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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 at the Hanford Patrol Academy Demolition Sites (HPADS). The HPADS is identified as a Resource Conservation and Recovery Act treatment unit that will be clean closed in accordance with the applicable laws and regulations.

No constituents of concern were found in concentrations indicating contamination of soil by HPADS activities.

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ACRONYMS

1		
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3		
4	CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act</i>
5		
6	CRDL	contract required detection limit
7	DQO	Data Quality Objectives
8	Ecology	Washington State Department of Ecology
9	EPA	U.S. Environmental Protection Agency
10	GS/MS	gas chromatography/mass spectroscopy
11	HEIS	Hanford Environmental Information System
12	HPADS	Hanford Patrol Academy Demolition Sites
13	IRIS	<i>Integrated Risk Information System</i>
14	MTCA	<i>Model Toxics Control Act</i>
15	QC	quality control
16	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
17	SAP	sampling and analysis plan
18	TIC	tentatively identified compounds
19	TSD	treatment, storage, and/or disposal
20	VOA	volatile organics analysis
21	WAC	<i>Washington Administrative Code</i>

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DATA EVALUATION REPORT FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES CLEAN CLOSURE

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

10 This data evaluation report summarizes the sampling activities undertaken
11 and the analytical results obtained in a soil sampling and analysis study
12 performed at the Hanford Patrol Academy Demolition Sites (HPADS) *Resource*
13 *Conservation and Recovery Act of 1976* (RCRA) closure site. The results of
14 this study will be used in assessing contamination of soils, at the surface
15 and at depth, that occurred during HPADS treatment operations. The HPADS had
16 treated non-radioactive explosive, ignitable, shock-sensitive, and/or reactive
17 discarded chemical products.

18
19 The scope of this report is the evaluation of the highest detectable
20 analyte concentrations of the 30 samples taken to represent the unit soils.
21 This report does not describe analytical methodology, nor does it provide raw
22 analytical data or the sampling validation report. The sampling and analysis
23 plan (SAP) is presented in the *Hanford Patrol Academy Demolition Sites Closure*
24 *Plan* (DOE-RL 1994a). The plan was discussed and agreed to by all parties
25 during the December 9, 1993, and the February 9, 1994, Data Quality Objectives
26 (DQO) meetings. All analytical data were validated according to
27 *Data Validation Procedures for Chemical Analysis* (WHC 1993). The laboratory
28 data package and data validation report have been transmitted to the
29 Washington State Department of Ecology (Ecology), the regulatory lead for
30 closure of this unit (DOE-RL 1994c).

1.2 SUMMARY OF RESULTS

31
32
33 To meet the criteria for clean closure of the HPADS, analytical results
34 must verify that the concentration of all detonation activity residues is at
35 or below action levels. Action levels are defined as levels above the Hanford
36 Site soil background threshold levels identified in *Hanford Site Background:*
37 *Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 1994b) and the
38 *Model Toxics Control Act* (MTCA) (WAC 173-340), Method B, residential levels.
39 No constituents of concern were found in concentrations indicating
40 contamination of the soils at the HPADS (i.e., concentrations above action
41 levels).

42
43
44 Regulator acceptance of the findings presented in this report will
45 qualify the treatment unit for clean closure in accordance with *Washington*
46 *Administrative Code* (WAC) 173-303-610, "Dangerous Waste Regulations," without
47 further sampling, soil removal, and/or decontamination.
48
49
50

1.3 TREATMENT UNIT INFORMATION

The HPADS is located on the Hanford Site and is 3.2 kilometers southwest of the 300 Area and 0.8 kilometers north of the Horn Rapids Road. The HPADS consists of Closure Areas No. 1 and No. 2, which were used for the demolition of discarded explosive and shock sensitive chemical products (Figure 1). Closure Area No. 1 was used from 1975 through 1984 and Closure Area No. 2 was used from 1984 through 1991. For detonation events at Closure Area No. 1, the individual chemical containers were placed on the ground near the invert of the target butt. The containers then were detonated using M14 rifle fire. Closure Area No. 2 is a crater 3 meters (10 feet) in diameter and approximately 0.4 meters (1.5 feet) deep. The individual containers were placed in the detonation pit and wrapped with detonation cord. The detonation then was initiated with electric blasting caps.

2.0 SAMPLING

Soil sampling was performed on September 26, 1994, in accordance with the SAP provided in HPADS Closure Plan (DOE-RL 1994). There were 10 sample locations in Closure Area No. 1 and 12 sample locations in Closure Area No. 2. Samples were taken at three distinct intervals: 0 to 15 centimeters, 15 to 30 centimeters, and 15 to 46 centimeters. Chemical residues from the demolition events would have been deposited on the surface of the soil column. With the sampling approach described in the SAP, leachable or windblown constituents in the vicinity of the detonation would be detected.

A total of 30 samples were collected at the HPADS as follows: 13 samples (12 samples and 1 co-located duplicate) in Closure Area No. 1 and 17 samples (16 samples and 1 co-located duplicate) in Closure Area No. 2.

2.1 CLOSURE AREA NO. 1

Thirteen soil samples were taken from specific locations (Figure 2) within Closure Area No. 1. Closure Area No. 1 is located immediately south of the known distance target range at the bottom of the slope and measures approximately 10.6 by 34.7 meters. Closure Area No. 1 consists of two distinct regions, A and B. Region A is where the actual detonation events took place. Five soil samples were collected in Region A, as shown in Figure 2. Region B is where any unreacted explosive chemical products would have been dispersed after subsequent grading activities. Seven samples were collected in Region B as shown in Figure 3.

2.2 CLOSURE AREA NO. 2

Closure Area No. 2 consists of a detonation pit measuring approximately 3 meters in diameter and 0.4 meters deep. Seventeen soil samples were taken from specific locations, as shown in Figure 3, within a 4.5-meter radius centered about the detonation pit.

2.3 SAMPLE COLLECTION

The thirty samples collected on September 26, 1994, were assigned Hanford Environmental Information System (HEIS) numbers as follows: BOCZQ2 through BOCZQ9 and BOCZRO through BOCZR4 were collected in Closure Area No. 1 and BOCZN3 through BOCZN9 and BOCZP0 through BOCZP9 were collected in Closure Area No. 2. Duplicate Samples BOCZN7 and BPCZQ3 were collected in Closure Area No. 1 and Closure Area No. 2, respectively. A trip blank (BOCZQ1) was prepared and transported with the samples. An equipment blank (BOCZQ0) was collected from unused decontaminated sampling equipment from the soils in Closure Area No. 2.

Environmental field services personnel collected the soil samples using decontaminated hand tools at each closure area. At each location sampled, windblown soil and debris were pushed aside. The SAP required that the samples be taken at two distinct intervals: 0 to 15 centimeters and 30 to 46 centimeters below grade. However, in the field, samples were taken at four distinct intervals: 0 to 15 centimeters, 15 to 30 centimeters, 0 to 46 centimeters, and 15 to 46 centimeters below grade, because of collapsing sidewalls at certain locations. The soil was collected and placed in a sample bottle. Each bottle then was labeled and placed into a plastic bag. All samples were cooled to 4°C during storage and transportation to the offsite laboratory.

The sampling equipment was decontaminated in the 1706 KE Laboratory in accordance with Environmental Investigation Instruction 5.5, "Laboratory Cleaning of RCRA/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sampling Equipment" (WHC 1988). There was no equipment decontamination in the field.

2.4 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

Duplicate Samples BPCZQ3 and BOCZN7 were collected in Closure Area No. 1 and Closure Area No. 2, respectively. These duplicates corresponded to Sample BOCZN6 in Closure Area No. 1 and BPCZQ2 in Closure Area No. 2. 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. Duplicates 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

1 subjected to the same handling as the routine samples and was analyzed to
2 determine if contamination originated from the sample container or
3 transportation and storage procedures. The trip blank was submitted to the
4 analytical laboratory with the routine samples.

5
6 Equipment blanks consist of clean sand poured over or through the
7 sampling device after decontamination, collected in a sample bottle, and
8 transported to the laboratory for analysis. Equipment blanks test for
9 residual contamination from inadequate decontamination of the sampling
10 equipment at the 1706 KE Facility.

11 12 13 14 3.0 PERFORMANCE STANDARDS

15
16
17 The performance standards, or action levels, for soils are defined in
18 the *Hanford Patrol Academy Demolition Sites Closure Plan* (DOE-RL 1994a),
19 Chapter 6, Section 6.1. To meet action levels for clean closure, analytical
20 results must verify that dangerous waste constituents treated at the unit are
21 not present in concentrations above these levels. Action levels are defined
22 as levels above the Hanford Site soil background threshold levels identified
23 in *Hanford Site Background: Part 1, Soil Background for Nonradioactive*
24 *Analytes* (DOE-RL 1994b) and MTCA, Method B, levels. If analyses determine
25 that concentrations are above both guidelines, a phase two investigation would
26 be developed. Additional information on the Hanford Site Background threshold
27 levels is provided in Section 3.1 and is listed in Tables 3-1 through 3-5.
28 Information on MTCA, Method B, health-based levels are provided in Section 3.2
29 and calculations are described in WAC 173-340-740(3)(a)(iii), Method B,
30 levels. In this report, the analytical results have been evaluated and
31 compared with action levels to verify that the concentration of all detonation
32 activity residues is at or below action levels.

33 34 35 3.1 HANFORD SITE BACKGROUND

36
37 The background action levels used in this report are based on a sitewide
38 approach to determining background levels and was developed as an alternative
39 to local unit-based background determinations at the Hanford Site
40 (DOE-RL 1994b). Using local background for each treatment, storage, and/or
41 disposal (TSD) unit can lead to different definitions of contamination and
42 different assessments of remediation goals and risk for various TSD units.
43 The Hanford Site Background approach is based on the premise that: (1) the
44 waste management units are located on or in a common sequence of vadose zone
45 sediments, and (2) the basic characteristics that control the chemical
46 composition of these sediments are similar throughout the Hanford Site.
47 The range of natural soil composition is used to establish a single set of
48 soil background data. Use of the Hanford Site Background for environmental
49 restoration on the Hanford Site is technically preferable to the use of the
50 unit-based background because the former more accurately represents the
51 natural variability in soil composition and also provides a more consistent
52 and efficient basis for evaluating contamination in soils.

1 The Hanford Site Background threshold levels are summarized in Tables 3-1
2 and 5. The background threshold is the concentration level defining the upper
3 limit of the background population. Background thresholds are based on a
4 tolerance interval approach. The calculated threshold levels depend on the
5 confidence interval and percentile used in the calculation.
6 WAC 173-340-708(11)(d) specifies a tolerance coefficient of 95 percent and a
7 coverage of 95 percent. The Hanford Site Background threshold levels are
8 based on this 95/95 confidence interval. Statistical calculations are
9 described in the source document (DOE-RL 1994b).

10 11 12 3.2 HEALTH-BASED LEVELS 13

14 The calculated health-based cleanup levels in this data evaluation report
15 are from the equations, risk levels, and exposure assumptions found in the
16 MTCA, Method B (WAC 173-340-740 [3][a][iii]). For noncarcinogens, the
17 principal variable is the oral reference dose. The oral reference dose is
18 defined as the maximum level of daily human exposure at or below which no
19 adverse effect is expected to occur during a lifetime. For carcinogens, the
20 cancer slope factor is the basis for determining human health effects; it is a
21 measurement of the risk per unit dose. The oral reference dose and the cancer
22 slope factor are chemical-specific and are obtained from the *Integrated Risk*
23 *Information System* (IRIS) database (EPA 1995), if available. Secondary
24 sources for these toxicity values are from the U.S. Environmental Protection
25 Agency (EPA) or Ecology.

4.0 ANALYSES

All samples collected for chemical analysis were analyzed by SW-846 methods (EPA 1986) and approved EPA 300-series methods (EPA 1983). The contaminants of concern and the methods used for analysis are:

- VOA, EPA Method 8240
- Semi-VOA, EPA Method 8270
- Detonation residue, EPA Method 8330
- Anions, EPA Method 300.0
- Metals, EPA Method 6010
- Total nitrogen, EPA Method 353.1-2.

All samples were sent to Lockheed Analytical Services Laboratory in Las Vegas, Nevada, for analysis. Anions and total nitrogen results are grouped together in the data package titled 'Anions' and will be discussed in this report under the subtitle of 'Inorganic Compounds.' The highest analyte concentrations from the volatile organics, metals, and general chemistry groups, have concentration comparison tables that list and identify chemical concentrations (see Tables 3-1 through 3-5). All known nitroexplosives and semi-volatile organic compounds were reported as undetected. No further evaluation will be presented for these undetected analytes.

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), according to 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 by purge and trap with capillary column on a GC/MS. All samples were analyzed and all analytes, with the exception of methylene chloride, were reported as undetected. The semi-VOA was performed by direct injection of sample extract on a capillary column on a GC/MS. The samples did not contain any Appendix IX compounds.

4.2 INORGANIC ANALYSES

Samples were analyzed for metals using EPA Method 6010.

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 (EPA 1993) 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, only the results from Method 353.2 (EPA 1993) will be evaluated, as agreed to during the DQO process.

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, duplicate 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 quality control (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 by the laboratory because it is below the method detection limit. These data are 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.
- 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 (CRDL), but greater than the instrument detection limit.

All TICs reported during the organics analyses are deemed as estimated and presumptive and are qualified as estimated during the data validation process (WHC 1993).

Some discrepancies were noted in the validation of the laboratory data resulting in the data being qualified. The qualifiers are listed in Tables 3-1, 3-2, and 3-3. The following qualifiers were applied to the data as described and required in the data validation guidelines (WHC 1993):

- During the data validation process, Samples BOCZQ2 and BOCZQ3 (duplicate) were inadvertently validated in two separate data packages. Sample BOCZQ2 was assigned to Data Package LK05-LAS-005 and the duplicate Sample BOCZQ3 was assigned to Data Package LK-LAS-004.
- VOA Samples BOCZN8 and BOCZN9 from Closure Area No. 2 were qualified as at estimated (J) for methylene chloride because the surrogate recovery was greater than the control limit and the result was greater than the CRDL.
- The holding times for some phosphate results were exceeded and the applicable results were qualified as estimated (J) or rejected (R).

However, this is a result of applying holding times established for water samples to these soil samples.

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 limits are not considered to signify contamination. The unit soils will be considered clean with respect to that analyte. The health-based action levels will be based on MTCA, Method B, or Hanford Site Background threshold levels for soil, whichever is less stringent. Any analyte found in concentrations greater than the action level will require further evaluation.

6.1 ORGANICS

No semi-volatile compounds or detonation residues were reported for Closure Areas No. 1 and No. 2, and no volatile residues were reported for Closure Area No. 1. The VOA for Closure Area No. 2 shows that methylene chloride was detected in Samples BOCZN7, BOCZN7RE, BOCZN8 and BOCZN9, as shown in Table 3-1, at concentrations well below the MTCA, Method B, Cleanup Level of 130 mg/kg. Therefore, methylene chloride is of no concern because of its low concentration.

6.2 METALS

The metals analyses are summarized in Tables 3-2 and 3-3. Arsenic, lead, manganese, sodium, and zinc results qualified with a J, which indicate that the data are estimated but considered usable for decision-making purposes. Beryllium, cadmium, and cobalt results qualified with a B, which indicate that the analyte concentrations are less than the CRDL, but greater than the instrument detection limit. The highest concentration for each analyte reported above the respective laboratory instrumentation detection limit was compared to MTCA, Method B, and/or Hanford Site Background threshold levels (DOE-RL 1994b). All metals were found to be below action levels, therefore, indicating no contamination present.

6.3 ANIONS

The anions analyses are summarized in Tables 3-4 and 3-5. The highest concentration, for each anion analyte, 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, therefore, indicating no contamination present.

7.0 CONCLUSIONS

The sampling and analysis activities identified few analyte concentrations above detection limits. All VOCs were below MTCA, Method B. No nitroexplosives were detected. When MTCA, Method B, and Hanford Site Background threshold levels were available, all analytes were below those action levels. Of the semi-volatile organic compounds for which no action levels were available, all were TICs whose concentrations were below quantitation limits. These compounds were of no concern to the closure of the unit for any one of the following reasons:

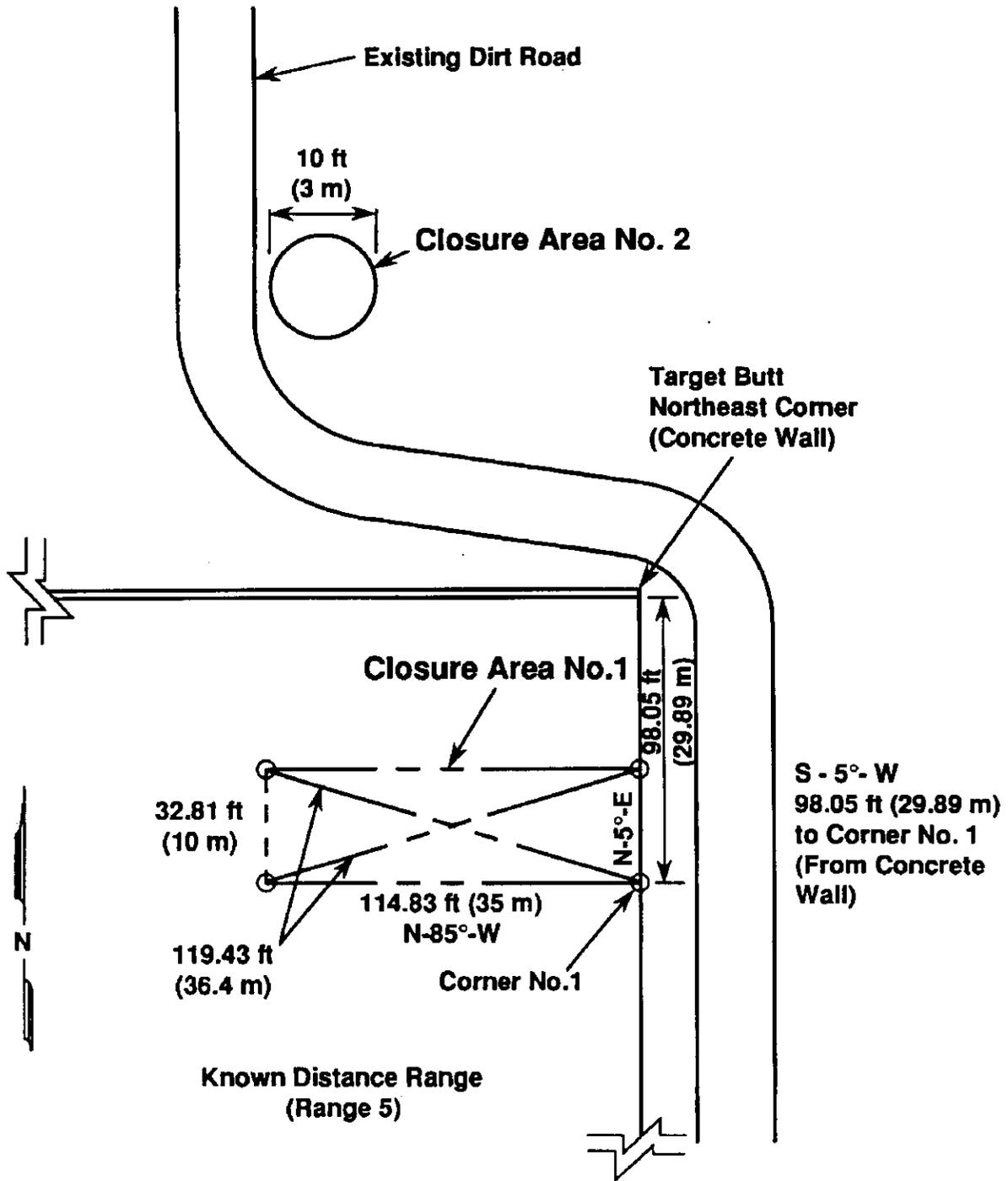
- Low concentrations
- Attributed to common laboratory contaminants
- Contamination by equipment
- Constituents were not hazardous substances or dangerous waste constituents.

Concentrations of all organic analytes are below MTCA, Method B and/or Hanford Site Background threshold levels, indicating no inorganic contamination is present at the HPADS.

In summary, the analytical results for the HPADS soils verify that the concentration of all constituents of concern are below action levels. Consequently, under the provisions of WAC 173-303-610, this RCRA unit qualifies for clean closure.

8.0 REFERENCES

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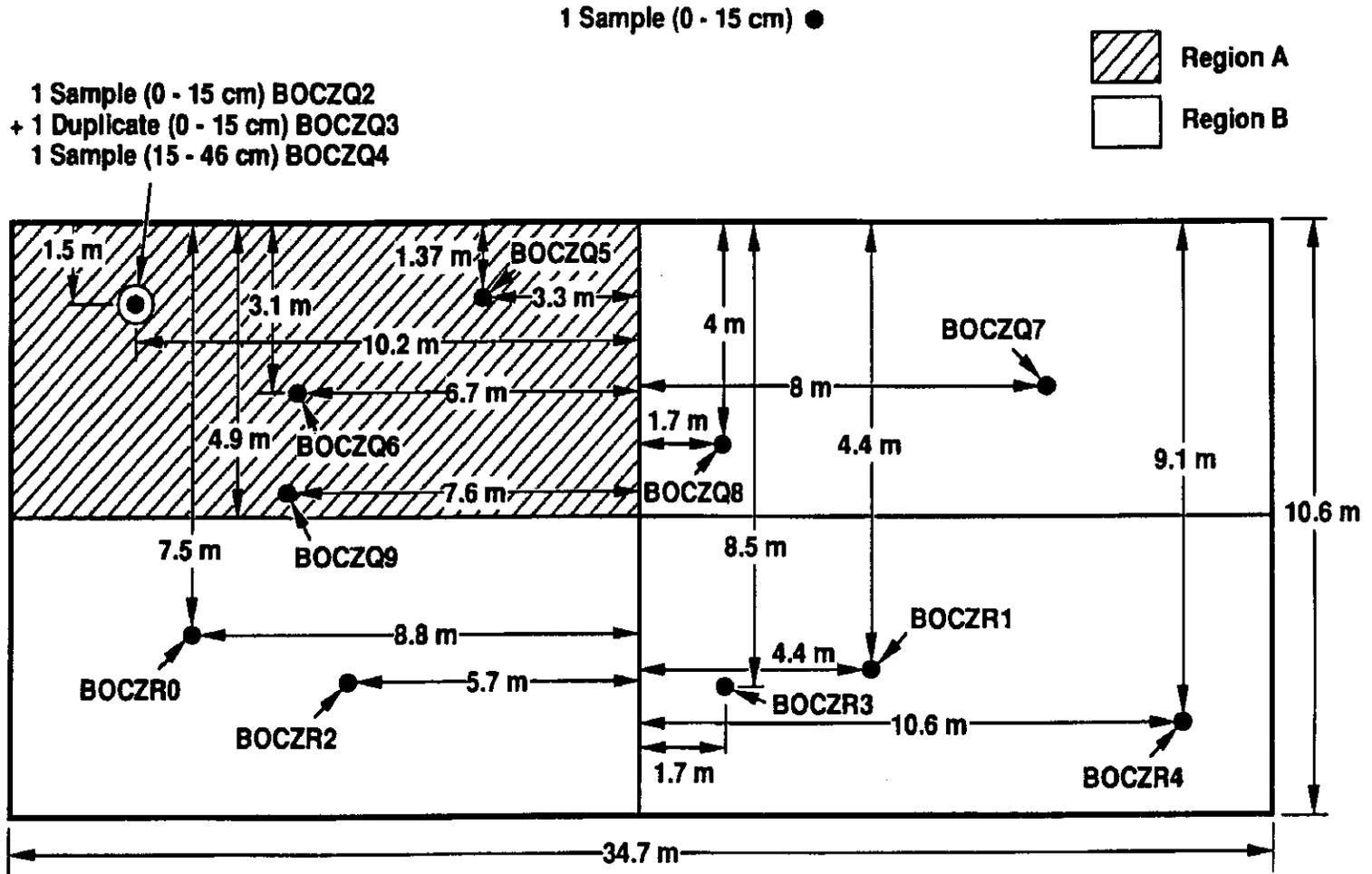


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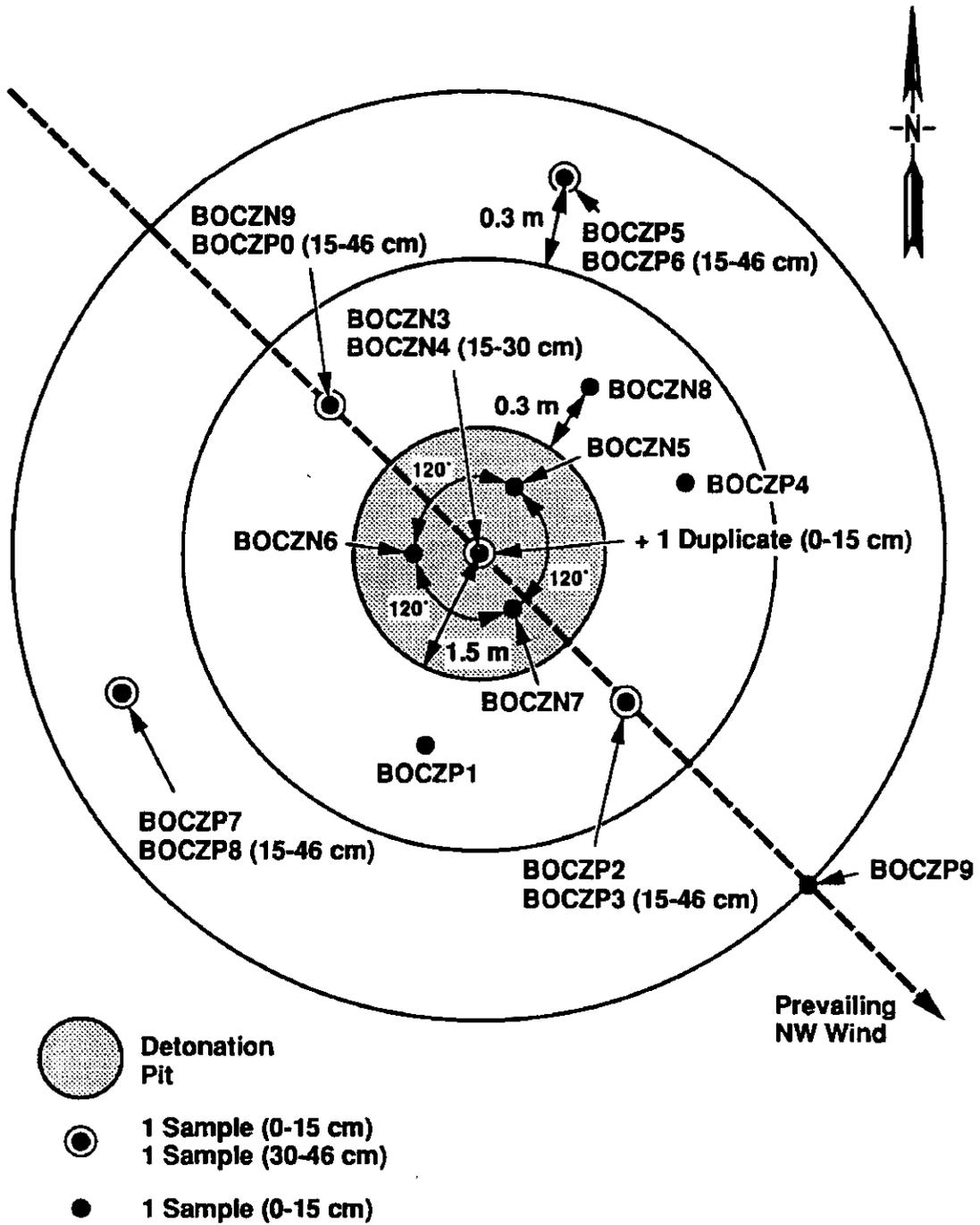
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1 Figure 1. Hanford Patrol Academy Demolition Sites Closure Areas.

1 Figure 2. Hanford Patrol Academy Demolition Sites Closure Area No. 1.



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1 Figure 3. Hanford Patrol Academy Demolition Sites Closure Area No. 2.

Table 1. Hanford Patrol Academy Demolition Sites Closure Area No. 2, Analytical Results for Soils, Volatile Organic Compounds.

Sample number	Name of Constituent	Qualifiers ^a	Highest Concentration $\mu\text{g}/\text{kg}$	MTCA Method B ₁ Cleanup Levels ^b (Cancer) mg/kg	Hanford Site Soil Background 95/95 threshold ^c mg/kg	Hanford Site Soil Background Maximum Conc. ^c mg/kg
BOCZ _N 7 BOCZ _N 7RE ^d	Methylene Chloride	UJ J	5.0 6.5	130	NA	NA
BOCZ _N 8	Methylene Chloride	J	6.4	130	NA	NA
BOCZ _N 9	Methylene Chloride	J	7.5	130	NA	NA

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

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

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

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

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

Sample number indicates reanalysis.

NA = not available

Table 2. Hanford Patrol Academy Demolition Sites Closure Area No. 1, Analytical Results for Soil, Metals.

Sample number	Name of Constituent	Highest Concentration mg/kg	MTCA Method B Cleanup Levels ^a (Cancer) mg/kg	Hanford Site Soil Background 95/95 threshold ^b mg/kg	Hanford Site Soil Background Maximum Conc. ^b mg/kg
BOCZRO	Aluminum	7000	-	15082	28800
BOCZRO	Arsenic	3.0	24	9	27.7
BOCZRO	Barium	109	5600	174.6	480
BOCZRO	Beryllium	0.35 B	400	1.76	10
BOCZQ2	Cadmium	0.83 B	40	NC	11
BOCZRO	Calcium	8190	-	24642	105000
BOCZR1	Chromium	9.9	400	28.23	320
BOCZR3	Cobalt	7.1 B	-	18.88	110
BOCZQ2 BOCZQ3 - Duplicate	Copper	13.3 13.0	3000	29.96	61
BOCZRO	Iron	24200	-	38246	68100
BOCZQ3	Lead	19.1 J	3000	14.87	74.1
BOCZRO	Magnesium	5720	-	9160	32300
BOCZRO	Manganese	376 J	11000	583	2870
BOCZR1	Nickel	14.2	1600	24.66	200
BOCZRO	Potassium	1650	-	1090	7900
BOCZQ6	Sodium	413 J	-	1393	6060
BOCZRO	Vanadium	46.6	560	106.5	140
BOCZRO	Zinc	44.6	24000	78.9	366

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

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

^b DOE/RL, 1994, 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 a laboratory estimate because it is below the method detection limit.

B For inorganics data, indicates that the analyte concentration is less than the contract required detection limit, but greater than the instrument detection limit.

NC not computed

Table 3. Hanford Patrol Academy Demolition Sites Closure Area No. 2, Analytical Results for Soils, Metals.

Sample number	Name of Constituent	Highest Concentration mg/kg	MTCA Method B Cleanup Levels ^a (Cancer) mg/kg	Hanford Site Soil Background 95/95 threshold ^b mg/kg	Hanford Site Soil Background Maximum Conc. ^b mg/kg
BOCZP3	Aluminum	8360	-	15082	28800
BOCZP7	Arsenic	3.0 J	24	9	27.7
BOCZP7	Barium	97.3	5600	174.6	480
BOCZP3	Beryllium	0.37 B	400	1.76	10
BOCZN8	Calcium	3770	-	24642	105000
BOCZN8	Chromium	13.2	400	28.23	320
BOCZP7	Cobalt	7.5 B	-	18.88	110
BOCZP4	Copper	64.6	3000	29.96	61
BOCZP0	Iron	25400	-	38246	68100
BOCZN5	Lead	14.4 J	3000	14.87	74.1
BOCZP0	Magnesium	4910	-	9160	32300
BOCZP7	Manganese	424	11000	583	2870
BOCZP0	Nickel	12.6	1600	24.66	200
BOCZN8	Potassium	2090	-	1090	7900
BOCZN4	Sodium	644 J	-	1393	6060
BOCZP0	Vanadium	50.3	560	106.5	140
BOCZP4	Zinc	74.7 J	24000	78.9	366

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

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

^b DOE/RL, 1994, 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 a laboratory estimate because it is below the method detection limit.

B For inorganics data, indicates that the analyte concentration is less than the contract required detection limit, but greater than the instrument detection limit.

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Table 4. Hanford Patrol Academy Demolition Sites Closure Area No. 1, Analytical Results for Soils, Anions.

Sample number	Name of Constituent	Highest 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
BOCZR0	Fluoride	0.63	4800.0	13.0	73.30
BOCZR0	Chloride	0.86	NA	783.0	1480.0
BOCZQ3	Phosphate	1.1	NA	12.7	225.0
BOCZQ3	Sulfate	3.1	NA	931.0	12600.0
BOCZQ7	Nitrate+Nitrite	6.2	130000+8000=138000	208.0*	906.0*

^a Calculation found in Model Toxics Control Act (WAC-173-340-740)

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for

^b implementation in closure plans

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

* = Nitrate concentration values only

Table 5. Hanford Patrol Academy Demolition Sites Closure Area No. 2, Analytical Results for Soils, Anions.

Sample number	Name of Constituent	Highest 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
BOCZN4	Fluoride	2.5	4800.0	13.00	73.30
BOCZP2	Chloride	3.3	NA	783.0	1480.0
BOCZN3	Phosphate	5.7	NA	12.70	225.0
BOCZN8	Sulfate	5.2	NA	931.0	12600.0
BOCZN8	Nitrate+Nitrite	12	130000+8000=138000	208.0*	906.0*

^a Calculation found in Model Toxics Control Act (WAC-173-340-740)

Note: MTCA, Method B, use the lowest of the two cleanup levels, cancer or noncancer-based, for

^b implementation in closure plans

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

* = Nitrate concentration values only

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