ	250 UJ	250 UJ	1200 UJ	1200 UJ	1200 UJ
Arochlor 1016	12674-11-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1221	11104-28-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1232	11141-16-5	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1242	53469-21-9	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1248	12672-29-6	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1254	11097-69-1	190 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	240 UJ	260 UJ	240 UJ
Arochlor 1260	11096-82-5	190 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	240 UJ	260 UJ	240 UJ

Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
alpha BHC	319-84-6	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
beta BHC	319-85-7	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
delta BHC	319-86-8	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
gamma BHC (Lindane)	58-89-9	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Heptachlor	76-44-8	62 UJ	62 UJ	8.0 U	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Aldrin	309-00-2	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Heptachlor Epoxide	1024-57-3	62 UJ	62 UJ	8.0 U	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Endosulfan I	959-98-8	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Dieldrin	60-57-1	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDE	72-55-9	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endrin	72-20-8	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endosulfan II	33213-65-9	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDD	72-54-8	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endosulfan Sulfate	1031-07-8	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDT	50-29-3	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Methoxychlor	72-43-5	620 UJ	620 UJ	80 U	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ
Endrin Ketone	53494-70-5	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
alpha-Chlorodane	5103-71-9	620 UJ	620 UJ	80 UJ	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ
gamma-Chlorodane	5103-74-2	620 UJ	620 UJ	80 UJ	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
Toxaphene	8001-35-2	1200 UJ	1200 UJ	160 U	1200 UJ	1300 UJ	1300 UJ	2900 UJ	1800 UJ	2500 UJ	2500 UJ
Arochlor 1016	12674-11-2	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1221	11104-28-2	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1232	11141-16-5	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1242	53469-21-9	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1248	12672-29-6	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1254	11097-69-1	240 UJ	240 UJ	160 U	240 UJ	260 UJ	260 UJ	280 UJ	360 UJ	260 UJ	260 UJ
Arochlor 1260	11096-82-5	240 UJ	240 UJ	160 U	240 UJ	260 UJ	260 UJ	280 UJ	360 UJ	260 UJ	260 UJ

Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
alpha BHC	319-84-6	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
beta BHC	319-85-7	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
delta BHC	319-86-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
gamma BHC (Lindane)	58-89-9	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Heptachlor	76-44-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Aldrin	309-00-2	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
Heptachlor Epoxide	1024-57-3	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Endosulfan I	959-98-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Dieldrin	60-57-1	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDE	72-55-9	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Endrin	72-20-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 UJ	260 UJ	120 UJ	260 UJ	150 UJ
Endosulfan II	33213-65-9	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDD	72-54-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Endosulfan Sulfate	1031-07-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDT	50-29-3	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Methoxychlor	72-43-5	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 U	1300 UJ	600 UJ	1300 UJ	770 UJ
Endrin Ketone	53494-70-5	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
alpha-Chlorodane	5103-71-9	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 UJ	1300 UJ	600 UJ	1300 UJ	770 UJ
gamma-Chlorodane	5103-74-2	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 UJ	1300 UJ	600 UJ	1300 UJ	770 UJ

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. (µg/Kg)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
Toxaphene	8001-35-2	3100 UJ	1300 UJ	2500 UJ	1300 UJ	2500 UJ	170 U	2600 UJ	1200 UJ	2600 UJ	1500 UJ
Arochlor 1016	12674-11-2	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1221	11104-28-2	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1232	11141-16-5	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1242	53469-21-9	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1248	12672-29-6	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1254	11097-69-1	320 UJ	260 UJ	260 UJ	260 UJ	260 UJ	170 U	260 UJ	240 UJ	260 UJ	300 UJ
Arochlor 1260	11096-82-5	320 UJ	260 UJ	260 UJ	260 UJ	260 UJ	170 U	260 UJ	240 UJ	260 UJ	300 UJ

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.

**Reasons for Westinghouse Hanford Qualification--
Pesticides/Polychlorinated Biphenyls**

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

LABORATORY BLANK--Arochlor-1254, beta-BHC, and lindane were detected in laboratory blanks. This resulted in an undetected qualification, "U", of one or more of those analytes detected at similar concentrations in the following:

B00FK6	B00GS4	B00GW1	B00H02
B00FK7	B00GS9	B00GW3	B00H03
B00FK8	B00GT7	B00GW4	B00H04
B00FK9	B00GV5	B00GW8	B00H05
B00FL0	B00GV6	B00GX6	B00H06
B00FL1	B00GV7	B00GZ2	B00H10
B00FL3	B00GV8	B00GZ6	B00H14
B00FL4	B00GV9	B00GZ8	B00H19
B00GR9	B00GW0	B00H01	B00H23

SURROGATE RECOVERY--Recovery was high for sample B00H01. All pesticide/PCB constituents were undetected but qualified as "UJ" for B00H01.

Split Samples:

SURROGATE RECOVERY--Recovery was high for sample B00GS5. All pesticide/PCB constituents were undetected but qualified as "UJ" for B00GS5.

MS/MSD--Recovery was high for sample B00GS5. All pesticide/PCB constituents were undetected but qualified "UJ" per OSM guidelines.

Table A-2. B-Pond Phase 3 Herbicide Data. (µg/Kg)

SAMPLE	TYPE	POND	APPROXIMATE DEPTH (ft)	HERBICIDES			
				2,4-D		2,4,5-TP	
B00FK6	Reg	3A	6.5	100	UJ	10	UJ
B00FK7	Reg	3A	8.5	100	UJ	10	UJ
B00FK8	Reg	3A	10.5	100	UJ	10	UJ
B00FK9	Reg	3A	13	100	UJ	10	UJ
B00FL0	Reg	3A	14.5	100	UJ	10	UJ
B00FL1	Reg	3A	16	100	UJ	10	UJ
B00FL3	Blank	3A	---	500	UJ	50	UJ
B00FL4	Reg	3A	28	500	UJ	50	UJ
B00GR9	Fdup	3A	28	500	UJ	50	UJ
B00GS4	Reg	3A	52.5	500	UJ	50	UJ
B00GS9	Reg	3A	66.5	500	UJ	50	UJ
B00GT7	Reg	3A	97	100	UJ	10	UJ
B00GV5	Reg	3A	143.5	150	UJ	15	UJ
B00GV6	Reg	3B	1	150	UJ	15	UJ
B00GV7	Reg	3B	3.5	150	UJ	15	UJ
B00GV8	Reg	3B	5.5	151	UJ	15.1	UJ
B00GV9	Blank	3B	---	150	UJ	15	UJ
B00GW0	Reg	3B	7.5	28	UJ	3	UJ
B00GW1	Reg	3B	9.5	29	UJ	3	UJ
B00GW3	Reg	3B	13	150	UJ	15	UJ
B00GW4	Fdup	3B	13	148	UJ	14.8	UJ
B00GW8	Reg	3B	21	30	UJ	3	UJ
B00GX6	Reg	3B	61.5	152	UJ	15.2	UJ
B00GZ2	Reg	3B	90.5	154	UJ	15.4	UJ
B00GZ6	Reg	3B	118.5	100	UJ	10	UJ
B00GZ8	Reg	3B	123.5	4900	UJ	490	UJ
B00H00	Reg	3C	1	100	UJ	10	UJ
B00H01	Reg	3C	3	100	UJ	10	UJ
B00H02	Reg	3C	5	98	UJ	10	UJ
B00H03	Reg	3C	7	960	UJ	96	UJ
B00H04	Reg	3C	9	990	UJ	99	UJ
B00H05	Fdup	3C	9	960	UJ	96	UJ
B00H06	Reg	3C	11.5	980	UJ	98	UJ
B00H14	Reg	3C	30	2400	UJ	240	UJ
B00H10	Blank	3C	---	990	UJ	99	UJ
B00H19	Reg	3C	60	990	UJ	99	UJ
B00H23	Reg	3C	80	100	UJ	10	UJ

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.

Reasons for Westinghouse Hanford Company Qualification--Herbicides

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28
Azinphos-methly	86-50-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Coumaphos	56-72-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Demeton	8065-48-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Diazanon	333-41-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dimethoate	60-51-5	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Disulfoton	298-04-4	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
EPN	2104-64-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethion	563-12-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethoprop	13194-78-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Famphur	52-85-7	0.17 UJ	0.17 UJ	0.16 UJ	0.16 UJ	0.16 UJ	0.17 UJ	0.15 UJ	0.16 UJ	0.16 UJ
Fensulfothion	115-90-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fenthion	55-38-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Malathion	121-75-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Merphos	150-50-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mevinphos	7786-34-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Monocrotophos	6923-22-4	NT	NT	NT	NT	NT	NT	NT	NT	NT

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28
Naled	300-76-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Parathion ethyl	156-38-2	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Parathion methyl	298-00-0	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Phorate	298-02-2	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ronnel	299-84-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sulfotepp	3689-24-5	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
TEPP	21646-99-1	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Thionazin	297-97-2	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Trichloronate	327-98-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.025 UJ	0.03 UJ	0.03 UJ

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B
	DEPTH	53	66.5	97	143.5	1	3.5	5.5	---	7.5
Azinphos methly	86-50-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Coumaphos	56-72-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Demeton	8065-48-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Diazanon	333-41-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dimethoate	60-51-5	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Disulfoton	298-04-4	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
EPN	2104-64-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethion	563-12-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethoprop	13194-78-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Famphur	52-85-7	0.19 UJ	0.16 UJ	0.16 UJ	0.17 UJ	0.16 UJ	0.16 UJ	0.16 UJ	0.15 UJ	0.16 UJ
Fensulfothion	115-90-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fenthion	55-38-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Malathion	121-75-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Merphos	150-50-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mevinphos	7786-34-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Monocrotophos	6923-22-4	NT	NT	NT	NT	NT	NT	NT	NT	NT

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B
	DEPTH	53	66.5	97	143.5	1	3.5	5.5	---	7.5
Naled	300-76-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Parathion ethyl	156-38-2	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Parathion methyl	298-00-0	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Phorate	298-02-2	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Ronnel	299-84-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sulfotepp	3689-24-5	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
TEPP	21646-99-1	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Thionazin	297-97-2	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Trichloronate	327-98-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.025 UJ	0.03 UJ

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GW1	B00GW3	B00GW4	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00
	TYPE	Reg	Reg	Fdup	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C
	DEPTH	9.5	13	13	21	61.5	90.5	118.5	123.5	1
Azinphos methly	86-50-0	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Coumaphos	56-72-4	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.26 UJ	0.24 UJ	0.21 UJ
Demeton	8065-48-3	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Diazanon	333-41-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Dimethoate	60-51-5	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Disulfoton	298-04-4	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
EPN	2104-64-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ethion	563-12-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ethoprop	13194-78-4	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Famphur	52-85-7	0.16 UJ	0.16 UJ	0.16 UJ	0.16 UJ	NT	NT	NT	NT	NT
Fensulfothion	115-90-2	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Fenthion	55-38-9	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Malathion	121-75-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Merphos	150-50-5	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Mevinphos	7786-34-7	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Monocrotophos	6923-22-4	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GW1	B00GW3	B00GW4	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00
	TYPE	Reg	Reg	Fdup	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C
	DEPTH	9.5	13	13	21	61.5	90.5	118.5	123.5	1
Naled	300-76-5	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Parathion ethyl	156-38-2	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Parathion methyl	298-00-0	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Phorate	298-02-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ronnel	299-84-3	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
TEPP	21646-99-1	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	0.26 UJ	0.26 UJ	0.30 UJ	0.31 UJ	0.26 UJ
Thionazin	297-97-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	NT	NT	NT	NT	NT
Trichloronate	327-98-0	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	NT	NT	NT	NT	NT

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00H01	B00H02	B00H03	B00H04	B00H05	B00H06	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Reg	Fdup	Reg	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	3	5	7	9	9	11.5	30	---	60	80
Azinphos methly	86-50-0	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Coumaphos	56-72-4	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Demeton	8065-48-3	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Diazanon	333-41-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Dimethoate	60-51-5	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Disulfoton	298-04-4	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
EPN	2104-64-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ethion	563-12-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ethoprop	13194-78-4	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Famphur	52-85-7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fensulfothion	115-90-2	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Fenthion	55-38-9	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Malathion	121-75-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Merphos	150-50-5	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Mevinphos	7786-34-7	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Monocrotophos	6923-22-4	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ

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Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00H01	B00H02	B00H03	B00H04	B00H05	B00H06	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Reg	Fdup	Reg	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	3	5	7	9	9	11.5	30	---	60	80
Naled	300-76-5	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Parathion ethyl	156-38-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Parathion methyl	298-00-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Phorate	298-02-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ronnel	299-84-3	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulfotepp	3689-24-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulprofos	35400-43-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
TEPP	21646-99-1	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.28 UJ	0.26 UJ	0.25 UJ	0.26 UJ	0.27 UJ
Thionazin	297-97-2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Trichloronate	327-98-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
o,o,o-Triethylphos phorothioate	126-68-1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NT Not a target analyte for this sample, see text.
U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.

Reasons for Westinghouse Hanford Company Qualification--Organophosphorous Pesticides

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE SAMPLE ID	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
POND	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28
Total tetrachlorinated dibenzo-p-dioxins (TCDD)	0.062 UJ	0.060 UJ	0.056 UJ	0.11 UJ	0.071 UJ	0.068 UJ	0.042 UJ	0.056 UJ	0.051 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)	0.13 UJ	0.17 UJ	0.13 UJ	0.10 UJ	0.16 UJ	0.22 UJ	0.15 UJ	0.16 UJ	0.084 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)	0.12 UJ	0.18 UJ	0.13 UJ	0.40 UJ	0.17 UJ	0.15 UJ	0.11 UJ	0.15 UJ	0.18 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)	0.15 UJ	0.21 UJ	0.19 UJ	0.19 UJ	0.16 UJ	0.23 UJ	0.17 UJ	0.15 UJ	0.27 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)	0.13 UJ	0.21 UJ	0.13 UJ	0.11 UJ	0.16 UJ	0.17 UJ	0.15 UJ	0.15 UJ	0.21 UJ
Total tetrachlorinated dibenzo-furans (TCDF)	0.11 UJ	0.077 UJ	0.058 UJ	0.085 UJ	0.071 UJ	0.079 UJ	0.061 UJ	0.055 UJ	0.047 UJ
Total pentachlorinated dibenzo-furans (PeCDF)	0.039 UJ	0.053 UJ	0.046 UJ	0.058 UJ	0.047 UJ	0.050 UJ	0.036 UJ	0.049 UJ	0.058 UJ
Total hexachlorinated dibenzo-furans (HxCDF)	0.11 UJ	0.11 UJ	0.085 UJ	0.14 UJ	0.11 UJ	0.11 UJ	0.072 UJ	0.13 UJ	0.10 UJ
Total heptachlorinated dibenzo-furans (HpCDF)	0.13 UJ	0.17 UJ	0.11 UJ	0.13 UJ	0.13 UJ	0.19 UJ	0.13 UJ	0.23 UJ	0.14 UJ
Total octachlorinated dibenzo-furans (OCDF)	0.069 UJ	0.19 UJ	0.077 UJ	0.096 UJ	0.12 UJ	0.14 UJ	0.059 UJ	0.11 UJ	0.20 UJ

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Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE SAMPLE ID	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
POND	3A	3A	3A	3A	3B	3B	3B	3B	3B
DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5
Total tetrachlorinated dibenzo-p-dioxins (TCDD)	0.17 UJ	0.12 UJ	0.063 UJ	0.086 UJ	0.070 UJ	0.044 UJ	0.036 UJ	0.048 UJ	0.032 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)	0.30 UJ	0.35 UJ	0.21 UJ	0.20 UJ	0.16 UJ	0.12 UJ	0.087 UJ	0.11 UJ	0.057 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)	0.29 UJ	0.25 UJ	0.14 UJ	0.28 UJ	0.19 UJ	0.15 UJ	0.15 UJ	0.14 UJ	0.098 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)	0.24 UJ	0.27 UJ	0.13 UJ	0.14 UJ	0.19 UJ	0.12 UJ	0.11 UJ	0.13 UJ	0.11 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)	0.23 UJ	0.27 UJ	0.12 UJ	0.090 UJ	0.25 UJ	0.15 UJ	0.12 UJ	0.067 UJ	0.13 UJ
Total tetrachlorinated dibenzo-furans (TCDF)	0.14 UJ	0.14 UJ	0.058 UJ	0.084 UJ	0.051 UJ	0.038 UJ	0.033 UJ	0.038 UJ	0.033 UJ
Total pentachlorinated dibenzo-furans (PeCDF)	0.069 UJ	0.067 UJ	0.057 UJ	0.052 UJ	0.082 UJ	0.035 UJ	0.036 UJ	0.051 UJ	0.046 UJ
Total hexachlorinated dibenzo-furans (HxCDF)	0.084 UJ	0.15 UJ	0.086 UJ	0.072 UJ	0.10 UJ	0.094 UJ	0.093 UJ	0.095 UJ	0.073 UJ
Total heptachlorinated dibenzo-furans (HpCDF)	0.15 UJ	0.14 UJ	0.23 UJ	0.12 UJ	0.14 UJ	0.097 UJ	0.093 UJ	0.14 UJ	0.084 UJ
Total octachlorinated dibenzo-furans (OCDF)	0.030 UJ	0.19 UJ	0.12 UJ	0.13 UJ	0.21 UJ	0.10 UJ	0.13 UJ	0.13 UJ	0.066 UJ

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Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE SAMPLE ID	B00GW1	B00GW3	B00GW4	B00GW8	B00H00	B00H02	B00H03
TYPE	Reg	Reg	Fdup	Reg	Reg	Reg	Reg
POND	3B	3B	3B	3B	3C	3C	3C
DEPTH	9.5	13	13	21	1	5	7
Total tetrachlorinated dibenzo-p-dioxins (TCDD)	0.041 UJ	0.047 UJ	0.031 UJ	0.044 UJ	0.10 UJ	0.16 UJ	0.12 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)	0.080 UJ	0.12 UJ	0.090 UJ	0.13 UJ	0.15 UJ	0.12 UJ	0.38 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)	0.11 UJ	0.12 UJ	0.087 UJ	0.16 UJ	0.20 UJ	0.22 UJ	0.17 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)	0.15 UJ	0.14 UJ	0.11 UJ	0.13 UJ	0.24 UJ	0.27 UJ	0.17 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)	0.15 UJ	0.096 UJ	0.14 UJ	0.11 UJ	0.23 UJ	0.32 UJ	0.15 UJ
Total tetrachlorinated dibenzo-furans (TCDF)	0.035 UJ	0.039 UJ	0.050 UJ	0.052 UJ	0.062 UJ	0.077 UJ	0.067 UJ
Total pentachlorinated dibenzo-furans (PeCDF)	0.047 UJ	0.038 UJ	0.045 UJ	0.035 UJ	0.19 UJ	0.10 UJ	0.11 UJ
Total hexachlorinated dibenzo-furans (HxCDF)	0.11 UJ	0.088 UJ	0.066 UJ	0.11 UJ	0.23 UJ	0.15 UJ	0.18 UJ
Total heptachlorinated dibenzo-furans (HpCDF)	0.10 UJ	0.10 UJ	0.079 UJ	0.082 UJ	0.53 UJ	0.19 UJ	0.32 UJ
Total octachlorinated dibenzo-furans (OCDF)	0.094 UJ	0.16 UJ	0.11 UJ	0.13 UJ	0.14 UJ	0.23 UJ	0.12 UJ

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.

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Reasons for Westinghouse Hanford Company Qualification--Dioxins and Furans

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	ANALYSIS DATE	2/20/91	2/20/91	2/20/91	2/22/91	2/22/91	2/20/91	2/22/91	2/28/91	2/22/91	2/20/91
	MOISTURE (%)	12	10.9	5.3	6.7	6.8	11.2	0.0	4.9	5.3	23.2
Chloromethane	74-87-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Bromomethane	74-83-9	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Vinyl Chloride	75-01-4	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Chloroethane	75-00-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Methylene Chloride	75-09-2	6 U	4 J	3 J	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Acetone	67-64-1	11 U	64	55	11 U	13	11 U	17	11 UJ	27	13 U
Carbon Disulfide	75-15-0	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1-Dichloroethene	75-35-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1-Dichloroethane	75-34-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,2-Dichloroethene (total)	540-59-0	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Chloroform	67-66-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,2-Dichloroethane	107-06-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
2-Butanone	78-93-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
1,1,1-Trichloroethane	71-55-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Carbon Tetrachloride	56-23-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Vinyl Acetate	108-05-4	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Bromodichloromethane	75-27-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	ANALYSIS DATE	2/20/91	2/20/91	2/20/91	2/22/91	2/22/91	2/20/91	2/22/91	2/28/91	2/22/91	2/20/91
	MOISTURE (%)	12	10.9	5.3	6.7	6.8	11.2	0.0	4.9	5.3	23.2
1,2-Dichloropropane	78-87-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
cis-1,3-Dichloropropene	10061-01-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Trichloroethene	79-01-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Dibromochloromethane	124-48-1	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1,2-Trichloroethane	79-00-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Benzene	71-43-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
trans-1,3-Dichloropropene	10061-02-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Bromoform	75-25-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
4-Methyl-2-pentanone	108-10-1	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
2-Hexanone	591-78-6	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Tetrachloroethene	127-18-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1,2,2-Tetrachloroethane	79-34-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Toluene	108-88-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Chlorobenzene	108-90-7	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Ethylbenzene	100-41-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Styrene	100-42-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Xylene (total)	1330-20-7	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	ANALYSIS DATE	2/26/91	2/28/91	2/28/91	3/4/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91
	MOISTURE (%)	19	7.3	4.0	NA	5.0	4.0	5.0	0.0	0.0	3.1
Chloromethane	74-87-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Bromomethane	74-83-9	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Vinyl Chloride	75-01-4	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Chloroethane	75-00-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Methylene Chloride	75-09-2	30 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	18 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Carbon Disulfide	75-15-0	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	75-35-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	75-34-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	540-59-0	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	67-66-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	107-06-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	78-93-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
1,1,1-Trichloroethane	71-55-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	56-23-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	108-05-4	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Bromodichloromethane	75-27-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	ANALYSIS DATE	2/26/91	2/28/91	2/28/91	3/4/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91
	MOISTURE (%)	19	7.3	4.0	NA	5.0	4.0	5.0	0.0	0.0	3.1
1,2-Dichloropropane	78-87-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	10061-01-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	79-01-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	124-48-1	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	79-00-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	71-43-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	10061-02-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	75-25-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	108-10-1	12 U	11 U	10 U	3 J	11 U	10 U	11 U	10 U	10 U	10 U
2-Hexanone	591-78-6	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Tetrachloroethene	127-18-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	79-34-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	108-88-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	108-90-7	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	100-41-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	100-42-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	1330-20-7	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	ANALYSIS DATE	3/11/91	3/11/91	3/12/91	3/11/91	3/21/91	3/21/91	3/21/91	3/22/91	3/21/91	3/21/91
	MOISTURE (%)	3.0	3.0	3	3.1	5.4	5.0	16.7	34.5	3.9	4.8
Chloromethane	74-87-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Bromomethane	74-83-9	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Vinyl Chloride	75-01-4	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Chloroethane	75-00-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Methylene Chloride	75-09-2	5 U	5 U	44 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Acetone	67-64-1	10 U	10 U	19 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Carbon Disulfide	75-15-0	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1-Dichloroethene	75-35-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1-Dichloroethane	75-34-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,2-Dichloroethene (total)	540-59-0	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Chloroform	67-66-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,2-Dichloroethane	107-06-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
2-Butanone	78-93-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
1,1,1-Trichloroethane	71-55-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Carbon Tetrachloride	56-23-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Vinyl Acetate	108-05-4	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Bromodichloromethane	75-27-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	ANALYSIS DATE	3/11/91	3/11/91	3/12/91	3/11/91	3/21/91	3/21/91	3/21/91	3/22/91	3/21/91	3/21/91
	MOISTURE (%)	3.0	3.0	3	3.1	5.4	5.0	16.7	34.5	3.9	4.8
cis-1,3-Dichloropropene	10061-01-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Trichloroethene	79-01-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Dibromochloromethane	124-48-1	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1,2-Trichloroethane	79-00-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Benzene	71-43-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
trans-1,3-Dichloropropene	10061-02-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Bromoform	75-25-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
4-Methyl-2-pentanone	108-10-1	10 U	10 U	10 U	10 U	3 J	3 J	13 U	15 U	10 U	11 U
2-Hexanone	591-78-6	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Tetrachloroethene	127-18-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1,2,2-Tetrachloroethane	79-34-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Toluene	108-88-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Chlorobenzene	108-90-7	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Ethylbenzene	100-41-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Styrene	100-42-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Xylene (total)	1330-20-7	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	ANALYSIS DATE	3/21/91	3/28/91	3/22/91	3/22/91	3/22/91	3/26/91	4/2/91	3/28/91	4/2/91	4/2/91
	MOISTURE (%)	4.8	NA	5.0	4.3	5.6	6	8.7	NA	6.1	22.3
Chloromethane	74-87-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Bromomethane	74-83-9	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Vinyl Chloride	75-01-4	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Chloroethane	75-00-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Methylene Chloride	75-09-2	5 U	5 U	5 U	5 U	5 U	31 U	5 U	5 U	5 U	6 U
Acetone	67-64-1	15 U	10 U	11 U	10 U	11 U	20 U	11 U	10 U	49	13 U
Carbon Disulfide	75-15-0	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethene	75-35-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethane	75-34-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethene (total)	540-59-0	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Chloroform	67-66-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethane	107-06-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
2-Butanone	78-93-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
1,1,1-Trichloroethane	71-55-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Carbon Tetrachloride	56-23-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Vinyl Acetate	108-05-4	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Bromodichloromethane	75-27-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloropropane	78-87-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U

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Table A-5. Volatile Organic Compounds. (µg/Kg)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	ANALYSIS DATE	3/21/91	3/28/91	3/22/91	3/22/91	3/22/91	3/26/91	4/2/91	3/28/91	4/2/91	4/2/91
	MOISTURE (%)	4.8	NA	5.0	4.3	5.6	6	8.7	NA	6.1	22.3
cis-1,3-Dichloropropene	10061-01-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Trichloroethene	79-01-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Dibromochloromethane	124-48-1	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1,2-Trichloroethane	79-00-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Benzene	71-43-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
trans-1,3-Dichloropropene	10061-02-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Bromoform	75-25-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
4-Methyl-2-pentanone	108-10-1	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
2-Hexanone	591-78-6	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Tetrachloroethene	127-18-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1,2,2-Tetrachloroethane	79-34-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Toluene	108-88-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Chlorobenzene	108-90-7	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Ethylbenzene	100-41-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Styrene	100-42-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Xylene (total)	1330-20-7	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.

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Reasons for Westinghouse Hanford Company Qualification--Volatile Organics

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--B00FL4 was qualified as estimated, "J". Fourteen day holding time criteria established for water missed on sample B00FL4 by 7 days.

LABORATORY BLANK--Acetone was qualified as undetected at 15 µg/Kg in B00H02 because acetone was also reported in the associated laboratory blank (#910321-027). A summary of VOA Reagent Blanks at Primary Lab:

Nine laboratory blanks total:
6 with no reported contaminants
1 with Acetone at 26 µg/Kg (3/21/91)
1 with 4-methyl-2-pentanone at 3 J µg/Kg (2/28/91)
1 with an unknown tentatively identified compound (TIC) at 7 J µg/Kg (3/22/91)

Split Samples:

LABORATORY BLANK--Methylene chloride and acetone were found in laboratory blanks, and were qualified as undetected, "U", in samples B00H07, B00GW5, and B00GS5.

CALIBRATION--Two samples had analytes qualified because of separate exceedances of Westinghouse Hanford-OSM's calibration criteria. All analytes were undetected. Sample B00H07 was qualified "UJ" for the following analytes:

alpha BHC	aldrin	chlordane
beta BHC	endrin	gamma chlordane
delta BHC	alpha	

Sample B00GW5 was qualified "UJ" for the following analytes:

alpha BHC	aldrin	endosulfan sulfate
beta BHC	endosulfan I	4,4'-DDT
delta BHC	4,4'-DDE	alpha chlordane
gamma BHC (lindane)	4,4'-DDD	gamma chlordane

Additional Note to Volatile Organic Compound Data, Table A-5.

Three "unknown" compounds were reported as VOA TICs: 19 J, 22 J, 11 J µg/Kg in the regular sample B00GV5. No similar compounds were found in the associated laboratory blank.

Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	EXTRACTION DATE	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
	ANALYSIS DATE	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
Phenol	108-95-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-chloroethyl)ether	111-44-4	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Chlorophenol	95-57-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,3-Dichlorobenzene	541-73-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,4-Dichlorobenzene	106-46-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzyl Alcohol	100-51-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,2-Dichlorobenzene	95-50-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Methylphenol	95-48-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-Chloroisopropyl) ether	108-60-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Methylphenol	106-44-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
N-Nitrosodipropylamine	621-64-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachloroethane	67-72-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Nitrobenzene	98-95-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Isophorone	78-59-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Nitrophenol	88-75-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dimethylphenol	105-67-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzoic acid	65-85-0	5400 UJ	590 J	520 J	5100 UJ	360 J	470 J	4800 UJ	370 J	390 J	6300 UJ
bis(2-chloroethoxy)methane	111-91-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	EXTRACTION DATE	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
	ANALYSIS DATE	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
2,4-Dichlorophenol	120-83-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,2,4-Trichlorobenzene	120-82-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Naphthalene	91-20-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Chloroaniline	106-47-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorobutadiene	87-68-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Chloro-3-methylphenol	59-50-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Methylnaphthalene	91-57-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorocyclopentadiene	77-47-4	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4,6-Trichlorophenol	88-06-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4,5-Trichlorophenol	95-95-4	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
2-Chloronaphthalene	91-58-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Nitroaniline	88-74-4	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Dimethylphthalate	131-11-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Acenaphthylene	208-96-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
3-Nitroaniline	99-09-2	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Acenaphthene	83-32-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dinitrophenol	51-28-5	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
4-Nitrophenol	100-02-7	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ

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9 13318.1436

Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	EXTRACTION DATE	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
	ANALYSIS DATE	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
Dibenzofuran	132-64-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dinitrotoluene	121-14-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,6-Dinitrotoluene	606-20-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Diethylphthalate	84-66-2	1100 UJ	170 J	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	210 J
4-Chlorophenyl-phenylether	7005-72-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Fluorene	86-73-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Nitroaniline	100-01-6	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
4,6-Dinitro-2-methylphenol	534-52-1	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
N-Nitrosodiphenylamine	86-30-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Bromophenyl-phenylether	101-55-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorobenzene	118-74-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Pentachlorophenol	87-86-5	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Phenanthrene	85-01-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Anthracene	120-12-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Di-n-Butylphthalate	84-74-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Fluoranthene	206-44-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Pyrene	129-00-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Butylbenzylphthalate	85-68-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
	POND	3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
	DEPTH	6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
	EXTRACTION DATE	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
	ANALYSIS DATE	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
3,3'-Dichlorobenzidine	91-94-1	2200 UJ	2200 UJ	2100 UJ	2100 UJ	2100 UJ	2200 UJ	2000 UJ	2100 UJ	2100 UJ	1300 UJ
Benzo(a)anthracene	56-55-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-ethylhexyl)phthalate	117-81-7	1100 UJ	1100 UJ	1100 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1400 UJ
Chrysene	218-01-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Di-n-octylphthalate	117-84-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(b)fluoranthene	205-99-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(k)fluoranthene	207-08-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(a)pyrene	50-32-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Dibenz(a,h)anthracene	53-70-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(g,h,i)perylene	191-24-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	?	No	No	?	No
Total TICs		7	7	8	6	8	8	2	7	9	8
TICs without laboratory "B" flags		3	3	4	2	5	5	0	4	6	4

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	EXTRACTION DATE	2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
	ANALYSIS DATE	3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
Phenol	108-95-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-chloroethyl)ether	111-44-4	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Chlorophenol	95-57-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,3-Dichlorobenzene	541-73-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,4-Dichlorobenzene	106-46-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzyl Alcohol	100-51-6	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,2-Dichlorobenzene	95-50-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Methylphenol	95-48-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-Chloroisopropyl) ether	108-60-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Methylphenol	106-44-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
N-Nitrosodipropylamine	621-64-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachloroethane	67-72-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Nitrobenzene	98-95-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Isophorone	78-59-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Nitrophenol	88-75-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dimethylphenol	105-67-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzoic acid	65-85-0	2200 U	830 J	5000 UJ	4800 UJ	290 J	240 J	5100 U	4800 U	4800 U	5000 UJ
bis(2-chloroethoxy)methane	111-91-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	EXTRACTION DATE	2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
	ANALYSIS DATE	3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
2,4-Dichlorophenol	120-83-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,2,4-Trichlorobenzene	120-82-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Naphthalene	91-20-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Chloroaniline	106-47-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorobutadiene	87-68-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Chloro-3-methylphenol	59-50-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Methylnaphthalene	91-57-6	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorocyclopentadiene	77-47-4	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4,6-Trichlorophenol	88-06-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4,5-Trichlorophenol	95-95-4	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
2-Chloronaphthalene	91-58-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Nitroaniline	88-74-4	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Dimethylphthalate	131-11-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Acenaphthylene	208-96-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
3-Nitroaniline	99-09-2	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Acenaphthene	83-32-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dinitrophenol	51-28-5	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
4-Nitrophenol	100-02-7	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	EXTRACTION DATE	2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
	ANALYSIS DATE	3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
Dibenzofuran	132-64-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dinitrotoluene	121-14-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,6-Dinitrotoluene	606-20-2	NA	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Diethylphthalate	84-66-2	95 J	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U*	1000UJ*
4-Chlorophenyl-phenylether	7005-72-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Fluorene	86-73-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Nitroaniline	100-01-6	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
4,6-Dinitro-2-methylphenol	534-52-1	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
N-Nitrosodiphenylamine	86-30-6	450 U[1]	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Bromophenyl-phenylether	101-55-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorobenzene	118-74-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Pentachlorophenol	87-86-5	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Phenanthrene	85-01-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Anthracene	120-12-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Di-n-Butylphthalate	84-74-2	450 U*	1100 UJ	1000 UJ	990 UJ	2500 U	990 U	1000 U	1900 U	990 U	1800 UJ
Fluoranthene	206-44-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Pyrene	129-00-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Butylbenzylphthalate	85-68-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
	TYPE	Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
	EXTRACTION DATE	2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
	ANALYSIS DATE	3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
3,3'-Dichlorobenzidine	91-94-1	900 U	2200 UJ	2100 UJ	2000 UJ	2000 U	2000 U	2100 U	2000 U	2000 U	2000 UJ
Benzo(a)anthracene	56-55-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-ethylhexyl)phthalate	117-81-7	450 U*	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Chrysene	218-01-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Di-n-octylphthalate	117-84-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(b)fluoranthene	205-99-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(k)fluoranthene	207-08-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(a)pyrene	50-32-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Dibenz(a,h)anthracene	53-70-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(g,h,i)perylene	191-24-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		0	8	13	7	17	9	7	16	11	9
TICs without laboratory "B" flags		0	4	11	4	9	2	2	8	4	2

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	EXTRACTION DATE	3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
	ANALYSIS DATE	4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
Phenol	108-95-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-chloroethyl)ether	111-44-4	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Chlorophenol	95-57-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,3-Dichlorobenzene	541-73-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,4-Dichlorobenzene	106-46-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzyl Alcohol	100-51-6	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,2-Dichlorobenzene	95-50-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Methylphenol	95-48-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-Chloroisopropyl) ether	108-60-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Methylphenol	106-44-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
N-Nitrosodipropylamine	621-64-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachloroethane	67-72-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Nitrobenzene	98-95-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Isophorone	78-59-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Nitrophenol	88-75-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dimethylphenol	105-67-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzoic acid	65-85-0	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300UJ*	5000 UJ	5000 UJ
bis(2-chloroethoxy)methane	111-91-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg.	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	EXTRACTION DATE	3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
	ANALYSIS DATE	4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
2,4-Dichlorophenol	120-83-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,2,4-Trichlorobenzene	120-82-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Naphthalene	91-20-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Chloroaniline	106-47-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorobutadiene	87-68-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Chloro-3-methylphenol	59-50-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Methylnaphthalene	91-57-6	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorocyclopentadiene	77-47-4	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4,6-Trichlorophenol	88-06-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4,5-Trichlorophenol	95-95-4	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
2-Chloronaphthalene	91-58-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Nitroaniline	88-74-4	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Dimethylphthalate	131-11-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Acenaphthylene	208-96-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
3-Nitroaniline	99-09-2	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Acenaphthene	83-32-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dinitrophenol	51-28-5	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
4-Nitrophenol	100-02-7	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	EXTRACTION DATE	3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
	ANALYSIS DATE	4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
Dibenzofuran	132-64-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dinitrotoluene	121-14-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,6-Dinitrotoluene	606-20-2	1000 UJ	1000 U	NA	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Diethylphthalate	84-66-2	1000UJ*	1000 U*	370 U	1000 UJ	1000 UJ	370 J	1200 UJ	1500UJ*	1000 UJ	1000 UJ
4-Chlorophenyl-phenylether	7005-72-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Fluorene	86-73-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Nitroaniline	100-01-6	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
4,6-Dinitro-2-methylphenol	534-52-1	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
N-Nitrosodiphenylamine	86-30-6	1000 UJ	1000 U	90 J[1]	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Bromophenyl-phenylether	101-55-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorobenzene	118-74-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Pentachlorophenol	87-86-5	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Phenanthrene	85-01-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Anthracene	120-12-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Di-n-Butylphthalate	84-74-2	1000 UJ	1000 U	45 J	1500 UJ	1000 UJ	1400 UJ	1200 UJ	4500 UJ	1000 UJ	1000 UJ
Fluoranthene	206-44-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Pyrene	129-00-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Butylbenzylphthalate	85-68-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
	TYPE	Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
	POND	3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
	DEPTH	13	13	13	21	61.5	90.5	118.5	123.5	1	3
	EXTRACTION DATE	3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
	ANALYSIS DATE	4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
3,3'-Dichlorobenzidine	91-94-1	2000 UJ	2000 U	740 U	2000 UJ	2100 UJ	2100 UJ	2400 UJ	3000 UJ	2100 UJ	2100 UJ
Benzo(a)anthracene	56-55-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-ethylhexyl)phthalate	117-81-7	1000 UJ	1000 U	54 J	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1200 UJ	1600 UJ
Chrysene	218-01-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Di-n-octylphthalate	117-84-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(b)fluoranthene	205-99-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(k)fluoranthene	207-08-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(a)pyrene	50-32-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Dibenz(a,h)anthracene	53-70-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(g,h,i)perylene	191-24-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		6	11	5	13	14	17	11	20	16	17
TICs without laboratory "B" flags		0	4	5	7	5	9	1	1	5	0

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	EXTRACTION DATE	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
	ANALYSIS DATE	4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
Phenol	108-95-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-chloroethyl)ether	111-44-4	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Chlorophenol	95-57-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,3-Dichlorobenzene	541-73-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,4-Dichlorobenzene	106-46-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzyl Alcohol	100-51-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,2-Dichlorobenzene	95-50-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Methylphenol	95-48-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-Chloroisopropyl) ether	108-60-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Methylphenol	106-44-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
N-Nitrosodipropylamine	621-64-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachloroethane	67-72-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Nitrobenzene	98-95-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Isophorone	78-59-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Nitrophenol	88-75-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dimethylphenol	105-67-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzoic acid	65-85-0	6300 UJ	5000UJ*	5100UJ*	5000UJ*	5100UJ*	1700 U	5300UJ*	4800UJ*	5100UJ*	6200 U*
bis(2-chloroethoxy)methane	111-91-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	EXTRACTION DATE	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
	ANALYSIS DATE	4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
2,4-Dichlorophenol	120-83-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,2,4-Trichlorobenzene	120-82-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Naphthalene	91-20-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Chloroaniline	106-47-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorobutadiene	87-68-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Chloro-3-methylphenol	59-50-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Methylnaphthalene	91-57-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorocyclopentadiene	77-47-4	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4,6-Trichlorophenol	88-06-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4,5-Trichlorophenol	95-95-4	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
2-Chloronaphthalene	91-58-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Nitroaniline	88-74-4	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Dimethylphthalate	131-11-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Acenaphthylene	208-96-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
3-Nitroaniline	99-09-2	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Acenaphthene	83-32-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dinitrophenol	51-28-5	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
4-Nitrophenol	100-02-7	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	EXTRACTION DATE	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
	ANALYSIS DATE	4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
Dibenzofuran	132-64-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dinitrotoluene	121-14-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,6-Dinitrotoluene	606-20-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	NA	1100 UJ	990 UJ	1100 UJ	1300 U
Diethylphthalate	84-66-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000UJ*	340 U	1100UJ*	990 UJ	1100 UJ	1300 U*
4-Chlorophenyl-phenylether	7005-72-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Fluorene	86-73-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Nitroaniline	100-01-6	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
4,6-Dinitro-2-methylphenol	534-52-1	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
N-Nitrosodiphenylamine	86-30-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U[1]	1100 UJ	990 UJ	1100 UJ	1300 U
4-Bromophenyl-phenylether	101-55-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorobenzene	118-74-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Pentachlorophenol	87-86-5	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Phenanthrene	85-01-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Anthracene	120-12-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Di-n-Butylphthalate	84-74-2	2000 UJ	1500 UJ	2500 UJ	2100 UJ	3100 UJ	340 U	2500 UJ	1100 UJ	2200 UJ	3700 U
Fluoranthene	206-44-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Pyrene	129-00-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Butylbenzylphthalate	85-68-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U

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Table A-6. B-Pond Phase 3 Semivolatiles. (µg/Kg)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
	TYPE	Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
	POND	3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
	DEPTH	5	7	9	9	11.5	11.5	30	---	60	80
	EXTRACTION DATE	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
	ANALYSIS DATE	4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
3,3'-Dichlorobenzidine	91-94-1	2600 UJ	2100 UJ	2100 UJ	2100 UJ	2100 UJ	690 U	2200 UJ	2000 UJ	2100 UJ	2500 U
Benzo(a)anthracene	56-55-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-ethylhexyl)phthalate	117-81-7	1400 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Chrysene	218-01-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Di-n-octylphthalate	117-84-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(b)fluoranthene	205-99-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(k)fluoranthene	207-08-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(a)pyrene	50-32-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Indeno(1,2,3-cd)pyrene	193-39-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Dibenz(a,h)anthracene	53-70-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(g,h,i)perylene	191-24-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		18	21	21	20	21	5	21	21	19	20
TICs without laboratory "B" flags		1	4	3	2	2	5	4	4	2	4

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.
* NOTE: Analyte was qualified as non-detected at the adjusted CRQL due to traces in immediate laboratory blank and sample however, other samples analyzed at that laboratory are reported in this table at sub-CRQL concentrations.
1 Cannot be separated from Diphenylamine.

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Reasons for Westinghouse Hanford Company Qualification--
Semivolatile Organic (Base/Neutral/Acid) Compounds

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". The following samples were qualified "J" based on extraction outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

B00FK6	B00GR9	B00GX6	B00H04
B00FK7	B00GS4	B00GZ2	B00H05
B00FK8	B00GS9	B00GZ6	B00H06
B00FK9	B00GT7	B00GZ8	B00H10
B00FL0	B00GV5	B00H00	B00H14
B00FL1	B00GW1	B00H01	B00H19
B00FL3	B00GW3	B00H02	
B00FL4	B00GW8	B00H03	

LABORATORY BLANK--The target compounds diethyl phthalate bis(2-ethylhexyl) phthalate, di-n-butyl phthalate and benzoic acid were detected in laboratory blanks. This resulted in an undetected qualification, "U", of one or more of those analytes detected at similar concentrations in the following:

B00FK6	B00GS9	B00GW4	B00H04
B00FK7	B00GT7	B00GW8	B00H05
B00FK8	B00GV5	B00GX6	B00H06
B00FK9	B00GV6	B00GZ2	B00H10
B00FL0	B00GV7	B00GZ6	B00H14
B00FL1	B00GV8	B00GZ8	B00H19
B00FL3	B00GV9	B00H00	B00H23
B00FL4	B00GW0	B00H01	
B00GR9	B00GW1	B00H02	
B00GS4	B00GW3	B00H03	

Blank qualification criteria were also applied to compounds reported as TICs. The TICs were not reported when present in similar concentrations in the immediately associated laboratory blank.

Split Samples:

LABORATORY BLANKS--The compounds di-n-butylpthalate, fluoranthene, pyrene, butylbenzylphthalate, and bis(2-ethylhexyl)phthalate were detected at sub-CRQL levels in the laboratory blank associated with B00GS5. Similar levels in sample B00GS5 were qualified "U" at the quantitation limit.

Additional notes :

The split samples B00GS5, B00GW5, and B00H07 had a pH reported in conjunction with the semivolatile analysis. Reported values were 7.1, 7.2, and 6.3, respectively.

A listing of semivolatile TICs follows in Table A-7.

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00FK6	Dioctyl Adipate	123-79-5	630 J
	Unknown		1400 J
	Unknown		960 J
B00FK7	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	550 J
	2-Pyrrolidinone, 1-methyl-	872-50-4	610 J
	Unknown		900 J
B00FK8	Unknown Hydrocarbons		5400 J
	Unknown Hydrocarbons		1100 J
	Unknown		1500 J
	Unknown		500 J
B00FK9	Octanoic Acid	124-07-2	460 J
	Unknown		1400 J
B00FL0	Unknown Hydrocarbon		2800 J
	Unknown Hydrocarbon		810 J
	Unknown		520 J
	Unknown		1500 J
	Unknown		490 J
B00FL1	Dimethyl Hydrazine		600 JY
	Unknown Hydrocarbon		530 J
	Unknown		1500 J
	Unknown		1700 J
	Unknown		620 J
B00FL3	None		
B00FL4	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	480 J
	Phosphoric acid, Dioctadecyl e		470 J
	Unknown		1200 J
	Unknown		1600 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GR9	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	450 J
	Dimethyl Hydrazine		460 J
	Unknown		630 J
	Unknown		440 J
	Unknown		790 J
	Unknown		640 J
B00GS4	Phosphoric acid, Dioctadecyl e		1200 J
	Unknown Hydrocarbon		1700 J
	Unknown		1300 J
	Unknown		650 J
B00GS5	None		
B00GS9	Butyl Cellosolve	111-76-2	690 J
	Unknown		470 J
	Unknown		1400 J
	Unknown		490 J
B00GT7	Unknown Hydrocarbon		3000 J
	Unknown Phthalate ester		470 J
	Unknown		780 J
	Unknown		2000 J
	Unknown		820 J
	Unknown		2300 J
	Unknown		550 J
	Unknown		1600 J
	Unknown		1400 J
	Unknown		1400 J
	Unknown		2000 J
B00GV5	Unknown		780 J
	Unknown		1400 J
	Unknown		640 J
	Unknown		790 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GV6	2-Pyrrolidinone, 1-methyl-	872-50-4	620 J
	Isoheptdecanol		1800 J
	Sat'd. Hydrocarbon		1200 J
	Sat'd. Hydrocarbon		1100 J
	Sat'd. Hydrocarbon		570 J
	Sat'd. Hydrocarbon		670 J
	Sat'd. Hydrocarbon		1300 J
	Unknown		1200 J
	Unknown		920 J
B00GV7	Hexadecanoic acid	57-10-3	1500 J
	Tetradecanoic acid, tetradecyl	3234-85-3	520 J
B00GV8	Pentadecanoic acid	1002-84-2	820 J
	Unknown		640 J
B00GV9	Unknown Alkoxy Cpd		1800 J
	Unknown Alkyl Hydrocarbon		1800 J
	Unknown Alkyl Hydrocarbon		440 J
	Unknown Phthalate ester		890 J
	Unknown		400 J
	Unknown		4800 J
	Unknown		490 J
	Unknown		850 J
B00GW0	Unknown Alkyl Hydrocarbon		470 J
	Unknown Alkyl Hydrocarbon		1200 J
	Unknown Alkyl/Alkoxy Cpd		990 J
	Unknown Alkyl/Alkoxy Cpd		2300 J
B00GW1	Unknown Alkoxy Cpd		860 J
	Unknown Alkyl Hydrocarbon		1500 J
B00GW3	None		

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GW4	Unknown Alkyl/Alkoxy Cpd		1000 J
	Unknown Alkyl/Alkoxy Cpd		2300 J
	Unknown Phthalate ester		460 J
	Unknown		440 J
B00GW5	Adipate		10000 J
	Aldol condensate		200 JA
	Aldol condensate		600 JA
	Unknown		200 J
	Unknown		1000 J
B00GW8	Unknown Alkoxy Cpd		670 J
	Unknown Alkyl Hydrocarbon		1000 J
	Unknown Alkyl Hydrocarbon		450 J
	Unknown Phthalate ester		610 J
	Unknown		3600 J
	Unknown		450 J
	Unknown		470 J
B00GX6	1-Dotriacontanol		3100 J
	Sat'd. Hydrocarbon		740 J
	Unknown Alkyl Hydrocarbon		3600 J
	Unknown Alkyl Hydrocarbon		1300 J
	Unknown		830 J
B00GZ2	3-Eicosene, (e)-		7900 J
	7 Hexadecane, (Z)-		500 J
	1-Propanol, 2-ethoxy-		850 J
	Unknown Alkyl Hydrocarbon		3300 J
	Unknown Alkyl Hydrocarbon		1400 J
	Unknown Hydrocarbon		500 J
	Unknown Hydrocarbon		520 J
	Unknown Hydrocarbon		4600 J
	Unknown		980 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GZ6	Unknown		1400 J
B00GZ8	Unknown Alkyl Hydrocarbon		2600 J
B00H00	Unknown Hydrocarbon		1200 J
	Unknown Hydrocarbon		3800 J
	Unknown Hydrocarbon		1600 J
	Unknown Hydrocarbon		910 J
	Unknown		590 J
B00H01	None		
B00H02	Unknown		790 J
B00H03	bis(2-Methoxyethyl)ester	117-82-8	860 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	2600 J
	Unknown Alkyl Hydrocarbon		900 J
	Unknown Hydrocarbon		1200 J
B00H04	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	4100 J
	Unknown Hydrocarbon		960 J
	Unknown		1100 J
B00H05	bis(2-Methoxyethyl)ester	117-82-8	790 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	2300 J
B00H06	Unknown Alkyl Hydrocarbon		1000 J
	Unknown Hydrocarbon		940 J
B00H07	Adipate		6000 J
	Aldol condensate		200 JA
	Phthalate		100 J
	Unknown Hydrocarbon		200 J
	Unknown		200 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds. Laboratory Reported Compounds Not in the Associated Lab Blank (6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00H14	Propanoic acid, 2-methyl-, 2,2-D		1200 J
	Unknown Hydrocarbon		780 J
	Unknown		800 J
	Unknown		890 J
B00H10	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	1100 J
	Unknown Alkyl Hydrocarbon		550 J
	Unknown		550 J
	Unknown		2100 J
B00H19	bis(2-Methoxyethyl)ester	117-82-8	880 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	3300 J
B00H23	bis(2-Methoxyethyl)ester	117-82-8	1200 J
	Unknown Hydrocarbon		1100 J
	Unknown Hydrocarbon		1100 J
	Unknown		1100 J

J The associated value is an estimated quantity.

Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. (µg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb		Ba	Be		B	Cd		Ca
B00FK6	Reg	3A	6.5	6600	5.6	U	72	0.36		4.5	0.98		3400
B00FK7	Reg	3A	8.5	6900	5.4	U	81	0.43		8.6	1.2		5300
B00FK8	Reg	3A	10.5	3800	5.1	U	61	0.36		3.2	1.6		8100
B00FK9	Reg	3A	13	4500	4.8	U	55	0.31		4.8	0.85		8400
B00FL0	Reg	3A	14.5	5200	5.1	U	69	0.53		3.5	1.2		9200
B00FL1	Reg	3A	16	5600	5.4	U	75	0.40		7.4	1.3		12000
B00FL3	Blank	3A	---	130	5.0	U	1.6	0.03	U	3.7	0.30	U	36
B00FL4	Reg	3A	28	4700	5.1	U	67	0.38		4.7	0.54		9300
B00GR9	Fdup	3A	28	3900	5.1	U	54	0.34		5.3	0.72		6900
B00GS0	Reg	3A	31.5	NA	NA		NA	NA		NA	NA		NA
B00GS1	Reg	3A	36.5	6100	5.2	U	71	0.41		0.42	1.6	U	12000
B00GS2	Reg	3A	42	5200	6.5		65	0.35		0.39	0.99	U	7700
B00GS3	Reg	3A	46.5	5300	5.2	U	72	0.35		0.42	0.69	U	9300
B00GS4	Reg	3A	52.5	8700	5.5	U	91	0.50		1.3	0.33	U	14000
B00GS5	Split	3A	52.5	4020	4.0	UJ	75	0.34	B	NA	0.762	U	11600
B00GS8	Reg	3A	57	4800	4.9	U	66	0.31		0.39	0.34	U	6700
B00GS9	Reg	3A	66.5	5500	5.9		75	0.35		0.41	0.31	U	8000
B00GT1	Reg	3A	77	9600	5.7	U	83	0.37		0.46	0.34	U	11000
B00GT3	Blank	3A	---	230	4.8	U	4.6	0.029	U	0.38	0.29	U	64
B00GT4	Reg	3A	85.5	6500	5.2	U	56	0.23		8.2	0.49		7400
B00GT5	Fdup	3A	85.5	6300	5.2	U	52	0.25		8.3	0.58		8300
B00GT6	Split	3A	85.5	2450	4.0	U	36.3	B	0.21	U	NA	0.83	U	5280
B00GT7	Reg	3A	97	6600	4.8	U	75	0.28		8.2	0.58		6300

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Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb		Ba	Be		B	Cd		Ca
BOOFK6	Reg	3A	6.5	6600	5.6	U	72	0.36		4.5	0.98		3400
BOOGT8	Reg	3A	102	7600	14		87	0.35		8.0	0.76		7800
BOOGV0	Reg	3A	122	6500	4.6	U	71	0.29		8.8	0.28	U	5800
BOOGV1	Blank	3A	---	300	4.6	U	6.4	0.12		5.9	0.27	U	60
BOOGV2	Reg	3A	131	7400	4.6	U	77	0.30		7.4	0.60		8000
BOOGV3	Fdup	3A	131	7100	5.2	U	110	0.30		9.1	0.64		7600
BOOGV4	Split	3A	131	2590	3.76	U	43.7	0.28	B	NA	0.79	U	3450
BOOGV5	Reg	3A	143.5	6100	8.0		53	0.28		9.3	0.62		6400
BOOGV6	Reg	3B	1	4500	5.0	U	62	0.32		8.7	0.67		6900
BOOGV7	Reg	3B	3.5	5200	4.9	U	70	0.33		7.6	0.50		7700
BOOGV8	Reg	3B	5.5	5300	5.1	U	87	0.35		8.9	0.31	U	7700
BOOGV9	Blank	3B	---	150	5.0	U	2.0	0.03		7.5	0.30	U	37
BOOGW0	Reg	3B	7.5	7200	5.3	U	80	0.40		6.1	0.80		13000
BOOGW1	Reg	3B	9.5	5000	5.1	U	64	0.35		6.6	0.80		8700
BOOGW3	Reg	3B	13	4600	5.0	U	80	0.35		5.8	1.7		7100
BOOGW4	Fdup	3B	13	4900	4.8	U	78	0.35		5.8	0.84		7600
BOOGW5	Split	3B	13	2210	3.89	U	58.3	0.20	U	NA	0.82	U	5220
BOOGW6	Reg	3B	16	7000	5.3	U	75	0.42		8.0	0.90		10000
BOOGW8	Reg	3B	21	6000	5.1	U	76	0.35		7.2	0.80		7600
BOOGW9	Reg	3B	28	6500	5.2	U	96	0.38		8.1	0.60		7300
BOOGX2	Reg	3B	31	5500	5.1	U	65	0.37		6.8	0.96		7200
BOOGX3	Reg	3B	35.5	5700	5.0	U	63	0.33		5.2	1.6		6500
BOOGX4	Reg	3B	40	5600	5.1	U	75	0.37		4.7	1.7		6800

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Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
B00FK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
B00GX5	Reg	3B	52	6000	5.1 U	95	0.36	7.1	1.2	6600
B00GX6	Reg	3B	61.5	5400	5.1 U	75	0.34	4.2	1.5	7700
B00GX8	Reg	3B	70.5	7400	5.2 U	84	0.32	3.7	1.3	8000
B00GY0	Blank	3B	---	200	4.9 U	3.6	0.05	6.0	0.29 U	49
B00GY1	Reg	3B	80.5	8400	5.2 U	80	0.29	12	0.66	8700
B00GY2	Fdup	3B	80.5	7200	5.2 U	63	0.29	8.7	0.82	8000
*B00GY9	Split	3B	80.5	2930	12.5 U	43.7	1.0 U	NA	1.0 U	5160
B00GZ2	Reg	3B	90.5	7300	5.1 U	84	0.31	6.9	1.0	7000
B00GZ3	Reg	3B	105	6900	5.1 U	66	0.30	5.0	1.1	5800
B00GZ6	Reg	3B	118.5	17000	5.8 U	88	0.88	7.6	1.3	5000
B00GZ8	Reg	3B	123.5	13000	4.9 U	87	0.56	9.5	1.8	3000
B00H00	Reg	3C	1	6000	5.2 U	53	0.41	8.3	2.0	11000
B00H01	Reg	3C	3	6200	5.0 U	50	0.36	5.8	1.0	5900
B00H02	Reg	3C	5	6500	5.2 U	60	0.39	7.7	1.2	6900
B00H03	Reg	3C	7	5400	5.0 U	88	0.29	11	2.5	6800
B00H04	Reg	3C	9	6000	5.0 U	92	0.21	12	2.3	7300
B00H05	Fdup	3C	9	7100	4.9 U	79	0.26	9.4	2.1	7600
B00H06	Reg	3C	11.5	4900	5.3 U	76	0.30	12	2.3	6800
B00H07	Split	3C	11.5	2300	4.0 U	57.1	0.36 B	NA	0.8 UJ	4820
B00H09	Reg	3C	16	4600	5.2 U	170	0.23	14	1.7	5300
B00H10	Blank	3C	---	260	4.9 U	3.0	0.066	3.4	0.29 U	75
B00H11	Reg	3C	20.5	4700	5.2 U	69	0.30	0.42 U	1.0	6200

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Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. (µg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
B00FK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
B00H14	Reg	3C	30	5600	4.8 U	73	0.35	4.9	1.7	6800
B00H15	Reg	3C	36	6000	5.2 U	56	0.27	10	1.9	6200
B00H16	Reg	3C	40.5	5500	5.3 U	84	0.26	12	2.3	9400
B00H17	Fdup	3C	40.5	5500	5.1 U	78	0.32	0.41 U	0.62	5800
B00H18	Reg	3C	50	5800	5.3 U	69	0.35	0.42 U	1.7	7800
B00H19	Reg	3C	60	7000	5.3 U	97	0.29	4.5	1.2	6500
B00H20	Reg	3C	70.5	7300	5.2 U	70	0.33	4.0	1.7	7400
B00H21	Blank	3C	---	150	5.0 U	2.4	0.04	3.9	0.30 U	92
B00H23	Reg	3C	80	8300	5.2 U	100	0.37	3.5	1.3	7600
B00H24	Split	3C	80	3720 J	3.59 UJ	46.8 J	0.21 B	NA	0.756 U	4740 J

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.
B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit. This concentration flag was only reported with split samples.
* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.
NA Analysis not requested.

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
BOOFK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
BOOFK7	Reg	3A	8.5	6.6	13	15	26000	5300	390 J	1.1 U
BOOFK8	Reg	3A	10.5	3.3	15	17	29000	5200	400 J	1.0 U
BOOFK9	Reg	3A	13	5.9	12	16	24000	4300	300 J	0.96 U
BOOFL0	Reg	3A	14.5	7.4	14	16	29000	4500	360 J	1.0 U
BOOFL1	Reg	3A	16	5.9	14	21	28000	5100	370 J	1.1 U
BOOFL3	Blank	3A	---	0.99 U	0.50 U	0.40 U	190	19	4.5 J	0.99 U
BOOFL4	Reg	3A	28	3.5	13	17	28000	4000	360 J	1.0 U
BOOGR9	Fdup	3A	28	4.9	13	14	25000	3600	300 J	1.0 U
BOOGS0	Reg	3A	31.5	NA	NA	NA	NA	NA	NA	NA
BOOGS1	Reg	3A	36.5	9.6	13	16	27000	6600	410	1.0 U
BOOGS2	Reg	3A	42	7.7	11	16	26000	5300	300	0.97 U
BOOGS3	Reg	3A	46.5	3.9	12	17	26000	5100	350	1.0 U
BOOGS4	Reg	3A	52.5	8.1	12	20	27000	8700	440	1.1 U
BOOGS5	Split	3A	52.5	0.572 U	10.4	13.8	15700	4670	354 J	NA
BOOGS8	Reg	3A	57	3.5	12	15	24000	4300	300	0.99 U
BOOGS9	Reg	3A	66.5	3.1	12	18	27000	4600	340	1.0 U
BOOGT1	Reg	3A	77	13	8.4	13	19000	6600	360	1.1 U
BOOGT3	Blank	3A	---	0.96 U	0.48 U	0.57	890	38	7.5	0.96 U
BOOGT4	Reg	3A	85.5	11	7.0	12	16000 J	4700	250 J	1.0 U
BOOGT5	Fdup	3A	85.5	9.4	7.4	13	16000 J	4000	260 J	1.0 U
BOOGT6	Split	3A	85.5	0.63 U	3.6 B	4.9 B	5450	1700	140 J	NA
BOOGT7	Reg	3A	97	12	10	16	20000 J	4300	260 J	1.3

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
B00FK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
B00GT8	Reg	3A	102	16	14	27	29000 J	5500	340 J	1.9
B00GV0	Reg	3A	122	9.5	12	16	21000 J	3800	250 J	1.1
B00GV1	Blank	3A	---	0.91 U	0.72	1.4	1300 J	42	13 J	0.91 U
B00GV2	Reg	3A	131	10	13	23	24000 J	3800	290 J	1.5
B00GV3	Fdup	3A	131	14	14	22	24000 J	4300	290 J	1.9
B00GV4	Split	3A	131	2.9	6.3 B	10.1	9140	2210	151	NA
B00GV5	Reg	3A	143.5	16	14	45	25000 J	5100	280 J	2.4
B00GV6	Reg	3B	1	8.7	12	16	24000 J	3600	280 J	1.2
B00GV7	Reg	3B	3.5	8.6	14	17	25000 J	3800	340 J	1.4
B00GV8	Reg	3B	5.5	14	13	19	26000 J	4000	350 J	1.5
B00GV9	Blank	3B	---	1.3	0.50 U	5.7	270 J	22	5.4 J	1.00 U
B00GW0	Reg	3B	7.5	9.7	11	19	23000 J	7000	410 J	1.3
B00GW1	Reg	3B	9.5	5.1	14	25	28000 J	5000	360 J	1.4
B00GW3	Reg	3B	13	14	13	19	27000	4900	300	1.0 U
B00GW4	Fdup	3B	13	7.2	13	18	25000 J	4200	340 J	0.95 U
B00GW5	Split	3B	13	0.61 U	6.1 B	8.6	9620	1990 J	152	NA
B00GW6	Reg	3B	16	8.1	14	17	30000 J	5800	400 J	1.1 U
B00GW8	Reg	3B	21	6.8	14	18	29000 J	4600	360 J	1.0 U
B00GW9	Reg	3B	28	9.4	15	21	29000 J	4200	340 J	1.0
B00GX2	Reg	3B	31	7.6	14	17	27000 J	3800	320 J	1.0
B00GX3	Reg	3B	35.5	9.6	13	18	24000	3800	270	1.0 U
B00GX4	Reg	3B	40	5.9	14	19	27000	4600	310	1.0 U

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9 13318.1450

Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
B00FK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
B00GX5	Reg	3B	52	11	13	21	27000	4200	300	1.5
B00GX6	Reg	3B	61.5	11	12	17	25000	4400	310	1.2
B00GX8	Reg	3B	70.5	11	9.5	14	21000	4800	300	1.0 U
B00GY0	Blank	3B	---	0.98 U	0.49 U	1.5	970 J	32	18 J	0.98 U
B00GY1	Reg	3B	80.5	19	9.1	26	30000 J	4300	370 J	2.0
B00GY2	Fdup	3B	80.5	17	8.9	22	29000 J	4400	350 J	1.4
*B00GY9	Split	3B	80.5	2.1	10.4 U	10.9	9600	2530	183	NA
B00GZ2	Reg	3B	90.5	18	12	33	26000 J	3900	300 J	1.9
B00GZ3	Reg	3B	105	20	11	19	22000	4600	280	1.4
B00GZ6	Reg	3B	118.5	25	9.5	19	23000	8400	270	1.2 U
B00GZ8	Reg	3B	123.5	18	7.3	13	17000	6000	270	0.99 U
B00H00	Reg	3C	1	6.0	13	17	28000	5000	370	1.0 U
B00H01	Reg	3C	3	11	11	19	23000	4600	290	1.0 U
B00H02	Reg	3C	5	13	14	26	29000	5000	350	1.8
B00H03	Reg	3C	7	7.6	13	16	25000	4500	300	1.0 U
B00H04	Reg	3C	9	11	13	18	26000	4500	320	2.2
B00H05	Fdup	3C	9	20	12	16	22000	5500	300	1.0
B00H06	Reg	3C	11.5	4.1	15	17	30000	5000	400	1.1 U
B00H07	Split	3C	11.5	0.634 U	6 B	9.4	11400	2350	172	NA
B00H09	Reg	3C	16	4.6	10	13	21000	3700	250	1.0 U
B00H10	Blank	3C	---	0.98 U	0.49 U	0.39 U	650	44	12	0.98 U
B00H11	Reg	3C	20.5	5.7	13	14	25000	3900	300	1.0 U

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
B00FK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
B00H14	Reg	3C	30	5.7	12	17	26000	4100	290	0.97 U
B00H15	Reg	3C	36	7.1	12	15	23000	3700	280	1.0 U
B00H16	Reg	3C	40.5	6.3	13	15	26000	4300	290	1.1 U
B00H17	Fdup	3C	40.5	11	14	19	25000	4800	310	1.0 U
B00H18	Reg	3C	50	7.3	16	17	31000	4900	390	1.2
B00H19	Reg	3C	60	11	8.1	15	17000	4200	270	1.3
B00H20	Reg	3C	70.5	11	11	19	23000	4500	290	1.0 U
B00H21	Blank	3C	---	7.2	0.50 U	0.40 U	270	45	6.9	0.99 U
B00H23	Reg	3C	80	27	12	23	25000	5800	310	1.0 U
B00H24	Split	3C	80	8.5 J	8.1 B	12.7	13600 J	3230 J	189 J	NA

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.
B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit. This concentration flag was only reported with split samples.
* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.
NA Analysis not requested.

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Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
B00FK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
B00FK7	Reg	3A	8.5	10	1200	540	0.64 U	240	67	51
B00FK8	Reg	3A	10.5	5.9	590	550	0.61 U	230	81	51
B00FK9	Reg	3A	13	7.7	560	320	0.58 U	230	59	45
B00FL0	Reg	3A	14.5	10	600	500	0.62 U	290	86	54
B00FL1	Reg	3A	16	7.5	840	510	0.64 U	320	81	55
B00FL3	Blank	3A	---	0.99 U	59 U	58	0.59 U	20	0.50 U	2.1
B00FL4	Reg	3A	28	6.4	530	370	0.62	220	78	48
B00GR9	Fdup	3A	28	6.4	530	370	0.61 U	240	78	47
B00GS0	Reg	3A	31.5	NA	NA	NA	NA	NA	NA	NA
B00GS1	Reg	3A	36.5	15	900	400	1.5	280	68	56
B00GS2	Reg	3A	42	13	750	330	1.0	270	68	52
B00GS3	Reg	3A	46.5	12	800	280	1.1	280	68	51
B00GS4	Reg	3A	52.5	12	1500	480	1.1	250	58	60
B00GS5	Split	3A	52.5	6.6 B	1110 U	NA	0.952 U	131 B	18.2	32.4
B00GS8	Reg	3A	57	7.1	670	310	0.66	330	62	45
B00GS9	Reg	3A	66.5	7.0	710	270	0.77	310	74	52
B00GT1	Reg	3A	77	16	1800	450	0.83	180	41	42
B00GT3	Blank	3A	---	0.96 U	57 U	87	0.57 U	16	0.48 U	0.6
B00GT4	Reg	3A	85.5	11	1000	440	0.63 U	200	38	34
B00GT5	Fdup	3A	85.5	10	830	550	0.62 U	160	40	33
B00GT6	Split	3A	85.5	3.6 B	420 U	NA	0.83 U	90.3 B	7.6 B	12.4
B00GT7	Reg	3A	97	10	800	470	0.58 U	540	52	37

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Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
B00FK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
B00GT8	Reg	3A	102	15	1100	560	0.61 U	740	73	51
B00GV0	Reg	3A	122	11	930	450	0.56 U	490	56	42
B00GV1	Blank	3A	---	0.91 U	83	82	0.55 U	58	3.1	7.4
B00GV2	Reg	3A	131	9.8	870	330	0.56 U	810	65	43
B00GV3	Fdup	3A	131	16	860	510	0.62 U	770	61	43
B00GV4	Split	3A	131	6.1 B	390 B	NA	0.79 U	341	15.4	15.6
B00GV5	Reg	3A	143.5	24	550	320	0.65 U	600	69	45
B00GV6	Reg	3B	1	8.2	680	340	0.60 U	320	64	48
B00GV7	Reg	3B	3.5	8.9	660	330	0.58 U	360	72	50
B00GV8	Reg	3B	5.5	13	670	360	0.62 U	340	70	52
B00GV9	Blank	3B	---	1.4	60 U	110	0.60 U	34	0.50 U	4.1
B00GW0	Reg	3B	7.5	11	1300	260	0.64 U	210	52	48
B00GW1	Reg	3B	9.5	8.2	780	280	0.61 U	230	78	50
B00GW3	Reg	3B	13	11	850	300	0.60 U	340	71	46
B00GW4	Fdup	3B	13	8.8	670	220	0.57 U	280	76	45
B00GW5	Split	3B	13	4.3 B	491 B	NA	0.82 U	132 B	11.3	17.7
B00GW6	Reg	3B	16	10	870	300	0.63 U	260	82	51
B00GW8	Reg	3B	21	8.3	740	240	0.61 U	450	76	50
B00GW9	Reg	3B	28	11	730	240	0.62 U	560	87	50
B00GX2	Reg	3B	31	8.9	660	250	0.62 U	390	82	49
B00GX3	Reg	3B	35.5	9.2	710	290	0.60 U	520	77	44
B00GX4	Reg	3B	40	10	780	410	0.61 U	420	76	46

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Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
B00FK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
B00GX5	Reg	3B	52	9.7	910	390	0.62 U	550	72	46
B00GX6	Reg	3B	61.5	12	770	450	0.61 U	420	68	43
B00GX8	Reg	3B	70.5	12	1200	400	0.62 U	450	54	40
B00GY0	Blank	3B	---	0.99	65	100	0.59 U	51	0.59	3.3
B00GY1	Reg	3B	80.5	12	970	290	0.62 U	610	45	40
B00GY2	Fdup	3B	80.5	14	1100	260	0.65	410	45	36
*B00GY9	Split	3B	80.5	8.3 U	1040 U	NA	2.1 U	1040 U	15.0	17.3
B00GZ2	Reg	3B	90.5	13	780	250	0.61 U	710	67	40
B00GZ3	Reg	3B	105	15	1200	430	0.61 U	500	58	39
B00GZ6	Reg	3B	118.5	21	3000	430	0.70 U	210	38	56
B00GZ8	Reg	3B	123.5	14	2000	290	0.59 U	180	34	43
B00H00	Reg	3C	1	9.4	1100	350	0.62 U	560	77	51
B00H01	Reg	3C	3	11	830	460	0.60 U	470	62	41
B00H02	Reg	3C	5	13	970	300	0.62 U	620	78	57
B00H03	Reg	3C	7	10	940	410	0.60 U	450	62	49
B00H04	Reg	3C	9	11	960	290	0.60 U	510	69	49
B00H05	Fdup	3C	9	29	790	260	0.59 U	540	58	39
B00H06	Reg	3C	11.5	7.0	670	290	0.63 U	390	85	54
B00H07	Split	3C	11.5	5.0 B	256 B	NA	0.85 U	263 U	17.3	19.3
B00H09	Reg	3C	16	6.8	550	290	0.62 U	310	55	38
B00H10	Blank	3C	---	0.98 U	59 U	100	0.59 U	31	0.53	5.5
B00H11	Reg	3C	20.5	14	630	270	0.62 U	270	68	47

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Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
BOOFK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
BOOH14	Reg	3C	30	9.6	860	260	0.58 U	440	69	49
BOOH15	Reg	3C	36	7.9	720	250	0.62 U	520	60	42
BOOH16	Reg	3C	40.5	12	750	270	0.64 U	510	72	46
BOOH17	Fdup	3C	40.5	14	670	300	0.61 U	440	68	45
BOOH18	Reg	3C	50	8.9	770	370	0.64 U	430	85	54
BOOH19	Reg	3C	60	11	1100	430	0.63 U	410	38	34
BOOH20	Reg	3C	70.5	10	1100	310	0.62 U	570	63	41
BOOH21	Blank	3C	---	4.1	60 U	76	0.60 U	56	0.50 U	2.2
BOOH23	Reg	3C	80	18	1000	350	0.63 U	730	61	42
BOOH24	Split	3C	80	9.5	694 B	NA	1.1 B	275 B	23	23.5

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.
B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit. This concentration flag was only reported with split samples.
* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.
NA Analysis not requested.

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**Reasons for Westinghouse Hanford Company Qualification--
Analytes by Inductively Coupled Plasma (Aluminum-Zinc)**

Regular, Field Duplicate, and Silica Sand Samples:

MATRIX SPIKE--The spike recovery for Mg and Fe was high for several batches. This resulted in an estimated, "J", qualification for samples in those batches. Affected samples are:

B00FK6	B00GT4	B00GV6	B00GY0
B00FK7	B00GT5	B00GV7	B00GY1
B00FK8	B00GT7	B00GV8	B00GY2
B00FK9	B00GT8	B00GV9	B00GZ2
B00FL0	B00GV0	B00GW0	B00GW9
B00FL1	B00GV1	B00GW1	B00GX2
B00FL3	B00GV2	B00GW4	
B00FL4	B00GV3	B00GW6	
B00GR9	B00GV5	B00GW8	

Split Samples:

LABORATORY BLANKS--B00GS5, B00GT6 and B00GW5 were qualified as undetected, "U", for K based on traces in the associated blanks. Sample B00H07 was likewise qualified for Na because contamination was present in the associated blank. (Blank concentrations were less than the CLP CRQL.)

INDUCTIVELY COUPLED PLASMA (ICP) INTERFERENCE CHECK SAMPLE--B00GS5, B00H07, B00H24, B00GT6 and B00GW5 Mn results were qualified as estimated, "J", because of the possibility of false positive results. A "UJ" qualified Sb results for B00H24 and B00GS5 because of the potential for false negative results from interference. Sodium results for B00GV4 were qualified "J", because of the possibility of false positive results.

MATRIX SPIKE--The Cd and Mn results for B00H07 were qualified "UJ" and "J", respectively because of associated low matrix spike recoveries. The Sb results for B00H24 and B00GS5 were qualified "UJ" because of low spike recoveries (<75%).

DUPLICATE ANALYSIS--Barium and Cr results of sample B00H24 were qualified because of variability among duplicate analyses.

SERIAL DILUTION--Several major soil elements (Al, Fe, Mn, Ca, and Mg) were qualified as estimated, "J", for B00H24 because of serial dilution results differed from initial sample results by >10%.

Table A-9. Analytes by Atomic Absorption Spectroscopy. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic		Lead		Mercury		Selenium		Thallium	
B00FK6	Reg	3A	6.5	2.6		5.1		1.0	UJ	0.54	U	1.1	U
B00FK7	Reg	3A	8.5	2.86		5.1		1.0	UJ	0.54	U	1.1	U
B00FK8	Reg	3A	10.5	1.8		3.12		1.0	UJ	0.50	U	0.99	U
B00FK9	Reg	3A	13	2.0		3.83		1.0	UJ	0.52	U	1.0	U
B00FL0	Reg	3A	14.5	1.7		3.18		1.0	UJ	0.52	U	1.0	U
B00FL1	Reg	3A	16	2.6		4.0		1.0	U	0.50	U	0.99	U
B00FL3	Blank	3A	---	0.49	U	0.39	U	1.0	U	0.49	U	1.0	U
B00FL4	Reg	3A	28	1.3		2.6		1.0	U	1.0	U	1.0	U
B00GR9	Fdup	3A	28	1.1		2.6		1.0	U	0.46	U	0.92	U
B00GS0	Reg	3A	31.5	0.97		3.0		1.0	U	NA		NA	
B00GS1	Reg	3A	36.5	2.1		4.2		1.0	U	NA		NA	
B00GS2	Reg	3A	42	1.5		2.6		1.0	U	NA		NA	
B00GS3	Reg	3A	46.5	1.9		3.1		1.0	U	NA		NA	
B00GS4	Reg	3A	52.5	4.2		11		1.0	U	1.1	UD	1.1	U
B00GS5	Split	3A	52.5	4.4		8.7	J	0.12	U	0.348	UJ	0.696	UJ
B00GS8	Reg	3A	57	1.5		2.5		1.0	U	NA		NA	
B00GS9	Reg	3A	66.5	1.3		2.8		1.0	U	0.99	UD	0.99	U
B00GT1	Reg	3A	77	1.2		5.1		1.0	U	1.1	UD	1.1	U
B00GT3	Blank	3A	---	0.44	U	0.45		1.0	U	NA		NA	
B00GT4	Reg	3A	85.5	1.6		2.1		1.0	U	NA		NA	
B00GT5	Fdup	3A	85.5	1.7		2.5		1.0	U	NA		NA	
B00GT6	Split	3A	85.5	0.42	UJ	2.5		0.11	UJ	NA		NA	
B00GT7	Reg	3A	97	1.2		4.3		1.0	U	0.49	U	0.97	U

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Table A-9. Analytes by Atomic Absorption Spectroscopy. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic		Lead		Mercury		Selenium		Thallium	
B00GT8	Reg	3A	102	1.5		9.3		1.0	U	NA		NA	
B00GV0	Reg	3A	122	0.94		2.8		1.0	U	NA		NA	
B00GV1	Blank	3A	---	0.5	U	0.52		1.0	U	0.50	U	NA	
B00GV2	Reg	3A	131	0.79		5.0		1.0	U	NA		NA	
B00GV3	Fdup	3A	131	0.82		4.6		1.0	U	NA		NA	
B00GV4	Split	3A	131	0.6	B	7.3		0.1	U	NA		NA	
B00GV5	Reg	3A	143.5	0.94		18		1.0	U	0.54	U	1.1	U
B00GV6	Reg	3B	1	1.0		2.6		1.0	U	0.50	U	1.0	U
B00GV7	Reg	3B	3.5	2.0		3.4		1.0	U	0.52	U	1.0	U
B00GV8	Reg	3B	5.5	1.6		3.5		1.0	U	0.52	U	1.1	U
B00GV9	Blank	3B	---	0.5	U	0.50		1.0	UJ	0.05	U	1.0	U
B00GW0	Reg	3B	7.5	7.1		13		1.0	UJ	0.53	U	1.1	U
B00GW1	Reg	3B	9.5	3.7		4.1		1.0	UJ	0.50	U	1.0	U
B00GW3	Reg	3B	13	6.6		3.2		1.0	UJ	0.51	U	1.0	U
B00GW4	Fdup	3B	13	2.4		3.6		1.0	UJ	0.51	U	1.0	U
B00GW5	Split	3B	13	1.0	J	0.36	U	0.1	UJ	0.32	U	0.89	U
B00GW6	Reg	3B	16	2.6		4.7		1.0	UJ	NA		NA	
B00GW8	Reg	3B	21	2.2		3.0		1.0	UJ	0.52	U	1.0	U
B00GW9	Reg	3B	28	1.2		2.9		1.0	UJ	NA		NA	
B00GX2	Reg	3B	31	0.93		3.0		1.0	UJ	NA		NA	
B00GX3	Reg	3B	35.5	0.68		2.3		1.0	U	NA		NA	
B00GX4	Reg	3B	40	0.82		2.5		1.0	U	NA		NA	
B00GX5	Reg	3B	52	0.90		2.7		1.0	U	NA		NA	

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Table A-9. Analytes by Atomic Absorption Spectroscopy. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic		Lead	Mercury		Selenium		Thallium	
B00GX6	Reg	3B	61.5	0.61		2.2	1.0	U	0.52	U	1.0	U
B00GX8	Reg	3B	70.5	1.5		3.1	1.0	U	NA		NA	
B00GY0	Blank	3B	---	0.5	U	0.43	1.0	U	NA		NA	
B00GY1	Reg	3B	80.5	1.6		20	1.0	U	NA		NA	
B00GY2	Fdup	3B	80.5	1.9		8.8	1.0	U	NA		NA	
*B00GY9	Split	3B	80.5	1.9	U	7.1	0.56		NA		NA	
B00GZ2	Reg	3B	90.5	1.2		9.9	1.0	U	0.51	U	1.0	U
B00GZ3	Reg	3B	105	0.98		2.9	1.0	U	NA		NA	
B00GZ6	Reg	3B	118.5	0.59	U	8.5	1.0	U	0.54	U	1.0	U
B00GZ8	Reg	3B	123.5	7.2		7.2	1.0	U	0.61	U	1.2	U
B00H00	Reg	3C	1	2.5		3.9	1.0	U	0.51	U	1.0	U
B00H01	Reg	3C	3	1.9		3.1	1.0	U	0.51	U	1.0	U
B00H02	Reg	3C	5	2.3		30	1.0	U	0.52	U	1.0	U
B00H03	Reg	3C	7	2.1		2.5	1.0	U	0.52	U	1.0	U
B00H04	Reg	3C	9	1.8		2.6	1.0	U	0.52	U	1.0	U
B00H05	Fdup	3C	9	1.3		2.6	1.0	U	0.51	U	1.0	U
B00H06	Reg	3C	11.5	1.7		2.5	1.0	U	0.52	U	1.0	U
B00H07	Split	3C	11.5	0.9	B	2.2	0.1	U	0.16	U	8.0	U
B00H09	Reg	3C	16	0.80		1.9	1.0	U	NA		NA	
B00H10	Blank	3C	---	0.5	U	0.51	0.1	UJ	0.50	U	1.0	U
B00H11	Reg	3C	20.5	0.82		2.5	0.1	UJ	NA		NA	
B00H14	Reg	3C	30	0.92		2.4	0.1	UJ	0.52	U	1.0	U
B00H15	Reg	3C	36	0.65		1.8	0.1	UJ	NA		NA	

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Table A-9. Analytes by Atomic Absorption Spectroscopy. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic	Lead	Mercury	Selenium	Thallium
B00H16	Reg	3C	40.5	0.76	2.0	0.1 UJ	NA	NA
B00H17	Fdup	3C	40.5	0.50 U	1.9	0.1 UJ	NA	NA
B00H18	Reg	3C	50	0.73	2.1	0.1 UJ	NA	NA
B00H19	Reg	3C	60	1.4	2.8	0.1 UJ	0.53 U	1.0 U
B00H20	Reg	3C	70.5	0.88	2.22	0.1 UJ	NA	NA
B00H21	Blank	3C	---	0.5 U	0.4 U	0.1 UJ	0.50 U	1.0 U
B00H23	Reg	3C	80	1.4	2.5	0.1 UJ	0.52 U	1.0 U
B00H24	Split	3C	80	0.66 J	2.1	0.107 UR	NA	NA

U The analyte was undetected at the stated limit.
J The associated value is an estimated quantity.
NA Analysis not requested.
D Sample quantitation may be affected by dilution.
B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit. This concentration flag was only reported with split samples.
* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.
R Qualified by WHC Office of Sample Management as unusable.

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**Reasons for Westinghouse Hanford Company Qualification--
Analytes by Atomic Absorption Spectroscopy**

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All holding time criteria were met except for some mercury samples. Those samples were qualified "UJ". All samples were flagged as estimated, "J". The 28 day criteria established for water was exceeded for the following Phase 3 soil samples:

B00FK6	B00GW1	B00GX2	B00H17
B00FK7	B00GW3	B00H10	B00H18
B00FK8	B00GW4	B00H11	B00H19
B00FK9	B00GW6	B00H14	B00H20
B00FL0	B00GW8	B00H15	B00H21
B00GV9	B00GW9	B00H16	B00H23
B00GW0			

Split Samples:

LABORATORY BLANKS--Selenium results for B00GW5 were qualified as "U" because similar levels were found in the immediately associated laboratory blank.

HOLDING TIME--Mercury sample results for B00GW5 and B00GT6 were qualified Because of holding times greater than 28 days. Mercury was not detected in either sample; both were qualified "UJ".

SPIKE RECOVERY--Low percent recovery of spike led Westinghouse Hanford-OSM to qualify As result as estimated, "J" or "UJ" on B00GW5 and B00GT6, respectively. The Pb, Se, and Tl results for B00GS5 were also qualified "J", "UJ", and "UJ", respectively, for spike recoveries outside limits. The Hg results for B00H24 were qualified unusable, "R", because there was no spike recovery.

Table A-10. Miscellaneous Analytes. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia		Chloride		Cyanide		Fluoride		Nitrate		Sulfate		Sulfide	
B00FK6	Reg	3A	6.5	0.001	U	20	U	1.0	UJ	2		20	UJ	20	U	0.1	UJ
B00FK7	Reg	3A	8.5	0.001	U	20	U	0.12	J	1.4		20	UJ	20	U	0.1	UJ
B00FK8	Reg	3A	10.5	0.001	U	20	U	1.0	U	0.8		20	UJ	20	U	0.1	UJ
B00FK9	Reg	3A	13	0.001	U	20	U	1.0	UJ	0.6		20	UJ	20	U	0.1	UJ
B00FL0	Reg	3A	14.5	0.001	U	20	U	1.0	UJ	0.6		20	UJ	24		0.1	UJ
B00FL1	Reg	3A	16	0.001	U	20	U	1.0	UJ	0.8		20	UJ	20	U	0.1	UJ
B00FL3	Blank	3A	---	0.001	U	20	U	1.0	UJ	0.4		20	UJ	20	U	0.1	UJ
B00FL4	Reg	3A	28	0.001	U	20	U	1.0	UJ	0.6		20	UJ	20	U	0.1	UJ
B00GR9	Fdup	3A	28	0.001	U	20	U	1.0	UJ	0.6		20	UJ	20	U	0.1	UJ
B00GS0	Reg	3A	30.5	0.001	U	20	U	NA		1.2		20	UJ	20	U	NA	
B00GS1	Reg	3A	36.5	0.001	U	20	U	NA		2.2		20	UJ	20	U	NA	
B00GS2	Reg	3A	42	0.001	U	20	U	NA		1.0		20	UJ	20	U	NA	
B00GS3	Reg	3A	46.5	0.001	U	20	U	NA		1.0		20	UJ	20	U	NA	
B00GS4	Reg	3A	52.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
B00GS5	Split	3A	52.5	NA		NA		0.6	UI	NA		NA		NA		NA	
B00GS8	Reg	3A	57	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00GS9	Reg	3A	66.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
B00GT1	Reg	3A	77	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00GT3	Blank	3A	---	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00GT4	Reg	3A	85.5	0.001	U	1	U	NA		2	U	1	UJ	1	U	NA	
B00GT5	Fdup	3A	85.5	0.001	U	1	U	NA		2	U	1	UJ	1	U	NA	
B00GT6	Split	3A	85.5	NA		NA		NA		NA		NA		NA		NA	
B00GT7	Reg	3A	97	0.001	U	1	U	1.0	UJ	2	U	1	UJ	1	U	0.1	U

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Table A-10. Miscellaneous Analytes. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia		Chloride		Cyanide		Fluoride		Nitrate		Sulfate		Sulfide	
BOOGT8	Reg	3A	102	0.001	U	20	U	NA		2		20	UJ	21		NA	
BOOGV0	Reg	3A	122	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
BOOGV1	Blank	3A	---	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
BOOGV2	Reg	3A	131	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
BOOGV3	Fdup	3A	131	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
BOOGV4	Split	3A	131	NA		NA		NA		NA		NA		NA		NA	
BOOGV5	Reg	3A	143.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGV6	Reg	3B	1	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGV7	Reg	3B	3.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	U
BOOGV8	Reg	3B	5.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	U
BOOGV9	Blank	3B	---	0.001		20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW0	Reg	3B	7.5	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW1	Reg	3B	9.5	0.001	U	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW3	Reg	3B	13	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW4	Fdup	3B	13	0.001	U	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW5	Split	3B	13	NA		NA		0.5	U	NA		NA		NA		NA	
BOOGW6	Reg	3B	16	NA		20	U	NA		2	U	20	UJ	20	U	NA	
BOOGW8	Reg	3B	21	0.001	U	20	U	1.0	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOGW9	Reg	3B	28	NA		20	U	NA		2		20	UJ	20	U	NA	
BOOGX2	Reg	3B	31	NA		20	U	NA		2	U	20	UJ	20	U	NA	
BOOGX3	Reg	3B	35.5	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
BOOGX4	Reg	3B	40	0.001	U	20	U	NA		2.6		20	UJ	20	U	NA	
BOOGX5	Reg	3B	52	0.001	U	20	U	NA		2.4		20	UJ	20	U	NA	

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Table A-10. Miscellaneous Analytes. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia		Chloride		Cyanide		Fluoride		Nitrate		Sulfate		Sulfide	
B00GX6	Reg	3B	61.5	0.001	U	20	U	0.1	UJ	2.0		20	UJ	20	U	0.1	UJ
B00GX8	Reg	3B	70.5	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00GY0	Blank	3B	---	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00GY1	Reg	3B	80.5	0.001	U	20	U	NA		2	U	20	UJ	39		NA	
B00GY2	Fdup	3B	80.5	0.001	U	20	U	NA		2.0		20	UJ	46		NA	
B00GY9	Split	3B	80.5	NA		NA		NA		NA		NA		NA		NA	
B00GZ2	Reg	3B	90.5	0.001	U	20	U	0.1	UJ	2.2		20	UJ	36		0.1	UJ
B00GZ3	Reg	3B	105	0.001	U	20	U	NA		2.0		20	UJ	25		NA	
B00GZ6	Reg	3B	118.5	0.001	U	20	U	1.0	UJ	3.0		20	UJ	28		0.1	UJ
B00GZ8	Reg	3B	123.5	0.001	U	20	U	0.1	UJ	2	U	20	UJ	26		0.1	UJ
B00H00	Reg	3C	1	0.001	U	20	U	1.0	UJ	2.0		20	UJ	20	U	0.1	UJ
B00H01	Reg	3C	3	0.001	U	20	U	1.0	UJ	2.2		20	UJ	20	U	0.1	UJ
B00H02	Reg	3C	5	0.001	U	20	U	1.0	UJ	2.2		20	UJ	20	U	0.1	UJ
B00H03	Reg	3C	7	0.001	U	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
B00H04	Reg	3C	9	0.001	U	20	U	0.1	UJ	2	U	20	UJ	26		0.1	UJ
B00H05	Fdup	3C	9	0.001	U	20	U	0.1	UJ	2	U	20	UJ	21		0.1	UJ
B00H06	Reg	3C	11.5	0.001	U	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
B00H07	Split	3C	11.5	NA		NA		0.5	UJ	NA		NA		NA		NA	
B00H09	Reg	3C	16	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	
B00H10	Blank	3C	---	0.001	UJ	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
B00H11	Reg	3C	20.5	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
B00H14	Reg	3C	30	0.001	U	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
B00H15	Reg	3C	36	0.001	U	20	U	NA		2	U	20	UJ	20	U	NA	

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Table A-10. Miscellaneous Analytes. (μg/g)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia		Chloride		Cyanide		Fluoride		Nitrate		Sulfate		Sulfide	
BOOH16	Reg	3C	40.5	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
BOOH17	Fdup	3C	40.5	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
BOOH18	Reg	3C	50	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
BOOH19	Reg	3C	60	0.001	UJ	20	U	0.17	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOH20	Reg	3C	70.5	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
BOOH21	Blank	3C	---	0.001	UJ	20	U	NA		2	U	20	UJ	20	U	NA	
BOOH23	Reg	3C	80	0.001	UJ	20	U	0.1	UJ	2	U	20	UJ	20	U	0.1	UJ
BOOH24	Split	3C	80	NA		NA		NA		NA		NA		NA		NA	

U The analyte was undetected at the stated concentration.
J The associated value is an estimated quantity.
NA Analysis not requested.
I Information only, see validation explanations.

Reasons for Westinghouse Hanford Company Qualification--Miscellaneous Analytes

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--Nitrate holding time of 48 hrs exceeded for all samples. All samples qualified as estimated, "J", for nitrate. Only B00GT7, B00GV7, and B00GV8 were analyzed within 28 days for sulfide. All other samples were qualified as estimated, "J", for sulfide. All samples were qualified as estimated, "J", for cyanide because of holding times in excess of 14 days. A 28 day holding time for ammonia analyses was exceeded for the following samples:

B00H10	B00H17	B00H19	B00H21
B00H11	B00H18	B00H20	B00H23
B00H16			

Split Samples:

MATRIX SPIKE/DUPLICATE--No matrix spike or duplicate results were provided for cyanide in sample B00GS5 or B00H07. The undetected value for B00GS5 was qualified as "UI", or information only while a similar undetected result for B00H07 was qualified as estimated, "UJ".

Table A-11. List of Radioactivity Data (ρCi/g)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA[1]
BOOFK6	Reg	3A	-6.5	5.34	2.9	-0.221	4.8	12.7	0.84	NA
BOOFK7	Reg	3A	-8.5	4.5	2.9	5.0	5.0	3.47	0.51	NA
BOOFK8	Reg	3A	-10.5	3.21	2.8	-0.863	4.8	3.65	0.51	NA
BOOFK9	Reg	3A	-13	2.4	2.7	-2.61	4.8	3.86	0.52	NA
BOOFL0	Reg	3A	-14.5	-2.42	2.3	-9.51	4.5	1.43	4.0	NA
BOOFL1	Reg	3A	-16	2.37	2.7	-1.43	4.8	0.00	0.41	NA
BOOFL3	Blank	3A	---	-0.77	2.4	-10.5	4.4	-0.0686	0.29	NA
BOOFL4	Reg	3A	-28	-1.08	2.4	1.16	4.4	0.226	0.074	NA
BOOGR9	Fdup	3A	-28	-2.44	2.3	-12.6	4.4	3.27	0.50	NA
BOOGS0	Reg	3A	-31.5	-0.309	2.5	-11.3	4.4	NA	NA	NA
BOOGS1	Reg	3A	-36.5	-2.39	2.3	-11.2	4.4	NA	NA	NA
BOOGS2	Reg	3A	-42	-0.337	1.9	2.33	4.7	NA	NA	NA
BOOGS3	Reg	3A	-46.5	1.05	2.1	6.72	4.9	NA	NA	NA
BOOGS4	Reg	3A	-52.5	2.28	2.3	4.82	4.8	0.13	0.46	NA
BOOGS5	Split	3A	-52.5	3.4	1.3	33	2	< 0.04	---	Done
BOOGS8	Reg	3A	-57	0.711	2	3.32	4.7	NA	NA	NA
BOOGS9	Reg	3A	-66.5	1.48	0.48	2.26	0.87	379	330	NA
BOOGT1	Reg	3A	-77	1.67	0.51	3.35	0.93	NA	NA	NA
BOOGT3	Blank	3A	---	0.76	0.11	0.67	0.13	NA	NA	NA
BOOGT4	Reg	3A	-85.5	2.46	2.3	8.24	5.0	NA	NA	NA
BOOGT5	Fdup	3A	-85.5	1.84	2.2	5.49	4.8	NA	NA	NA
BOOGT6	Split	3A	-85.5	< 3	---	19	2	NA	NA	NA
BOOGT7	Reg	3A	-97	1.81	2.2	0.815	4.6	36.1	1.7	Done
BOOGT8	Reg	3A	-102	42.59	5.5	4.94	5.2	NA	NA	NA
BOOGV0	Reg	3A	-122	1.74	1.9	-2.12	4.8	NA	NA	NA
BOOGV1	Blank	3A	---	1.45	1.9	-0.26	4.9	NA	NA	NA
BOOGV2	Reg	3A	-131	1.93	1.9	-0.22	4.9	NA	NA	NA
BOOGV3	Fdup	3A	-131	2.16	2	5.84	5.2	NA	NA	NA
BOOGV4	Split	3A	-131	< 2	---	26	3	NA	NA	NA
BOOGV5	Reg	3A	-143.5	3.52	2.2	7.43	5.3	1.00	0.433	Done
BOOGV6	Reg	3B	-1	2.21	1.7	1.65	4.7	-0.182	0.44	Done
BOOGV7	Reg	3B	-3.5	4.82	2.2	5.78	5.0	1.25	0.55	Done
BOOGV8	Reg	3B	-5.5	1.83	1.7	5.93	5.0	1.14	0.54	Done
BOOGV9	Blank	3B	---	2.95	1.9	-0.72	4.6	-0.016	0.45	Done
BOOGW0	Reg	3B	-7.5	3.27	1.9	8.75	5.1	36.5	1.7	Done

Table A-11. List of Radioactivity Data (ρCi/g)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA[1]
BOOGW1	Reg	3B	-9.5	2.43	1.8	3.28	4.8	0.222	0.47	Done
BOOGW3	Reg	3B	-13	1.22	1.6	2.91	3.8	1.55	0.40	Done
BOOGW4	Fdup	3B	-13	4.02	2.1	3.42	4.8	1.06	0.53	Done
BOOGW5	Split	3B	-13	< 1	---	19	2	< 0.04	---	Done
BOOGW6	Reg	3B	-16	3.89	2	6.84	5.0	NA	NA	NA
BOOGW8	Reg	3B	-21	1.43	1.6	0.48	4.7	1.47	0.56	Done
BOOGW9	Reg	3B	-28	1.82	1.7	1.36	4.7	NA	NA	NA
BOOGX2	Reg	3B	-31	4.28	2.1	3.59	4.8	NA	NA	NA
BOOGX3	Reg	3B	-35.5	3.45	2	2.06	3.8	NA	NA	NA
BOOGX4	Reg	3B	-40	2.38	1.8	3.86	3.9	NA	NA	NA
BOOGX5	Reg	3B	-52	3.01	1.9	4.57	3.9	NA	NA	NA
BOOGX6	Reg	3B	-61.5	7.29	2.4	3.74	3.9	1.22	0.38	Done
BOOGX8	Reg	3B	-70.5	2.54	1.8	5.88	4.0	NA	NA	NA
BOOGY0	Blank	3B	---	-0.47	2.3	-0.59	4.1	NA	NA	NA
BOOGY1	Reg	3B	-80.5	-0.94	2.3	4.1	-0.41	NA	NA	NA
BOOGY2	Fdup	3B	-80.5	1.14	2.5	4.57	4.4	NA	NA	NA
BOOGY9	Split	3B	-80.5	2.7	1.2	31	2	NA	NA	NA
BOOGZ2	Reg	3B	-90.5	-2.59	2	3.02	4.3	0.806	0.34	Done
BOOGZ3	Reg	3B	-105	-1.77	2.2	1.37	4.2	NA	NA	NA
BOOGZ6	Reg	3B	-118.5	-0.46	2.3	1.49	4.2	9.17	0.78	Done
BOOGZ8	Reg	3B	-123.5	-2.7	2.3	4.34	4.3	2.43	0.46	Done
BOOH00	Reg	3C	-1	-1.45	2.2	-0.30	4.1	1.31	0.38	Done
BOOH01	Reg	3C	-3	-0.65	2.3	-0.78	4.1	1.37	0.39	Done
BOOH02	Reg	3C	-5	-2.25	2.1	0.30	4.1	2.86	0.049	Done
BOOH03	Reg	3C	-7	-1.71	2.5	2.32	4.2	2.58	0.47	Done
BOOH04	Reg	3C	-9	-1.87	2.4	-1.37	4.0	1.86	0.42	Done
BOOH05	Fdup	3C	-9	-3.21	2.3	0.64	4.1	1.60	0.41	Done
BOOH06	Reg	3C	-11.5	-1.44	2.5	4.56	4.3	1.13	0.37	Done
BOOH07	Split	3C	-11.5	1.9	1	2	25	< 0.04	---	Done
BOOH09	Reg	3C	-16	2.0	1.6	6.94	4.2	NA	NA	NA
BOOH10	Blank	3C	---	0.94	1.4	2.13	4.0	0.101	0.37	Done
BOOH11	Reg	3C	-20.5	3.29	1.8	3.61	4.0	NA	NA	NA
BOOH14	Reg	3C	-30	2.98	1.8	6.59	4.2	0.608	0.41	Done
BOOH15	Reg	3C	-36	-1.11	1	-3.12	3.6	NA	NA	NA
BOOH16	Reg	3C	-40.5	3.02	1.8	4.11	4.1	NA	NA	NA

Table A-11. List of Radioactivity Data (pCi/g)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA[1]
B00H17	Fdup	3C	-40.5	3.85	1.9	3.51	4.0	NA	NA	NA
B00H18	Reg	3C	-50	1.86	1.6	3.51	4.0	NA	NA	NA
B00H19	Reg	3C	-60	0.68	1.4	-1.39	3.7	0.479	0.40	Done
B00H20	Reg	3C	-70.5	2.66	2	6.38	5.1	NA	NA	NA
B00H21	Blank	3C	---	2.53	2	-1.47	4.7	NA	NA	NA
B00H23	Reg	3C	-80	2.46	2	3.29	4.9	2.29	0.52	Done
B00H24	Split	3C	-80	M	M	M	M	NA	NA	NA

NA Analysis not requested.
M Missing result, figure not available for this report.
--- Result only reported as a "less-than" value--counting error not specified by laboratory.
1. GEA = Gamma Energy Analysis, see Table A-12.

Table A-12. Gamma Energy Analysis Unvalidated, Raw Data. (µCi/g)

Radionuclide w/ estimated counting error (Err)

Primary Laboratory

Sample	^{137}Cs	--Err	^{234m}Pa	--Err	^{234}Th	--Err	^{235}U	--Err
B00GS4	0.602	0.31	26.03	52.7	3.84	6	NR	
B00GS9	0.34	0.2	7.1	33.7	0.94	3.8	NR	
B00GT7	0.0193	0.23	22.73	37.4	0.0945	4.1	NR	
B00GV5	0.136	0.3	55.35	43.2	1.78	5.9	NR	
B00GV6	0.262	0.23	-12	49.7	-1.69	5.9	NR	
B00GV7	0.0374	0.23	-6.03	37.9	-1.95	4.1	NR	
B00GV8	0.446	0.27	21.38	47.3	0.0968	6	NR	
B00GV9	0.31	0.31	-22.05	51	-2.43	5.9	NR	
B00GW1	0.0635	0.24	11.1	40.7	0.702	4.1	NR	
B00GW0	0.0238	0.22	21.3	39.2	-1.13	4.1	NR	
B00GW3	0.259	0.22	29.28	30.8	-0.224	0.37	NR	
B00GW4	0.495	0.27	-24.68	45.6	-0.194	5.9	NR	
B00GW8	-0.0818	0.23	27.83	40	-1.03	4.1	NR	
B00GX6	0.112	0.20	5.83	34.1	7.56	1.8	NR	
B00GZ6	0.32	0.2	25.62	29.4	1.27	3.7	NR	
B00GZ8	0.0241	0.17	15.48	31.1	NR		NR	
B00H00	0.0268	0.18	1.04	31.1	-3.83	2.4	0.308	0.21
B00H01	-0.0589	0.2	10.02	36.5	0.858	3.3	NR	
B00H02	0.0708	0.19	1.04	32.4	-0.149	3.7	NR	
B00H03	-0.113	0.18	-5.18	31.7	NR		NR	
B00H04	0.0924	0.17	44.28	34.6	5.84	2	NR	
B00H05	0.0429	0.20	8.04	36.2	8.28	1.8	NR	
B00H06	0.0193	0.18	54.12	29.9	-1.63	3.8	NR	
B00H10	0.103	1.6	33.9	30.7	6.54	1.6	NR	
B00H14	0.175	0.20	-31.38	33.0	0.373	3.7	NR	
B00H19	0.0433	0.18	6.48	31.8	-0.451	3.8	NR	
B00H23	0.0618	0.19	9.3	32.2	-1.93	2.4	NR	

NR Not Reported.

Table A-12. Gamma Energy Analysis Unvalidated, Raw Data. (µCi/g)

Radionuclide w/ estimated counting error (Err)

Alternate (Split) Laboratory

Sample	^{40}K	--Err	^{226}Ra	--Err	^{228}Th	--Err
B00GS5	14	1.4	1.9	0.48	0.864	0.086
B00GW5	9.76	0.98	0.853	0.359	0.42	0.042
B00H07	10.1	1	0.513	0.297	0.557	0.056

Undetected radionuclides reported for the above split samples as "less-than" the following (ρCi/g-dry):

	^{7}Be	^{54}Mn	^{58}Co	^{59}Fe	^{60}Co	^{65}Zn
B00GS5	<1	<0.04	<0.08	<0.4	<0.03	<0.1
B00GW5	<0.8	<0.03	<0.06	<0.3	<0.03	<0.08
B00H07	<0.6	<0.03	<0.05	<0.2	<0.02	<0.08

	^{95}Zr	^{103}Ru	^{106}Ru	^{131}I	^{134}Cs	^{137}Cs
B00GS5	<0.1	<0.3	<0.03	<2000	<0.04	<0.03
B00GW5	<0.08	<0.2	<0.2	<300	<0.03	<0.02
B00H07	<0.07	<0.1	<0.2	<100	<0.03	<0.02

	^{140}Ba	^{141}Ce	^{144}Ce
B00GS5	<30	<0.6	<0.3
B00GW5	<10	<0.4	<0.2
B00H07	<5	<0.2	<0.1

References

WHC, 1990, WHC-CM-5-3, Westinghouse Hanford Company, Richland, Washington.

EPA, 1986, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, U.S. Environmental Protection Agency, Washington, D.C.

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APPENDIX B

ANALYTE VARIABILITY GRAPHS

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Introduction

Appendix B contains graphs of selected validated duplicate data. The graphs show how variability does/does not trend over the observed concentration range of the duplicate pairs. The ONLY points appearing on the graphs are those where each validated member of a data pair were reported at detectable levels. These are based on some of the data appearing in the Appendix A.

Each point on the graphs shows a standard deviation based on only two sample results. The reader is cautioned about making grand inferences from any particular point. Though inferences about a population variability based on only two samples are minimally precise, multiple estimates impart more confidence.

Most graphs display two sets of validated data--field duplicate/regular or split/regular sample pairs. The first is based on the results of field duplicates and their associated regular samples. These were collected concurrently and submitted to the primary laboratory without notification that they were duplicate samples. The first set demonstrates uncertainty in the media and a single laboratory measurement system.

The second set appearing on most graphs is based on the results of split samples and their associated regular samples. Split samples were submitted by Westinghouse Hanford to an alternate laboratory; associated regular samples were submitted to the primary laboratory. This set shows the wider validated data uncertainty associated the media and an independent laboratory estimate of the true average concentration at a particular location.

Figure B-1. Selected Duplicates: Gross Alpha.

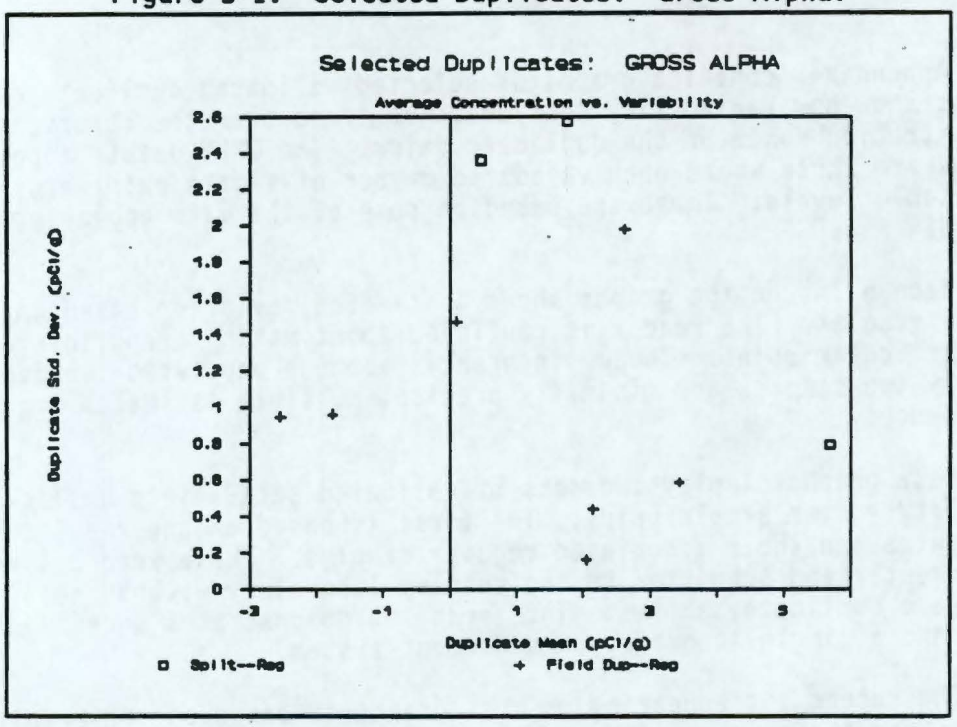

Figure B-2. Selected Duplicates: Aluminum.

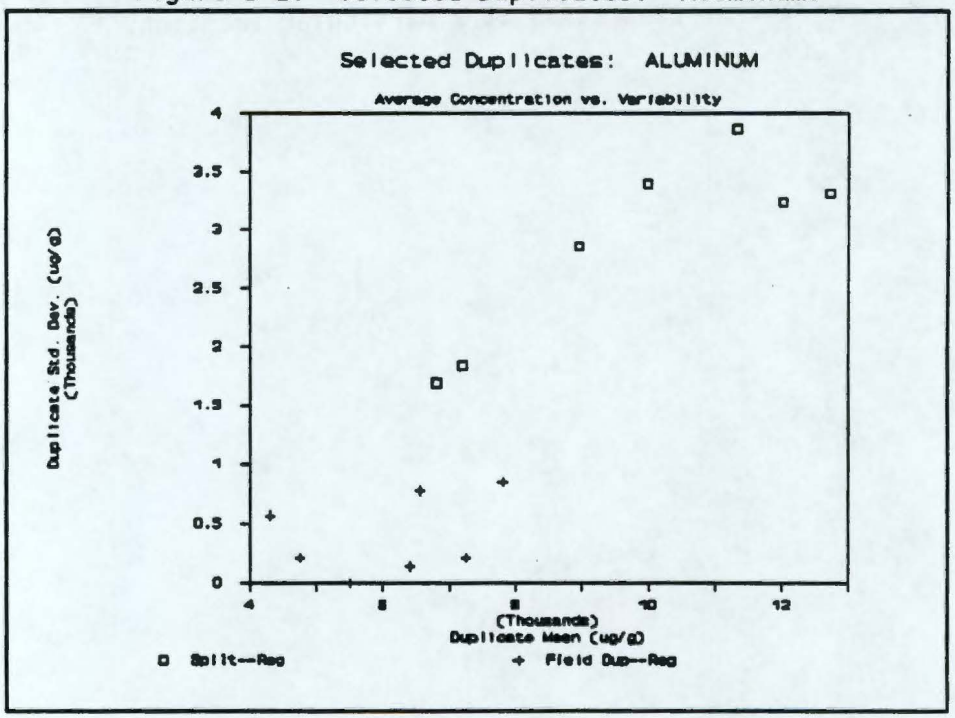

Figure B-3. Selected Duplicates: Arsenic.

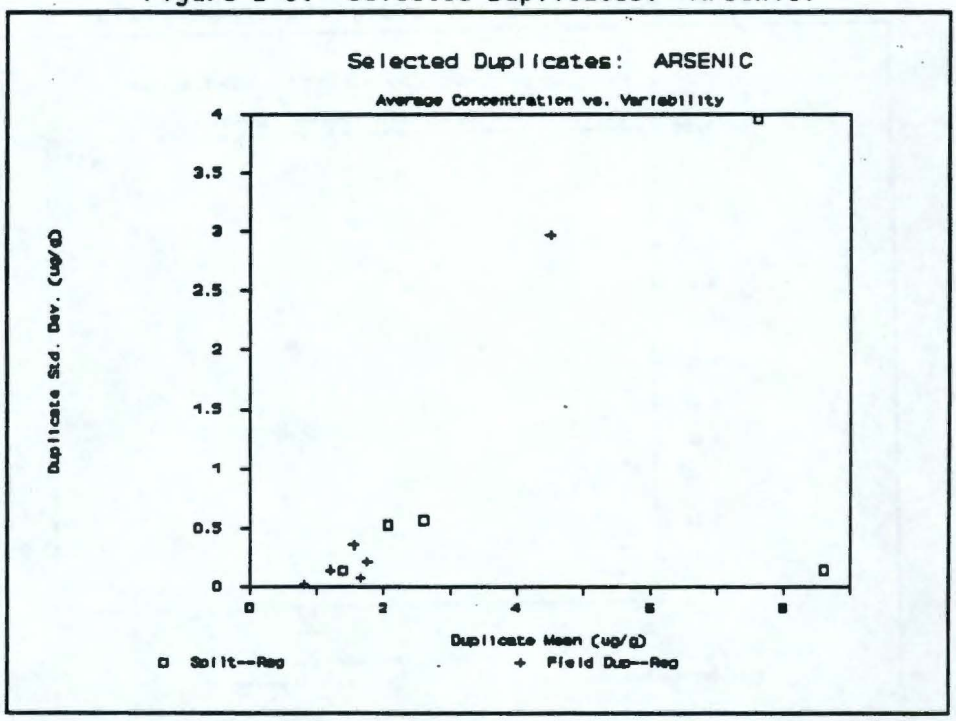

Figure B-4. Selected Duplicates: Barium.

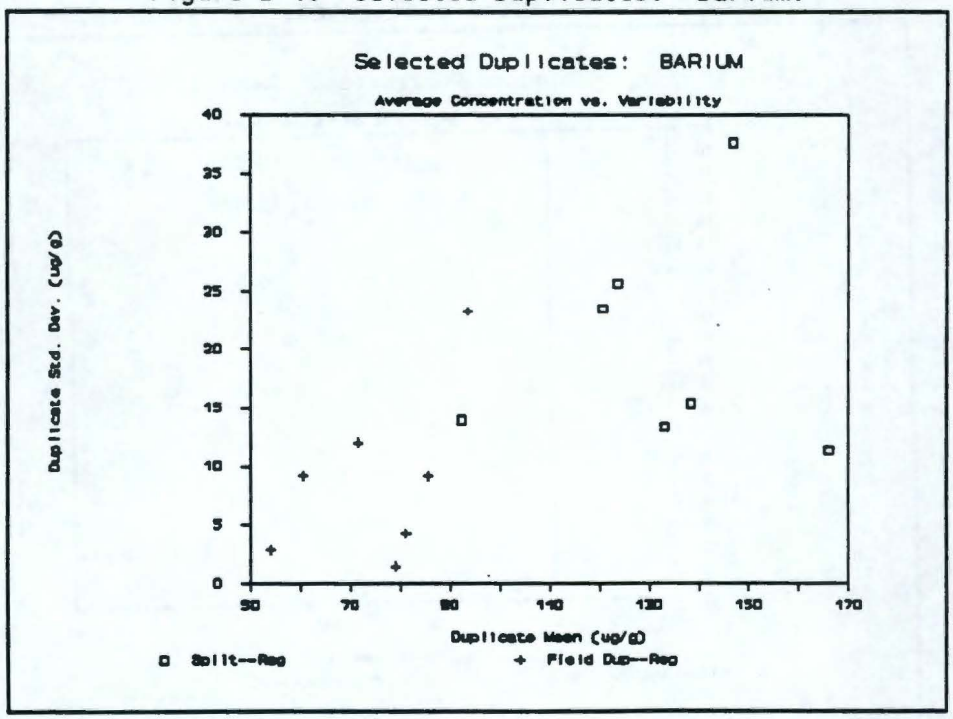

Figure B-5. Selected Duplicates: Beryllium.

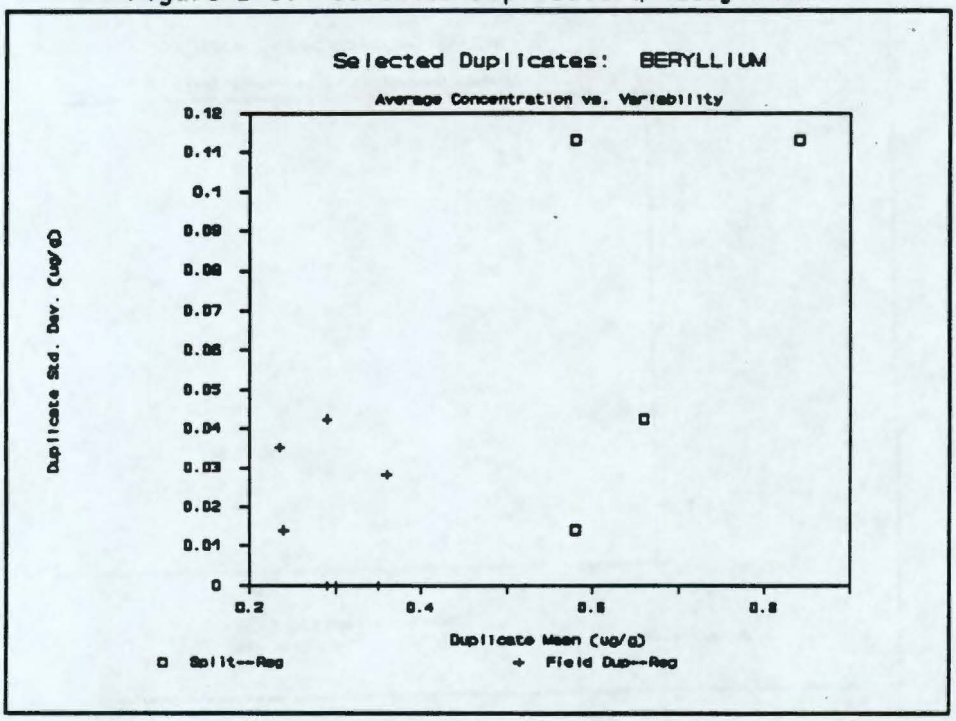

Figure B-6. Selected Duplicates: Gross Beta.

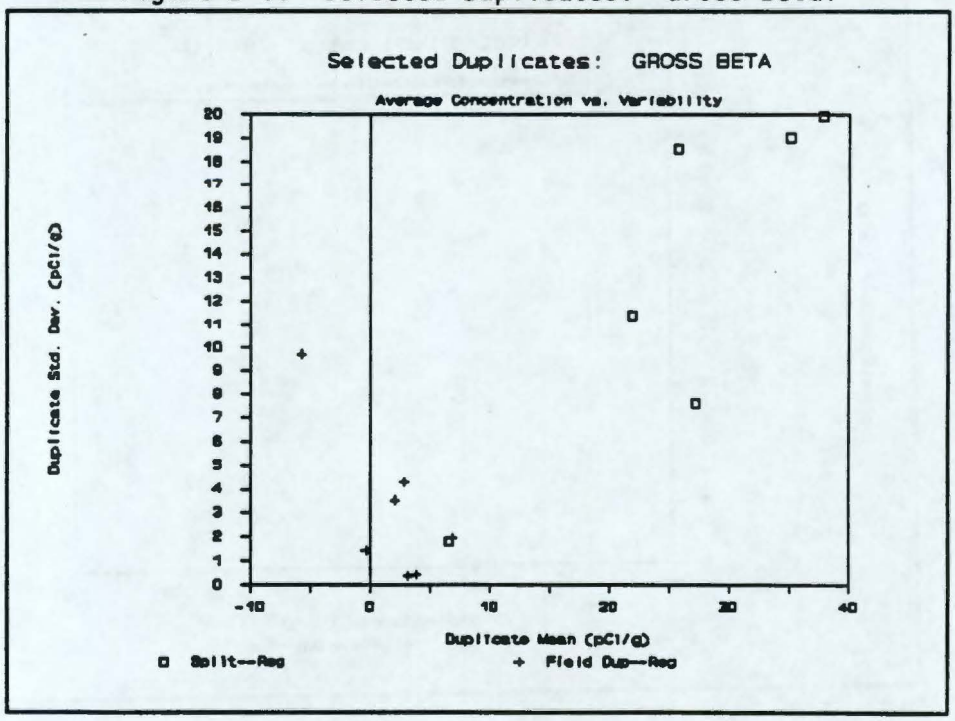

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Figure B-7. Selected Duplicates: Boron.

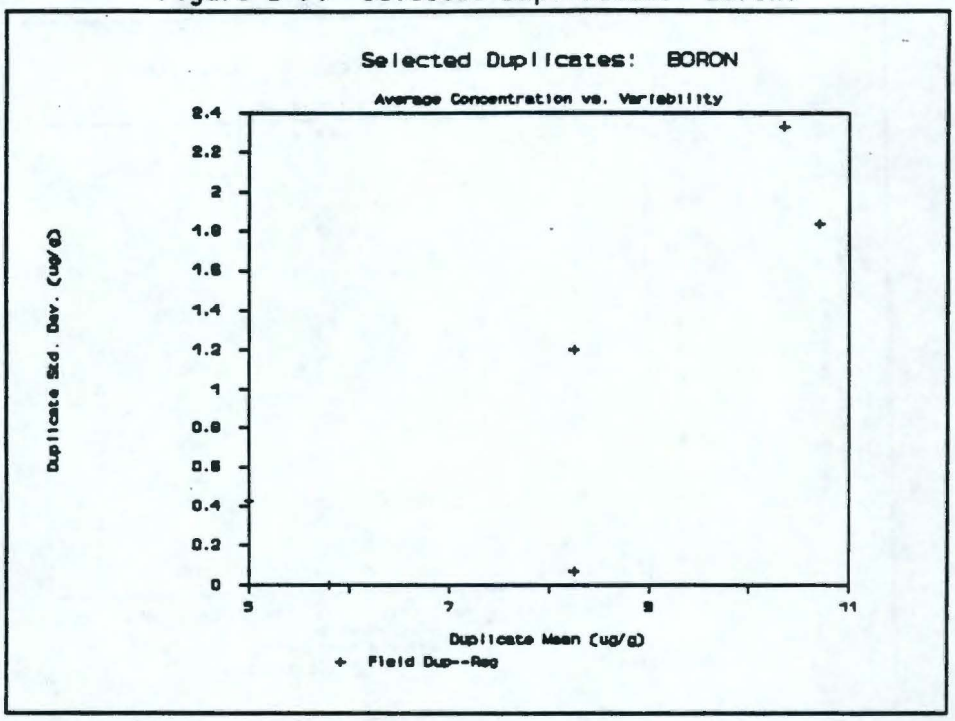

Figure B-8. Selected Duplicates: Cadmium.

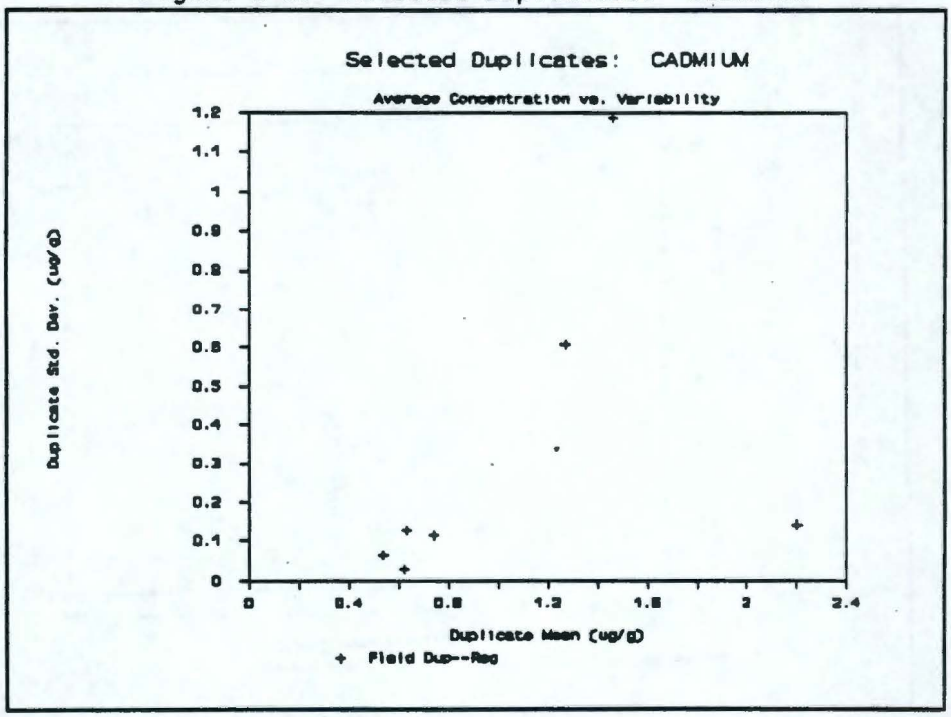

Figure B-9. Selected Duplicates: Calcium.

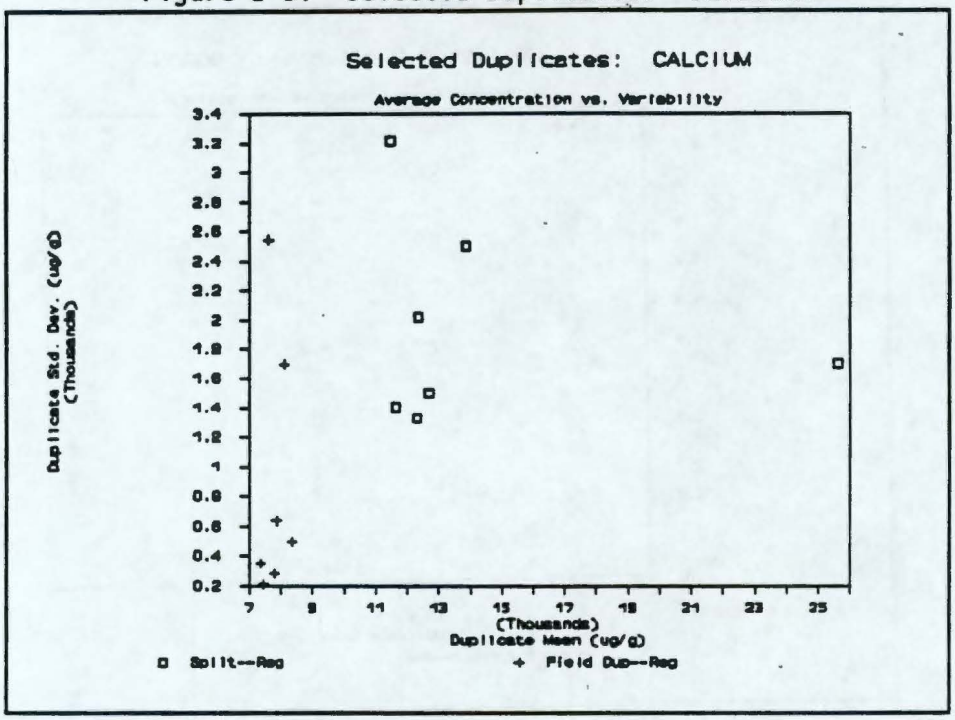

Figure B-10. Selected Duplicates: Chromium.

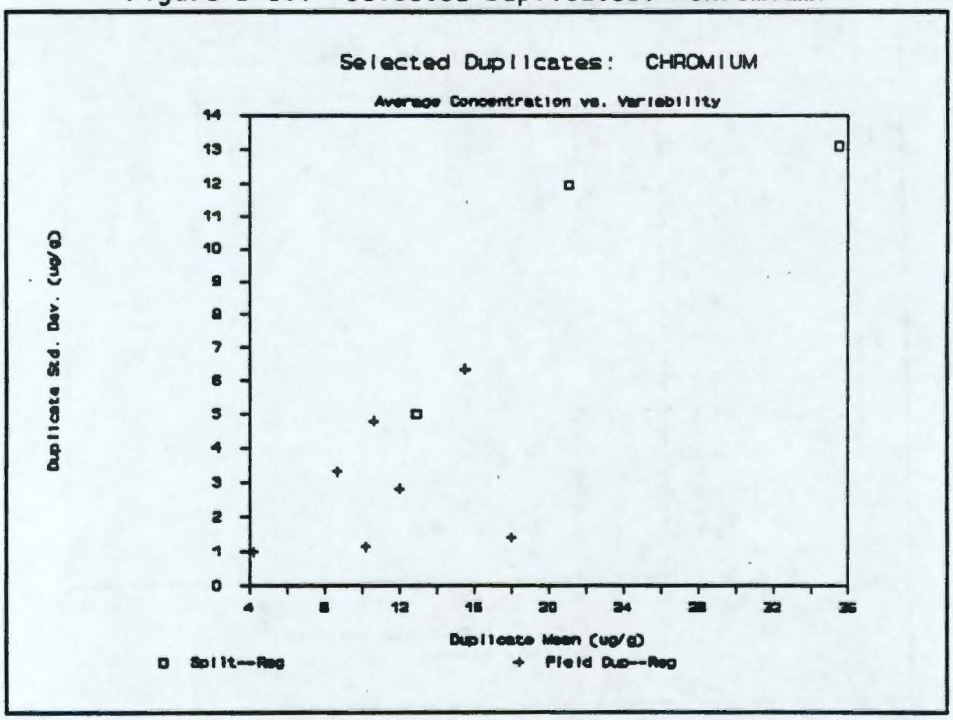

Figure B-11. Selected Duplicates: Cobalt.

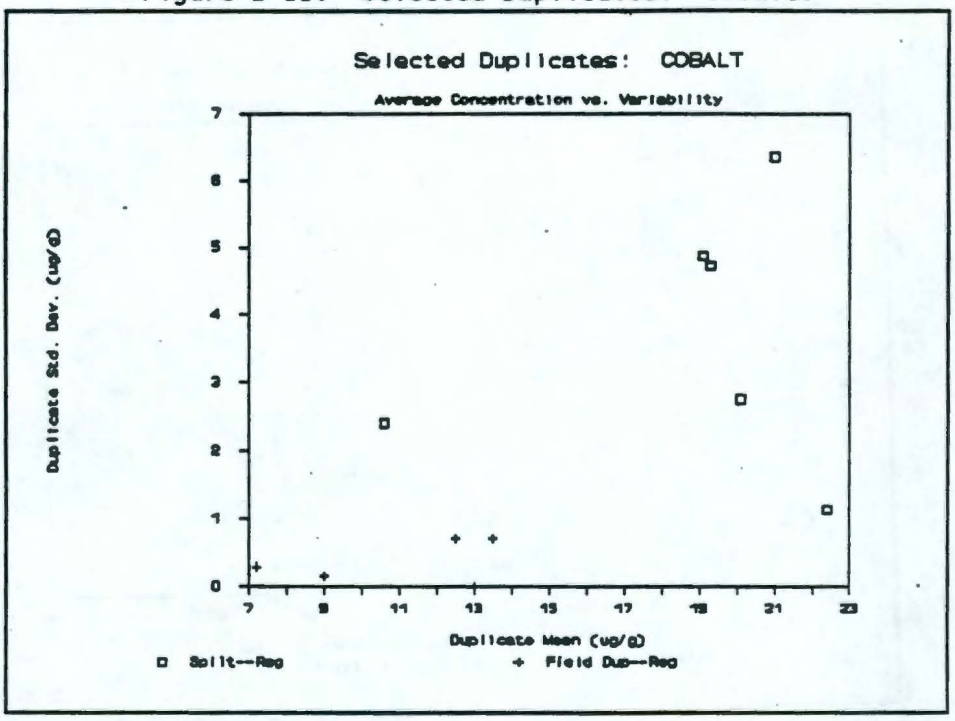

Figure B-12. Selected Duplicates: Copper.

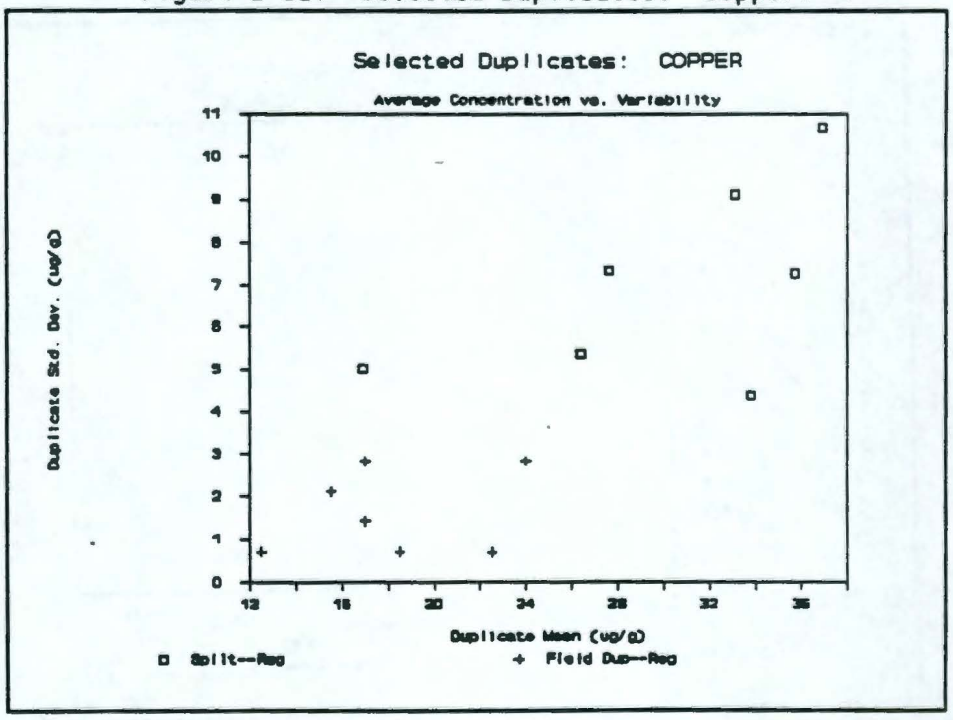

Figure B-13. Selected Duplicates: Lead.

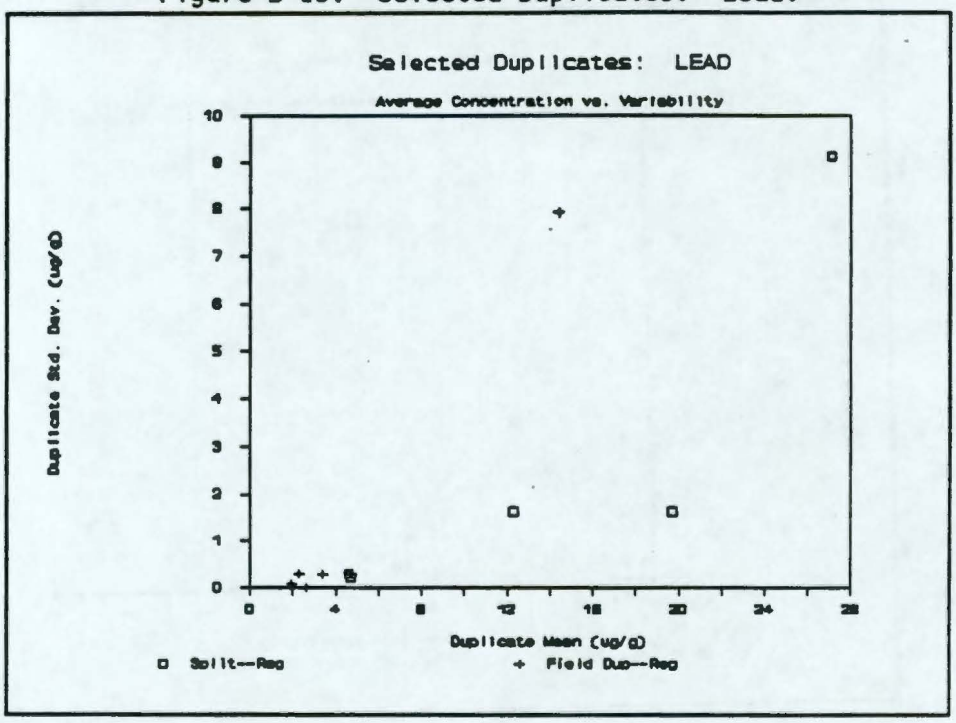

Figure B-14. Selected Duplicates: Magnesium.

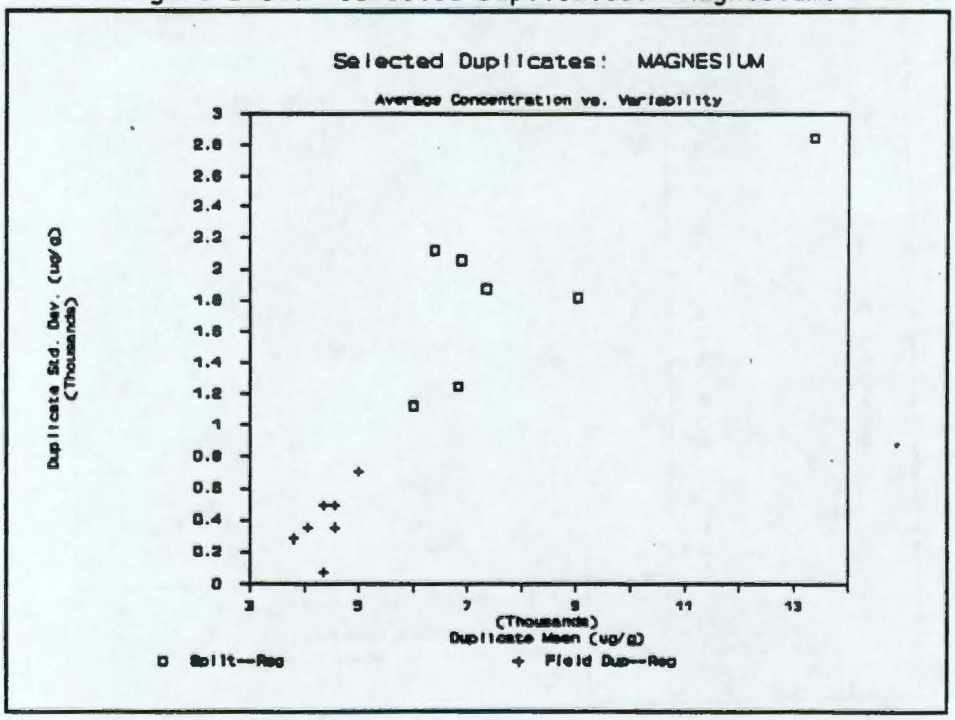

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Figure B-15. Selected Duplicates: Manganese.

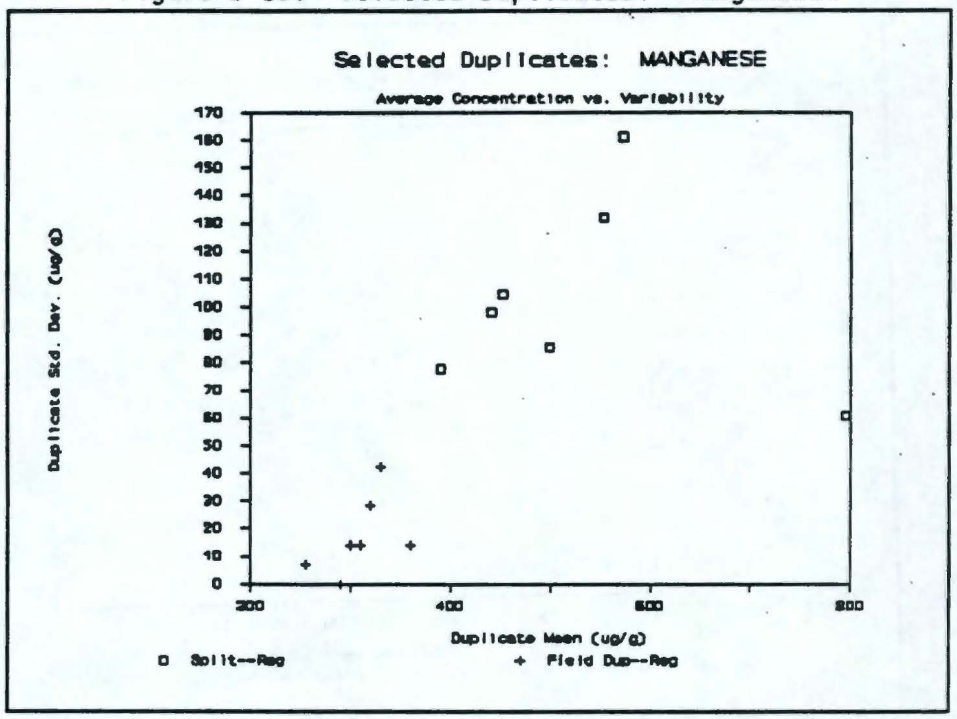

Figure B-16. Selected Duplicates: Molybdenum.

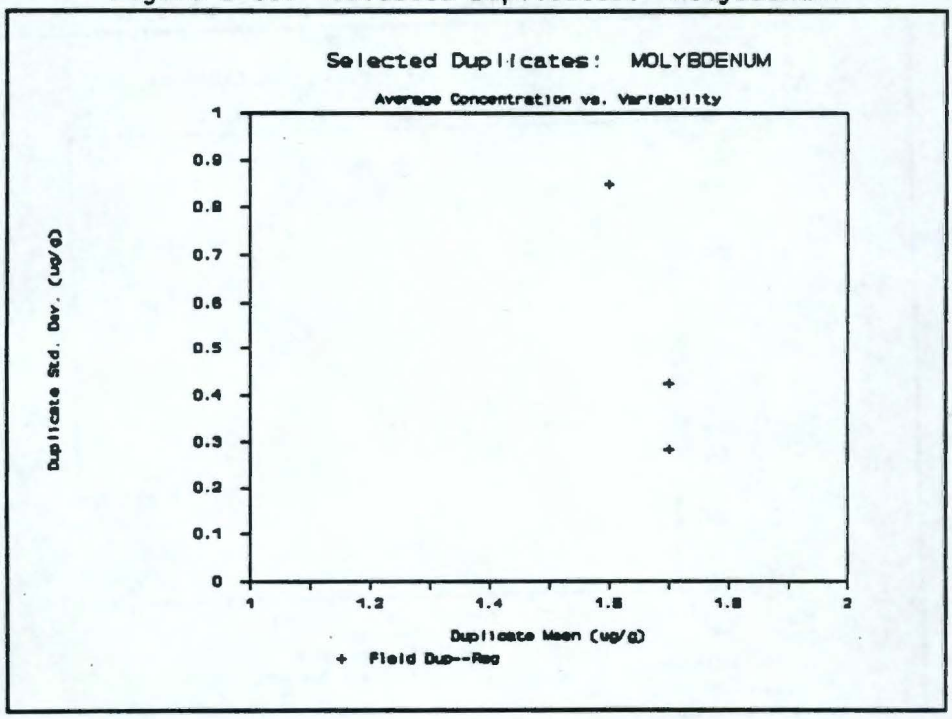

Figure B-17. Selected Duplicates: Nickel.

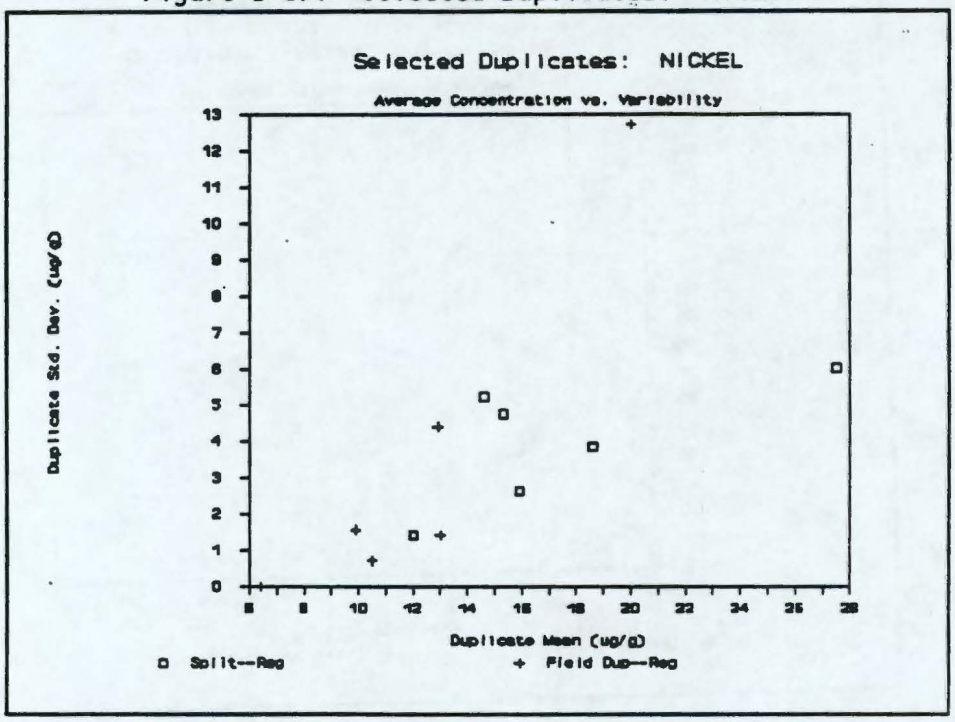

Figure B-18. Selected Duplicates: Potassium.

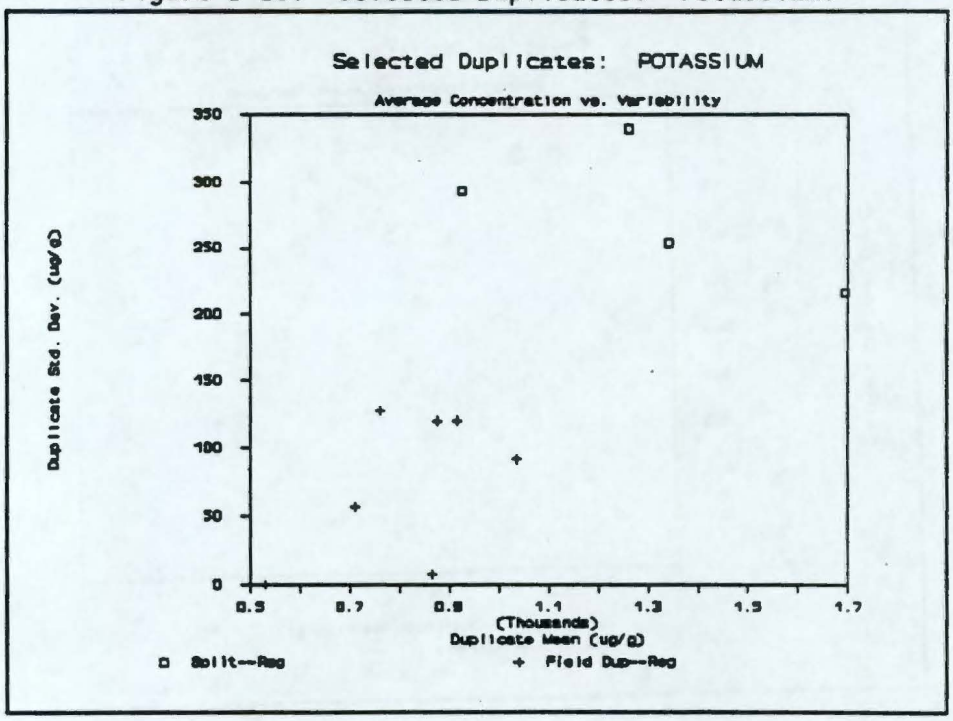

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Figure B-19. Selected Duplicates: Silicon.

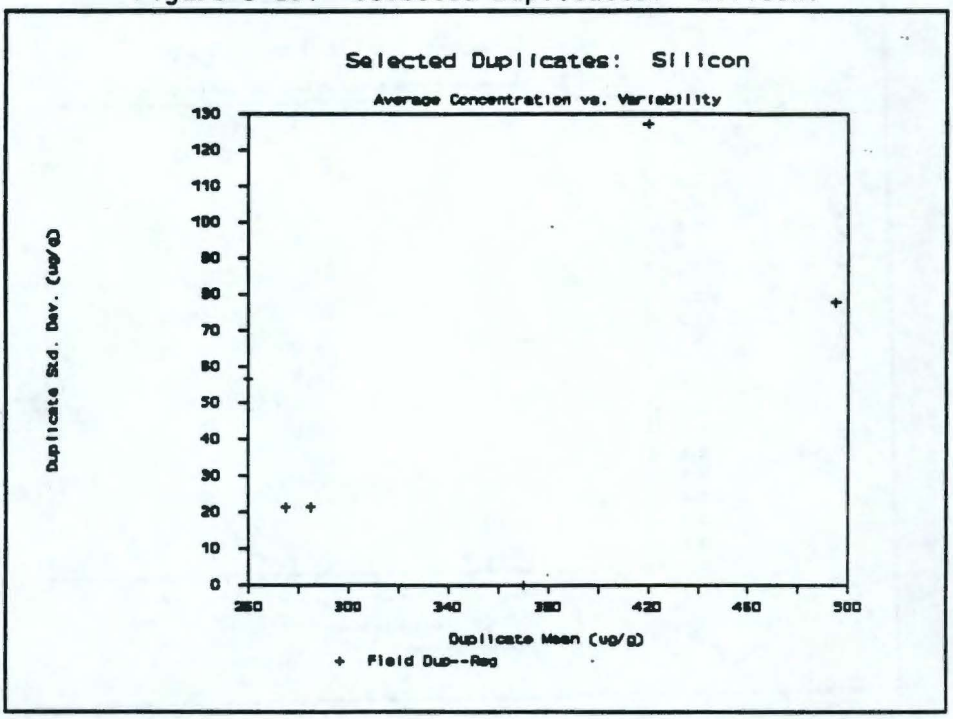

Figure B-20. Selected Duplicates: Sodium.

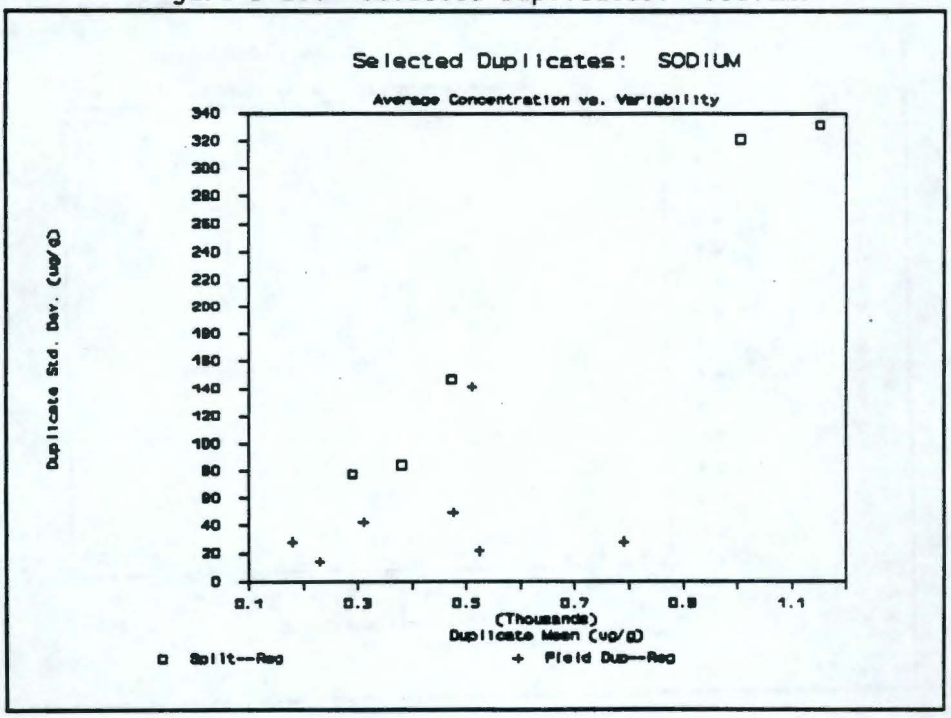

Figure B-21. Selected Duplicates: ^{90}Sr.

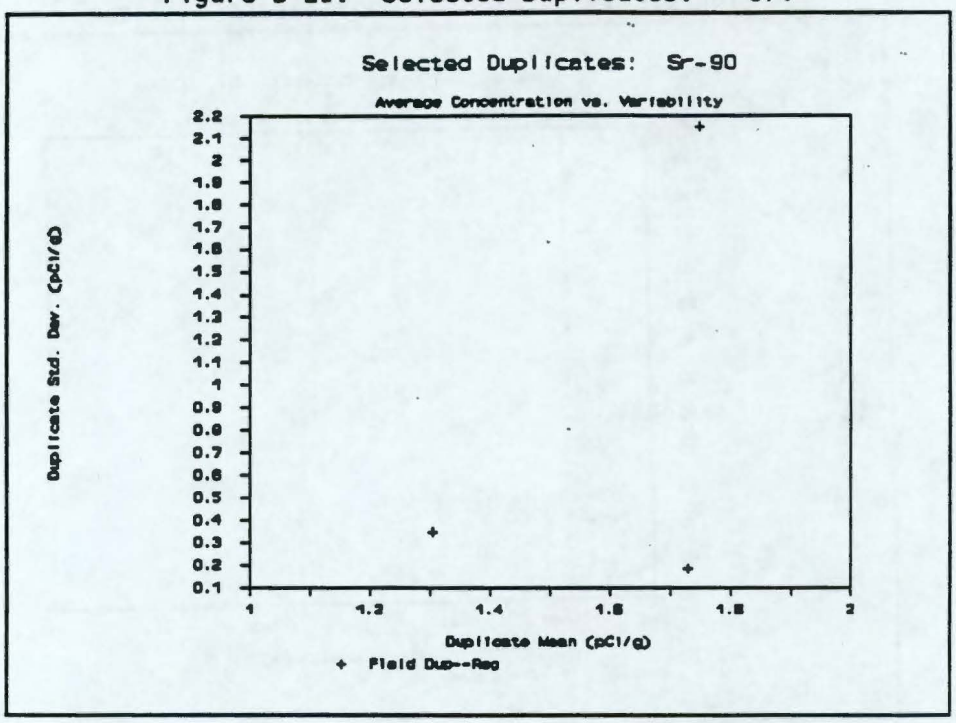

Figure B-22. Selected Duplicates: Sulfate.

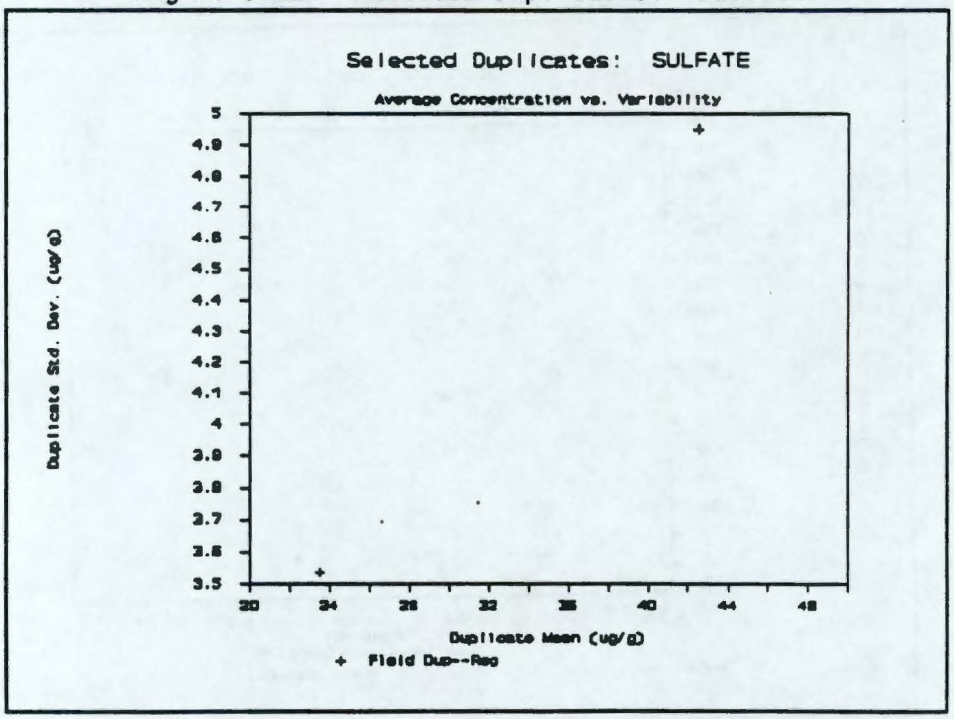

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Figure B-23. Selected Duplicates: Vanadium.

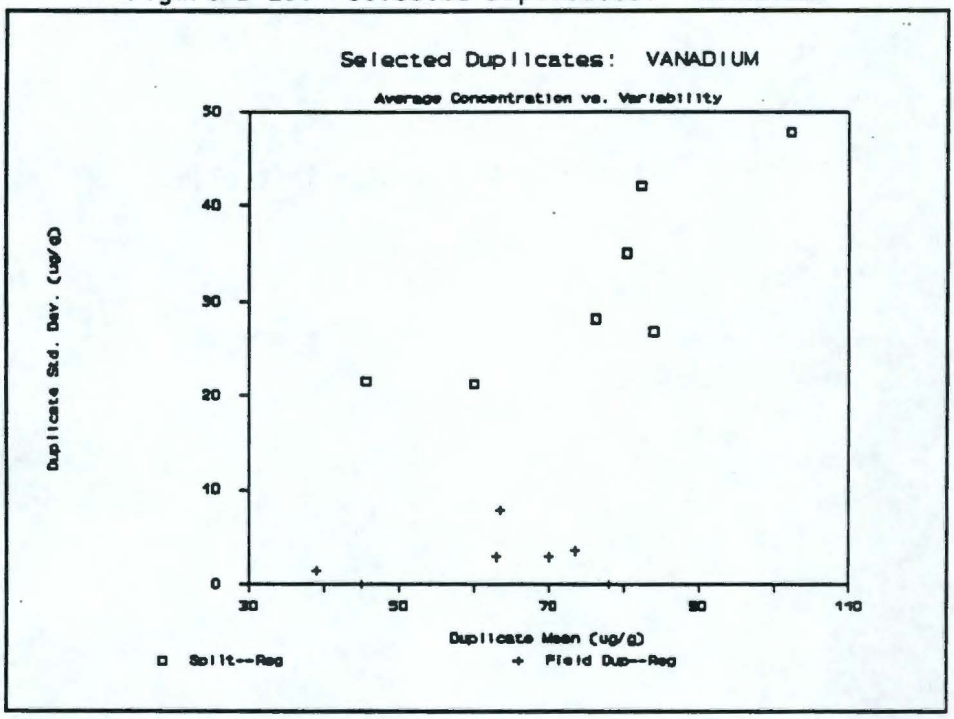
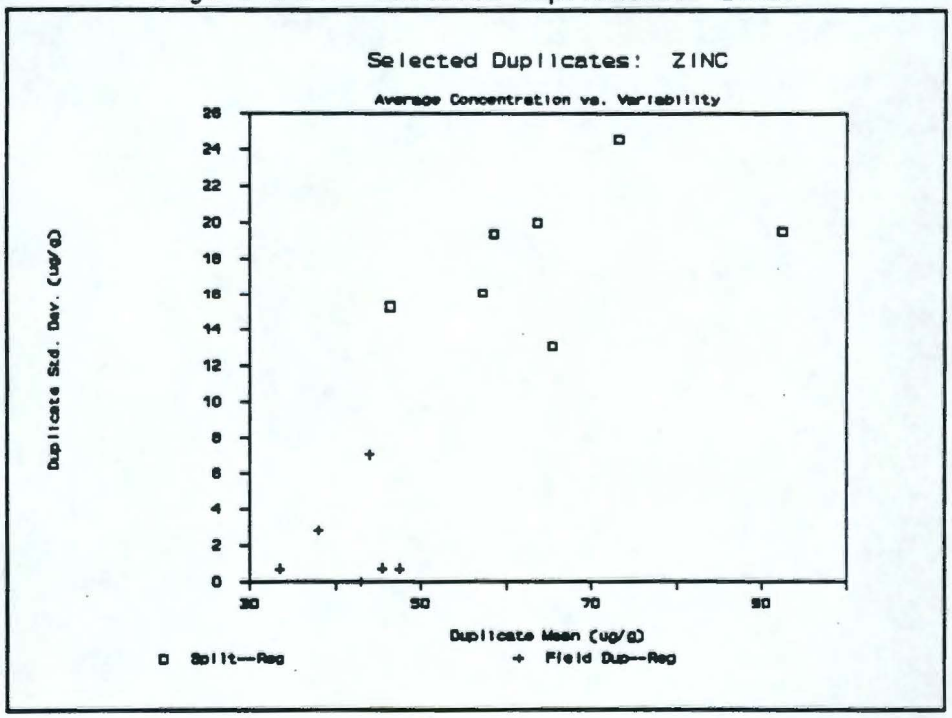


Figure B-24. Selected Duplicates: Zinc.



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APPENDIX C

ENVIRONMENTAL PROTECTION AGENCY OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE MEMORANDUM

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 19 1989

SOLID WASTE AND EMERGENCY RESPONSE

Mr. Thomas C. Jorling
Commissioner
Department of Environmental Conservation
State of New York
Albany, New York 12233-1010

Dear Mr. Jorling:

I am writing in response to your letter of May 5, 1989, in which you ask numerous questions concerning the regulatory status, under the Resource Conservation and Recovery Act (RCRA), of environmental media (ground water, soil, and sediment) contaminated with RCRA-listed hazardous waste.

As you point out in your letter, it is correct that the Agency's "contained-in" interpretation is that contaminated environmental media must be managed as if they were hazardous wastes until they no longer contain the listed waste, or are delisted. This leads to the critical question of when an environmental medium contaminated by listed hazardous waste ceases to be a listed hazardous waste. In your letter, you discuss three possible answers (based on previous EPA positions and documents) which you believe address this question, and request the Agency to clarify its interpretation. Each of these is discussed below.

The first possible answer you cite would be that the contaminated media would be a hazardous waste unless and until it is delisted, based on the "mixture" and "derived-from" rules. As you correctly state in your letter, a waste that meets a listing description due to the application of either of these rules remains a listed hazardous waste until it is delisted. However, these two rules do not pertain to contaminated environmental media. Under our regulations, contaminated media are not considered solid wastes in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations. Therefore, contaminated environmental media cannot be considered a hazardous waste via the "mixture" rule (i.e., to have a hazardous waste mixture, a hazardous waste must be mixed with a solid waste per 40 CFR 261.3(a)(2)(iv)). Similarly, the "derived-from" rule does not apply to contaminated media. Our basis for stating that contaminated environmental media must be managed as hazardous wastes is that they "contain"

listed hazardous waste. These environmental media must be managed as hazardous waste because, and only as long as, they "contain" a listed hazardous waste, (i.e., until decontaminated).

The second possibility you mention is that environmental media contaminated with a RCRA listed waste no longer have to be managed as a hazardous waste if the hazardous constituents are completely removed by treatment. This is consistent with the Agency's "contained-in" interpretation and represents the Agency's current policy.

The third possibility you discuss comes from Sylvia Lowrance's January 24, 1989, memorandum that you cited in your letter. This memorandum indicates that OSW has not issued any definitive guidance as to when, or at what levels, environmental media contaminated with listed hazardous waste are no longer considered to contain that hazardous waste. It also states that until such definitive guidance is issued, the Regions may determine these levels on a case-specific basis. Where this determination involves an authorized State, such as New York, our policy is that the State may also make such a determination.

Related to such a determination, you ask whether a risk assessment approach that addressed the public health and environmental impacts of hazardous constituents remaining in treatment residuals would be acceptable. This approach would be acceptable for contaminated media provided you assumed a direct exposure scenario, but would not be acceptable for "derived-from" wastes under our current rules. Additionally, consistent with the statute, you could substitute more stringent standards or criteria for contaminated environmental media than those recommended by the Federal EPA if you determined it to be appropriate.

The Agency is currently involved in a rulemaking effort directed at setting de minimis levels for hazardous constituents below which eligible listed wastes, treatment residuals from those wastes, and environmental media contaminated with those listed wastes would no longer have to be managed as hazardous wastes. The approach being contemplated in the De Minimis program would be similar to that used in the proposed RCRA Clean Closure Guidance in terms of the exposure scenario (direct ingestion), the management scenario (not in a waste management unit), and the levels (primarily health-based).

Your final question related to whether the "remove and decontaminate" procedure set forth in the March 19, 1987 Federal Register preamble to the conforming regulations on closing surface impoundments applies when making complete removal determinations for soil. These procedures do apply when one

chooses to clean close a hazardous waste surface impoundment by removing the waste. The preamble language states that the Agency interprets the term "remove" and "decontaminate" to mean removal of all wastes, liners, and/or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment (52 FR 8706). Further discussion of these requirements is provided in a clarification notice published on March 28, 1988, (53 FR 1144) and in OSWER Policy Directive # 9476.00-18 on demonstrating equivalence of Part 265 clean closure with Part 264 requirements (copy enclosed).

I hope that this response will be helpful to you in establishing and implementing New York's hazardous waste policies on related issues. Should you have additional questions, please contact Bob Dellinger, Chief of the Waste Characterization Branch at (202) 475-8551.

Sincerely yours,

Robert L. Duprey

for Jonathan Z. Cannon
Acting Assistant Administrator

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