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7. Abstract

This report summarizes the sampling activities undertaken and the analytical results obtained in a soil sampling and analyses study performed for the 200 West Area Ash Pit Demolition Site (Ash Pit Demolition Site). The Ash Pit Demolition Site is identified as a Resource Conservation and Recovery Act (RCRA) treatment unit that will be closed in accordance with the applicable laws and regulations.

No constituents of concern were found in concentrations indicting contamination of the soil by Ash Pit Demolition Site activities.

8. RELEASE STAMP

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DATA EVALUATION REPORT FOR 200 WEST AREA ASH PIT DEMOLITION SITE CLEAN CLOSURE

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this report is to describe the soil sampling performed at the 200 West Area Ash Pit Demolition Site (Ash Pit Demolition Site), to present the analytical results of these verification samples, and to compare the results to clean closure criteria.

The scope of this report is the evaluation of the analyte concentrations for the eleven soil samples that represent the unit soils. This report does not describe analytical methodology, nor does it provide raw analytical data or the sampling validation report. A description of the sampling plan is presented in the *200 West Ash Pit Demolition Site Closure Plan* (DOE-RL 1994a). The sampling plan was discussed and agreed to by all parties during the Data Quality Objectives (DQO) meeting held May 24, 1994. All analytical data were validated according to *Data Validation Procedures for Chemical Analysis* (WHC 1993). The laboratory data package and data validation report have been transmitted to the Washington State Department of Ecology (Ecology), which is the regulatory lead for closure of this unit (DOE-RL 1994c).

The Ash Pit Demolition Site is a *Resource Conservation and Recovery Act of 1976* (RCRA) treatment unit located in the 200 West Area of the Hanford Site. Two demolition events occurred at the Ash Pit Demolition Site: the first in November 1984 and the second in June 1986. These demolition events are considered a form of thermal treatment for discarded explosive chemical products. Because it will no longer be used for this thermal treatment, the unit is being closed. Soil sampling, for the purpose of clean closure of the Ash Pit Demolition Site, occurred in July 1994 in accordance with the Ash Pit Demolition Site Closure Plan, Revision 1 (DOE-RL 1994a).

1.2 SUMMARY OF RESULTS

To meet the criteria for clean closure of the Ash Pit Demolition Site, analytical results must verify that the concentrations of all detonation activity residues are at or below action levels. Action levels are defined as levels above the Hanford Site soil background threshold levels identified in *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 1994b) and/or the "Model Toxics Control Act (MTCA) Cleanup Regulation" (*Washington Administrative Code* [WAC] 173-340) Method B residential levels. No constituents of concern were found in concentrations indicating contamination of the soil at the Ash Pit Demolition Site (i.e., concentrations above action levels).

Regulator acceptance of the findings presented in this report will qualify the treatment unit for clean closure in accordance with WAC 173-303-610, "Dangerous Waste Regulations," without further sampling, soil removal, and/or decontamination.

1.3 TREATMENT UNIT INFORMATION

The Ash Pit Demolition Site closure area is located in the eastern portion of the 200 West Area, as shown in Figure 1. The closure area occupies an area 20 feet (6 meters) by 20 feet (6 meters) square. It is located within a multi-use borrow pit area, as shown in Figure 2. The entire multi-use borrow pit area is approximately 600 feet (180 meters) by 800 feet (244 meters) in size with a gravelly, sparsely vegetated landscape.

There were only two demolition activities at the Ash Pit Demolition Site: November 1984 and June 1986. Discarded explosive chemical products (DOE-RL 1994a) were placed in a shallow depression, 6 to 12 inches (15 to 30 centimeters) deep, which was dug expressly for the demolition activity. The discarded explosive chemical products were detonated in their original metal and glass containers. Conventional explosives (i.e., nitroglycerin, dynamite, and detonating cord) were placed around and on top of the chemical containers. After the detonation event, the area was inspected to confirm that no intact chemicals or containers remained.

2.0 SAMPLING

Soil sampling was performed on July 12, 1994. Sampling activities were performed as specified in the sampling and analysis plan (SAP) provided in the Ash Pit Demolition Site closure plan (DOE-RL 1994a). Eleven samples were collected (10 samples and 1 collocated duplicate). Two blank samples were included during sampling: a trip blank and an equipment blank. The trip blank is used to test for contamination due to sample handling. The equipment blank is used to determine whether decontamination of sampling equipment is adequate.

2.1 SAMPLE LOCATIONS

The sample locations and the intervals are shown in Figure 3. The eleven soil samples were taken within a 7.5-foot (2.3-meter) radius centered around the blasting pit. Before sampling, the blasting pit was reconstructed by removing wind-blown sand to create a 2-foot (61-centimeter) deep, 3-foot (91-centimeter) diameter hole (original diameter 1.5 feet [46 centimeters]). Sample intervals within the reconstructed crater (Figure 3, shaded area) were based on the configuration of the reconstructed crater. All eleven sample locations were authoritatively selected to ensure comprehensive coverage in the inner radius of the pit and to account for the effects of prevailing wind patterns on the pit. The collocated duplicate sample was taken at the center of the crater at an interval of 0 to 6 inches (0 to 15 centimeters).

2.2 SAMPLE COLLECTION

The eleven samples required by the closure plan were assigned Hanford Environmental Information System (HEIS [WHC 1990]) numbers BOCBN0, BOCBM9, and BOC950 through BOC960 (Figure 3). The trip blank sample was numbered BOCBN0 and the equipment blank sample was numbered BOCBM9.

Engineering support personnel used hand tools (i.e., stainless steel spoon and bowl) to obtain the soil samples in accordance with information provided in Figure 3. Sampling depth ranged from 0 to 18 inches (0 to 46 centimeters). Samples were collected for offsite laboratory analyses per SW-846 as requested on the Sample Analysis Form 94-329 (Figure 4). The sampling equipment was decontaminated in the 1706 KE Laboratory in accordance with Environmental Investigation Instruction 5.5, "Laboratory Cleaning of RCRA/CERCLA Sampling Equipment" (WHC 1988). A complete set of decontaminated equipment was provided for each sample. All sampling equipment was later returned to the 1706 KE Laboratory for decontamination.

Because samples going offsite are required to show a certificate of nondangerous radioactivity, additional aliquots were taken for total activity readings. These aliquots were transported to the 222-S Laboratory on the following day, July 13, 1994. The evaluation of the total activity results allowed release of the samples for offsite transfer on July 14, 1994. All samples were packaged, handled, and shipped in accordance with Westinghouse Hanford Company (WHC) Environmental Investigations Instructions (WHC 1988). All samples were cooled to 4 °Celsius during storage and transported to the offsite laboratory. Samples are listed in Table 1.

2.3 QUALITY CONTROL SAMPLES

Figure 3 summarizes sample identification, location, and quality control (QC) designation.

Sample Number BOC952, and a collocated duplicate (BOC953), were taken from the center of the crater at an interval of 0 to 6 inches (0 to 15 centimeters). Duplicate samples are collected as close as possible to the same point in space and time; however, they are stored in separate containers and analyzed independently. Duplicate samples are used to estimate the precision of the sampling process.

Trip blanks are used when samples are taken for volatile organics analysis (VOA). The trip blank for this study consisted of clean sand that was placed in a sample bottle in an uncontaminated area. The trip blank was subjected to the same handling as the routine samples and was analyzed to determine if contamination originated from the sample container or transportation and storage procedures. The trip blank was submitted to the analytical laboratory with the routine samples.

Equipment blanks consist of clean sand poured over or through the sampling device after decontamination; these blanks are collected in a sample bottle and transported to the laboratory for analysis. Equipment blanks test for residual contamination from inadequate decontamination of the sampling equipment at the 1706 KE Facility. One equipment blank was collected after the sampling event was completed.

3.0 PERFORMANCE STANDARDS

The performance standards, or action levels, for soils are defined in the *200 West Area Ash Pit Demolition Site Closure Plan* (DOE-RL 1994a), Chapter 6, Section 6.1. To meet action levels for clean closure, analytical results must verify that potentially dangerous waste constituents treated at the unit are not present in concentrations above these levels. Action levels are defined as levels above the Hanford Site soil background threshold levels identified in *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 1994b) and MTCA (WAC 173-340) Method B levels. If analyses determine that concentrations are above both guidelines, a phase two investigation would be developed. Additional information on the Hanford Site Background threshold levels is provided in Section 3.1 and is listed in Tables 2 and 3. Information on MTCA Method B health-based levels is provided in Section 3.2 and calculations are described in MTCA, Method B (WAC 173-340-740[3][a][iii]). In this report, the analytical results have been evaluated and compared with the action levels to verify that the concentration of all detonation activity residues is at or below action levels.

3.1 BACKGROUND LEVELS

The background action levels used in this report are based on a sitewide approach to determining background levels and were developed as an alternative to local unit-based background determinations at the Hanford Site (DOE-RL 1994b). Using local background for each RCRA treatment, storage, and/or disposal unit can lead to different definitions of contamination and different assessments of remediation goals and risk for various RCRA units. The Hanford Site Background approach is based on the premise that: (1) the waste management units are located on or in a common sequence of vadose zone sediments, and (2) the basic characteristics that control the chemical composition of these sediments are similar throughout the Hanford Site. The range of natural soil compositions is 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 the former more accurately represents the natural variability in soil composition and also provides a more consistent and efficient basis for evaluating contamination in soils.

The Hanford Site Background threshold levels are summarized in Tables 2 and 3. The background threshold is the concentration level defining the upper limit 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 percent and a coverage of 95 percent. The Hanford Site Background threshold levels are based on this 95/95 confidence interval. Statistical calculations are described in the source document (DOE-RL 1994b).

3.2 HEALTH-BASED LEVELS

The health-based action levels used in this report are based on calculations from the equations, risk levels, and exposure assumptions found

in the MTCA Method B. For noncarcinogens, the principal variable is the reference dose. The reference dose, as defined in the Environmental Protection Agency's (EPA) *Integrated Risk Information System* (IRIS) database (EPA 1995), is an estimate of a daily exposure to the human population that likely is to be without an appreciable risk of deleterious effects during a lifetime. For carcinogens, the cancer slope factor is the basis for determining human health effects; it is a measurement of the risk per unit dose. The reference dose and the cancer slope factor are chemical-specific and are obtained from IRIS. If not available in IRIS, secondary sources for these toxicity values include the Ecology Cleanup Levels and Risk Calculation database (Ecology 1995) and EPA Health Effects Assessment Summary Tables (EPA 1994).

4.0 LABORATORY ANALYSES

All samples were sent to IT-Quanterra Laboratory in Knoxville, Tennessee, for analysis. All samples were submitted for VOAs, semi-VOAs, detonation residues, ICP metals, anions, and total nitrogen (Figure 4).

Table 1 lists the analytical methods for Ash Pit Demolition Site soils. Each analyte group, except nitroexplosives and VOAs, has a concentration comparison table that lists and identifies chemical concentrations (see Tables 2, 3, and 4). All known nitroexplosives data were reported as undetected. All volatile organic compounds (VOC) were reported as undetected except for the equipment blank (BOCBM9) in which only trichloroethene, at 2 parts per billion, was estimated. No further evaluation will be presented for these undetected analytes.

All analytical data were validated according to *Data Validation Procedures for Chemical Analysis* (WHC 1993) (refer to Section 5.0).

4.1 ORGANIC ANALYSES

Samples were submitted for VOA and semi-VOA, including standard target analytes and Appendix IX compounds, using gas chromatography/mass spectroscopy (GS/MS), which is based on EPA SW-846 Methods 8240 and 8270. Any unidentified compounds were subjected to a computer-generated library search and mass spectral interpretation. Those unidentified analytes that generally correlate with known compound spectra are listed as tentatively identified compounds (TIC). The VOA was performed using purge and trap with capillary column GC/MS. Matrix spike and matrix duplicate samples were analyzed for Sample BOC950 and met all method-specified QC limits.

The semi-VOA was performed by direct injection of sample extract on a capillary column GC/MS. The samples did not contain any Appendix IX compounds. A matrix spike and a matrix spike duplicate were analyzed for Sample BOC950. The matrix spike and matrix spike duplicate passed all QC criteria with the exception of 2,4-dinitrotoluene in the matrix spike duplicate, which was one percentage point above the criterion. However, the laboratory control sample did meet all QC criteria. Because two of the QC

criteria were met and the third was only one percentage point above the criterion, this discrepancy is not considered significant enough to have effected the usefulness of the analytical data.

4.2 INORGANIC ANALYSES

Samples were analyzed for the following anions: fluoride, chloride, phosphate, sulfate, nitrate, and nitrite. The EPA Method 300 (EPA 1993) was used to determine the fluoride, chloride, phosphate, and sulfate concentrations. The EPA Method 353.2 (EPA 1993) was used to determine the nitrate/nitrite concentrations. It should be noted that EPA Method 300 reports values for nitrate and nitrite and these are included in the validation data package (DOE-RL 1994c). However, for the purpose of this report and as agreed to during the DQO process, only the results from Method 353.2 will be evaluated in the report.

Metals were analyzed using cold vapor atomic absorption (CVAA) spectroscopy for mercury; graphite furnace atomic absorption (GRAA) spectroscopy for arsenic, lead, selenium, and thallium; and for the remaining metals, inductively coupled plasma (ICP) spectroscopy. All QC was acceptable. A matrix spike and a matrix spike duplicate were prepared for Sample Number B0C950. Spike recovery was within acceptance limits for all parameters except antimony, arsenic, copper, manganese and zinc. Poor spike recovery for these analytes was attributed to sample nonhomogeneity and matrix interference. Duplicate relative percent difference (RPD) (i.e., precision) results were within acceptance limits for all parameters except for chromium, zinc, and titanium, which exhibited slight variations due to sample nonhomogeneity.

5.0 DATA VALIDATION

Data validation was performed by Golder Associates Inc., in accordance with Level D as defined in *Data Validation Procedures for Chemical Analysis* (WHC 1993). Level D validation includes evaluation and qualification of results based on analytical holding times, method blank results, matrix spikes and matrix spike duplicates, surrogate recoveries, and analytical method blanks.

The criteria and limits for the validation procedures are listed in the source document. Results of the data validators' review of the QC applied in this sampling event were transmitted to the regulators with the validated data packages (DOE-RL 1994c).

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

U Indicates the compound or analyte was analyzed for and not detected in the sample.

UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Because of a QC deficiency identified during data validation, the associated quantitation limit is an estimate. These data are useable for decision-making purposes.

J Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate but is usable for decision-making purposes.

JN Indicates a TIC that has been determined to be valid in terms of identification and quantitation.

UR Indicates the compound or analyte was analyzed for and not detected in the sample. As a result of a major QC deficiency identified during data validation, the associated data have been qualified as unusable for decision-making purposes.

R Indicates the compound or analyte was analyzed for and detected. As a result of a major QC deficiency identified during data validation, the concentration reported has been qualified as unusable. The associated data should be considered unusable for decision-making purposes.

DJ Indicates the compound or analyte was analyzed at a secondary dilution factor, value estimated.

B For organic data, indicates that the analyte was detected in both the sample and the associated blank. For inorganic data, indicates that the analyte concentration is less than the contract required detection limit, but greater than the instrument detection limit.

BJ For organic data, indicates that the analyte was detected in both the sample and the associated blank. Because of a QC deficiency identified during data validation, the associated data have been qualified as estimated. For inorganic data, indicates that constituent was analyzed for and detected at a concentration less than the contract required detection limit but greater than the instrument detection limit. Because of a QC deficiency identified during data validation, the associated data have been qualified as estimated.

TICs are reported for guidance only and are deemed as estimated and presumptive (WHC 1993). The true identity of the compound may be different than the tentative identity reported.

Some discrepancies were noted in the validation of the laboratory data resulting in some of the data being qualified. The qualifiers are listed in Tables 2, 3, and 4.

Holding times were exceeded for several samples as noted below. However, this is a result of applying holding times established for water samples to soil samples.

The following qualifiers were applied to the data as described and required in the data validation guidelines (WHC 1993):

- For the VOA, methylene chloride, acetone, and toluene were detected in the laboratory blank. This resulted in some data being qualified as nondetect (U). Also, the holding times for Samples BOC950, BOC951, BOC954, BOC957, and BOC958 were exceeded by two days and qualified as estimated (J) or undetected (UJ).

- For semi-VOA, the spike recovery of 2,4-dinitrotoluene was below the control limit and the affected results were qualified as estimated (J) or undetected (UJ).

- For anions, the holding times for some phosphate results were exceeded and the affected results were qualified as estimated (J) or rejected (R).

- For nitrate/nitrite, the matrix spike recovery was below the control limit and the affected results were qualified as estimated (J).

- For metals, the matrix spike recoveries for antimony, arsenic, copper, manganese and zinc were below the control limit and the affected results were qualified as estimated (BJ)/(J) or undetected (UJ).

- Copper was reported in the laboratory blank at negative concentrations. This resulted in some data being qualified as estimated (J) or nondetect (UJ).

- Aluminum, arsenic, calcium, and zinc were reported in the laboratory blank for the equipment blank (BOCBM9). This resulted in some data for this sample being qualified as nondetect (U).

- For copper, the ICP serial dilution exceeded 10 percent. This resulted in all data being qualified as estimated (J).

- For selenium, the matrix spike recovery was below the control limit and the affected results were qualified as undetected (UJ).

- The method of standard additions (MSA) was required for arsenic analysis of Samples BOC952 and BOC953 but was not performed; therefore, associated results were qualified as estimated (J).

- The correlation coefficient of the lead MSA analysis for Samples BOC954 and BOC957 was below the control limit; therefore, associated results were qualified as estimated (J).

Additional information on the above noted laboratory discrepancies can be found in the data validation packages (DOE-RL 1994c).

6.0 DATA EVALUATION

The closure plan proposed comparing concentrations of constituents of concern to health-based action levels. For a given constituent, analytical results below the detection limit are not considered to signify contamination. Therefore, the samples are considered clean with respect to that analyte. The health-based action levels are based on MTCA Method B or Hanford Site Background threshold levels for soil, whichever is less stringent. For a given constituent, analytical results at or below the health-based levels will be considered clean with respect to that analyte. Any analyte found in concentrations greater than the health-based level will require further evaluation.

6.1 ORGANICS

No VOCs were reported in the analytical sample results for unit soils. However, in the equipment blank (BOCBM9), results were nondetect for all components except trichloroethene at 2.00 parts per billion. There will be no further discussion on VOC, because the VOC was found in the equipment blank only; all site sample results showed no VOC present.

For the semi-VOA, all results were below action levels except for one sample (BOC954). This one sample was high in Polynuclear Aromatic Hydrocarbons (PAHs) concentration and was the only sample to register high PAHs. A second DQO meeting was convened to discuss the results of this sample. The results of this DQO and the subsequent resampling and analysis are discussed in Chapter 7.0 of this report. The conclusion of these additional activities has determined that Sample BOC954 to be anomalous. Therefore, the results of this sample are being dismissed from determination of contamination.

As discussed below for the semi-VOA, all compounds were either below the health-based action levels or have been identified as common laboratory contaminants.

Phthalate compounds were identified in all soil samples but not in the equipment blank. According to data validation guidelines, these are common laboratory contaminants when detected in concentrations less than 4,000 parts per billion in soil samples. Because all values were below this limit, all phthalate compounds are being dismissed as attributable to laboratory contamination.

There are no Hanford Site Background threshold levels, MTCA, Method B levels, or practical quantitative limits (PQL) for TICs found in these samples. TICs are a qualitative measure of whether or not a compound is detected; the result is estimated. The true identity of the compound may be different than what is reported. The TICs found in this study are not EPA-listed hazardous substances (40 CFR 261) nor are they WAC dangerous waste constituents having a waste designation level (WAC 173-303). No toxicity (oral reference dose) information or carcinogenicity (cancer potency factor) information is available from the EPA. Because the TICs have no established

action levels or relationship to dangerous waste regulations and are present at such low concentration levels, the TICs are considered to be of no concern to the closure of the RCRA unit.

TICs identified as 1,4-dimethyl-cyclohexane, hexadecanoic acid, and 2-methoxy-2-propoxy propane were found in the equipment blank in low concentrations and are being attributed to, and dismissed as, contamination.

In Sample Number BOC951, one TIC was identified as octacosane estimated at 91 parts per billion. Octacosane is a long, single-chain hydrocarbon categorized as a wax bi-product. Because it is not subject to the dangerous waste regulations, it is of no concern.

A TIC identified as octadecane was detected in Sample Number BOC960 estimated at 150 parts per billion. Because it is not subject to the dangerous waste regulations, octadecane is of no concern.

A TIC identified as naphtho(1,2,3,4-def)chrysene was detected in Sample Number BOC955 estimated at 430 parts per billion. Because it is not subject to the dangerous waste regulations, naphtho(1,2,3,4-def)chrysene is of no concern.

6.2 INORGANICS

No nitroexplosives compounds were detected in the soil sample.

The anion analyses are summarized in Table 3. Phosphate and nitrate-nitrite results that were qualified with a 'J' indicate that the data are estimated but considered usable for decision-making purposes. Anion analyses reported above the laboratory instrumentation detection limits were compared to MTCA, Method B, and/or Hanford Site Background threshold levels (DOE-RL 1994b). Fluoride, chloride, phosphate, sulfate, and nitrite-nitrate concentrations were all found to be below action levels indicating no contamination present in unit soils. Note that chloride, sulfate, and nitrate-nitrite were detected in the equipment blank indicating that the likely source was from the sampling equipment.

The inorganic data for metals are summarized in Table 4. Some analytical data were qualified with a 'J' indicating that the data are estimated but considered usable for decision-making purposes. Some sample analytes were detected in the equipment blank which indicates that the source was from the sampling equipment (see Table 4). Metals analyses reported above the laboratory instrumentation detection limits were compared to MTCA, Method B and/or Hanford Site Background threshold levels (DOE-RL 1994b). All constituents in unit soils were below action levels indicating no contamination present.

7.0 PHASE II RESAMPLING AND REANALYSIS

The closure plan states that any analyte found in concentrations greater than the health-based level will require further evaluation. As a consequence of finding one sample with a high PAH concentration, a second DQO meeting was held to discuss details surrounding the sample's analytical results, as well as to determine further possible action. Laboratory documentation stated that during extraction of the original soil subsample taken from Sample BOC954, the extract showed characteristics not shown by any of the other samples; it was a dark, oily residue. Because of the appearance of the extract and the high levels of PAH concentration found in the sample, it was agreed by all parties that the sample should be retested by taking a new subsample from the original sample and reanalyzing it. It was known by all parties that the reanalysis would occur beyond the holding times for semi-VOA. However, because the initially reported concentration of PAHs were so high, it was recognize that if the original PAH results were accurate, then PAH residues would be found during the reanalyses. In addition to having the original sample (BOC954) reanalyzed, a limited amount of resampling of the Ash Pit Demolition Site was agreed to by all parties.

7.1 RESAMPLING AND ANALYSIS

A Phase II investigation involved additional sampling at the Ash Pit Demolition Site and was supported by the U.S. Department of Energy, Richland Operations Office (RL), Ecology, and WHC. As previously noted, this sampling was performed to provide additional information about the Ash Pit Demolition Site because a suspect sample result was found during the Phase 1 sampling. High concentrations of PAH were reported in a sample from the center of the sampling boundary at a depth of 31 to 46 centimeters (12 to 18 inches).

For the resampling, eight soil samples were taken from specific locations within a 180-centimeter (6-feet) radius circle centered at the blasting pit and two additional remote soil samples were taken randomly outside the sampling boundary (see Figure 5). Ecology took three split samples for separate analyses (see Figure 5). The two remote samples were taken for information only and were not in direct support of this Phase II investigation. Samples collected for chemical analysis were analyzed for semi-VOA using SW-846, Method 8270, at the Environmental Analytical Laboratory (EAL). The objective of the work was to verify that the concentrations of semi-VOA were below action levels. If the sampling analytical results from this activity were below action levels, then the original suspect sample (BOC954) data was an anomaly. Ecology sent their split samples to a separate contract laboratory. Agreement was made to accept either EAL data or Ecology data.

7.2 RESULTS OF THE RESAMPLING AND REANALYSIS

Sample BOC954 data from the Phase I sampling event is listed in Figure 5a. Reanalysis data performed by IT-Quanterra using a subsample from the remaining Sample BOC954 showed that no PAHs were presentand no semi-VOC

were detected (see Figure 5b). Phase II analytical results from the EAL found that no PAHs were present and no semi-VOA were detected. The analytical results from Ecology split samples demonstrated that the location was clean with respect to RCRA contamination (Ecology et al. 1995).

8.0 CONCLUSIONS

The sampling and analysis activities identified few analyte concentrations above detection. No volatile organic compounds or nitroexplosives were detected in the soil samples. For analytes for which MTCA, Method B, and Hanford Site Background threshold levels were available, all analytes were below action levels. The units from Sample B0C954 were dismissed as anomalies. Of the semi-VOCs for which no action levels were available, all were TICs. All semi-VOC detections were TICs. These analytes were of no concern to the closure of the unit for any one of the following reasons:

- Low concentrations
- Attributed to common laboratory contaminants
- Found in equipment blank
- Constituents were not hazardous substances or dangerous waste constituents.

Concentrations of anions and metals are below health-based action levels, indicating no inorganic contamination is present at the Ash Pit Demolition Site.

In summary, the analytical results for the Ash Pit Demolition Site soils verify that the concentration of all detonation activity residues are below action levels. No constituents of concern were found in concentrations indicating contamination of the soil at the Ash Pit Demolition Site (i.e., concentrations above action levels). Consequently, under the provisions of WAC 173-303-610, this RCRA unit qualifies for clean closure.

9.0 REFERENCES

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WHC, 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

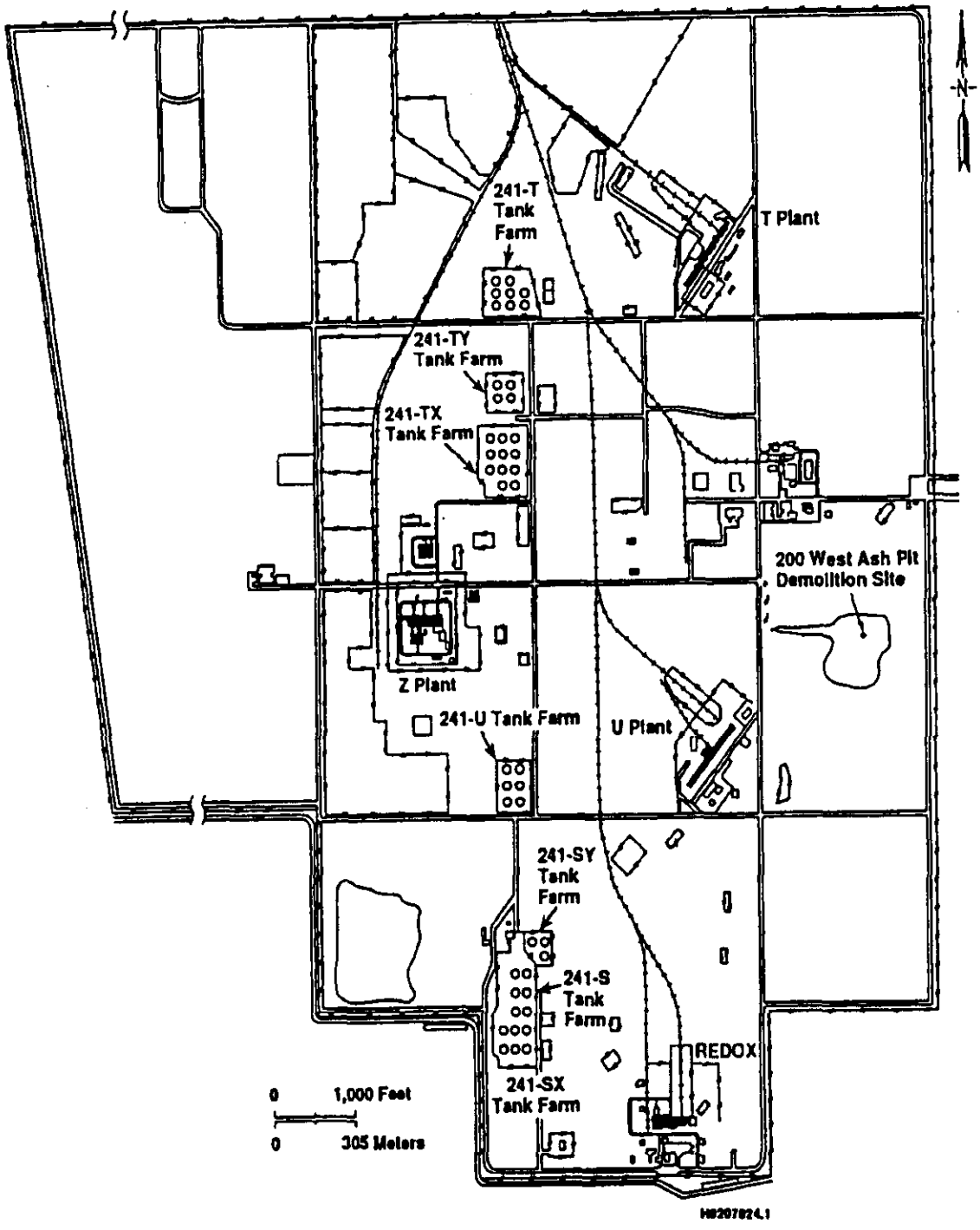

Figure 1. 200 West Area.

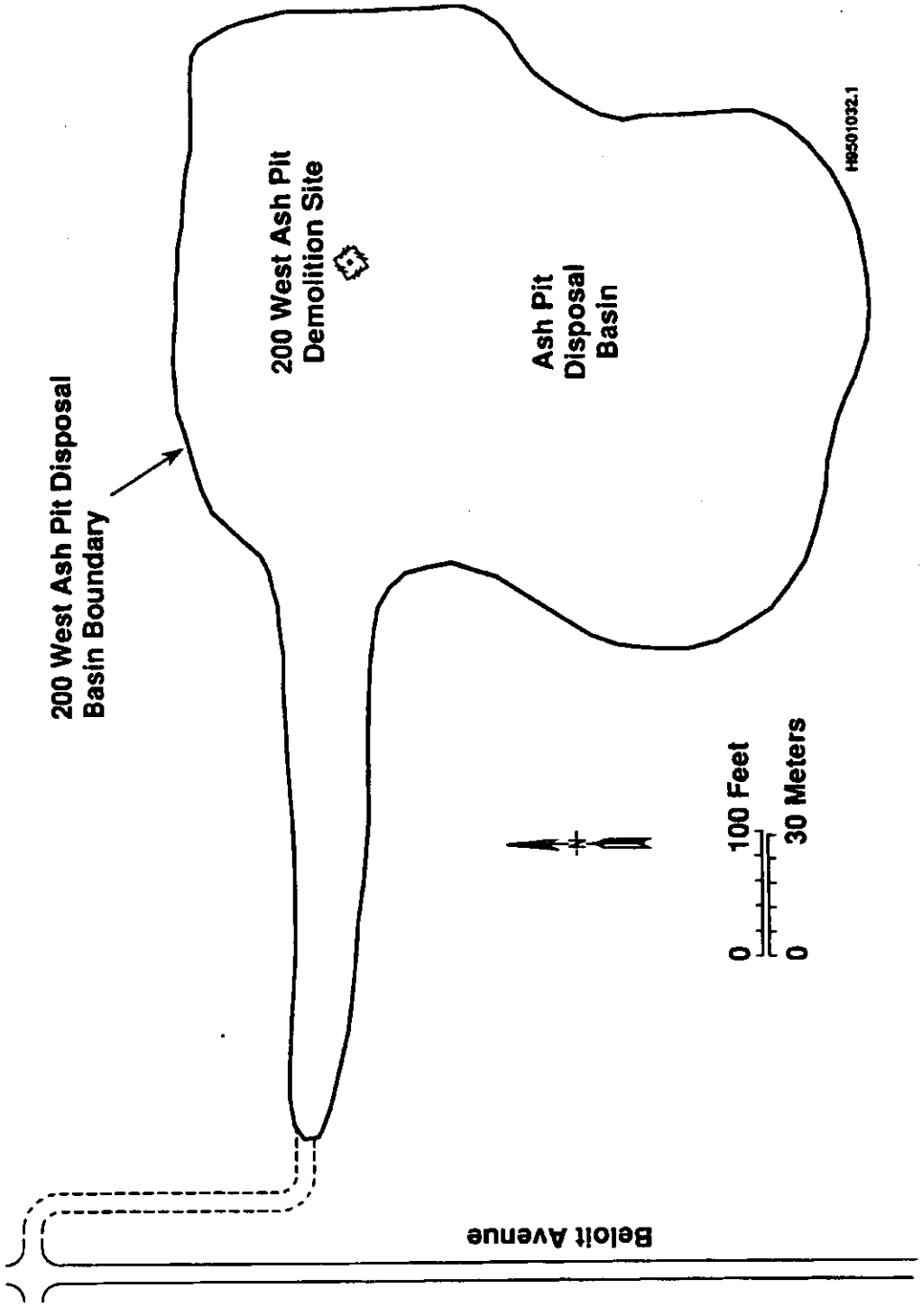

Figure 2. Layout of Ash Pit Demolition Site Closure Area.

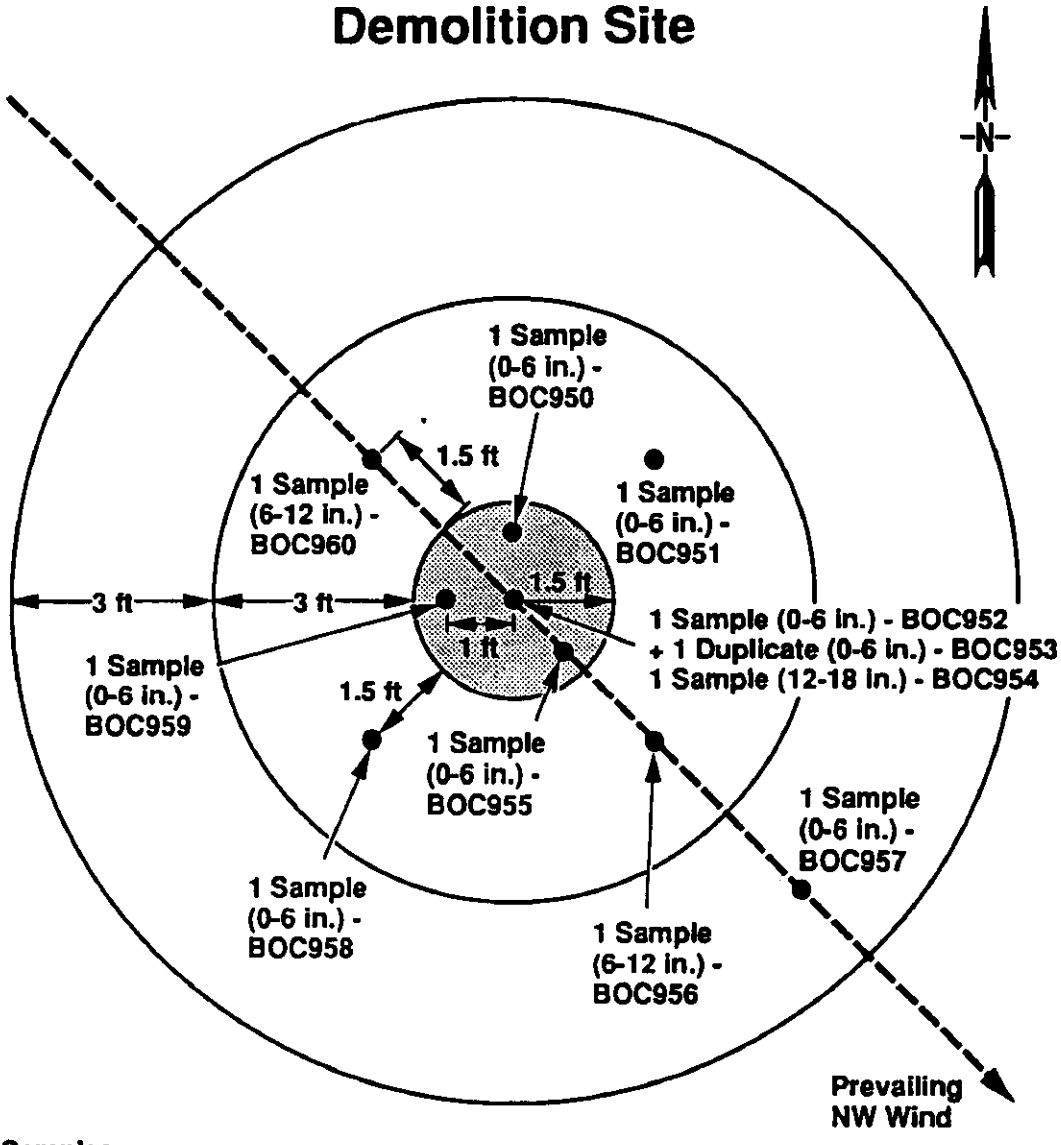

Figure 3. Ash Pit Demolition Site Closure Area, Sampling Locations, and Sample Intervals.

951003.0826

1

OFFICE OF SAMPLE MANAGEMENT
FIELD SAMPLING REQUIREMENTS

Requirements are for IT

REV 0 06/27/94

94-329
SAF Number

PARAMETER/ ANALYSIS	ANALYTICAL METHODS	CONTAINER[1]/ VOLUME	PRESERVATION	HOLDING TIME
1. VOA	8240 Appendix IX	Gs* 125 mL	Cool 4°C	7 Days
2. Semi-VOA	8270 Appendix IX	aG 125 mL	Cool 4°C	14 Days[3]
3. Detonation Residue	8330	aG 125 mL	Cool 4°C	14 Days[3]
4. Anions - F, Cl, SO_4 - PO_4, NO_4, NO_3	EPA 300.0	G 125 mL	Cool 4°C	28 Days 48 Hours
5. NO_2 - NO_3	EPA 353.1	P/G 125 mL	Cool 4°C	28 Days
6. ICP Metals AA Metals - Arsenic - Lead - Selenium - Mercury	6010 7060 7421 7740 7471	G 125 mL	Cool 4°C	6 Months 6 Months 6 Months 6 Months 28 Days
7. Activity Scan (IT)	Lab Specific	G/P 40 mL	Cool 4°C	ASAP
8. Rod Screen (222-S)	Lab Specific	G/P small vial (at least 1 g)	None	ASAP

[1] Container Types:

P	=	Plastic (Polyethylene)	Pw	=	Plastic (Polyethylene)/wide mouth jar
G	=	Glass	PP	=	Polypropylene
Gs	=	Glass w/septum cap	aG	=	Amber Glass
Gw	=	Glass/wide mouth jar	T	=	Fluorocarbon Resins
Gs*	=	Glass w/septum cap-- No head space in container	aGs	=	Amber Glass w/septum cap
			aGs*	=	Amber Glass w/septum cap No head space in container

[2] 7 Days for Extraction, 40 Days for Analysis

[3] 14 Days for Extraction, 40 Days for Analysis

Figure 4. Facsimile of Sample Analyses Form 94-329.

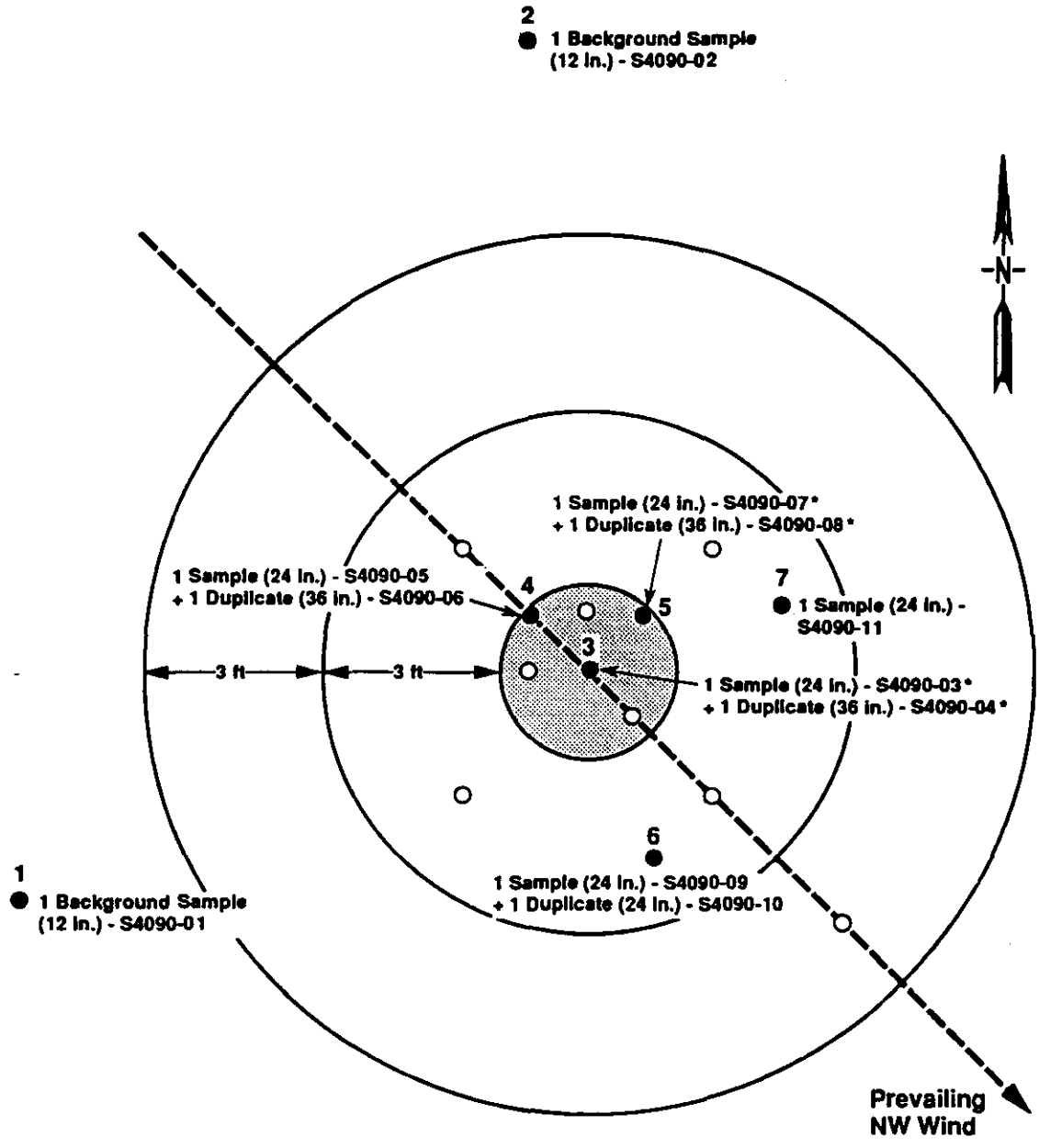

Figure 5. Ash Pit Demolition Site Closure Area, Phase II Resampling Locations.

Table 1. Routine and Quality Control Samples.

Sample number	Constituent Analysis[a]	Analytical Method
BOC950	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010[b] EPA[c] 300.0, 353
BOC951	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC952	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC953 Duplicate	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC954	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC955	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC956	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC957	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC958	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC959	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOC960	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOCBM9 Equipment Blank	VOA, Semi-VOA, Detonation residue, ICP Metals, Anions, TN	SW-846:8240, 8270, 8330, 6010 EPA 300.0, 353
BOCBN0 Trip Blank	VOA	SW-846:8240

[a] = Sample locations and analytical requirements are in Figures 3 and 4.

[b] = EPA 1986.

[c] = EPA 1993.

TN = nitrate-nitrite.

NOTE: All samples submitted to IT-Quanterra, Knoxville, Tenn.

Table 2. Ash Pit Demolition Site, Analytical Results for Soils, Semi-Volatile Organics Compounds.
(sheet 1 of 2)

Sample number	Name of Constituent	CAS[a]	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Level[b] mg/kg	Hanford Site Soil Background 95/95 threshold mg/kg	Hanford Site Background Maximum Conc. mg/kg
B0C950	Di-N-Butylphthalate	84-74-2	J	.13	8,000.00	NA	NA
	TIC:						
	Hexadecanoic Acid	57-10-3	JN	1.10	NA		
	2-methoxy-2-propoxy propane	53951-40-4	JN	.14	NA		
B0C951	Di-N-Butylphthalate	84-74-2	J	.057	8,000.00	NA	NA
	Bis(2-ethylhexyl)phthalate	117-81-7	BJ	.051	71.00		
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.071	NA		
	2,6,-Dimethyl-Heptadecane	54105-67-8	JN	.13	NA		
	Hexadecanoic Acid	57-10-3	JN	.37	NA		
	Octacosane	630-02-4	JN	.091	NA		
B0C952	Di-N-Butylphthalate	84-74-2	J	.53	8,000.00	NA	NA
	Bis(2-ethylhexyl)phthalate	117-81-7	BJ	.04	71.00		
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.12	NA		
	2-methoxy-2-propoxy propane	53951-40-4	BJN	1.20	NA		
	Octacosane	630-02-4	JN	.068	NA		
B0C953 (Duplicate of B0C952)	Di-N-Butylphthalate	84-74-2	J	.12	8,000.00	NA	NA
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.12	NA		
	Hexadecanoic Acid	57-10-3	BJN	.11	NA		
	2-methoxy-2-propoxy propane	53951-40-4	JN	1.80	NA		
B0C955	Di-N-Butylphthalate	84-74-2	J	.065	8,000.00	NA	NA
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.094	NA		
	Naphtho(1,2,3,4-DEF)Chrysene	192-65-4	JN	.43	NA		
	2-methoxy-2-propoxy propane	53951-40-4	JN	.63	NA		
B0C956	Di-N-Butylphthalate	84-74-2	J	.09	8,000.00	NA	NA
	Fluoranthene	206-44-0	J	.042	3,200.00		
	Pyrene	129-00-0	J	.036	2,400.00		
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.081			
	Hexadecanoic Acid	57-10-3	JN	.071			
B0C957	Di-N-Butylphthalate	84-74-2	J	.034	8,000.00	NA	NA
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.093	NA		
B0C958	Di-N-Butylphthalate	84-74-2	J	.067	8,000.00	NA	NA
	Bis(2-ethylhexly)phthalate	117-81-7	BJ	.039	71.00		
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.074	NA		
	Hexadecanoic Acid	57-10-3	JN	.088	NA		

Table 2. Ash Pit Demolition Site, Analytical Results for Soils, Semi-Volatile Organics Compounds. (sheet 2 of 2)

Sample number	Name of Constituent	CAS[a]	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Level[b] mg/kg	Hanford Site Soil Background 95/95 threshold mg/kg	Hanford Site Background Maximum Conc. mg/kg
B0C959	Di-N-Butylphthalate	84-74-2	J	.14	8,000.00	NA	NA
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.14	NA		
	Hexadecanoic Acid	57-10-3	JN	.14	NA		
B0C960	Di-N-Butylphthalate	84-74-2	J	.18	8,000.00	NA	NA
	Fluoranthene	206-44-0	J	.12	3,200.00		
	Phenanthrene	85-01-8	J	.046	0.14[c]		
	Pyrene	129-00-0	J	.10	2,400.00		
	Benzo(A)Anthracene	56-55-3	J	.052	0.14[c]		
	Chrysene	218-01-9	J	.066	0.14[c]		
	Benzo(B)Fluoranthene	205-99-2	J	.067	0.14[c]		
	Benzo(K)Fluoranthene	207-08-9	J	.048	0.14[c]		
	Benzo(A)Pyrene	50-32-8	J	.053	0.14		
	Benzo(G,H,I)Perylene	191-24-2	J	.04	0.14[c]		
	TIC:						
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.085	NA		
	Hexadecanoic Acid	57-10-3	JN	.14	NA		
	Octadecane	593-45-3	JN	.15	NA		
B0CBM9 equip. blank	TIC:					NA	NA
	1,4-Dimethyl-Cyclohexane	2207-04-7	JN	.076	NA		
	Hexadecanoic Acid	57-10-3	JN	.10	NA		
	2-methoxy-2-propoxy propane	53951-40-4	BJN	1.20	NA		

a = Chemical Abstract Services.

b = Calculation found in Model Toxics Control Act (173-340-740).

c = Calculation based on slope factor for benzo(A)pyrene for carcinogenic risk.

J = Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, by the laboratory because it is below the method detection limit.

JN = Tentatively identified compounds (TICs) were reported in the samples and deemed estimated and presumptive.

BJ = Indicates that the compound was detected in both the sample and the associated method blank. The associated concentration is estimated.

mg/kg = milligram/kilogram (parts per million).

NA = not available.

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for implementation in closure plans.

Table 3. Ash Pit Demolition Site, Analytical Results for Soil, Anions. (sheet 1 of 2)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C950	Fluoride	-	1.20	4800.0	13.00	73.30
	Chloride	-	0.70	NA	783.0	1480.0
	Phosphate	-	3.60	NA	12.70	225.0
	Sulfate	-	4.00	NA	931.0	12600.0
	Nitrate+Nitrite	J	0.89	130000+8000=138000	208.0*	906.0*
B0C951	Fluoride	-	0.80	4800.0	13.00	73.30
	Chloride	-	4.90	NA	783.0	1480.0
	Phosphate	J	7.90	NA	12.70	225.0
	Sulfate	-	21.00	NA	931.0	12600.0
	Nitrate+Nitrite	J	5.20	130000+8000=138000	208.0*	906.0*
B0C952	Fluoride	-	0.80	4800.0	13.00	73.30
	Chloride	-	0.40	NA	783.0	1480.0
	Phosphate	J	2.00	NA	12.70	225.0
	Sulfate	-	2.20	NA	931.0	12600.0
	Nitrate+Nitrite	J	0.65	130000+8000=138000	208.0*	906.0*
B0C953 (Duplicate of B0C952)	Fluoride	-	0.60	4800.0	13.00	73.30
	Chloride	-	0.60	NA	783.0	1480.0
	Phosphate	J	1.90	NA	12.70	225.0
	Sulfate	-	2.10	NA	931.0	12600.0
	Nitrate+Nitrite	J	0.84	130000+8000=138000	208.0*	906.0*
B0C954	Fluoride	-	0.80	4800.0	13.00	73.30
	Chloride	-	0.80	NA	783.0	1480.0
	Phosphate	J	3.10	NA	12.70	225.0
	Sulfate	-	4.50	NA	931.0	12600.0
	Nitrate+Nitrite	J	1.30	130000+8000=138000	208.0*	906.0*
B0C955	Fluoride	-	0.50	4800.0	13.00	73.30
	Chloride	-	0.70	NA	783.0	1480.0
	Phosphate	J	3.90	NA	12.70	225.0
	Sulfate	-	3.00	NA	931.0	12600.0
	Nitrate+Nitrite	J	1.00	130000+8000=138000	208.0*	906.0*
B0C956	Fluoride	-	0.80	4800.0	13.00	73.30
	Chloride	-	1.00	NA	783.0	1480.0
	Phosphate	J	2.90	NA	12.70	225.0
	Sulfate	-	4.20	NA	931.0	12600.0
	Nitrate+Nitrite	J	1.10	130000+8000=138000	208.0*	906.0*
B0C957	Fluoride	-	0.50	4800.0	13.00	73.30
	Chloride	-	3.20	NA	783.0	1480.0
	Phosphate	J	2.30	NA	12.70	225.0
	Sulfate	-	8.60	NA	931.0	12600.0
	Nitrate+Nitrite	J	2.00	130000+8000=138000	208.0*	906.0*
B0C958	Fluoride	-	0.50	4800.0	13.00	73.30
	Chloride	-	0.90	NA	783.0	1480.0
	Phosphate	J	3.10	NA	12.70	225.0
	Sulfate	-	5.60	NA	931.0	12600.0
	Nitrate+Nitrite	J	2.00	130000+8000=138000	208.0*	906.0*

Table 3. Ash Pit Demolition Site, Analytical Results for Soil, Anions. (sheet 2 of 2)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C959	Fluoride	-	0.80	4800.0	13.00	73.30
	Phosphate	J	1.30	NA	12.70	225.0
	Sulfate	-	2.00	NA	931.0	12600.0
	Nitrate+Nitrite	J	0.84	130000+8000=138000	208.0*	906.0*
B0C960	Fluoride	-	1.70	4800.0	13.00	73.30
	Chloride	-	1.90	NA	783.0	1480.0
	Phosphate	J	4.50	NA	12.70	225.0
	Sulfate	-	20.00	NA	931.0	12600.0
	Nitrate+Nitrite	J	2.00	130000+8000=138000	208.0*	906.0*
B0CBM9	Chloride	-	2.40	NA	783.0	1480.0
equip	Sulfate	-	3.30	NA	931.0	12600.0
blank	Nitrate+Nitrite	J	1.00	130000+8000=138000	208.0*	906.0*

a = Calculation found in Model Toxics Control Act (173-340-740).

b = DOE/RL, 1994b, Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes, DOE/RL-92-24, Rev. 2.

J = Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, by the laboratory because it is below the method detection limit.

mg/kg = milligram/kilogram (parts per million).

* = Nitrate concentration values only.

NA = not available.

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for implementation in closure plans.

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 1 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C950	Aluminum	-	6,890.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.10	60.00	9.00	27.70
	Barium	-	81.80	5,600.00	175.00	480.00
	Beryllium	B	.24	400.00	1.80	10.00
	Cadmium	-	1.40	80.00	NC	11.00
	Calcium	-	9,440.00	NA	24,600.00	105,000.02
	Chromium	-	13.00	100.00[c]	28.00	320.00
	Cobalt	B	3.60	4800.00	19.00	110.00
	Copper	J	35.80	3000.00	30.00	61.00
	Iron	-	19,100.00	NA	38,200.00	68,100.00
	Lead	-	18.30	250.00[c]	14.90	74.10
	Magnesium	-	5,080.00	NA	9,160.00	32,300.00
	Manganese	J	315.00	11,000.00	583.00	1,110.00
	Mercury	-	.18	240.00	1.30	3.80
	Nickel	-	13.80	1600.00	25.00	200.00
	Potassium	-	1,080.00	NA	3,090.00	7,900.00
	Sodium	B	270.00	NA	1,390.00	6,060.00
	Vanadium	-	30.30	560.00	107.00	140.00
	Zinc	J	121.00	24,000.00	79.00	366.00
	Titanium	-	919.00	NA	3,180.00	3,180.00
B0C951	Aluminum	-	7,170.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.20	60.00	9.00	27.70
	Barium	-	94.90	5,600.00	175.00	480.00
	Beryllium	B	.34	400.00	1.80	10.00
	Calcium	-	8,470.00	NA	24,600.00	105,000.02
	Chromium	-	8.60	100.00[c]	28.00	320.00
	Cobalt	B	6.10	4800.00	19.00	110.00
	Copper	J	24.20	3000.00	30.00	61.00
	Iron	-	2,2600.00	NA	38,200.00	68,100.00
	Lead	-	17.50	250.00[c]	14.90	74.10
	Magnesium	-	5,080.00	NA	9,160.00	32,300.00
	Manganese	J	361.00	11,000.00	583.00	1,110.00
	Nickel	-	9.70	1600.00	25.00	200.00
	Potassium	-	2,530.00	NA	3,090.00	7,900.00
	Sodium	B	252.00	NA	1,390.00	6,060.00
	Vanadium	-	39.80	560.00	107.00	140.00
	Zinc	J	119.00	24,000.00	79.00	366.00
	Titanium	-	1,470.00	NA	3,180.00	3,180.00

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 2 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C952	Aluminum	-	6,940.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.10	60.00	9.00	27.70
	Barium	-	58.20	5,600.00	175.00	480.00
	Beryllium	B	0.23	400.00	1.80	10.00
	Calcium	-	10,800.00	NA	24,600.00	105,000.02
	Chromium	-	10.20	100.00[c]	28.00	320.00
	Cobalt	B	3.10	4800.00	19.00	110.00
	Copper	J	12.90	3000.00	30.00	61.00
	Iron	-	19,100.00	NA	38,200.00	68,100.00
	Lead	-	5.30	250.00[c]	14.90	74.10
	Magnesium	-	5,480.00	NA	9,160.00	32,300.00
	Manganese	J	314.00	11,000.00	583.00	1,110.00
	Nickel	-	12.10	1600.00	25.00	200.00
	Potassium	B	921.00	NA	3,090.00	7,900.00
	Sodium	B	232.00	NA	1,390.00	6,060.00
	Vanadium	-	33.00	560.00	107.00	140.00
	Zinc	J	48.70	24,000.00	79.00	366.00
	Titanium	-	965.00	NA	3,180.00	3,180.00
B0C953 (Duplicate to B0C952)	Aluminum	-	4,450.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.40	60.00	9.00	27.70
	Barium	B	37.60	5,600.00	175.00	480.00
	Calcium	-	7,900.00	NA	24,600.00	105,000.02
	Chromium	-	6.40	100.00[c]	28.00	320.00
	Copper	J	6.70	3000.00	30.00	61.00
	Iron	-	12,400.00	NA	38,200.00	68,100.00
	Lead	-	4.60	250.00[c]	14.90	74.10
	Magnesium	-	3,720.00	NA	9,160.00	32,300.00
	Manganese	J	207.00	11,000.00	583.00	1,110.00
	Nickel	B	5.60	1600.00	25.00	200.00
	Potassium	B	671.00	NA	3,090.00	7,900.00
	Sodium	B	141.00	NA	1,390.00	6,060.00
	Vanadium	-	19.70	560.00	107.00	140.00
	Zinc	J	31.00	24,000.00	79.00	366.00
	Titanium	-	678.00	NA	3,180.00	3,180.00

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 3 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
BOC954	Aluminum	-	5,530.00	80,000.00	15,100.00	28,800.00
	Arsenic	BJ	1.80	60.00	9.00	27.70
	Barium	-	66.20	5,600.00	175.00	480.00
	Beryllium	B	0.23	400.00	1.80	10.00
	Calcium	-	10,200.00	NA	24,600.00	105,000.02
	Chromium	-	8.00	100.00[c]	28.00	320.00
	Cobalt	B	3.70	4800.00	19.00	110.00
	Copper	J	9.70	3000.00	30.00	61.00
	Iron	-	15,900.00	NA	38,200.00	68,100.00
	Lead	J	5.10	250.00[c]	14.90	74.10
	Magnesium	-	4,270.00	NA	9,160.00	32,300.00
	Manganese	J	277.00	11,000.00	583.00	1,110.00
	Nickel	B	6.50	1600.00	25.00	200.00
	Potassium	B	1,020.00	NA	3,090.00	7,900.00
	Sodium	B	163.00	NA	1,390.00	6,060.00
	Vanadium	-	25.40	560.00	107.00	140.00
	Zinc	J	36.30	24,000.00	79.00	366.00
	Titanium	-	800.00	NA	3,180.00	3,180.00
BOC955	Aluminum	-	6,670.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.60	60.00	9.00	27.70
	Barium	-	70.90	5,600.00	175.00	480.00
	Beryllium	B	0.25	400.00	1.80	10.00
	Calcium	-	8,110.00	NA	24,600.00	105,000.02
	Chromium	-	9.40	100.00[c]	28.00	320.00
	Cobalt	B	4.10	4800.00	19.00	110.00
	Copper	J	15.50	3000.00	30.00	61.00
	Iron	-	18,300.00	NA	38,200.00	68,100.00
	Lead	-	5.10	250.00[c]	14.90	74.10
	Magnesium	-	4,990.00	NA	9,160.00	32,300.00
	Manganese	J	274.00	11,000.00	583.00	1,110.00
	Mercury	-	0.11	240.00	1.30	3.80
	Nickel	-	10.80	1600.00	25.00	200.00
	Potassium	-	1,130.00	NA	3,090.00	7,900.00
	Sodium	B	239.00	NA	1,390.00	6,060.00
	Vanadium	-	28.00	560.00	107.00	140.00
	Zinc	J	48.80	24,000.00	79.00	366.00
	Titanium	-	925.00	NA	3,180.00	3,180.00

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 4 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C956	Aluminum	-	7,060.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.3	60.00	9.00	27.70
	Barium	-	84.10	5,600.00	175.00	480.00
	Beryllium	B	0.24	400.00	1.80	10.00
	Calcium	-	9,950.00	NA	24,600.00	105,000.02
	Chromium	-	15.00	100.00[c]	28.00	320.00
	Cobalt	B	3.90	4800.00	19.00	110.00
	Copper	J	18.80	3000.00	30.00	61.00
	Iron	-	18,500.00	NA	38,200.00	68,100.00
	Lead	-	21.20	250.00[c]	14.90	74.10
	Magnesium	-	4,810.00	NA	9,160.00	32,300.00
	Manganese	J	305.00	11,000.00	583.00	1,110.00
	Mercury	-	0.76	240.00	1.30	3.80
	Nickel	-	12.10	1600.00	25.00	200.00
	Potassium	-	1,210.00	NA	3,090.00	7,900.00
	Silver	-	2.20	400.00	2.10	14.60
	Sodium	B	282.00	NA	1,390.00	6,060.00
	Vanadium	-	30.00	560.00	107.00	140.00
	Zinc	J	112.00	24,000.00	79.00	366.00
	Titanium	-	1,010.00	NA	3,180.00	3,180.00
B0C957	Aluminum	-	6,750.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.40	60.00	9.00	27.70
	Barium	-	89.10	5,600.00	175.00	480.00
	Calcium	-	8,500.00	NA	24,600.00	105,000.02
	Chromium	-	6.90	100.00[c]	28.00	320.00
	Cobalt	B	6.70	4800.00	19.00	110.00
	Copper	J	17.50	3000.00	30.00	61.00
	Iron	-	26,400.00	NA	38,200.00	68,100.00
	Lead	J	6.70	250.00[c]	14.90	74.10
	Magnesium	-	5,320.00	NA	9,160.00	32,300.00
	Manganese	J	374.00	11,000.00	583.00	1,110.00
	Nickel	-	10.80	1600.00	25.00	200.00
	Potassium	-	1,470.00	NA	3,090.00	7,900.00
	Sodium	B	223.00	NA	1,390.00	6,060.00
	Vanadium	-	51.10	560.00	107.00	140.00
	Zinc	J	49.50	24,000.00	79.00	366.00
	Titanium	-	1,910.00	NA	3,180.00	3,180.00

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 5 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C958	Aluminum	-	6,240.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.20	60.00	9.00	27.70
	Barium	-	84.40	5,600.00	175.00	480.00
	Calcium	-	8,500.00	NA	24,600.00	105,000.02
	Chromium	-	8.00	100.00[c]	28.00	320.00
	Cobalt	B	3.10	4800.00	19.00	110.00
	Copper	J	16.90	3000.00	30.00	61.00
	Iron	-	18,100.00	NA	38,200.00	68,100.00
	Lead	-	11.60	250.00[c]	14.90	74.10
	Magnesium	-	4,650.00	NA	9,160.00	32,300.00
	Manganese	J	329.00	11,000.00	583.00	1,110.00
	Nickel	-	9.70	1600.00	25.00	200.00
	Potassium	-	1,520.00	NA	3,090.00	7,900.00
	Sodium	B	190.00	NA	1,390.00	6,060.00
	Vanadium	-	27.90	560.00	107.00	140.00
	Zinc	J	60.80	24,000.00	79.00	366.00
	Titanium	-	1,020.00	NA	3,180.00	3,180.00
B0C959	Aluminum	-	5,290.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	3.30	60.00	9.00	27.70
	Barium	-	51.70	5,600.00	175.00	480.00
	Calcium	-	8,760.00	NA	24,600.00	105,000.02
	Chromium	-	8.00	100.00[c]	28.00	320.00
	Cobalt	B	3.20	4800.00	19.00	110.00
	Copper	J	5.60	3000.00	30.00	61.00
	Iron	-	16,100.00	NA	38,200.00	68,100.00
	Lead	-	4.20	250.00[c]	14.90	74.10
	Magnesium	-	4,580.00	NA	9,160.00	32,300.00
	Manganese	J	227.00	11,000.00	583.00	1,110.00
	Nickel	B	7.30	1600.00	25.00	200.00
	Potassium	B	940.00	NA	3,090.00	7,900.00
	Sodium	B	157.00	NA	1,390.00	6,060.00
	Vanadium	-	25.20	560.00	107.00	140.00
	Zinc	J	31.40	24,000.00	79.00	366.00
	Titanium	-	801.00	NA	3,180.00	3,180.00

Table 4. Ash Pit Demolition Site, Analytical Results for Soils, Metals. (sheet 6 of 6)

Sample number	Name of Constituent	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Levels[a] mg/kg	Hanford Site Soil Background 95/95 threshold[b] mg/kg	Hanford Site Soil Background Maximum Conc.[b] mg/kg
B0C960	Aluminum	-	7,030.00	80,000.00	15,100.00	28,800.00
	Arsenic	J	2.60	60.00	9.00	27.70
	Barium	-	99.50	5,600.00	175.00	480.00
	Beryllium	B	0.26	400.00	1.80	10.00
	Calcium	-	8,410.00	NA	24,600.00	105,000.02
	Chromium	-	24.00	100.00[c]	28.00	320.00
	Cobalt	B	4.70	4800.00	19.00	110.00
	Copper	J	27.80	3000.00	30.00	61.00
	Iron	-	19,700.00	NA	38,200.00	68,100.00
	Lead	-	36.40	250.00[c]	14.90	74.10
	Magnesium	-	4,910.00	NA	9,160.00	32,300.00
	Manganese	J	286.00	11,000.00	583.00	1,110.00
	Mercury	-	0.62	240.00	1.30	3.80
	Nickel	-	18.30	1600.00	25.00	200.00
	Potassium	-	1,340.00	NA	3,090.00	7,900.00
	Silver	B	1.70	400.00	2.10	14.60
	Sodium	B	370.00	NA	1,390.00	6,060.00
	Vanadium	-	33.00	560.00	107.00	140.00
	Zinc	J	155.00	24,000.00	79.00	366.00
	Titanium	-	1,100.00	NA	3,180.00	3,180.00
B0CBM9	Iron	-	104.00	NA	38,200.00	68,100.00
equip	Sodium	B	24.40	NA	1,390.00	6,060.00
blank	Titanium	-	1.40	NA	3,180.00	3,180.00

a = Calculation found in Model Toxics Control Act (173-340-740).

b = DOE/RL, 1994b, Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes, DOE/RL-92-24, Rev. 2.

c = MTCA, Method A Cleanup Level, when MTCA, Method B levels not available.

J = Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, by the laboratory because it is below the method detection limit.

B = Indicates the constituents was analyzed for and detected in the associated laboratory blank.

mg/kg = milligram/kilogram (parts per million).

* = Nitrate concentration values only.

NA = not available.

NC = not calculated.

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for implementation in closure plans.

Table 5a. Ash Pit Demolition Site, Analytical Results for Phase I Analysis of Soil Sample BOC954, Semi-Volatile Organics Compounds. (sheet 1 of 1)

Sample number	Name of Constituent	CAS[a]	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Level[b] mg/kg	Hanford Site Soil Background 95/95 threshold mg/kg	Hanford Site Background Maximum Conc. mg/kg
BOC954DL	Naphthalene	91-20-3	DJ	4.3	320.00	NA	NA
	Acenaphthene	83-32-9	DJ	6.9	4,800.00		
	Dibenzofuran	132-64-9	DJ	4.3			
	Fluorene	86-73-7	DJ	7.5	3,200.00		
	Phenanthrene	85-01-8	D	81.0	0.14[c]		
	Anthracene	120-12-7	DJ	12.0	24,000.00		
	Fluoranthene	206-44-0	D	87.0	3,200.00		
	Pyrene	129-00-0	D	66.0	2,400.00		
	Benzo(A)Anthracene	56-55-3	D	28.0	0.14[c]		
	Chrysene	218-01-9	D	34.0	0.14[c]		
	Benzo(B)Fluoranthene	205-99-2	D	22.0	0.14[c]		
	Benzo(K)Fluoranthene	207-08-9	D	24.0	0.14[c]		
	Benzo(A)Pyrene	50-32-8	D	25.0	0.14		
	Indeno(1,2,3-cd)Pyrene	193-39-5	DJ	16.0	0.14[c]		
	Benzo(G,H,I)Perylene	191-24-2	D	18.0	0.14[c]		
	TIC:						
	9,10-Anthracenedione	84-65-1	JN	JN	NA		
	11H-Benzo(A)Fluorene	238-84-6	JN	JN	NA		
	Benzo(B)Naphtho(2,1-D)thiophene	239-35-0	JN	JN	NA		
	Benzo(C)Phenathrene	195-19-7	JN	JN	NA		
	Benzo(J)Fluoranthene	205-82-3	JN	JN	NA		

[a] = Chemical Abstract Services.

[b] = Calculation found in Model Toxics Control Act (173-340-740).

[c] = Calculation based on slope factor for benzo(A)pyrene for carcinogenic risk.

J = Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, by the laboratory because it is below the method detection limit.

JN = Tentatively identified compounds (TICs) were reported in the samples and deemed estimated and presumptive.

DJ = Indicates that the compound was analyzed at a secondary dilution factor; value is estimated.

mg/kg = milligram/kilogram (parts per million).

NA = not available.

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for implementation in closure plans.

Table 5b. Ash Pit Demolition Site, Analytical Results for Phase II Reanalysis of Soil Sample BOC954, Semi-Volatile Organics Compounds. (sheet 1 of 1)

Sample number	Name of Constituent	CAS[a]	Qualifiers	Concentration mg/kg	MTCA Method B Cleanup Level[b] mg/kg	Hanford Site Soil Background 95/95 threshold mg/kg	Hanford Site Background Maximum Conc. mg/kg
BOC954DL	Naphthalene	91-20-3	U	NA	320.00	NA	NA
	Acenaphthene	83-32-9	U	NA	4,800.00		
	Dibenzofuran	132-64-9	U	NA			
	Fluorene	86-73-7	U	NA	3,200.00		
	Phenanthrene	85-01-8	U	NA	0.14[c]		
	Anthracene	120-12-7	U	NA	24,000.00		
	Fluoranthene	206-44-0	U	NA	3,200.00		
	Pyrene	129-00-0	U	NA	2,400.00		
	Benzo(A)Anthracene	56-55-3	U	NA	0.14[c]		
	Chrysene	218-01-9	U	NA	0.14[c]		
	Benzo(B)Fluoranthene	205-99-2	U	NA	0.14[c]		
	Benzo(K)Fluoranthene	207-08-9	U	NA	0.14[c]		
	Benzo(A)Pyrene	50-32-8	U	NA	0.14		
	Indeno(1,2,3-cd)Pyrene	193-39-5	U	NA	0.14[c]		
	Benzo(G,H,I)Perylene	191-24-2	U	NA	0.14[c]		
	TIC:						
	9,10-Anthracenedione	84-65-1	U	NA	NA		
	11H-Benzo(A)Fluorene	238-84-6	U	NA	NA		
	Benzo(B)Naphtho(2,1-D)thiophene	239-35-0	U	NA	NA		
	Benzo(C)Phenathrene	195-19-7	U	NA	NA		
	Benzo(J)Fluoranthene	205-82-3	U	NA	NA		

a = Chemical Abstract Services.

b = Calculation found in Model Toxics Control Act (173-340-740).

c = Calculation based on slope factor for benzo(A)pyrene for carcinogenic risk.

J = Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, by the laboratory because it is below the method detection limit.

U = Indicates that the compound was analyzed for and not detected.

mg/kg = milligram/kilogram (parts per million).

NA = not available.

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for implementation in closure plans.

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