4.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses those contaminants detected in surface soil, subsurface soil, surface water, sediment, and groundwater above background criteria or laboratory detection limits at WBG. Discussion is focused on the 14 burning pads and the Deactivation Furnace Area. This evaluation of the nature and extent of contamination incorporates data from the Phase I and Phase II RI, and from two samples collected at the Deactivation Furnace Area in 1997 (USACE 1998b). Data from other studies (see Section 1.2.3) and the field analytical results for explosives will be discussed qualitatively where they are useful in defining extent.

The evaluation of nature and extent begins with a discussion of the data and methodologies employed to arrive at facility-wide background criteria, in Section 4.1. Section 4.1 also describes the statistical analyses performed to differentiate site-related chemicals (SRCs). Section 4.2 describes the potential sources of these contaminants. Sections 4.3 through 4.8 identify the nature and extent of contamination by comparison of WBG analytical results to background or detection levels. Section 4.9 summarizes the CSM of WBG.

Some SRCs have been identified as human health or ecological contaminants of potential concern (COPCs). Because these COPCs potentially pose risk to human health or the environment, their environmental fate and transport properties are of interest, and are discussed in Section 5.0. The determinations of human health and ecological risk caused by contamination described in Section 4.0 are provided in Sections 6.0 and 7.0.

Tables summarizing the analytical results for each medium, by sampling station and by analyte, are included at the end of this section. Table E-13 in Appendix E lists the analytical methods used for each constituent and medium. The analytical data are presented in their entirety in Appendix F.

4.1 DATA EVALUATION METHODS

Samples from each environmental medium were collected at the locations described in Section 2.0 of this report. Analytical results from these samples were used to determine which chemicals could be related to past activities at the AOC. The methods for identifying SRCs are described in the following sections. The methods proposed in the *SAP Addendum for the Phase II Remedial Investigation at Winklepeck Burning Grounds and Determination of Facility-Wide Background at RVAAP* (USACE 1998a) were modified to use the quartile screening for outliers, as recommended by OEPA (Comment Resolution Meeting, December 2, 1998). The general process for identifying SRCs involved four steps: initial data reduction, background characterization, background comparison, and weight-of-evidence screening.

4.1.1 Data Reduction

Analytical results were reported by the laboratory in electronic form and loaded into a database. QC data such as sample splits and duplicates were excluded so that only one result was used for each station and depth sampled. Data validators determined whether a laboratory reanalysis should be used in place of an original reported result based on surrogate recoveries and other laboratory quality control information. When results were reported for both a diluted and undiluted sample, results from the diluted sample were used only for those analytes that exceeded the calibration range of the undiluted sample. Samples rejected in the validation process were excluded. Results with qualifiers of "U," "UJ," or "<" were considered not detected. "Not detected" results were included in summary statistics at one-half the reported detection limit. Nondetects that have unusually high detection limits (such as from diluted samples) may have a large effect on the calculated mean and exposure concentrations for the site data. Therefore, nondetects with elevated detection limits (more than 5× the contract-required detection limit) were excluded from the summary statistics.

Over 230 environmental soil, sediment, surface water, groundwater, and field QC samples were collected with approximately 12,500 discrete analyses (i.e., analytes) being obtained, reviewed, and integrated into the assessment (these totals do not include field measurements and field descriptions). The data quality assessment showed that over 99 percent of the sample analyses performed were acceptable for quantitative use in the RI (Appendix E).

Some analytical results were rejected for use based on the data validation criteria described in the *Quality Assurance Project Plan for RVAAP* [included in *Facility-Wide SAP for RVAAP* (USACE 1996a)]. Rejected soil data included 14 reported values for sodium due to the low levels of sodium observed in samples versus the elevated levels in corresponding laboratory blanks. This combination did not provide the confidence in the sodium values needed to accept the data. Aluminum values in 1 surface water and 26 groundwater samples and copper values in 7 groundwater samples were compromised due to negative drifts in the instrumental baseline. The low levels of metal reported in combination with instrumental shifts did not allow accurate measurement of the analytes at the detection limit. Nondetected results were flagged as rejected because the negative baseline could produce false negative results. Detected results for aluminum and copper were flagged as estimated because the negative baseline made the uncertainty in the concentration large especially close to the detection limit.

The rejected data do not significantly affect the interpretation of the results in this report. Only metals concentrations below the detection limit were rejected. Results above the detection limit were used in this report. For copper four results for the filtered unconsolidated zone samples and five results for the filtered bedrock zone samples were available to evaluate the background criteria. However, the rejected aluminum results included all of the filtered groundwater samples. This means that there were no valid results for calculating the background value or estimating AOC concentrations. The data were rejected because of the potential for false negative results. If aluminum were present at a concentration just above the detection limit, it could have been reported as a nondetect because of the negative drift in the instrument baseline. Any detects would have been qualified ‘J’ as estimated because of the baseline uncertainty. Although the rejected data prevent quantification of the aluminum concentration, the results indicate that the dissolved aluminum concentrations were near or below the 200 μg/L quantitation limit. The 200 μg/L quantitation limit represents the maximum range of the National Secondary Drinking Water Regulations based on cosmetic and aesthetic effects.

Reporting limits did not meet the quantitation limit goals for hexachlorobenzene (1 μg/L), pentachlorophenol (1 μg/L), benzo(*a*)pyrene (0.2 μg/L), and vinyl chloride (2 μg/L) in water samples. These goals were based on the MCL values for these compounds but could not be met by the standard EPA SW-846 procedures used. Reporting limits were 10 μg/L for all of these compounds. The laboratory would report concentrations found below the reporting limit but above the method detection limit. The method detection limits (MDLs) were 2.9 μg/L for hexachlorobenzene, 3.3 μg/L for pentachlorophenol, 2.7 μg/L for benzo(a)pyrene, and 0.58 μg/L for vinyl chloride (Table E-13 in Appendix E). Vinyl chloride could therefore be detected at or below the MCL criteria of 2 μg/L. Although lower than the reporting limits, the MDLs were still above the MCLs for hexachlorobenzene, pentachlorophenol, and benzo(*a*)pyrene. None of these compounds was detected in any surface water or groundwater sample taken at the site. Of these compounds, only benzo(*a*)pyrene was detected in soil or sediment samples at the site. All of three of these compounds have very low solubilities and, therefore, are not likely to be transported in the surface water or groundwater. Although the reporting limits did not meet the quantitation goals for four compounds, the low MDL value for vinyl chloride, the absence in water and other media of hexachlorobenzene and pentachlorophenol, and low solubility of benzo(*a*)pyrene provide reasonable evidence that these compounds are not likely to be present in water at concentrations that exceed the MCL criteria.

4.1.2 Determination of Facility-Wide Chemical Background

Samples of soil, sediment, surface water, and groundwater were collected to determine the range of background concentrations that could be expected in these media (see Section 2.0). Samples were taken in areas believed to be unaffected by plant activities **(Figure 2-2)**. Background locations were selected using aerial photographs and site visits with the concurrence of OEPA and USACE personnel. Sampling was conducted during the Phase II RI at WBG (April and May 1998). Analytical results for each sample are presented in Appendix F1.

4.1.2.1 Methodology

Data were screened statistically and graphically to determine if there were outliers that could affect the calculation of the background criteria. An outlier is a result that is so different from the other results that it has a much larger influence on the statistics that are calculated than do the other results. Outliers should be examined because they might indicate mistakes in the data such as transcription errors, improper calculations, or mislabeled data. An outlier might also be a perfectly valid but rare result. The OEPA guidance (Comment Resolution Meeting, December 2, 1998) calls for using upper and lower cutoff limits based on quartiles to identify outliers. The upper limit is the third quartile (the 75^{th} percentile) plus 1.5 × the interquartile range. For this evaluation all results that exceeded the upper cutoff limit were examined to determine if the results were valid and should be used in the statistical analyses. Outliers were removed so that background values would most nearly represent natural conditions and exclude human disturbance whether from RVAAP or pre-RVAAP activities.

The site-specific background criteria were determined using the following procedure:

(1) Analytes were grouped into one of three frequency-of-detection categories:

- frequency of detection ≥ 50 percent,
- frequency of detection between 0 and 50 percent, or
- frequency of detection = 0 percent (all nondetects).

(2) When frequency of detection ≥ 50 percent, the best-fit distribution for each analyte was determined using the Shapiro-Wilk test. Untransformed data and log-transformed data were used to test the hypothesis that data were normally distributed. The best fit was selected based on the largest p-value for the Shapiro-Wilk statistic. If the data were normally or log-normally distributed, the 95 parametric percent upper tolerance limit (UTL) was calculated using either the untransformed or log-transformed data:

$$UTL = x + k(STD_x) ,$$

where:

x = arithmetic mean of the background data,
k = appropriate tolerance factor for one-sided tolerance interval,
STD_x = standard deviation of the background concentrations.

If the distribution was neither normal nor log-normal (where $p < 0.05$), the nonparametric UTL was calculated as described by Walpole and Myers (1978). The nonparametric UTL is based on the rank of each observation. For sample size of 59 or less, the maximum result represents the nonparametric 95 percent UTL.

If the UTL was greater than the maximum detected background concentration, the maximum detected background concentration was used for the background criteria.

(3) If the frequency of detection was between 0 and 50 percent, there was very little confidence that the background distribution could be adequately characterized. In this situation, the 99th percentile of the background data was used as the background criteria.

(4) If the frequency of detection was 0 percent (no detects), the background criterion was set to zero to ensure that chemicals detected at the AOC but never detected in the background samples will be included as SRCs.

(5) If fewer than three results were available for a given chemical, the maximum detected background concentration was used for the background criterion. EPA guidance calls for using at least four observations for calculating UTLs and recommends eight or more observations (EPA 1989a).

4.1.2.2 Background Criteria

Soils

Depth Aggregation. Soil samples were taken from three intervals: 0 to 0.3 m (0 to 1 ft), 0.3 to 0.9 m (1 to 3 ft), and one interval in the 0.9- to 3.6-m (3- to 12-ft) range. Because boring locations were changed during sampling based on the lithological requirements for well screen intervals, all depth intervals for soils were not sampled for each boring **(Table 4-1)**.

Table 4-1. Sampling Depths for Background Soils

Station	Surface	Subsurface	Deep	USCS Symbol[a]
001	0 to 1 ft			SW-SP*
002	0 to 1 ft			SW-SP*
003	0 to 1 ft			P[b]
004	0 to 1 ft	1 to 3 ft	11 to 12 ft	P[b], SC, SM
005	0 to 1 ft	1 to 3 ft	7 to 8 ft	SM*, SM*, SP*
006	0 to 1 ft	1 to 3 ft	4 to 5 ft	CL, CL, ML
007	0 to 1 ft			CL
008	0 to 1 ft	1 to 3 ft	6 to 7 ft	CL*, CL*, ML*
009	0 to 1 ft			P[b]
010	0 to 1 ft	1 to 3 ft	3 to 4 ft	SM, ML*, ML*
011	0 to 1 ft			P[b]
012	0 to 1 ft	1 to 3 ft	11 to 12 ft	SM, CL, CL
013	0 to 1 ft			CL*
014	0 to 1 ft	1 to 3 ft	7 to 8 ft	CL, CL*, CL
015	0 to 1 ft	1 to 3 ft	9 to 10 ft	I[b], CL, CL
016		1 to 3 ft	9 to 9 ft	M*, P[b]
017		1 to 3 ft	8 to 9 ft	ML*, CL*
018		1 to 3 ft		ML*
019		1 to 3 ft	10 to 11 ft	ML*, ML*
020		1 to 3 ft	3 to 4 ft	CL, CL
021		1 to 3 ft	5 to 6 ft	ML*, ML*

[a]USCS (Unified Soil Classification) symbol is taken from geotechnical report (see Appendix H) or from field logs (denoted by "*").
[b]When a USCS designation was not made in the field, the sample was categorized as P = permeable or I = impermeable based on the soil description in the field log.

Concentrations for each sample were plotted by depth range for each inorganic analyte (Appendix F3). The Wilcoxon rank-sum test (SAS 1990), a nonparametric analysis of variance, was used to test the statistical significance of differences between the 0- to 0.3-m (0- to 1-ft) depth class and all data from >0.3 m (>1 ft) and between the 0.3- to 0.9-m (1- to 3-ft) depth class and all data >0.9 m (>3 ft). Tests with a probability level less than 0.05 were considered significant **(Table 4-2)**. The Wilcoxon rank-sum test has advantages over a t-test for comparing samples from distributions. The rank-sum test does not depend on the sample being taken from a normal distribution and is not as sensitive to outliers as is the t-test because it uses the ranks rather than the values of the concentrations. For the rank-sum test, all nondetects were set to zero so that they would be tied at the lowest rank.

The soil in the 0- to 0.3-m (0- to 1-ft) depth class was distinctly different from the deeper soils. Nearly all of the samples with detectable PAH concentrations were from the 0- to 0.3-m (0- to 1-ft) depth class. Differences between layers were statistically significant for 10 of the 16 PAH compounds tested (**Table 4-2**).

The Wilcoxon rank-sum test indicated significant differences between the surface and subsurface layers for 13 of the 24 inorganics tested. Cyanide (Figure F3-1), calcium (Figure F3-8), lead (Figure F3-13), manganese (Figure F3-15), and mercury (Figure F3-16) tended to be higher in concentration in the surface layer than the subsurface. Arsenic (Figure F3-4), chromium (Figure F3-9), cobalt (Figure F3-10), copper (Figure F3-11), iron (Figure F3-12), nickel (Figure F3-17), potassium (Figure F3-18), and zinc (Figure F3-24) tended to be lower in concentration in the surface layer than in the subsurface. Four metals, aluminum (Figure F3-2), lead (Figure F3-13), mercury (Figure F3-16), and vanadium (Figure F3-23), had significantly higher concentrations in the 0.3- to 0.9-m (1- to 3-ft) layer than in the deeper layer.

Separate background criteria for the surface soil are warranted based on the clear differences in concentration in organic and inorganic analytes between the surface and subsurface layers. Although four metals showed significant differences in concentration between the two subsurface layers, there are practical considerations for estimating only one background concentration for the subsurface. Risk analysis is usually performed on surface or subsurface soil as an aggregate, without further division of the subsurface. Combining all subsurface background soils for the calculation of the background criteria would provide the appropriate criteria for comparison. Site sampling intervals might not match those used for the background study, so having one subsurface background criterion simplifies the comparison.

Lithology Aggregation. Soil samples were classified as "permeable" or "impermeable" based on laboratory textural analysis or visual lithologic descriptions provided in the boring logs. Sampling intervals predominantly consisting of sand, silty sand, or clayey sand were classified as permeable. These materials generally comprise the following Unified Soil Classification System (USCS) groups: SW, SP, SM, and SC. Intervals predominantly consisting of silts, clays, sandy silts, or sandy clays were classified as impermeable. These materials generally comprise the following USCS groups: ML and CL. The USCS surface soils classifications were split with the majority categorized as permeable in the geotechnical report. The subsurface soils were predominantly impermeable soils **(Table 4-3)**.

The Wilcoxon rank-sum test was used to test for differences in lithology within the surface and subsurface soil layers **(Table 4-4)**. None of the tests were significant at the 0.05 probability level for the surface layer. In the subsurface layer, five metals had significantly higher concentrations in the impermeable soils than in the permeable soils. The distribution of results for each lithologic class is displayed graphically in Appendix F4. The significant differences were found for barium (Figure F4-5), chromium (Figure F4-9), cobalt (Figure F4-10), magnesium (Figure F4-14), and nickel (Figure F4-17).

Table 4-2. Results for Wilcoxon Rank-Sum Tests for Differences between Soil Depth Layers

Analyte	0 to 1 ft versus >1 ft	1 to 3 ft versus >3 ft
Cyanide	+	0
Aluminum	0	+
Antimony	0	0
Arsenic	-	0
Barium	0	0
Beryllium	0	0
Cadmium	0	0
Calcium	+	0
Chromium	-	0
Cobalt	-	0
Copper	-	0
Iron	-	0
Lead	+	+
Magnesium	0	0
Manganese	+	0
Mercury	+	+
Nickel	-	0
Potassium	-	0
Selenium	0	0
Silver	0	0
Sodium	0	0
Thallium	0	0
Vanadium	0	+
Zinc	-	0
Acenaphthene	0	NA
Acenaphthylene	0	NA
Anthracene	0	NA
Benzo(*a*)anthracene	+	NA
Benzo(*a*)pyrene	+	NA
Benzo(*b*)fluoranthene	+	NA
Benzo(*g,h,i*)perylene	+	NA
Benzo(*k*)fluoranthene	+	NA
Chrysene	+	NA
Dibenzo(*a,h*)anthracene	0	NA
Fluoranthene	+	NA
Fluorene	0	NA
Indeno(1,2,3-*cd*)pyrene	+	NA
Naphthalene	0	NA
Phenanthrene	+	NA
Pyrene	+	NA

\+ = Upper layer has significantly higher concentrations than lower layer at the 0.05 probability level.

\- = Lower layer has significantly higher concentrations than upper layer at the 0.05 probability level.

0 = Difference not significant at the 0.05 probability level.

NA = Not applicable.

Table 4-3. Number of Phase II Background Samples in Each Depth and Lithological Class

	Depth Class	
Lithological Class	**0 to 1 ft**	**>1 ft**
Impermeable	6	10
Permeable	9	4
No Recovery	0	0

Table 4-4. Results for Wilcoxon Rank-Sum Tests for Differences between Lithological Classes

Analyte	Permeable versus Impermeable in 0 to 1 ft	Permeable versus Impermeable in >1 ft
Cyanide	0	0
Aluminum	0	0
Antimony	0	0
Arsenic	0	0
Barium	0	+
Beryllium	0	0
Cadmium	0	0
Calcium	0	0
Chromium	0	+
Cobalt	0	+
Copper	0	0
Iron	0	0
Lead	0	0
Magnesium	0	+
Manganese	0	0
Mercury	0	0
Nickel	0	+
Potassium	0	0
Selenium	0	0
Silver	0	0
Sodium	0	0
Thallium	0	0
Vanadium	0	0
Zinc	0	0

+ = Significant difference at the 0.05 probability level.
0 = Difference not significant at the 0.05 probability level.

These tests indicate that lithology may be correlated with the concentrations of some metals. Aggregating the background data by both depth and lithology, however, would result in two groups, surface impermeable soils and subsurface permeable soils, with only five or six samples each (Table 4-3). Such a small sample size would result in poor estimates of the population statistics for those groups. Thus, for practical reasons, background statistics were estimated using only the depth rather than the lithologic aggregations.

Surface Soil Analysis. Samples were grouped as surface or subsurface and each group was examined for outliers. For surface soils the quartile method identified outliers for the following samples:

- BKGss-011(b)-0794-SO was an outlier for beryllium, lead, and magnesium. It also had 2-methylnaphthalene and PAH detects.

- BKGss-012(b)-0795-SO was an outlier for beryllium and magnesium. It also had 2-methylnaphthalene and PAH detects.

- BKGss-015(b)-0798-SO was an outlier for antimony, beryllium, cyanide and magnesium. It had PAH detects.

- BKGss-005(b)-0788-SO was an outlier for cyanide and had PAH detects.

- BKGss-007(b)-0790-SO had an outlier for selenium. It had no other outlier results and no SVOC detects.

All results for samples BKGss-011(b)-0794-SO, BKGss-012(b)-0795-SO, BKGss-015(b)-0798-SO, and BKGss-005(b)-0788-SO were removed because outliers for multiple analytes would suggest a potential problem with the entire sample. PAHs, in addition to metals, were elevated in these four samples. PAHs are related to combustion products and so could indicate human disturbance at the locations where they were detected. Visits to the sampling locations and review of aerial photography from before the plant activities started indicate that these sampling locations were near homes or farms and could have been influenced by activities associated with those structures.

The selenium result for sample BKGss-007(b)-0790-SO was not removed because the concentration of the other analytes did not indicate that there was a problem with the whole sample and the selenium result was relatively low, less than two times the detection limit (Figure F3-19).

The surface soil background criteria for each analyte was calculated after removing outliers according to the protocol above **(Table 4-5)**. Because the only detects for antimony (Figure F3-4) and beryllium (Figure F3-6) in surface soil were included in the outlier samples, the subsurface background criteria for antimony and beryllium were used for surface soils as well.

Subsurface Soil Analysis. For subsurface soils the quartile method identified outliers for the following samples:

- BKGso-012(b)-0829-SO (zinc outlier).
- BKGso-015(b)-0834-SO (antimony, lead, manganese, and nickel outliers).
- BKGso-014(b)-0832-SO (barium outlier).
- BKGso-017(b)-0826-SO (lead outlier).
- BKGso-017(b)-0925-SO (calcium outlier).
- BKGso-017(b)-0827-SO (calcium and magnesium outliers).
- BKGso-017(b)-0826-SO (calcium outlier).
- BKGso-014(b)-0833-SO (calcium and magnesium outlier).
- BKGso-021(b)-0823-SO (calcium and magnesium outlier).
- BKGso-019(b)-0808-SO (selenium outlier).
- BKGso-019(b)-0809-SO (selenium and thallium outliers).
- BKGso-020(b)-0810-SO (selenium outlier).
- BKGso-021(b)-0822-SO (selenium and thallium outliers).
- BKGso-021(b)-0823-SO (selenium outlier).
- BKGso-004(b)-0812-SO (thallium outlier).

Table 4-5. Surface Soil (0 to 1 ft) Background Criteria

Analyte	Results > Detection Limit[a]	Minimum Detect	Maximum Detect	Average Result[b]	Std. Dev.	Distr.[c]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[d,e]
Metals (mg/kg)									
Aluminum	11/ 11	4920.00	17700.00	1070.00	4914.00	N	22100.00	17700.00	17700.00
Antimony	0/ 11			0.32	6.21	O		0.78	0.96[e]
Arsenic	11/ 11	7.00	15.40	10.50	3.72	L	20.20	15.40	15.40
Barium	11/ 11	47.90	88.40	65.20	1202.00	L	112.00	88.40	88.40
Beryllium	0/ 11			0.25	0.54	O		0.82	0.88[e]
Cadmium	0/ 11			0.32	74.8	O		0.78	0.00
Calcium	11/ 11	238.00	15800.00	4300.00	18276.00	L	97300.00	15800.00	15800.00
Chromium	11/ 11	6.30	17.40	12.10	18.1	N	24.20	17.40	17.40
Cobalt	11/ 11	4.10	10.40	7.53	2.07	N	14.20	10.40	10.40
Copper	11/ 11	9.10	17.70	11.50	1980.00	X		17.70	17.70
Cyanide	0/ 11			0.32	0.15	O		0.78	0.00
Iron	11/ 11	10000.00	23100.00	17200.00	5336.00	N	27600.00	23100.00	23100.00
Lead	11/ 11	12.80	26.10	18.40	373.6	L	32.80	26.10	26.10
Magnesium	11/ 11	1140.00	3030.00	1970.00	2287.00	L	4410.00	3030.00	3030.00
Manganese	11/ 11	147.00	1450.00	638.00	499.9	L	3050.00	1450.00	1450.00
Mercury	7/ 11	0.03	0.04	0.04	0.15	X		0.16	0.04
Nickel	10/ 11	9.00	21.10	13.60	14.85	L	29.40	21.10	21.10
Potassium	11/ 11	303.00	927.00	621.00	518.3	N	1120.00	927.00	927.00
Selenium	2/ 11	0.69	1.40	0.45	0.69	D		1.40	1.40
Silver	0/ 11			0.65	2.92	O		1.60	0.00
Sodium	1/ 11	123.00	123.00	42.80	195.7	D		123.00	123.00
Thallium	0/ 11			0.32	0.54	O		0.78	0.00
Vanadium	11/ 11	9.10	31.10	19.00	4.98	N	40.80	31.10	31.10
Zinc	11/ 11	38.40	61.80	51.20	2066.00	N	74.80	61.80	61.80
Organics (mg/kg)									
Total organic carbon	11/ 11	7000.00	24000.00	14400.00		L	41700.00	24000.00	NA
SVOCs (µg/kg)									
Benzo(*a*)anthracene	6/ 11	44.00	110.00	142.00	250.00	X		520.00	NA
Benzo(*a*)pyrene	4/ 11	58.00	100.00	167.00	193.00	D		520.00	NA
Benzo(*b*)fluoranthene	6/ 11	62.00	140.00	159.00	275.00	N	351.00	520.00	NA
Benzo(*g,h,i*)perylene	2/ 11	46.00	51.00	185.00	74.9	D		520.00	NA
Benzo(*k*)fluoranthene	2/ 11	53.00	54.00	186.00	106.00	D		520.00	NA
Bis(2-ethylhexyl)phthalate	1/ 11	47.00	47.00	198.00	63.0	D		520.00	NA
Chrysene	6/ 11	57.00	120.00	147.00	248.00	N	369.00	520.00	NA
Fluoranthene	6/ 11	53.00	290.00	179.00	801.00	N	409.00	520.00	NA
Indeno(1,2,3-*cd*)pyrene	1/ 11	54.00	54.00	198.00	91.7	D		520.00	NA

Table 4-5. Surface Soil (0 to 1 ft) Background Criteria (continued)

Analyte	Results > Detection Limit[a]	Minimum Detect	Maximum Detect	Average Result[b]	Std. Dev.	Distr.[c]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[d,e]
Phenanthrene	2/ 11	110.00	150.00	197.00	661.00	D		520.00	NA
Pyrene	6/ 11	48.00	230.00	169.00	577.00	L	2390.00	520.00	NA

[a]Results for 4 samples with outlier results were excluded [(BKGSs-011(b)-0794-SO, BKGss-012(b)-0795-SO, BKGss-015(b)-0798-SO, and BKGss-005(b)-0788-SO)]
[b]Results less than the detection limit were set to one-half the reported detection limit.
[c]Distribution codes: L = Distribution most similar to lognormal.
N = Distribution significantly different from normal.
X = Distribution significantly different from normal and lognormal.
D = Non-parametric distribution – frequency of detection <50%.
0 = Zero detects – background criteria are set to zero (except for antimony and beryllium [see footnote e]).
[d]If 95% UTL > max. detect then background criteria = max. detect.
[e]Subsurface antimony and beryllium background used
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria was set to zero if there were no detects.
NA – not applicable. Background criteria were established for metals only.

None of the subsurface soil outliers were excluded from the analyses. The antimony outlier was less than 1 mg/kg, which was less than two times the detection limit (Figure F3-3). The lead outliers were less than concentrations observed at the surface (Figure F3-13). The barium outlier (Figure F3-5) was not more than two times the mean, and the nickel (Figure F3-17) and manganese (Figure F3-15) outliers were in the deepest samples only. These deep samples would be least likely to have a human disturbance.

The calcium (Figure F3-8) and magnesium (Figure F3-14) outliers for subsurface soils probably represent mineral variability rather than disturbed samples. Five samples were outliers for calcium, and three of these were outliers for magnesium as well. High calcium and magnesium would be consistent with the presence of a dolomitic mineral. The five calcium outliers in the subsurface soil all had lower concentrations than the maximum observed in the surface soil. For these reasons the outliers were included in the background criteria.

Five outliers were identified for selenium (Figure F3-19). All were less than 1.5 mg/kg. Only 8 of the 28 selenium results for subsurface samples were detects. For analytes with few detects, the result variability is artificially low because most of the results have been reported as the detection limit. In these cases most or all of the detects will be identified as outliers if the nondetects are included in the analysis. All selenium outliers were retained.

For thallium (Figure F3-22), 3 out of 28 samples were detects and all were outliers. For the same reasons as for selenium, the thallium outliers were not excluded from the analysis.

The zinc (Figure F3-24) outlier was not excluded because it was only 10 percent higher than the next largest sample.

The subsurface soil background criterion for each analyte was calculated according to the protocol above with no outliers removed **(Table 4-6)**.

Sediment and Surface Water

Seven stream locations upstream of RVAAP activities were sampled for sediment and surface water to characterize background conditions **(Figure 2-2)**. The quartile approach was used to screen each medium for outliers. Potassium and zinc were identified as outliers in both surface water and sediment at station BKGsw-001. The presence of elevated zinc and potassium in both the water and sediment at station BKGsw-001 indicates that these measurements represent the actual site conditions and are not spurious analyses. Station BKGsw-001 was the largest stream sampled (i.e., furthest upstream within the watershed) and these elevated concentrations presumably reflect the mineralogy and activities in the watershed. There was no reason to suspect that the elevated concentrations were caused by RVAAP activities so these samples were included in the background analyses.

No other outliers were identified for the metals concentrations. The only SVOCs detected in sediments were low levels of PAHs in samples from stations BKGsd-001, -002, -003, and -005 (Appendix F1, pages F-32 to F-46). Three VOCs (acetone, chloromethane, and toluene) were detected in the sediment sample from station BKGsd-007. These levels of organics are not high enough to justify removing samples because of man-made contamination. Background criteria were calculated for sediment **(Table 4-7)** and surface water **(Table 4-8)** according to the procedure described above. In all cases the maximum detection was less than the 95 percent UTL, so the maximum detection was used as the background criterion.

Eleven metals were detected in the samples from the background surface water stations. Five of these, aluminum, calcium, potassium, magnesium, and sodium, are relatively abundant elements that do not have applicable Ohio Water Quality Standards. Four metals, arsenic, barium, copper, and zinc, had background criteria that fell below the Ohio Water Quality Standards for protection of aquatic life (Mahoning River Basin

Table 4-6. Subsurface Soil (>1 ft) Background Criteria

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (mg/kg)									
Aluminum	27/ 27	1380.00	19500.00	11600.00	2862.00	N	22900.00	19500.00	19500.00
Antimony	8/ 27	0.27	0.96	0.34	0.42	D		0.96	0.96
Arsenic	27/ 27	3.50	19.80	12.10	2.86	N	21.40	19.80	19.80
Barium	27/ 27	10.70	134.00	58.60	90.62	N	124.00	134.00	124.00
Beryllium	12/ 27	0.26	0.88	0.37	0.25	D		0.88	0.88
Cadmium	0/ 27			0.29	2.23	O		0.62	0.00
Calcium	22/ 27	416.00	35500.00	4880.00	5325.00	L	44800.00	35500.00	35500.00
Chromium	27/ 27	4.10	27.20	16.90	3.92	N	31.30	27.20	27.20
Cobalt	27/ 27	2.30	23.20	9.94	3.96	L	31.00	23.20	23.20
Copper	27/ 27	2.90	32.30	19.50	8.16	N	34.10	32.30	32.30
Cyanide	0/ 27			0.29	0.01	O		0.62	0.00
Iron	27/ 27	3690.00	35200.00	23200.00	5561.00	N	39900.00	35200.00	35200.00
Lead	27/ 27	2.50	19.10	11.60	17.31	X		19.10	19.10
Magnesium	27/ 27	216.00	8790.00	3350.00	1344.00	X		8790.00	8790.00
Manganese	27/ 27	107.00	3030.00	400.00	584.00	X		3030.00	3030.00
Mercury	4/ 27	0.03	0.04	0.04	0.02	D		0.12	0.04
Nickel	27/ 27	3.80	60.70	23.60	8.30	L	76.10	60.70	60.70
Potassium	27/ 27	333.00	3560.00	1520.00	664.9	N	3350.00	3560.00	3350.00
Selenium	8/ 27	0.61	1.50	0.49	0.15	D		1.50	1.50
Silver	0/ 27			0.58	0.16	O		1.20	0.00
Sodium	7/ 23	29.90	145.00	59.50	55.96	D		524.00	145.00
Thallium	3/ 27	0.77	0.91	0.35	0.18	D		0.91	0.91
Vanadium	27/ 27	5.20	37.60	19.70	5.38	N	37.80	37.60	37.60
Zinc	27/ 27	7.60	93.30	60.50	25.26	N	99.90	93.30	93.30
SVOCs (µg/kg)									
Fluoranthene	1/ 12	76.00	76.00	188.00	339.35	D		410.00	NA
Pyrene	1/ 12	60.00	60.00	186.00	245.49	D		410.00	NA
VOCs (µg/kg)									
Toluene	2/ 2	0.94	3.40	2.17	1.10	N	3.40	3.40	NA

[a]Results less than the detection limit were set to one-half the reported detection limit.

[b]Dist. Codes:
- L = Distribution most similar to lognormal.
- N = Distribution most similar to normal.
- X = Distribution significantly different from normal and lognormal.
- D = Non-parametric distribution – frequency of detection <50%.
- 0 = Zero detects – background criteria set to 0.00.

[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria were set to zero if there were not detects.
NA - Not applicable. Background criteria were determined for metals only.

Table 4-7. Sediment Background Criteria

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average[a] Result	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (mg/kg)									
Aluminum	7/ 7	1710.00	13900.00	6430.00	4801.00	L	75900.00	13900.00	13900.00
Antimony	0/ 7			0.48	0.18	O		1.50	0.00
Arsenic	7/ 7	3.70	19.50	9.34	5.32	L	54.40	19.50	19.50
Barium	7/ 7	15.20	123.00	62.00	46.05	N	219.00	123.00	123.00
Beryllium	2/ 7	0.15	0.38	0.24	0.12	D		0.64	0.38
Cadmium	0/ 7			0.48	0.18	O		1.50	0.00
Calcium	5/ 7	920.00	5510.00	2320.00	2118.00	L	50300.00	5510.00	5510.00
Chromium	7/ 7	2.60	18.10	8.99	6.19	L	91.50	18.10	18.10
Cobalt	7/ 7	2.10	9.10	5.61	2.84	L	34.20	9.10	9.10
Copper	7/ 7	2.50	27.60	12.40	9.27	L	198.00	27.60	27.60
Cyanide	0/ 7			0.48	0.18	O		1.50	0.00
Iron	7/ 7	5170.00	28200.00	15500.00	9329.00	L	123000.00	28200.00	28200.00
Lead	7/ 7	3.40	27.40	13.00	9.13	N	44.00	27.40	27.40
Magnesium	7/ 7	434.00	2760.00	1450.00	854.4	L	11200.00	2760.00	2760.00
Manganese	7/ 7	154.00	1950.00	694.00	636.3	L	12100.00	1950.00	1950.00
Mercury	2/ 7	0.04	0.06	0.07	0.03	D		0.28	0.06
Nickel	5/ 7	4.00	17.70	9.00	5.48	L	68.20	17.70	17.70
Potassium	7/ 7	195.00	1950.00	745.00	607.2	L	8070.00	1950.00	1950.00
Selenium	1/ 7	1.70	1.70	0.62	0.50	D		1.70	1.70
Silver	0/ 7			0.96	0.37	O		3.00	0.00
Sodium	4/ 7	22.40	112.00	56.80	34.01	L	923.00	174.00	112.00
Thallium	1/ 7	0.89	0.89	0.56	0.23	D		1.50	0.89
Vanadium	7/ 7	3.30	26.10	12.50	8.85	L	139.00	26.10	26.10
Zinc	7/ 7	16.20	532.00	123.00	183.06	L	3090.00	532.00	532.00
SVOCs (μg/kg)									
Benzo(*a*)anthracene	2/ 6	73.00	100.00	256.00	178.7	D		980.00	NA
Benzo(*b*)fluoranthene	1/ 6	120.00	120.00	303.00	150.69	D		980.00	NA
Chrysene	1/ 6	95.00	95.00	298.00	156.96	D		980.00	NA
Fluoranthene	4/ 6	47.00	190.00	194.00	144.63	L	10000.00	920.00	NA
Pyrene	3/ 6	86.00	170.00	206.00	133.89	L	7340.00	920.00	NA

Table 4-7 (continued)

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
VOCs (µg/kg)									
Acetone	1/ 3	540.00	540.00	184.00	308.16	D		540.00	NA
Chloromethane	1/ 3	3.00	3.00	5.17	1.89	D		13.00	NA
Toluene	1/ 3	1.10	1.10	2.45	1.18	D		6.50	NA

[a]Results less than the detection limit were set to one-half the reported detection limit.
[b]Dist. Codes: L = Distribution most similar to lognormal.
N = Distribution most similar to normal.
X = Distribution significantly different from normal and lognormal.
D = Non-parametric distribution – frequency of detection <50%.
0 = Zero detects – background criteria set to 0.00.
[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 samples then background criteria = max. detect.
Background criteria were set to zero if there were no detects.
NA - Not applicable. Background criteria were determined for metals only.

Table 4-8. Surface Water Background Criteria

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average[a] Result	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (µg/L)									
Aluminum	5/ 6	661.00	3370.00	1450.00	1138.00	N	5670.00	3370.00	3370.00
Antimony	0/ 7			2.50	0.0	O		5.00	0.00
Arsenic	1/ 7	3.20	3.20	2.70	0.42	D		6.80	3.20
Barium	7/ 7	12.50	47.50	28.50	10.69	N	64.90	47.50	47.50
Beryllium	0/ 7			2.00	0.0	O		4.00	0.00
Cadmium	0/ 7			2.50	0.0	O		5.00	0.00
Calcium	7/ 7	13500.00	41400.00	23100.00	10554.00	L	92700.00	41400.00	41400.00
Chromium	0/ 7			5.00	0.0	O		10.00	0.00
Cobalt	0/ 7			25.00	0.0	O		50.00	0.00
Copper	4/ 7	3.50	7.90	5.94	3.56	L	62.40	25.00	7.90
Cyanide	0/ 7			0.01	0.0	O		0.01	0.00
Iron	7/ 7	440.00	2560.00	1370.00	715.4	L	8420.00	2560.00	2560.00
Lead	0/ 7			1.50	0.0	O		3.00	0.00
Magnesium	7/ 7	3240.00	10800.00	5520.00	2704.00	L	22300.00	10800.00	10800.00
Manganese	7/ 7	33.60	391.00	153.00	125.3	L	1820.00	391.00	391.00
Mercury	0/ 7			0.10	0.0	O		0.20	0.00
Nickel	0/ 7			20.00	0.0	O		40.00	0.00
Potassium	7/ 7	519.00	3170.00	1670.00	797.7	N	4390.00	3170.00	3170.00
Selenium	0/ 7			2.50	0.0	O		5.00	0.00
Silver	0/ 7			5.00	0.0	O		10.00	0.00
Sodium	6/ 7	4770.00	21300.00	11500.00	8285.00	N	39600.00	21300.00	21300.00
Thallium	0/ 7			0.93	0.0	O		2.00	0.00
Vanadium	0/ 7			25.00	0.0	O		50.00	0.00
Zinc	4/ 7	14.60	42.00	17.40	11.73	X		42.00	42.00

[a]Results less than the detection limit were set to one-half the reported detection limit.
[b]Dist. Codes: L = Distribution most similar to lognormal.
N = Distribution most similar to normal.
X = Distribution significantly different from normal and lognormal.
D = Non-parametric distribution – frequency of detection <50%.
0 = Zero detects – background criteria set to 0.00.
[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria were set to zero if there were no detects.

criteria for 'outside mixing zone average'). Two metals had background criteria that exceeded the Ohio Water Quality Standards. The background criteria for iron, 2560 µg/L, exceeded the Mahoning River Basin criteria for 'outside mixing zone average' of 1000 µg/L. The background criteria for manganese, 391 µg/L, exceeded the Mahoning River Basin criteria for 'outside mixing zone average' of 100 µg/L. Based on the Ohio Standards, iron and manganese could pose a risk for some organisms at background concentrations for RVAAP.

Groundwater

Fourteen wells were drilled to sample groundwater from areas believed to represent background conditions (**Figure 2-2**). Seven wells were screened in shallow unconsolidated material and seven in bedrock. Three of the bedrock wells were screened in shale and four in standstone (**Table 4-9**).

Table 4-9. Screened Material for Background Wells

Well	Surface Elevation (ft)	Depth to Bedrock (ft)	Start Screen Depth (ft) bgs	End Screen Depth (ft)	Screened Zone
BKGmw-004	965.16	NA	9.17	19.17	U
BKGmw-005	1149.44	NA	8.23	18.24	U
BKGmw-006	1026.38	3.50	24.68	34.68	SS
BKGmw-008	970.40	10.00	14.67	24.71	SS
BKGmw-010	1006.29	4.00	8.92	18.93	SS
BKGmw-012	997.57	8.10	39.60	59.60	Sh
BKGmw-013	986.59	NA	15.17	25.17	U
BKGmw-015	1037.90	10.80	30.10	50.10	Sh
BKGmw-016	1098.42	NA	8.43	18.45	U
BKGmw-017	1132.80	NA	23.24	33.28	U
BKGmw-018	1043.06	3.00	14.50	24.50	SS
BKGmw-019	1108.24	NA	23.00	33.04	U
BKGmw-020	1065.00	10.00	20.50	30.50	Sh
BKGmw-021	972.16	NA	7.74	17.77	U

U = Unconsolidated SS = Sandstone bedrock Sh = Shale bedrock

The groundwater background samples were divided into four groups: (1) bedrock, unfiltered; (2) bedrock, filtered; (3) unconsolidated, unfiltered; and (4) unconsolidated, filtered. The results for each group were plotted (Appendix F5) and examined for outliers using the quartile method.

Unconsolidated Unfiltered. Sample BKGmw-004(r)-0839-GW was identified as an outlier for arsenic, lead, and selenium. The unconsolidated unfiltered samples displayed the highest concentrations and the largest variability. The high concentrations and variability in the metals results can be attributed to the suspended particulates in the samples. All of the unfiltered samples had turbidity readings greater than 5 Ntu and many were off scale. OEPA guidance calls for using filtered samples when the turbidity of the unfiltered samples is greater than 5 Ntu. The measured metals concentrations reflect the variability in sample turbidity, not the in situ water quality. Because of the high turbidity, background criteria developed from unconsolidated unfiltered water samples were not used for screening the AOC data. Summary statistics were calculated for the purposes of comparison (**Table 4-10**).

Unconsolidated Filtered. Only two results were identified as outliers for filtered samples from the unconsolidated zone wells. BKGmw-013(r)-0848-GW was an outlier for barium and BKGmw-004(r)-0839-GW was an outlier for manganese. There was no indication of any problem with these analyses so they were included in the data analysis (**Table 4-11**). A background criterion was not determined for aluminum because all of the aluminum data were rejected. The background criteria developed from the unconsolidated well samples were used for screening the WBG site data because all wells at the site were screened in the unconsolidated zone.

Bedrock Unfiltered. All of the unfiltered samples from the bedrock wells had turbidity values greater than 5 NTU. Based on OEPA guidance (memorandum from Eileen Mohr, December 7, 1998) these results were not used for screening, however, statistics are provided for comparative purposes (**Table 4-12**). BKGmw-008(r)-0843-GW had outliers for aluminum, arsenic, chromium, iron, and lead. BKGmw-010(r)-0845-GW had outliers for manganese and nickel. BKGmw-012(r)-0847-GW had outliers for sodium. There was no indication of any problem with these analyses so they were included in the statistical summary.

Bedrock Filtered. Four of the filtered bedrock samples had outlier metal concentrations. BKGmw-020(r)-0838-GW had outlier for iron. BKGmw-012(r)-0847-GW had an outlier for sodium. BKGmw-010(r)-0845-GW had outliers for manganese and nickel. There was no indication of any problem with these analyses so they were included in the statistical summary. BKGmw-015(u)-0850-GW had an outlier for cyanide. Cyanide, however, was not detected in the unfiltered sample. This means that the cyanide detected in the filtered sample must have been introduced in the sampling or analysis process. The effect of removing particulates by filtering should reduce concentrations, not increase them. Cyanide was detected in the surface soil sample taken when well BKGmw-015 was drilled. The sample was most likely contaminated by equipment or personnel during sample filtration in the field. The filtered result for cyanide for this sample was therefore excluded.

A background criterion was not determined for aluminum because all of the aluminum data were rejected. All of the site wells at the WBG were screened in the unconsolidated zone; thus, the background criteria were calculated for the bedrock well samples only for comparison purposes **(Table 4-13)**.

4.1.3 Data Aggregates

The WBG data samples were grouped into aggregates for statistical summary and comparison with the background criteria. For the background screening all WBG data from both the Phase I and Phase II studies were combined. Data across the entire WBG were used with no spatial subdivisions for sediment, surface water, and groundwater. Soil samples were grouped into surface and subsurface aggregates by the sampling depth. Surface soils were those samples taken with lower end of the sampling interval less than or equal to 0.6 m (2 ft) bgs.

4.1.4 Data Screening

Summary statistics were calculated for each medium for each aggregate. All analytes detected at least once in an aggregate were included in the screening. SRCs are those chemicals that may be present at concentrations elevated above background because of the processes and activities associated with RVAAP. A metal was considered an SRC if it was detected above the background criterion in more than 5 percent of the samples. The essential nutrients calcium, iron, magnesium, potassium, and sodium were not considered SRCs even if they exceeded that background concentration. Organic compounds were not screened against the background criteria. All organic compounds detected were considered SRCs.

Surface Soil

Fourteen explosive compounds were detected in the surface soil samples **(Table 4-14)**. All of the detected explosives were considered SRCs. Of the 24 metals detected, all had at least one detect above the background criterion. Seventeen metals were considered SRCs. The five essential nutrients were not considered SRCs. In addition, manganese and vanadium were not considered SRCs because they were detected above background in less than 5 percent of the samples. Twenty SVOCs detected were considered SRCs. Nearly all of these compounds were PAHs. The VOCs chloroform, methylene chloride, and toluene were detected at low concentrations.

Table 4-10. Summary Statistics for Unconsolidated Zone Unfiltered Groundwater in Background Wells

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (µg/L)									
Aluminum	7/ 7	5180.00	48000.00	23100.00	105088.00	N	74400.00	48000.00	48000.00
Antimony	1/ 7	4.30	4.30	2.76	0.68	D		5.00	4.30
Arsenic	7/ 7	7.90	215.00	63.20	72.60	L	1760.00	215.00	215.00
Barium	7/ 7	59.60	327.00	164.00	90.90	L	1080.00	327.00	327.00
Beryllium	0/ 7			1.45	0.69	O		4.00	0.00
Cadmium	0/ 7			2.50	0.00	O		5.00	0.00
Calcium	7/ 7	17200.00	194000.00	100000.00	58152.00	N	298000.00	194000.00	194000.00
Chromium	6/ 7	15.50	85.20	37.80	27.20	L	400.00	85.20	85.20
Cobalt	4/ 7	24.60	46.30	31.40	8.96	X		50.00	46.30
Copper	6/ 7	16.00	289.00	94.40	97.90	L	2050.00	289.00	289.00
Cyanide (mg/l)	0/ 7			0.01	0.00	O		0.01	0.00
Iron	7/ 7	10700.00	195000.00	73700.00	65818.00	L	1620000.00	195000.00	195000.00
Lead	7/ 7	8.00	183.00	53.80	61.90	L	1460.00	183.00	183.00
Magnesium	7/ 7	14000.00	58400.00	35000.00	17887.00	L	195000.00	58400.00	58400.00
Manganese	7/ 7	306.00	2860.00	1410.00	917.00	L	14700.00	2860.00	2860.00
Mercury	4/ 7	0.08	0.25	0.12	0.06	L	0.69	0.25	0.25
Nickel	6/ 7	24.40	117.00	60.60	38.48	L	445.00	117.00	117.00
Potassium	7/ 7	2290.00	7480.00	5840.00	2137.00	X		7480.00	7480.00
Selenium	1/ 7	5.70	5.70	2.96	1.21	D		5.70	5.70
Silver	0/ 7			5.00	0.00	O		10.00	0.00
Sodium	7/ 7	4710.00	44700.00	18000.00	14090.00	L	205000.00	44700.00	44700.00
Thallium	1/ 7	2.40	2.40	1.21	0.58	D		3.00	2.40
Vanadium	7/ 7	7.90	98.10	43.80	31.40	L	633.00	98.10	98.10
Zinc	5/ 7	131.00	888.00	306.00	307.00	L	4710.00	888.00	888.00

[a]Results less than the detection limit were set to one-half the reported detection limit.

[b]Dist. Codes:
- L = Distribution most similar to lognormal.
- N = Distribution most similar to normal.
- X = Distribution significantly different from normal and lognormal.
- D = Non-parametric distribution – frequency of detection <50%.
- 0 = Zero detects – background criteria set to 0.00.

[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria were set to zero if there were no detects.

Table 4-11. Summary Statistics for Unconsolidated Zone Filtered Groundwater in Background Wells

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals(µg/L)									
Antimony	0/ 7			2.50	0.00	O		5.00	0.00
Arsenic	1/ 7	11.70	11.70	4.29	3.49	D		11.70	11.70
Barium	4/ 7	13.80	82.10	27.40	24.43	L	218.00	82.10	82.10
Beryllium	0/ 7			2.00	0.00	O		4.00	0.00
Cadmium	0/ 7			2.50	0.00	O		5.00	0.00
Calcium	7/ 7	15200.00	115000.00	78300.00	40269.00	N	215000.00	115000.00	115000.00
Chromium	1/ 7	7.30	7.30	5.33	0.87	D		10.00	7.30
Cobalt	0/ 7			25.00	0.00	O		50.00	0.00
Copper	0/ 4			10.10	4.90	O		25.00	0.00
Cyanide (mg/L)	0/ 7			0.01	0.00	O		0.01	0.00
Iron	3/ 7	208.00	279.00	136.00	113.70	D		279.00	279.00
Lead	0/ 7			1.50	0.0	O		3.00	0.00
Magnesium	7/ 7	4900.00	43300.00	24500.00	15180.00	N	76100.00	43300.00	43300.00
Manganese	6/ 7	273.00	1020.00	414.00	308.50	N	1460.00	1020.00	1020.00
Mercury	0/ 7			0.10	0.00	O		0.20	0.00
Nickel	0/ 7			20.00	0.00	O		40.00	0.00
Potassium	7/ 7	726.00	2890.00	1640.00	213.60	L	7000.00	2890.00	2890.00
Selenium	0/ 7			2.50	0.00	O		5.00	0.00
Silver	0/ 7			5.00	0.00	O		10.00	0.00
Sodium	7/ 7	2530.00	45700.00	17000.00	14794.00	L	305000.00	45700.00	45700.00
Thallium	0/ 7			0.86	0.23	O		2.00	0.00
Vanadium	0/ 7			25.00	0.00	O		50.00	0.00
Zinc	2/ 7	41.40	60.90	26.20	19.12	D		60.90	60.90
VOCs (µg/L)									
Chloroform	1/ 2	0.74	0.74	1.62	1.24	N	0.74	5.00	NA

[a]Results less than the detection limit were set to one-half the reported detection limit.
[b]Dist. Codes:
L = Distribution most similar to lognormal.
N = Distribution most similar to normal.
X = Distribution significantly different from normal and lognormal.
D = Non-parametric distribution – frequency of detection <50%.
0 = Zero detects – background criteria set to 0.00.
[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria was set to zero if there were no detects.
NA - Not applicable. Background criteria were determined for metals only.

Table 4-12. Summary Statistics for Bedrock Zone Unfiltered Groundwater in Background Wells

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Dist.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (µg/L)									
Aluminum	7/ 7	1100.00	9410.00	3370.00	2824.00	L	28400.00	9410.00	9410.00
Antimony	0/ 7			2.50	0.00	O		5.00	0.00
Arsenic	1/ 7	19.10	19.10	4.81	6.31	D		19.10	19.10
Barium	5/ 7	35.10	241.00	98.00	94.50	L	2580.00	241.00	241.00
Beryllium	0/ 7			1.78	0.59	O		4.00	0.00
Cadmium	0/ 7			2.50	0.00	O		5.00	0.00
Calcium	7/ 7	12600.00	48200.00	31900.00	12887.00	N	75700.00	48200.00	48200.00
Chromium	2/ 7	7.90	19.50	7.49	5.41	D		19.50	19.50
Cobalt	0/ 7			25.00	0.00	O		50.00	0.00
Copper	4/ 7	7.50	17.00	8.75	5.62	L	40.30	17.00	17.00
Cyanide (mg/L)	0/ 7			0.01	0.00	O		0.01	0.00
Iron	7/ 7	2150.00	21500.00	6730.00	6697.00	L	65200.00	21500.00	21500.00
Lead	4/ 7	2.20	23.00	5.97	7.84	L	72.60	23.00	23.00
Magnesium	7/ 7	3930.00	13700.00	11000.00	3385.00	X		13700.00	13700.00
Manganese	7/ 7	51.00	1260.00	372.00	424.00	L	8850.00	1260.00	1260.00
Mercury	0/ 7			0.10	0.00	O		0.20	0.00
Nickel	3/ 7	22.40	85.30	30.20	24.35	D		85.30	85.30
Potassium	7/ 7	1230.00	6060.00	3070.00	1723.00	L	20200.00	6060.00	6060.00
Selenium	0/ 7			2.50	0.00	O		5.00	0.00
Silver	0/ 7			5.00	0.00	O		10.00	0.00
Sodium	6/ 7	4850.00	49700.00	15700.00	15940.00	L	232000.00	49700.00	49700.00
Thallium	0/ 7			0.89	0.20	O		2.00	0.00
Vanadium	2/ 7	7.70	15.50	21.20	6.92	D		50.00	15.50
Zinc	2/ 7	72.80	193.00	63.50	60.02	D		193.00	193.00

[a]Results less than the detection limit were set to one-half the reported detection limit.
[b]Dist. Codes:
L = Distribution most similar to lognormal.
N = Distribution most similar to normal.
X = Distribution significantly different from normal and lognormal.
D = Non-parametric distribution – frequency of detection <50%.
0 = Zero detects – background criteria set to 0.00.
[c]If the 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria was not set to zero if there were no detects.

Table 4-13. Summary Statistics for Bedrock Zone Filtered Groundwater in Background Wells

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Std. Dev.[a]	Distr.[b]	Parametric 95% UTL	Nonparametric 95% UTL	Background Criteria[c]
Metals (µg/L)									
Antimony	0/ 7			2.50	0.00	O		5.00	0.00
Arsenic	0/ 7			2.50	0.00	O		5.00	0.00
Barium	5/ 7	5.80	256.00	80.20	100.00	L	6560.00	256.00	256.00
Beryllium	0/ 7			2.00	0.00	O		4.00	0.00
Cadmium	0/ 7			2.50	0.00	O		5.00	0.00
Calcium	7/ 7	12700.00	53100.00	33500.00	14531.00	N	82900.00	53100.00	53100.00
Chromium	0/ 7			5.00	0.00	O		10.00	0.00
Cobalt	0/ 7			25.00	0.00	O		50.00	0.00
Copper	0/ 5			12.50	0.00	O		25.00	0.00
Cyanide (mg/L)	0/ 6			0.01	0.00	O		0.01	0.00
Iron	2/ 7	152.00	1430.00	261.00	517.00	D		1430.00	1430.00
Lead	0/ 7			1.50	0.00	O		3.00	0.00
Magnesium	7/ 7	3630.00	15000.00	11100.00	4303.00	N	25800.00	15000.00	15000.00
Manganese	6/ 7	21.20	1340.00	293.00	490.00	L	34100.00	1340.00	1340.00
Mercury	0/ 7			0.10	0.00	O		0.20	0.00
Nickel	1/ 7	83.40	83.40	29.10	24.00	D		83.40	83.40
Potassium	7/ 7	609.00	5770.00	2350.00	1932.00	L	32800.00	5770.00	5770.00
Selenium	0/ 7			2.50	0.00	O		5.00	0.00
Silver	0/ 7			5.00	0.00	O		10.00	0.00
Sodium	6/ 7	4480.00	51400.00	15500.00	16861.00	L	359000.00	51400.00	51400.00
Thallium	0/ 7			0.94	0.17	O		2.00	0.00
Vanadium	0/ 7			25.00	0.00	O		50.00	0.00
Zinc	2/ 7	46.80	52.30	31.20	15.22	D		74.70	52.30

[a]Results less than the detection limit were set to one-half the reported detection limit.

[b]Dist. Codes:
- L = Distribution most similar to lognormal.
- N = Distribution most similar to normal.
- X = Distribution significantly different from normal and lognormal.
- D = Non-parametric distribution – frequency of detection <50%.
- 0 = Zero detects – background criteria set to 0.00.

[c]If 95% UTL >max. detect then background criteria = max. detect.
If distribution determined not normal or lognormal or fewer than 3 results then background criteria = max. detect.
Background criteria was set to zero if there were no detects.

Table 4-14. Determination of SRCs in Surface Soils

Analyte	Result > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detect > Site Background Criteria	SRC?
Explosives (mg/kg)							
1,3,5-Trinitrobenzene	15/ 99	0.055	490	6.28			Yes
1,3-Dinitrobenzene	1/ 99	0.084	0.084	0.65			Yes
2,4,6-Trinitrotoluene	29/ 99	0.03	3800	79.50			Yes
2,4-Dinitrotoluene	8/ 99	0.065	0.55	0.20			Yes
2,6-Dinitrotoluene	3/ 99	0.075	0.62	0.20			Yes
2-Nitrotoluene	3/ 99	0.074	0.17	0.65			Yes
3-Nitrotoluene	3/ 99	0.091	21	0.55			Yes
4-Nitrotoluene	2/ 99	0.13	0.19	0.65			Yes
HMX	14/ 99	0.11	1700	19.60			Yes
Nitrobenzene	2/ 99	0.035	0.054	0.66			Yes
Nitrocellulose as N	7/ 20	2.5	315	28.07			Yes
Nitroglycerin	2/ 21	5.5	12	2.03			Yes
RDX	10/ 99	0.18	9500	100.60			Yes
Tetryl	5/ 99	0.088	0.48	1.69			Yes
Metals (mg/kg)							
Aluminum	149/ 149	1410	50100	12400	17700.00	12/149	Yes
Antimony*	38/ 77	0.48	27.9	3.36	0.96	34/ 77	Yes
Arsenic	149/ 149	2.5	35.8	13.2	15.40	31/149	Yes
Barium	148/ 149	11.7	10400	384.1	88.40	69/149	Yes
Beryllium*	21/ 76	0.23	3.4	0.4205	0.88	8/ 76	Yes
Cadmium	102/ 148	0.06	877	11.26	0.0	102/148	Yes
Calcium	77/ 77	805	111000	10180	15800.00	11/ 77	No
Chromium	149/ 149	5.4	189	19.15	17.40	54/149	Yes
Cobalt	76/ 77	1.2	12.7	7.872	10.40	5/ 77	Yes
Copper	77/ 77	9.3	16800	416.5	17.70	63/ 77	Yes
Cyanide	7/ 76	0.064	1.2	0.3293	0.0	7/ 76	Yes
Iron	77/ 77	9450	39100	22440	23100.00	36/ 77	No
Lead	149/ 149	10.2	2200	168.4	26.10	76/149	Yes
Magnesium	77/ 77	1410	16700	3194	3030.00	24/ 77	No
Manganese	149/ 149	65.4	3910	559.6	1450.00	7/149	No
Mercury	77/ 149	0.025	1.2	0.07459	0.04	63/149	Yes
Nickel	77/ 77	7.4	133	20.76	21.10	25/ 77	Yes
Potassium	77/ 77	400	3050	1212	927.00	57/ 77	No
Selenium	100/ 149	0.34	5	0.8633	1.40	17/149	Yes
Silver	25/ 149	0.22	33.2	0.8942	0.0	25/149	Yes
Sodium	42/ 76	43.5	1080	128.7	123.00	23/ 76	No
Thallium	7/ 77	1.4	3.1	0.4866	0.0	7/ 77	Yes
Vanadium	77/ 77	11.2	34	20.99	31.10	3/ 77	No
Zinc	149/ 149	28.6	24900	424.2	61.80	97/149	Yes
SVOCs (mg/kg)							
2-Methylnaphthalene	3/ 14	0.047	0.15	0.16			Yes
Acenaphthene	2/ 14	0.14	0.15	0.19			Yes
Anthracene	2/ 14	0.44	0.48	0.23			Yes
Benzo(*a*)anthracene	4/ 14	0.043	1	0.27			Yes
Benzo(*a*)pyrene	4/ 14	0.06	0.8	0.25			Yes
Benzo(*b*)fluoranthene	4/ 14	0.093	1.1	0.29			Yes
Benzo(*g,h,i*)perylene	3/ 14	0.11	0.39	0.20			Yes
Benzo(*k*)fluoranthene	3/ 14	0.091	0.5	0.22			Yes

Table 4-14 (continued)

Analyte	Result > Detection Limit	Minimum Detect	Maximum Detect	Average Result	Site Background Criteria	Detect > Site Background Criteria	SRC?
Bis(2-ethylhexyl)phthalate	1/ 14	0.034	0.034	0.19			Yes
Carbazole	2/ 14	0.2	0.27	0.20			Yes
Chrysene	4/ 14	0.05	1	0.27			Yes
Di-*n*-butyl Phthalate	1/ 14	0.053	0.053	0.19			Yes
Dibenzo(*a,h*)anthracene	2/ 14	0.054	0.11	0.18			Yes
Dibenzofuran	2/ 14	0.11	0.16	0.19			Yes
Fluoranthene	5/ 14	0.04	2.7	0.50			Yes
Fluorene	2/ 14	0.18	0.24	0.20			Yes
Indeno(1,2,3-*cd*)pyrene	3/ 14	0.13	0.48	0.21			Yes
Naphthalene	1/ 14	0.076	0.076	0.18			Yes
Phenanthrene	5/ 14	0.07	2.4	0.41			Yes
Pyrene	5/ 14	0.036	2.1	0.40			Yes
VOCs (mg/kg)							
Chloroform	1/ 10	0.002	0.002	0.00			Yes
Methylene chloride	1/ 10	0.012	0.012	0.00			Yes
Toluene	8/ 10	0.00079	0.17	0.03			Yes

*Subsurface criteria used.
[a]Nondetects were set to one-half the reporting limit to calculate the average. In cases when detects were estimated below the reporting limit but above the method detection limit, the average may be larger than the maximum detect.

Subsurface Soil

The same fourteen explosive compounds that were detected in the surface soil samples were considered SRCs in the subsurface soils **(Table 4-15)**. Only eight metals were considered SRCs in the subsurface soils: antimony, barium, cadmium, copper, lead, mercury, silver, and zinc. Fewer organic compounds were detected in the subsurface soils: 14 SVOCs and 2 VOCs.

Table 4-15. Determination of SRCs in Subsurface Soils

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detects > Site Background Criteria	SRC?
Explosives (mg/kg)							
1,3,5-Trinitrobenzene	17/ 31	0.03	6.90	0.53			Yes
1,3-Dinitrobenzene	1/ 31	0.26	0.26	0.40			Yes
2,4,6-Trinitrotoluene	20/ 31	0.04	27.00	3.06			Yes
2,4-Dinitrotoluene	8/ 31	0.03	0.11	0.11			Yes
2,6-Dinitrotoluene	3/ 31	0.07	0.22	0.13			Yes
2-Nitrotoluene	2/ 31	0.08	4.80	0.39			Yes
3-Nitrotoluene	4/ 31	0.07	0.12	0.43			Yes
4-Nitrotoluene	3/ 31	0.08	0.11	0.43			Yes
HMX	18/ 31	0.10	14.00	0.93			Yes
Nitrobenzene	4/ 31	0.03	0.36	0.40			Yes
Nitrocellulose as N	3/ 6	3.20	88.40	16.87			Yes
Nitroglycerin	1/ 31	7.40	7.40	1.45			Yes
RDX	13/ 31	0.14	82.00	3.96			Yes
Tetryl	7/ 31	0.05	0.24	1.09			Yes
Metals (mg/kg)							
Aluminum	31/ 31	6330.00	17500.00	12480.00	19500.00	0/ 31	No
Antimony	13/ 31	0.34	2.40	0.50	0.96	3/ 31	Yes

Table 4-15 (continued)

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detects > Site Background Criteria	SRC?
Arsenic	31/ 31	5.80	20.50	13.69	19.80	1/ 31	No
Barium	31/ 31	31.10	400.00	115.60	124.00	8/ 31	Yes
Beryllium	10/ 31	0.23	1.30	0.36	0.88	1/ 31	No
Cadmium	4/ 31	0.62	11.90	0.92	0.0	4/ 31	Yes
Calcium	30/ 31	333.00	20500.00	3853.00	35500.00	0/ 31	No
Chromium	31/ 31	9.40	23.30	16.74	27.20	0/ 31	No
Cobalt	31/ 31	5.40	25.40	10.68	23.20	1/ 31	No
Copper	31/ 31	8.30	46.90	21.52	32.30	2/ 31	Yes
Iron	31/ 31	13300.00	37100.00	24640.00	35200.00	2/ 31	No
Lead	31/ 31	9.90	105.00	20.16	19.10	9/ 31	Yes
Magnesium	31/ 31	1430.00	6520.00	3200.00	8790.00	0/ 31	No
Manganese	31/ 31	211.00	3470.00	545.60	3030.00	1/ 31	No
Mercury	5/ 31	0.03	0.07	0.04	0.04	2/ 31	Yes
Nickel	31/ 31	11.40	46.80	22.23	60.70	0/ 31	No
Potassium	31/ 31	725.00	3490.00	1515.00	3350.00	1/ 31	No
Selenium	2/ 31	0.81	0.98	0.34	1.50	0/ 31	No
Silver	1/ 31	1.50	1.50	0.64	0.0	1/ 31	Yes
Sodium	12/ 24	18.90	227.00	71.84	145.00	4/ 24	No
Thallium	3/ 31	0.76	1.10	0.36	0.91	1/ 31	No
Vanadium	31/ 31	11.70	40.50	21.90	37.60	1/ 31	No
Zinc	31/ 31	37.60	184.00	72.68	93.30	3/ 31	Yes
SVOCs (mg/kg)							
2-Methylnaphthalene	1/ 9	0.06	0.06	0.18			Yes
Anthracene	1/ 9	0.10	0.10	0.19			Yes
Benzo(*a*)anthracene	2/ 9	0.05	0.48	0.21			Yes
Benzo(*a*)pyrene	2/ 9	0.06	0.50	0.22			Yes
Benzo(*b*)fluoranthene	2/ 9	0.08	0.70	0.24			Yes
Benzo(*g,h,i*)perylene	1/ 9	0.31	0.31	0.21			Yes
Benzo(*k*)fluoranthene	1/ 9	0.29	0.29	0.21			Yes
Carbazole	1/ 9	0.09	0.09	0.19			Yes
Chrysene	2/ 9	0.06	0.56	0.22			Yes
Dibenzo(*a,h*)anthracene	1/ 9	0.08	0.08	0.18			Yes
Fluoranthene	2/ 9	0.11	1.20	0.30			Yes
Indeno(1,2,3-*cd*)pyrene	1/ 9	0.37	0.37	0.22			Yes
Phenanthrene	2/ 9	0.09	0.53	0.22			Yes
Pyrene	2/ 9	0.08	0.91	0.26			Yes
VOCs (mg/kg)							
Acetone	1/ 5	0.05	0.05	0.02			Yes
Toluene	4/ 5	0.00	0.00	0.00			Yes

[a]Nondetects were set to one-half the reporting limit to calculate the average. In cases when detects were estimated below the reporting limit but above the method detection limit, the average may be larger than the maximum detect.

Sediment

Six explosive compounds were detected in the sediment samples **(Table 4-16)**. Fourteen of the 23 metals detected were considered SRCs. The list of metal SRCs in sediment matches the list in the surface soil except for vanadium, which is an SRC in sediment but not surface soil, and arsenic, selenium, silver, and zinc, which are SRCs in surface soil but not sediment. Eleven PAH compounds were detected in the sediment and three VOCs.

Table 4-16. Determination of SRCs in Sediment

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detects > Site Background Criteria	SRC?
Explosives (mg/kg)							
1,3,5-Trinitrobenzene	4/ 17	0.07	0.15	0.12			Yes
1,3-Dinitrobenzene	1/ 17	0.04	0.04	0.12			Yes
2,4,6-Trinitrotoluene	4/ 17	0.09	0.97	0.20			Yes
2,4-Dinitrotoluene	1/ 17	0.04	0.04	0.12			Yes
HMX	1/ 17	0.12	0.12	0.82			Yes
Nitrobenzene	1/ 17	0.07	0.07	0.13			Yes
Metals (mg/kg)							
Aluminum	17/ 17	4740.00	17900.00	10880.00	13900.00	5/ 17	Yes
Antimony	1/ 6	0.32	0.32	0.45	0.0	1/ 6	Yes
Arsenic	17/ 17	7.70	18.10	12.29	19.50	0/ 17	No
Barium	17/ 17	36.80	528.00	132.60	123.00	6/ 17	Yes
Beryllium	2/ 6	0.45	0.60	0.33	0.38	2/ 6	Yes
Cadmium	6/ 17	0.06	0.56	0.22	0.0	6/ 17	Yes
Calcium	6/ 6	975.00	3910.00	1760.00	5510.00	0/ 6	No
Chromium	17/ 17	7.20	21.30	13.05	18.10	1/ 17	Yes
Cobalt	6/ 6	5.70	10.40	7.95	9.10	1/ 6	Yes
Copper	6/ 6	7.80	49.10	19.65	27.60	1/ 6	Yes
Cyanide	1/ 6	0.11	0.11	0.40	0.0	1/ 6	Yes
Iron	6/ 6	13900.00	24000.00	17620.00	28200.00	0/ 6	No
Lead	17/ 17	10.20	40.10	17.62	27.40	1/ 17	Yes
Magnesium	6/ 6	1180.00	3280.00	2012.00	2760.00	1/ 6	No
Manganese	17/ 17	183.00	1050.00	506.40	1950.00	0/ 17	No
Mercury	3/ 17	0.04	0.16	0.04	0.06	1/ 17	Yes
Nickel	6/ 6	10.10	28.30	17.17	17.70	2/ 6	Yes
Potassium	6/ 6	665.00	1580.00	914.70	1950.00	0/ 6	No
Selenium	6/ 17	0.37	1.70	0.45	1.70	0/ 17	No
Sodium	5/ 6	25.90	107.00	128.20	112.00	0/ 6	No
Thallium	2/ 6	1.50	1.80	0.92	0.89	2/ 6	Yes
Vanadium	6/ 6	13.00	29.20	17.30	26.10	1/ 6	Yes
Zinc	17/ 17	38.30	166.00	80.86	532.00	0/ 17	No
SVOCs (mg/kg)							
Anthracene	1/ 3	0.15	0.15	0.16			Yes
Benzo(*a*)anthracene	1/ 3	0.56	0.56	0.30			Yes
Benzo(*a*)pyrene	1/ 3	0.39	0.39	0.24			Yes
Benzo(*b*)fluoranthene	1/ 3	0.56	0.56	0.30			Yes
Benzo(*g,h,i*)perylene	1/ 3	0.13	0.13	0.15			Yes
Benzo(*k*)fluoranthene	1/ 3	0.19	0.19	0.17			Yes
Chrysene	1/ 3	0.51	0.51	0.28			Yes
Fluoranthene	1/ 3	1.50	1.50	0.61			Yes
Indeno(1,2,3-*cd*)pyrene	1/ 3	0.17	0.17	0.17			Yes
Phenanthrene	1/ 3	0.64	0.64	0.32			Yes
Pyrene	1/ 3	0.94	0.94	0.42			Yes
VOCs (mg/kg)							
Acetone	1/ 2	0.02	0.02	0.01			Yes
Chloroform	1/ 3	0.00	0.00	0.00			Yes
Toluene	1/ 3	0.03	0.03	0.01			Yes

[a]Nondetects were set to one-half the reporting limit to calculate the average. In cases when detects were estimated below the reporting limit but above the method detection limit, the average may be larger than the maximum detect.

Surface Water

Nine metals were detected in the one site surface water sample taken. None of the metal concentrations were above the background criteria **(Table 4-17)**. Acetone was detected in the sample and is considered an SRC.

Table 4-17. Determination of SRCs in Surface Water

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result	Site Background Criteria	Detects > Site Background Criteria	SRC?
Metals (μg/L)							
Barium	1/ 1	7.90	7.90	7.90	47.50	0/ 1	No
Calcium	1/ 1	5730.00	5730.00	5730.00	41400.00	0/ 1	No
Copper	1/ 1	5.50	5.50	5.50	7.90	0/ 1	No
Iron	1/ 1	867.00	867.00	867.00	2560.00	0/ 1	No
Magnesium	1/ 1	1750.00	1750.00	1750.00	10800.00	0/ 1	No
Manganese	1/ 1	103.00	103.00	103.00	391.00	0/ 1	No
Potassium	1/ 1	524.00	524.00	524.00	3170.00	0/ 1	No
Sodium	1/ 1	1450.00	1450.00	1450.00	21300.00	0/ 1	No
Zinc	1/ 1	18.40	18.40	18.40	42.00	0/ 1	No
VOCs (μg/L)							
Acetone	1/ 1	7.20	7.20	7.20			Yes

Groundwater

Six explosive compounds were detected in nine groundwater samples analyzed **(Table 4-18)**. Six metals, barium, copper, cyanide, lead, manganese, and mercury, exceeded the background criteria and were considered SRCs. The only other organics detected were bis(2-ethylhexyl)phthalate and chloroform.

Table 4-18. Determination of SRCs in Groundwater

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detects > Site Background Criteria	SRC?
Explosives (μg/L)							
1,3-Dinitrobenzene	1/ 8	0.03	0.03	0.09			Yes
2,4-Dinitrotoluene	3/ 9	0.03	0.04	0.60			Yes
3-Nitrotoluene	1/ 8	0.08	0.08	0.10			Yes
HMX	1/ 9	8.00	8.00	1.11			Yes
Nitrobenzene	1/ 8	0.06	0.06	0.09			Yes
RDX	2/ 9	1.10	32.00	3.87			Yes
Metals (μg/L)							
Barium	6/ 9	7.60	98.10	36.84	82.10	1/ 9	Yes
Calcium	9/ 9	46500.00	118000.00	73820.00	115000.00	1/ 9	No
Copper	2/ 7	3.30	9.80	10.80	0	2/ 7	Yes
Cyanide	1/ 9	19.00	19.00	6.56	0	1/ 9	Yes
Iron	1/ 9	155.00	155.00	65.09	279.00	0/ 9	No
Lead	1/ 9	3.10	3.10	1.68	0	1/ 9	Yes
Magnesium	9/ 9	10300.00	34200.00	20380.00	43300.00	0/ 9	No
Manganese	8/ 9	58.00	2920.00	549.40	1020.00	1/ 9	Yes
Mercury	1/ 9	0.08	0.08	0.10	0	1/ 9	Yes
Potassium	9/ 9	777.00	3250.00	1594.00	2890.00	1/ 9	No

Table 4-18. Determination of SRCs in Groundwater (continued)

Analyte	Results > Detection Limit	Minimum Detect	Maximum Detect	Average Result[a]	Site Background Criteria	Detects > Site Background Criteria	SRC?
Sodium	8/ 9	3060.00	35800.00	10820.00	45700.00	0/ 9	No
Zinc	1/ 9	45.60	45.60	20.66	60.90	0/ 9	No
SVOCs (µg/L)							
Bis(2-ethylhexyl)phthalate	1/ 8	4.50	4.50	4.94	NA		Yes
VOCs (µg/L)							
Chloroform	3/ 9	0.64	1.70	2.05	NA		Yes

[a]Nondetects were set to one half the reporting limit to calculate the average. In cases when detects were estimated below the reporting limit but above the method detection limit, the average may be larger than the maximum detect.
[b]Background criteria were based on unconsolidated zone filtered groundwater samples. Criteria for analytes not detected in background samples were set to zero. Only metals were compared to background.

4.2 CONTAMINANT SOURCES

Unlike many other AOCs at RVAAP, there are no major fixed, permanent, process-related sources of contaminant release at WBG. Potential contaminants were brought into the WBG from other process operations at RVAAP, as a result of their waste disposal activities. The individual burning pads and roadside ditches were used periodically to destroy bulk explosives and off-specification munitions, as well as to dispose of waste oils, explosive-contaminated sawdust from settling ponds, laboratory chemicals, and other materials. This activity was performed for four decades beginning in 1941. The pads that were most frequently used for this purpose were those on Pallet Road E (Pads # 58 through 70), and Pads # 5, 6, 37 (the OBG), and 38. The RCRA-regulated Deactivation Furnace Area at Pad #45 was commonly used for contained destruction of munitions from the 1960s to 1983 (USACE 1997c), and is the only permanent localized source of potential contamination at WBG. Only Pad #37 was used for open burning after 1980. Historical records indicate that most of the remaining pads were rarely, or perhaps never, used for thermal destruction of munitions or other wastes. Residual ash and scrap from open burning was disposed at the Landfill North of WBG and, after 1980, ash from Pad #37 was drummed and stored in Building 1601.

Chemicals released to the environment through these non-localized burning sources include heavy metals (e.g., lead, cadmium, chromium), explosives (e.g., TNT, RDX, HMX), propellants (nitroglycerine, nitrocellulose, nitroguanidine), and possibly some VOCs and SVOCs.

4.3 SURFACE AND SUBSURFACE SOILS

Surface soil samples (0 to 2 ft bgs) were collected at each of the 70 burning pads at WBG in the Phase I RI. A total of 79 discrete surface soil samples were analyzed for explosives, and 72 were analyzed for the 11 process-related metals. Seven of the samples received the full suite of analyses for TAL metals, SVOCs, and PCBs/pesticides. Ten were analyzed for VOCs, and six for cyanide (USACE 1997a). Explosives were detected in several surface soil samples, and cadmium, lead, and manganese were commonly detected above background. PAHs were identified in a few samples at low concentrations, but other organic contamination was not present. Contamination in surface soils was concentrated in four general areas: Pallet Road E, West (Pads #59 through 62), Pallet Road E, East (Pads # 64 through 70), Pallet Road D, East (Pads # 52 and 53), and Pads #37 and #38. **Figures 4-1 and 4-2** show a summary of Phases I and II analytical results for explosives and metals, respectively, in surface soil across the AOC.

In the Phase II RI of WBG, surface soil samples were collected from 0 to 1 ft bgs at the 14 pads identified in the Phase I investigation and the Deactivation Furnace Area. Initially, only three samples per burning pad were collected. These were distributed to provide both an adequate spatial distribution of samples and characterization at locations where debris, staining, or unexploded ordnance (UXO) were observed. Additional surface soil samples were collected at the burning pads on the basis of explosive field screening results from the initial samples, or additional field observations of vegetative stress, surface runoff, or soil discoloration. All surface soil samples are designated "WBGss-XXX." Phase I RI samples are identified with the series numbered from -001 through -099, while Phase II samples have series numbers higher than -099. **Figure 2-1** shows the locations of all surface soil samples collected before the Phase II RI.

Subsurface soil samples [0.6 to 1.2 m and 1.2 to 1.6 m (2 to 4 ft and 4 to 6 ft)] were collected in the Phase II RI at Phase I locations that exhibited heavy metals and/or explosives contamination in the surface soils, and at Phase II locations that tested positive for TNT or RDX in the field screening of surface soils. At a minimum, a 0.6- to 1.2-m (2- to 4-ft) sample was collected at one Phase I surface soil sampling station at each of the 14 burning pads (excluding the Deactivation Furnace Area) that are the focus of this Phase II RI, for a determination of vertical extent of contamination. Thereafter, the surface soil field screening results were used to determine the placement of additional samples. Additional 0.6- to 1.2-m (2- to 4-ft) samples were collected at locations in which the surface soil samples exhibited potential contamination with explosives as determined by field screening, or at locations that exhibited high concentrations of explosives in other studies (e.g., Pad #67). A total of 21 samples [0.6- to 1.2-m (2- to 4-ft)] were collected. In addition, a 1.2- to 1.6-m (4- to 6-ft) sample was collected at each location in which the 0.6- to 1.2-m (2- to 4-ft) sample exhibited potential explosive contamination as determined with the field screening method. Nine such samples were scoped for the Phase II. When it became clear that most of the 0.6- to 1.2- m (2- to 4-ft) samples were nondetects for field explosives, the remainder of the 1.2- to 1.6- m (4- to 6-ft) samples were assigned to the pads considered to have the highest potential for contamination. The pads for which there is at least one 1.2- to 1.6-m(4- to 6-ft) sample are Pads #59, 60, 62, 66, 67, and 68. As a result, the subsurface sampling is biased toward those burning pads that suggest the greatest surface soil contamination. **Figure 4-3** illustrates the distribution of metals in subsurface soil samples in the Phase II RI. All subsurface soil samples are designated "WBGso-XXX" to distinguish them from the surface soil sample at the same location.

Eight pads (#5, 6, 37, 38, 40, 45, 58, and 61) had no 1.2- to 1.8-m (4- to 6-ft) sampling performed, based on the logic explained in Section 2.4.2.1. TNT and RDX concentrations in the shallow subsurface samples at these pads were determined to be < 1ppm, and analytical results for contaminants generally show a downward-decreasing concentration trend. Although there are no specific chemical data from the 1.2- to 1.8-m (4- to 6-ft) interval at these pads, inferences can be drawn on the basis of soil composition and chemistry. Soils at WBG promote abiotic cation and anion exchanges that favor some natural vertical attenuation of contaminants, so their concentrations in the 1.2- to 1.8-m (4- to 6-ft) interval would be expected to be lower. This is based on site-specific knowledge of soil profiles sampled at WBG, which exhibit no highly permeable zones or zones of accumulation in the uppermost 1.8 m (6 ft).

All sample collection and analysis for the Phase II RI was conducted in accordance with the *SAP Addendum for the Phase II Remedial Investigation at Winklepeck Burning Grounds and Determination of Facility-Wide Background at RVAAP* (USACE 1998a), as described in Section 2.0 of this report. Soil samples collected in the Phase II RI were analyzed for field explosives, TAL metals, explosives, VOCs, SVOCs, and PCBs/pesticides as described in Sections 2.4.1 and 2.4.2. Triple-based propellants (i.e., nitrocellulose, nitroguanidine, and nitroglycerine), omitted from the original scope, were analyzed in 28 of the samples that tested positive for field explosives, including at least one sample from each of the 14 pads. Analytical capacity from unexpended 1.2- to 1.8-m (4- to 6-ft) sampling was used to absorb these omissions. However, because the total number of samples was fixed, not all samples could be analyzed for all three compounds. Thus, some samples were analyzed for nitroglycerine only. Field change orders provided in Appendix D document these changes to the analytical program.

Figure 4-1. Selected Explosives in Surface Soil Across WBG

Figure 4-1. Selected Explosives in Surface Soil Across WBG

Figure 4-2. Selected Metals in Surface Soil Across WBG

Figure 4-2. Selected Metals in Surface Soil Across WBG

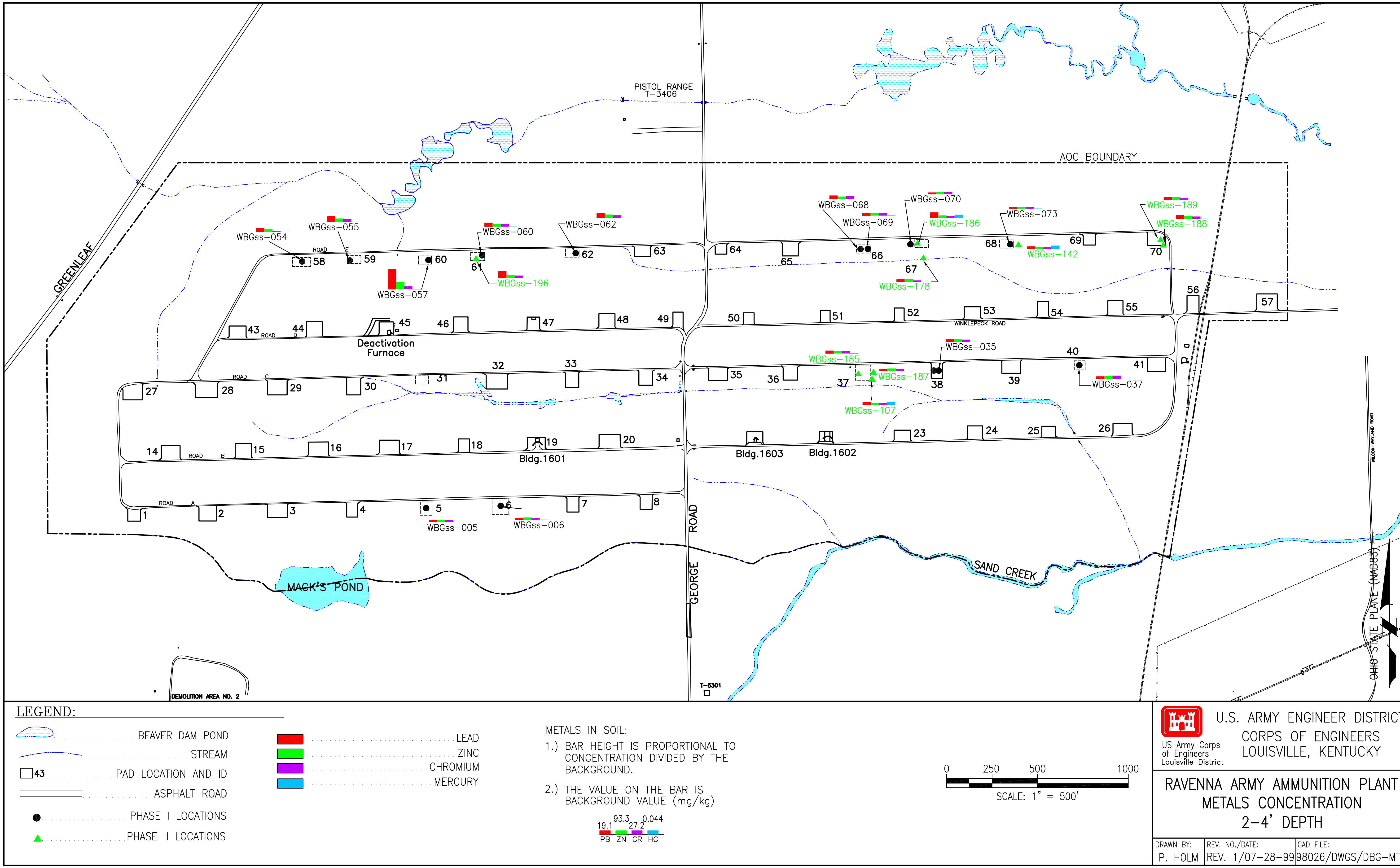

Figure 4-3. Selected Metals in Subsurface Soil (2-4') across WBG

The analytical results for soil samples collected at WBG are summarized by sample station and by analyte in **Tables 4-19a – 4-19e** and are then provided in their entirety in Appendix F. These tables also present the SRCs for soil at WBG. The following sections describe the distribution of explosives, propellants, inorganic, and organic constituents for each of the 14 pads and the Deactivation Furnace Area. For each area discussed, figures are presented (as appropriate) that illustrate the distribution of site-related explosives, propellants, and metals. The analytes presented in the figures represent those that occur with the greatest frequency at each pad, or those that represent the distribution of a suite of correlatable chemicals.

4.3.1 Pad #5

Surface Soils

Explosives or propellants were detected in two samples sent for laboratory analysis during the Phase I and II RIs. TNB, 2-nitrotoluene, and 3-nitrotoluene were each detected in sample WBGss-102. TNT was detected in sample WBGss-005. Field screening of samples WBGss-100, -101, and -102 shows negative results for TNT and RDX (**Figure 4-4**).

Eight inorganic elements including arsenic, cadmium, selenium, chromium, copper, iron, nickel, and zinc were detected at concentrations exceeding background criteria. Arsenic, cadmium, and selenium were only detected above background in surface soil from WBGss-005. Chromium, copper, iron, and nickel were detected above background in WBGss-102**.** Most of these metals occur at concentrations within a few mg/kg of the background criteria, and are relatively evenly distributed in concentration across the sample stations. **Figure 4-5** illustrates the distribution of four inorganic SRCs at Pad #5.

Samples from Pad #5 were not analyzed for organic constituents.

Subsurface Soils

A single subsurface sample was collected from the WBGso-005 location on Pad #5, at a depth of 0.6 to 1.2 m (2 to 4 ft). The sample was analyzed for explosives and metals.

Based upon non-detects for TNT and RDX in the field in the 0.6- to 1.2-m (2- to 4-ft) sample, a sample from the deeper subsurface was not collected. Laboratory analysis of the subsurface interval of WBGso-005 shows two detections of explosives: 0.034 mg/kg 1,3,5-TNB and 0.032 mg/kg TNB (see **Figure 4-4**).

Fifteen inorganic elements or compounds were detected in the 0.6- to 1.2-m (2- to 4-ft) sample; however, none were present at concentrations exceeding background criteria (see **Figure 4-5**).

Discussion

- Explosives were detected in surface soils only at low concentrations (generally less than 1 mg/kg).
- Results from adjacent surface soil samples were nondetects for explosives, indicating contamination is confined to the pad area.
- Explosives were not present above 1 mg/kg in the 0.6- to 1.2-m (2- to 4-ft) interval, indicating contamination diminishes with depth.
- Metals were detected at concentrations only slightly higher than background. Concentrations in the surface soils are slightly higher than those in the subsurface soils.

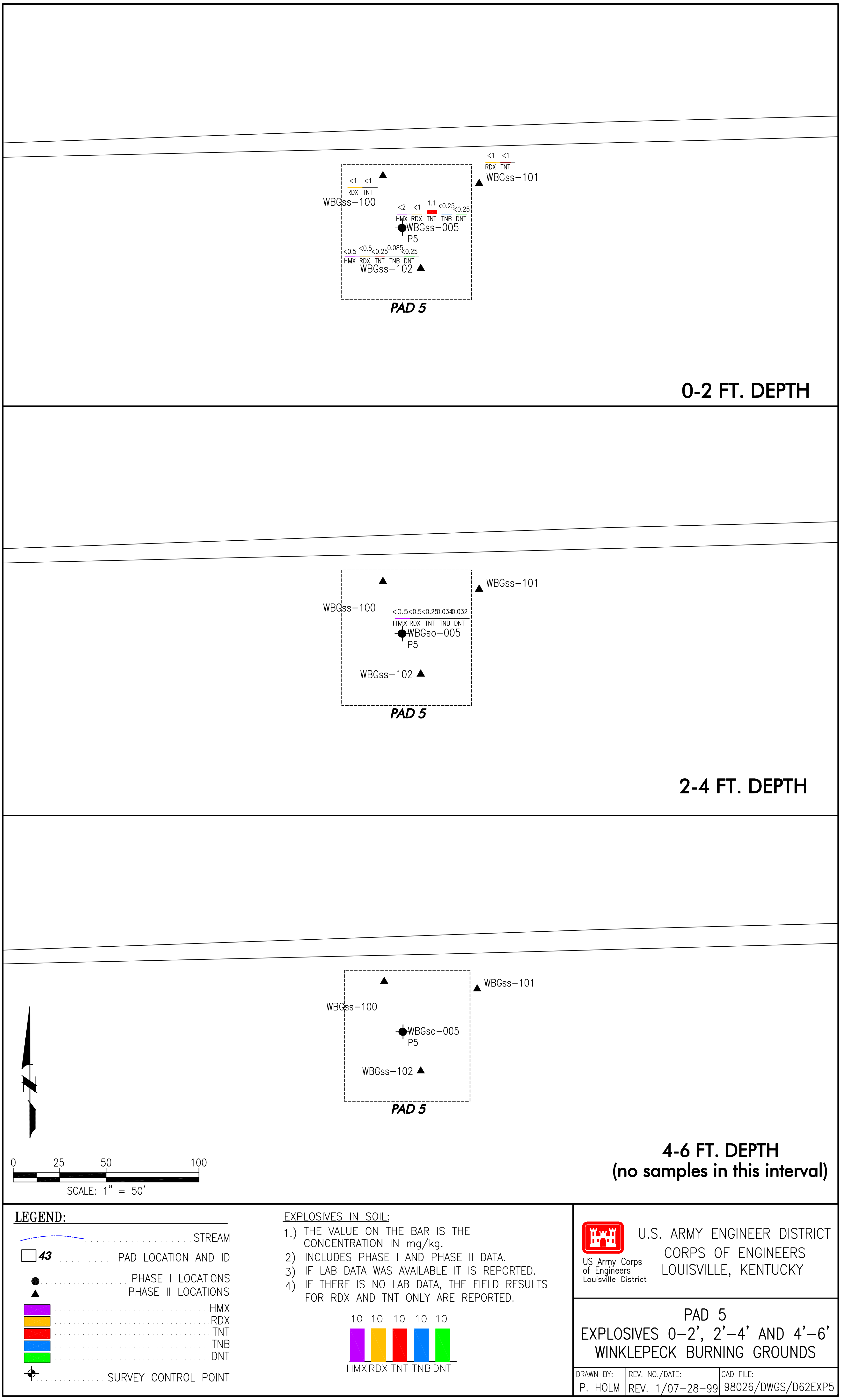

Figure 4-4. Explosives in Soil at Pad #5, WBG

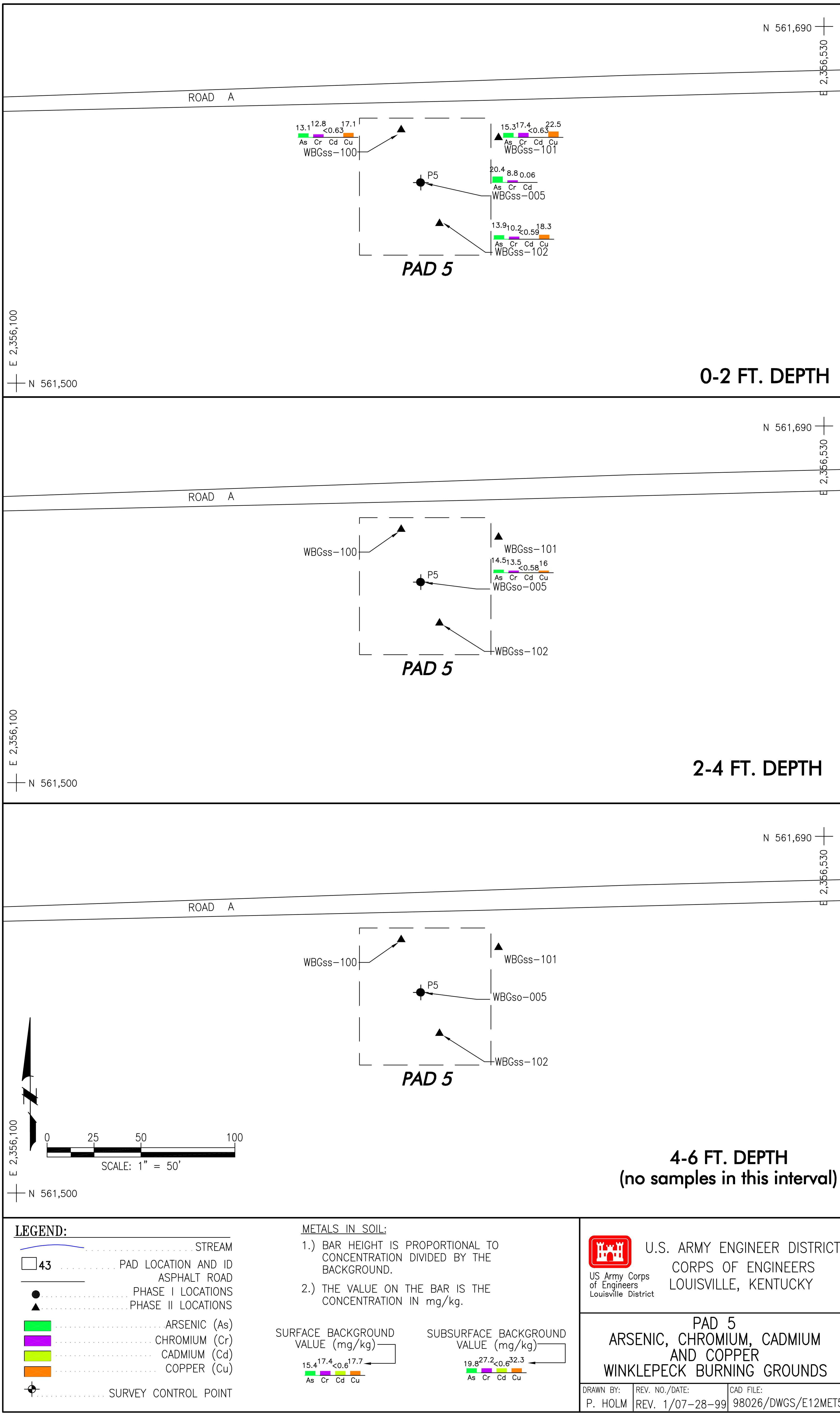

Figure 4-5. Selected Metals in Soil at Pad #5, WBG

4.3.2 Pad #6

Surface Soils

TNT was detected in samples WBGss-098 and WBGss-066 in Phase I. Samples WBGss-103, -104, and -105, collected from the area surrounding the Phase I samples, do not indicate the presence of TNT or RDX in field screening. The distribution of explosives is illustrated in **Figure 4-6**.

Arsenic, cadmium, mercury, and selenium were detected at concentrations above background criteria in samples collected from Pad #6. Each of these metals occurs above background in sample WBGss-006. Cadmium was additionally detected in samples WBGss-106, -107, and -108. Mercury was only detected in sample WBGss-105 and is the only TAL metal present at greater than twice the background value at this pad (**Figure 4-7**).

Samples from Pad #6 were not analyzed for organic constituents.

Subsurface Soils

One subsurface sample was collected from the WBGso-006 location on Pad #6. Field screening of this 0.6- to 1.2-m (2- to 4-ft) sample indicates TNT and RDX are not present. Laboratory results confirm this, with nondetects for all explosives (see **Figure 4-6**).

Sixteen inorganic elements or compounds were detected in the subsurface sample at Pad #6; however, none were present at concentrations above the background criteria (see **Figure 4-6**).

Discussion

- TNT was detected in surface soil at WBGss-006. Results from adjacent surface soil samples were nondetects for explosives, indicating contamination is confined to the pad area.

- Explosives were not present at concentrations greater than 1 mg/kg in the 0.6- to 1.2-m (2- to 4-ft) interval, indicating that contaminant concentrations diminish with depth.

Mercury was present at a concentration greater than twice the background in surface soil. No inorganics exceeded the background criteria in the subsurface.

4.3.3 Pad #37

Surface Soils

RDX was detected during the Phase I RI in one of the four samples (WBGss-033), at a concentration of 6.5 mg/kg. During Phase II sampling, field screening results indicate the presence of RDX at location WBGss-107. TNT was not detected in the field screening of any of the four Phase II samples. Analytical results for three Phase II samples include detections of nitrobenzene, TNB, TNT, 2,4-dinitrotoluene, 4-nitrotoluene, nitroglycerin, nitrocellulose, HMX, and RDX. Nitrobenzene was detected only in the surface sample from WBGss-106, and this was the only detected explosive or propellant for this sample. TNT, 2,4-DNT, HMX, nitroglycerine, and RDX were detected in samples WBGss-107 and WBGss-187. 1,3,5-TNB is detected only in sample WBGss-107. Nitrocellulose was detected only in sampleWBGss-187. The distribution of explosives at Pad #37 is illustrated in **Figure 4-8.**

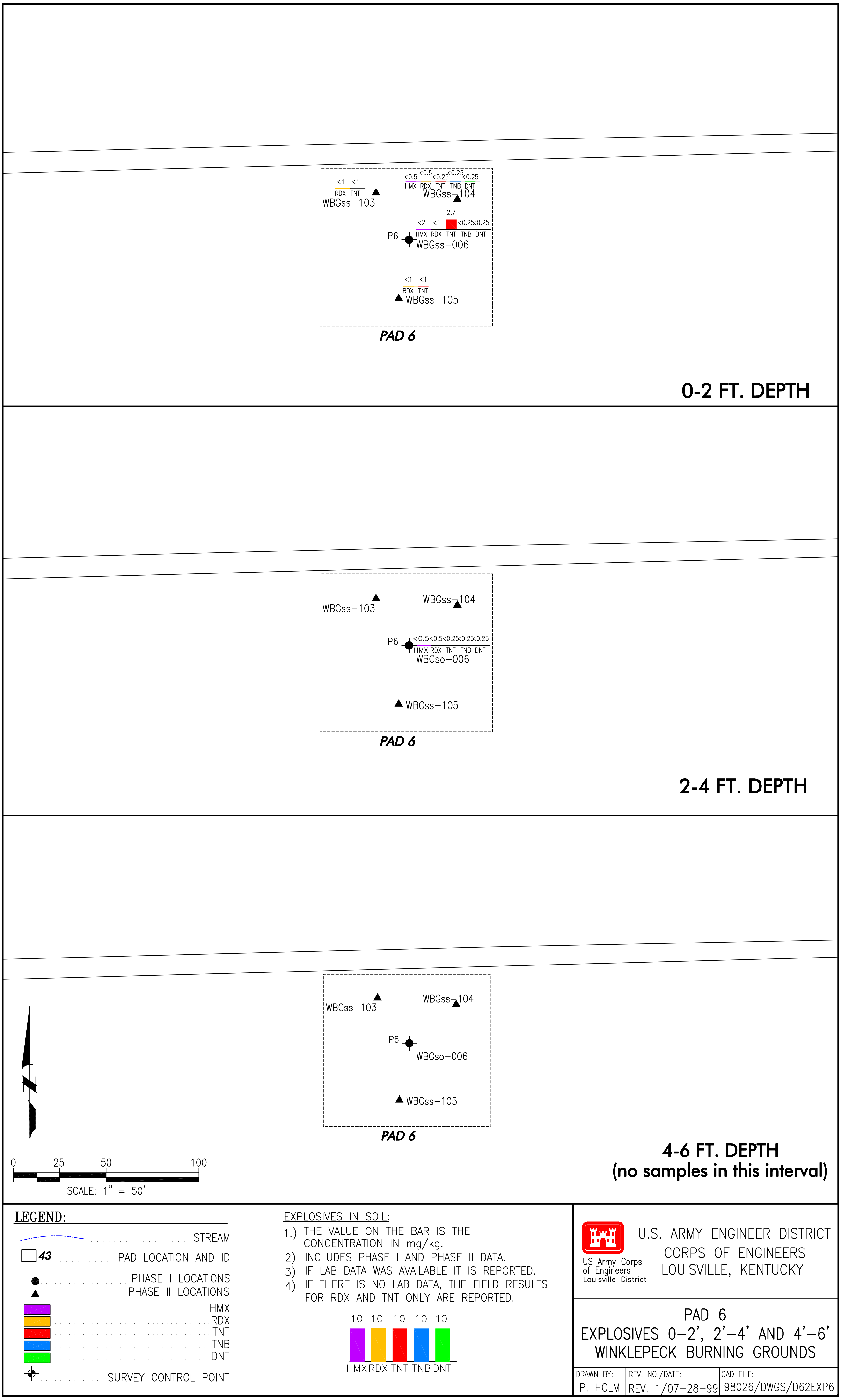

Figure 4-6. Explosives in Soil at Pad #6, WBG

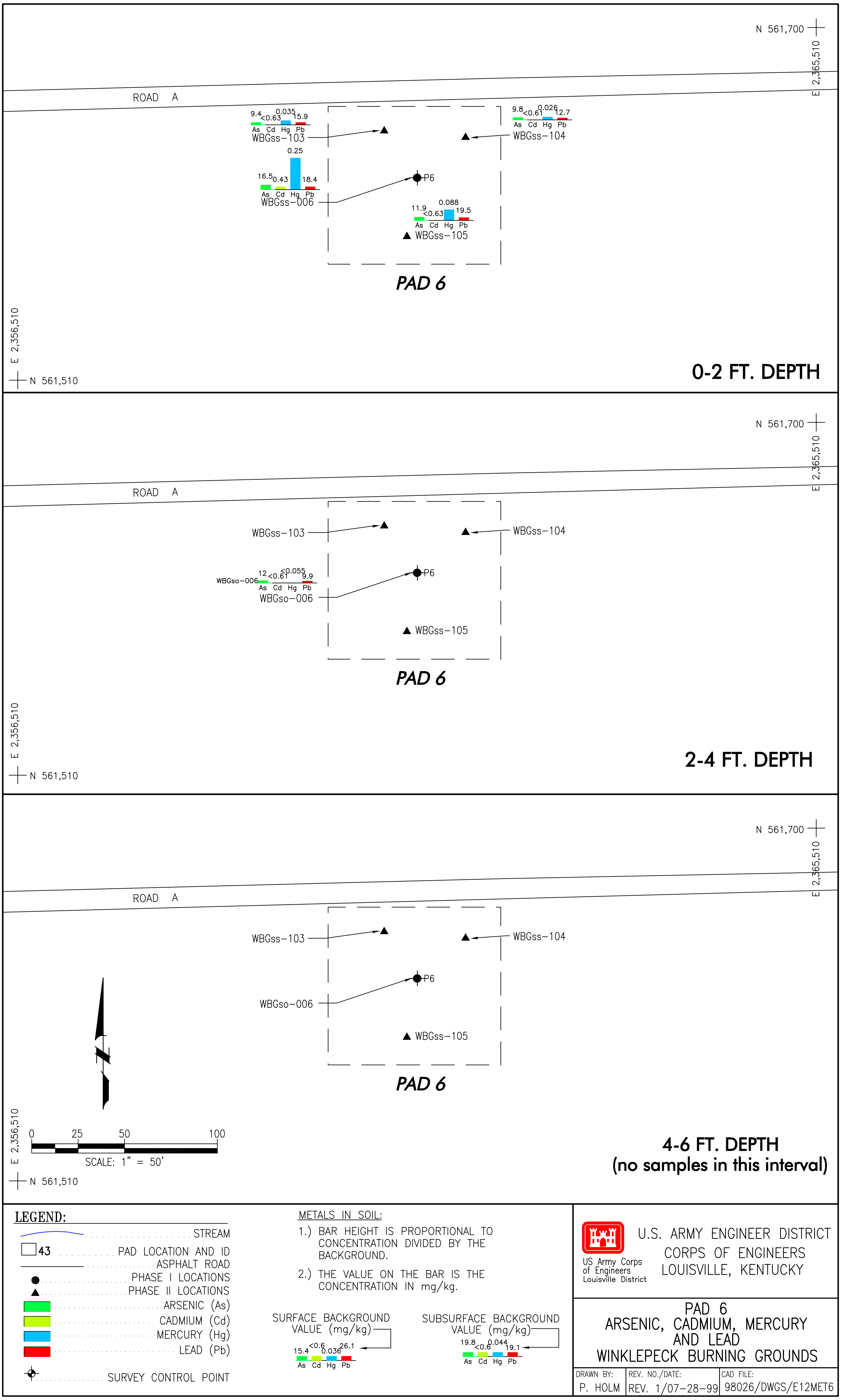

Figure 4-7. Selected Metals in Soil at Pad #6, WBG

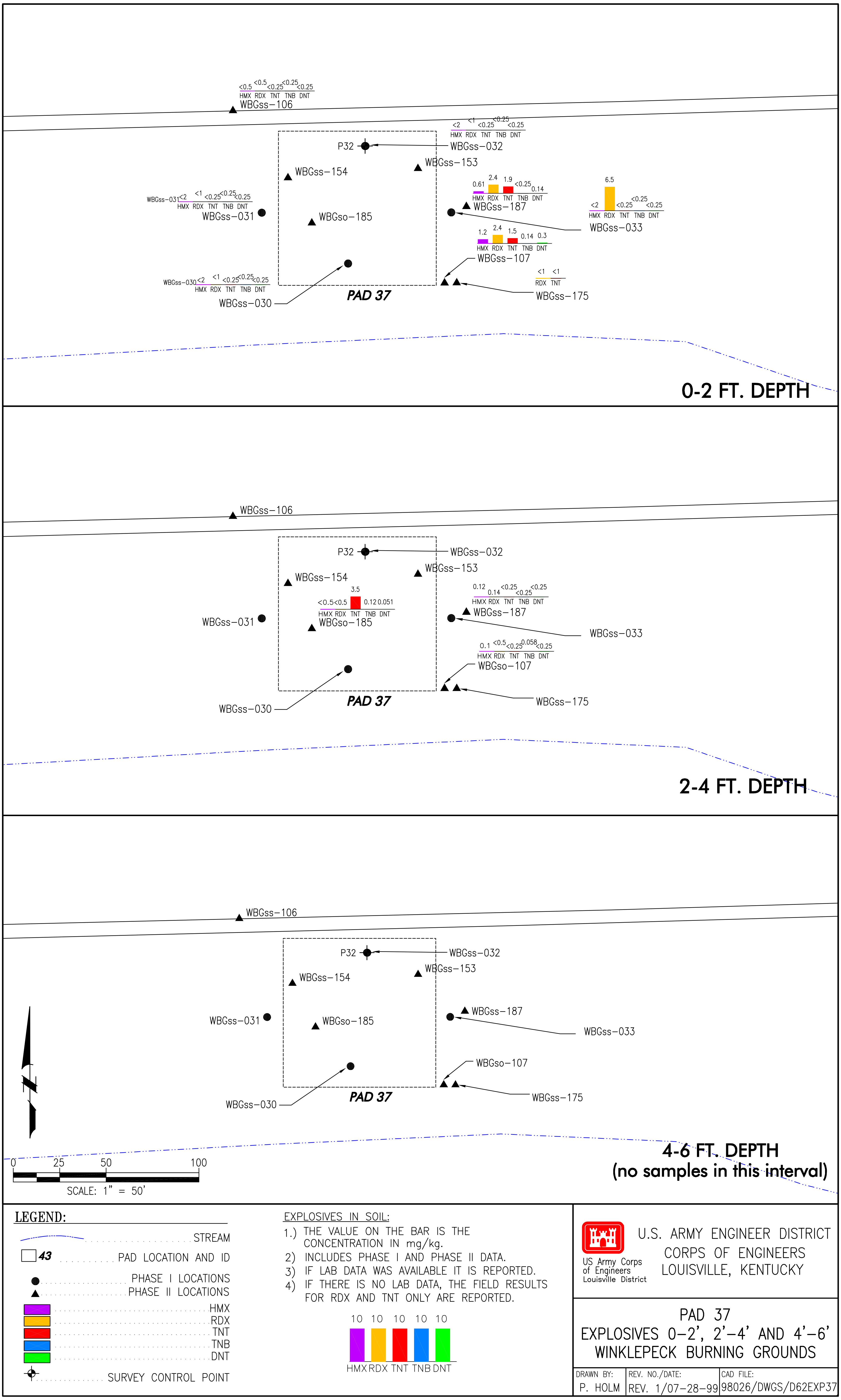

Figure 4-8. Explosives in Soil at Pad #37, WBG

At least five metals were detected at concentrations above background at each of the eight surface soil sampling locations. Metals detected above background at one or more of the sampling stations include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, nickel, selenium, silver, thallium, and zinc. Barium, cadmium, copper, lead, and zinc were present at concentrations many times greater than the background criteria in two or more surface soil samples. Cyanide was additionally detected in sample WBGss-031, at a concentration of 0.23 mg/kg. **Figure 4-9** illustrates the distribution of four inorganic SRCs at Pad #37.

Two samples from the Phase I investigation were analyzed for organics. Sample WBGss-030 was analyzed for VOCs, and sample WBGss-031 was analyzed for VOCs, SVOCs, and pesticides/PCBs. Chloroform was the only organic constituent detected in sample WBGss-030. Chloroform occurred at a concentration of 3 µg/kg. Organic compounds detected in sample WBGss-031 included bis(2-ethylhexyl)phthalate (34 µg/kg), di-*n*-butyl phthalate (53 µg/kg), and toluene (17 µg/kg). These compounds may be associated with former waste disposal practices; however, their source is unknown.

Samples WBGss-153 and WBGss-154 are slag samples. Their analyses are discussed in Section 4.8.

Subsurface Soils

Three samples were collected from the 0.6- to 1.2-m (2- to 4-ft) interval at Pad #37, from western half of the pad, and from two points located off the pad. All explosives field screening results for these samples indicated nondetects for TNT and RDX, so no deeper sampling was performed at the pad. Laboratory analysis of subsurface soils from WBGso-107, -185, and -187 indicated the presence of explosive compounds such as 1,3,5-TNB, HMX, RDX, and TNT in concentrations ranging from 0.051 to 3.5 mg/kg. The highest concentration of TNT (3.5 mg/kg) occurs at WBGso-185, immediately west of the former burn trays. Nitroglycerine was not present in any of the samples where analyzed. **Figure 4-8** shows the distribution of explosive compounds.

Twenty-one inorganic elements and compounds were detected in the subsurface soils at Pad #37; however, none were present above the background criteria. (see **Figure 4-9**).

Discussion

- Surface contamination with explosives is confined to the eastern edge of the pad. However, isolated TNT occurrences were detected in the 0.6- to 1.2-m (2- to 4-ft) interval in the center of the pad.

- Metals occurred in high concentrations in the surface soils on the eastern half of the pad and the adjacent area to the east.

- Concentrations of metals in the subsurface were dramatically lower than in the surface soils. Barium, cadmium, copper, and zinc concentrations were high in two or more surface soils.

4.3.4 Pad #38

Surface Soils

Five surface soil samples were collected at Pad #38 during the Phase I and II RIs. Explosives were detected in samples WBGss-034 and WBGss-035 (0.31mg/kg, 2,4-DNT and 2.8 mg/kg, TNT, respectively). Field screening of Phase II samples WBGss-108, -109, and -110 did not indicate the presence of TNT or RDX. Laboratory analytical results for sample WBGss-108, however, indicated the occurrence of 1,3,5-TNB at a concentration of 0.057 mg/kg. **Figure 4-10** illustrates the distribution of explosives at Pad #38.

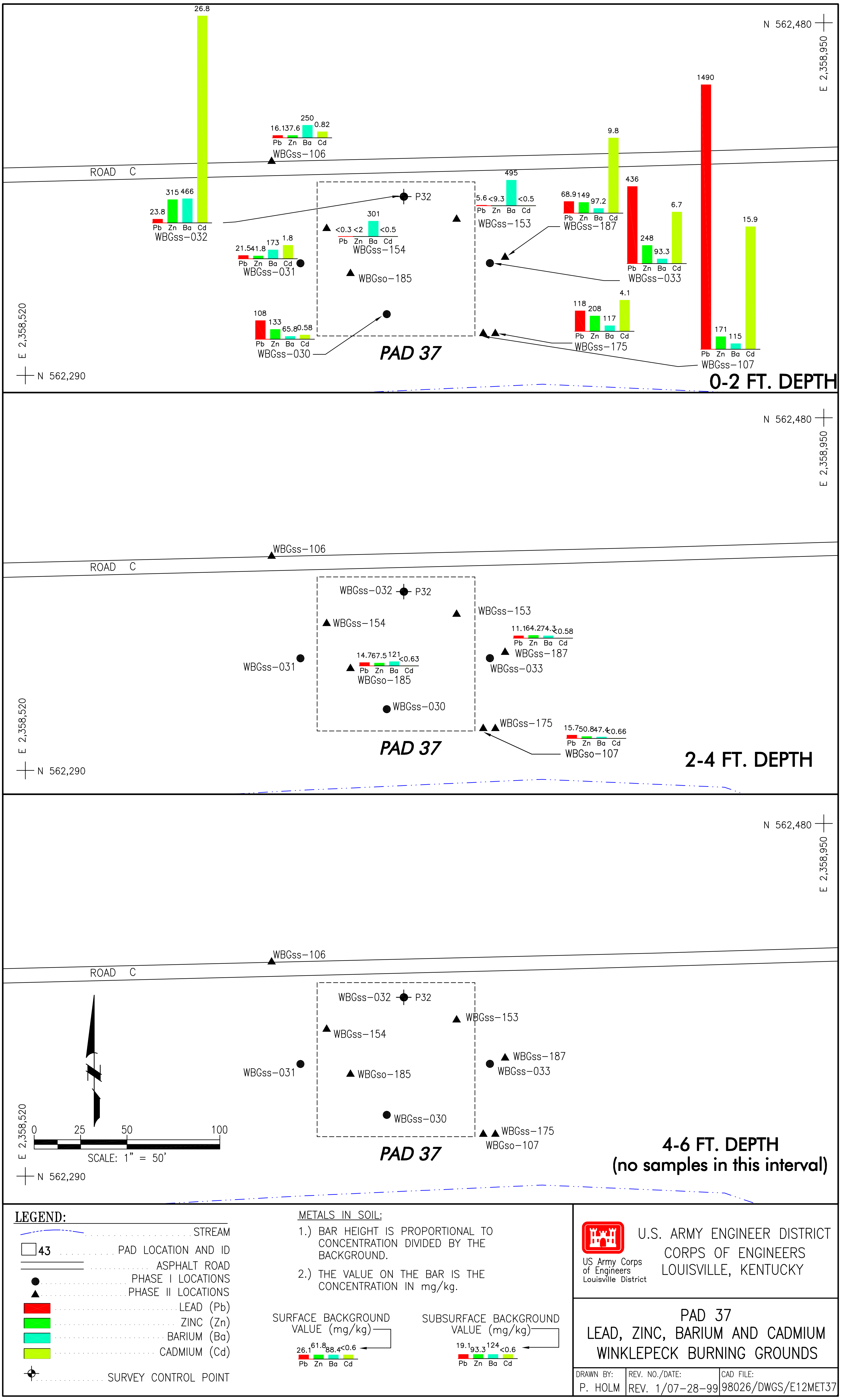

Figure 4-9. Selected Metals in Soil at Pad #37, WBG

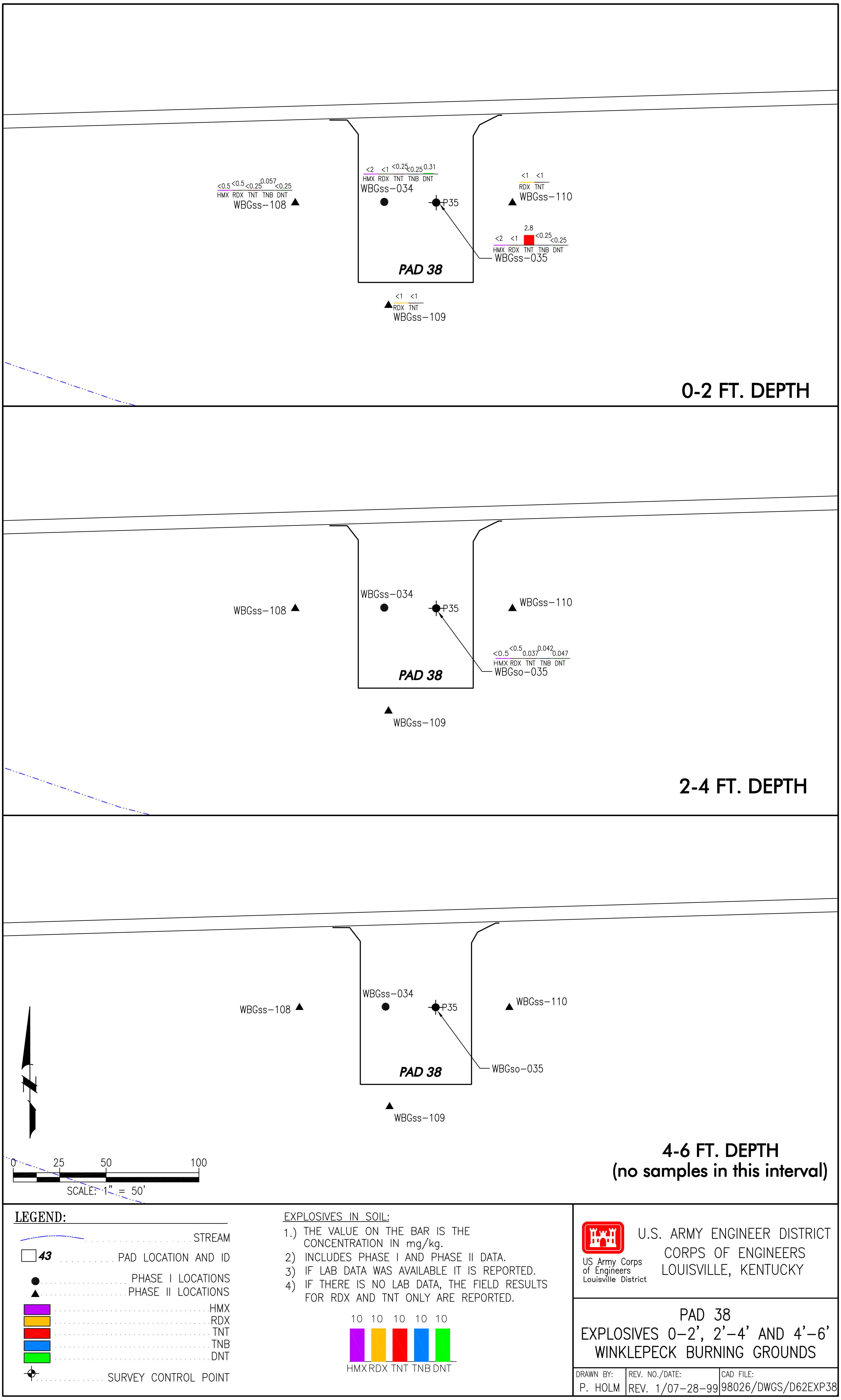

Figure 4-10. Explosives in Soil at Pad #38, WBG

Twelve metals were present above background criteria among five samples collected at Pad #38 during the Phase I and II RIs, including aluminum, antimony, arsenic, beryllium, cadmium, copper, chromium, iron, lead, nickel, selenium, and zinc. Each of the five samples had at least four metals occurring at concentrations exceeding background. In general, samples from the center and southern portions of the pad (WBGss-034, -035, and -109) showed the greatest number of detections above background. The greatest concentrations of barium, cadmium, and lead also occurred near the center of the pad in sample WBGss-034. Cadmium, zinc, and/or lead were detected at concentrations greater than twice the background value in three samples. **Figure 4-11** illustrates the distribution of four inorganic SRCs at Pad #38.

Samples from Pad #38 were not analyzed for organic compounds.

Subsurface Soils

Sample WBGso-035 was collected from 0.6 to 1.2 m (2 to 4 ft) at the Phase I sampling location on the eastern half of Pad #38. TNT and RDX were not detected in the field screening. The analytical laboratory results showed the presence of 1,3,5-TNB at 0.042 mg/kg, TNT at 0.037 mg/kg, and 2,4-DNT at a concentration of 0.047J mg/kg. Nitroglycerine was not detected (see **Figure 4-10**).

The only inorganic element or compound detected above background criteria was cadmium, which was present at a concentration of 0.62 mg/kg. (see **Figure 4-11**).

Discussion

- Explosives were present in concentrations less than 1 mg/kg in one surface and one subsurface sample.
- Field screening results indicate that any explosives contamination is confined to a small area.
- Metals occurred above background in the greatest concentrations in the surface soils on the pad and immediately south of the pad. Results for cadmium, lead, and zinc exceed the background criteria by many times.
- Results from the 0.6- to 1.2-m (2- to 4-ft) interval indicate that inorganic contamination is not present.

4.3.5 Pad #40

Surface Soils

Four surface soil samples were collected at Pad #40 during the Phase I and II RIs. Of these samples, field screening of samples WBGss-111, -112, and -113 did not indicate the presence of TNT and RDX. Samples from WBGss-037 and WBGss-113 were analyzed in the laboratory for explosives. Laboratory analytical results indicated the presence of TNB at a concentration of 0.064 mg/kg in surface soil from WBGss-113. No other explosives were detected. **Figure 4-12** displays the analytical results for explosives at Pad #40.

Inorganic elements detected at concentrations above background criteria in at least one surface soil sample at Pad # 40 include arsenic, barium, cadmium, copper, iron, lead, nickel, selenium, and zinc. Of the metals detected above background, concentrations of arsenic, lead or mercury were appreciably elevated in two sampling locations: WBGss-037 and WBGss-113. Arsenic was detected above background in three of four samples at concentrations ranging from 16.1 to 35.8 mg/kg. **Figure 4-13** shows the distribution of four inorganic SRCs.

Samples from Pad # 40 were not analyzed for organic compounds.

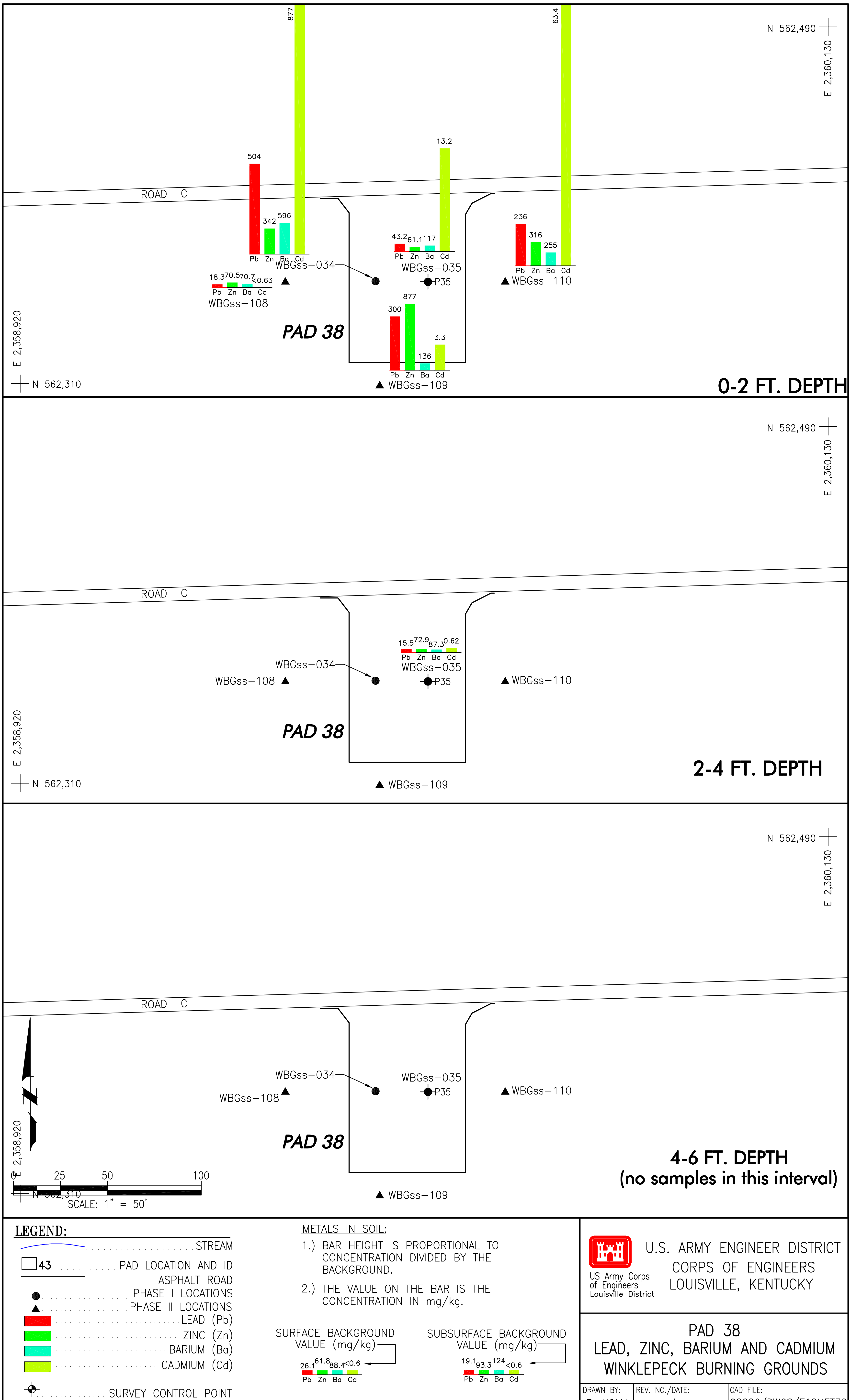

Figure 4-11. Selected Metals in Soil at Pad #38, WBG

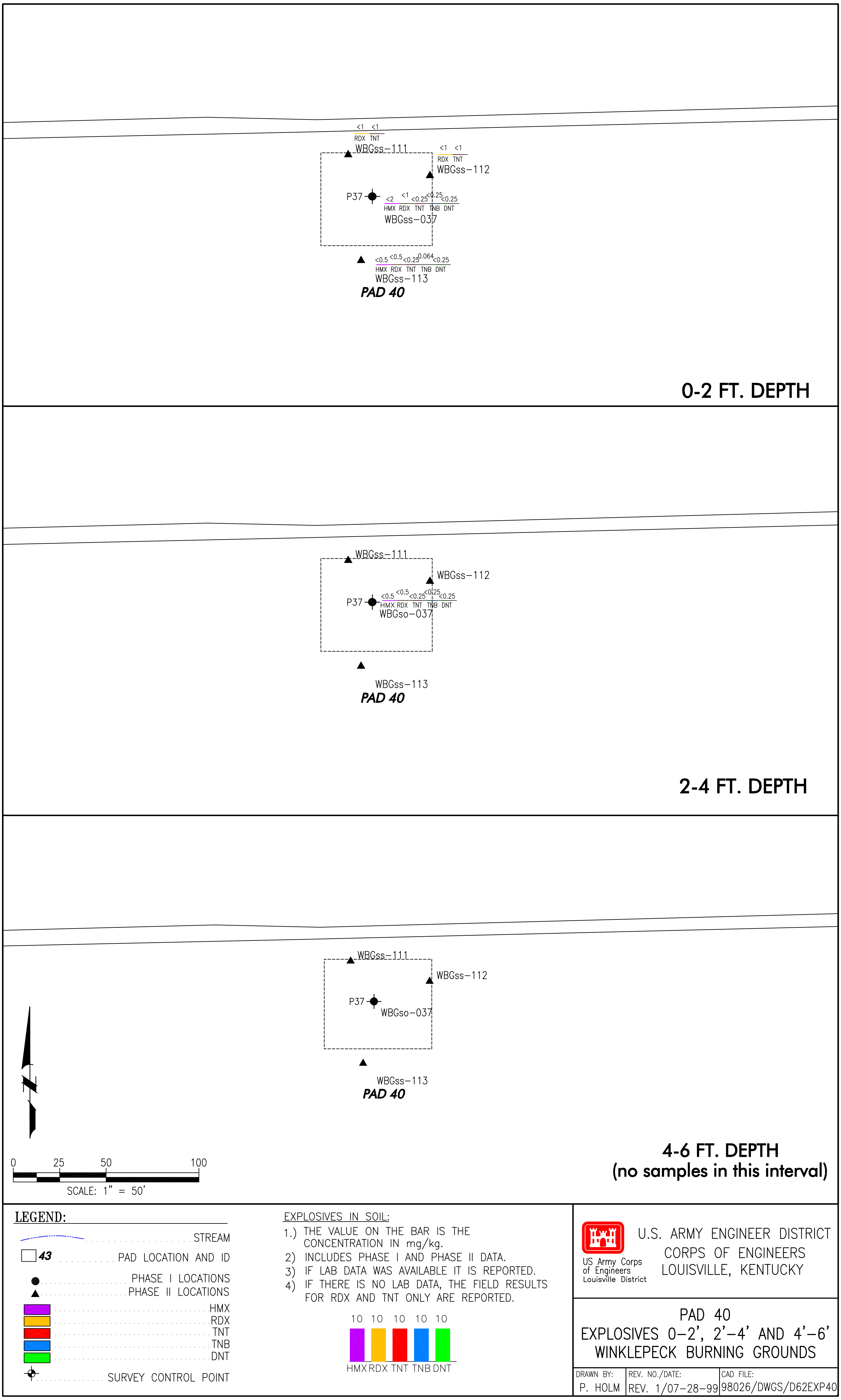

Figure 4-12. Explosives in Soil at Pad #40, WBG

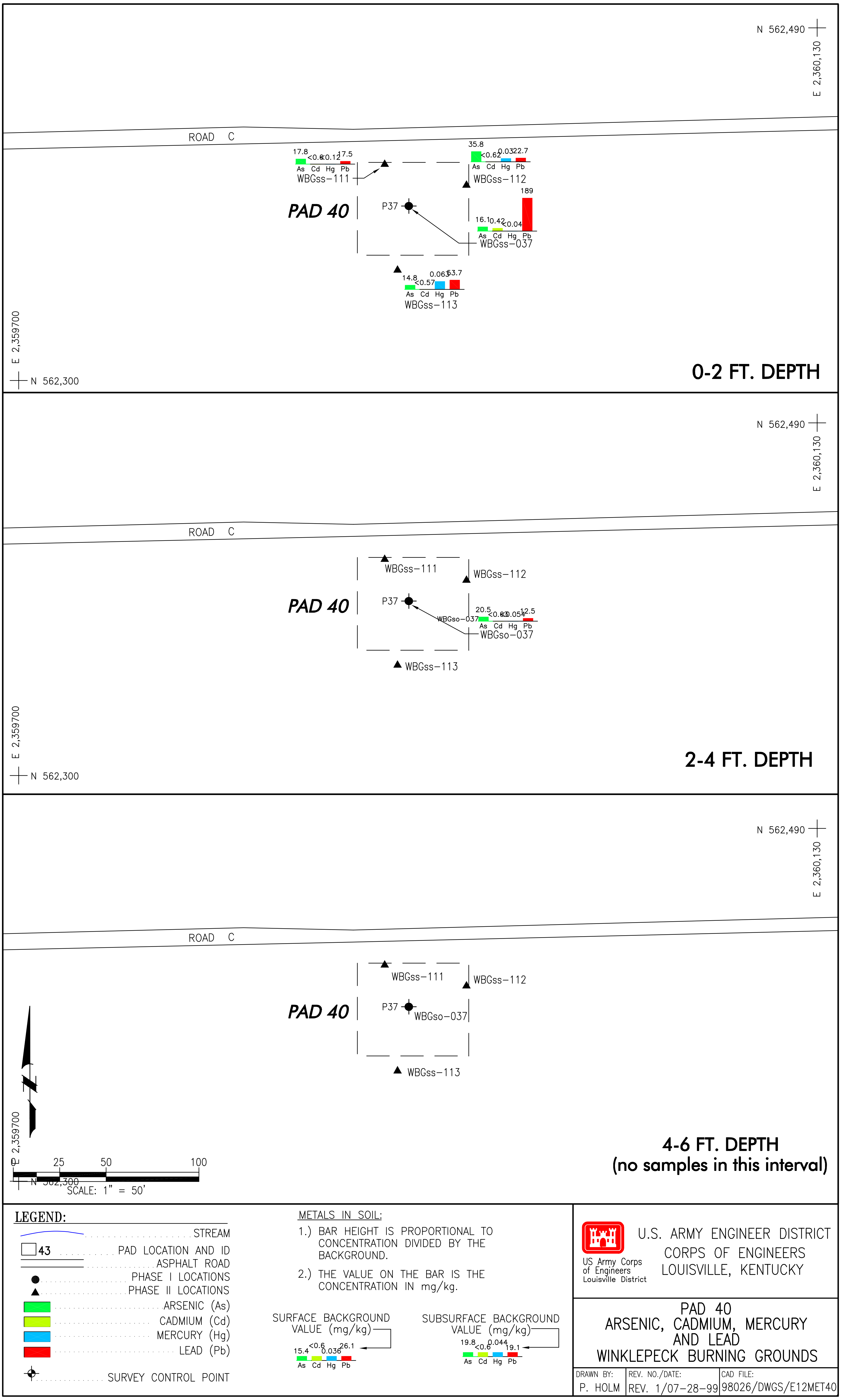

Figure 4-13. Selected Metals in Soil at Pad #40, WBG

Subsurface Soils

One sample, WBGso-037, was collected from 0.6 to 1.2 m (2 to 4 ft) in the center of Pad #40 and was analyzed for explosives, nitroglycerine, and TAL metals. Field screening for TNT and RDX indicated both were non-detects, and laboratory analysis confirms this with no explosives detected. Nitroglycerine was not detected. Based upon this information, no deeper sampling was performed (see **Figure 4-12**).

Arsenic and iron were both present above the background criteria, with concentrations of 20.5 mg/kg and 37,100 mg/kg, respectively. No other inorganic elements or compounds were detected above background criteria (see **Figure 4-13**).

Discussion

- Explosives were not detected above 1 mg/kg in the surface soils, and were not detected at all in the 0.6- to 1.2-m (2- to 4-ft) interval.
- Vertical and horizontal extent of explosives contamination at Pad #40 have thus been defined.
- The highest concentrations of metals above background occurred in surface soils at the center of the pad. Decreasing concentrations in the 0.6- to 1.2-m (2- to 4-ft) interval indicate some attenuation of metals contamination by adsorption.

4.3.6 Deactivation Furnace Area (Pad #45)

Soil analyses for the Phase II RI include samples collected in the Phase I and Phase II RIs, as well as those collected in the 1997 RCRA Field Investigation (USACE 1998b). The RCRA Field Investigation soil samples were collected within the RCRA unit boundary. Sample analyses for the RCRA Field Investigation followed protocols and methods consistent with those in the Phase I and Phase II investigations, and the quality of these data is on a par with the RI data. However, these data will not be incorporated into discussions of risk discussed in Sections 6.0 and 7.0 of this report. The data from the RCRA Field Investigation are provided in their entirety in Appendix F.

Surface Soils

Explosives were not detected in soils collected at WSBGss-041 in the Phase I RI. Surface soil samples collected in the 1997 RCRA Field Investigation (USACE 1998b) were not analyzed for explosives and propellants (see **Figure 4-14** for sample locations). However, in the Phase II RI, seven surface soil samples were collected from the Deactivation Furnace Area, biased to locations where UXO or visible contamination was present. Each of the samples was field screened for TNT and RDX. Results of field screening did not indicate the presence of these explosives. Laboratory analytical results for sample WBGss-144, however, indicated the presence of TNT at a concentration of 0.03 mg/kg, 2,6-dinitrotoluene at 0.075 mg/kg, and HMX at 0.12 mg/kg.

Seventeen metals were detected at concentrations exceeding background criteria in at least one of the eight surface soil samples collected at the Deactivation Furnace Area in the Phase II. Similarly, concentrations of 16 of the TAL metals were detected above background in one or more soil samples collected at the Deactivation Furnace Area in 1997. Metals exceeding background at the Deactivation Furnace Area include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, mercury, nickel, selenium, silver, vanadium, and zinc. Of these metals, selenium, silver, and vanadium were only detected above background criteria in one or two samples. Aluminum, manganese, and vanadium were

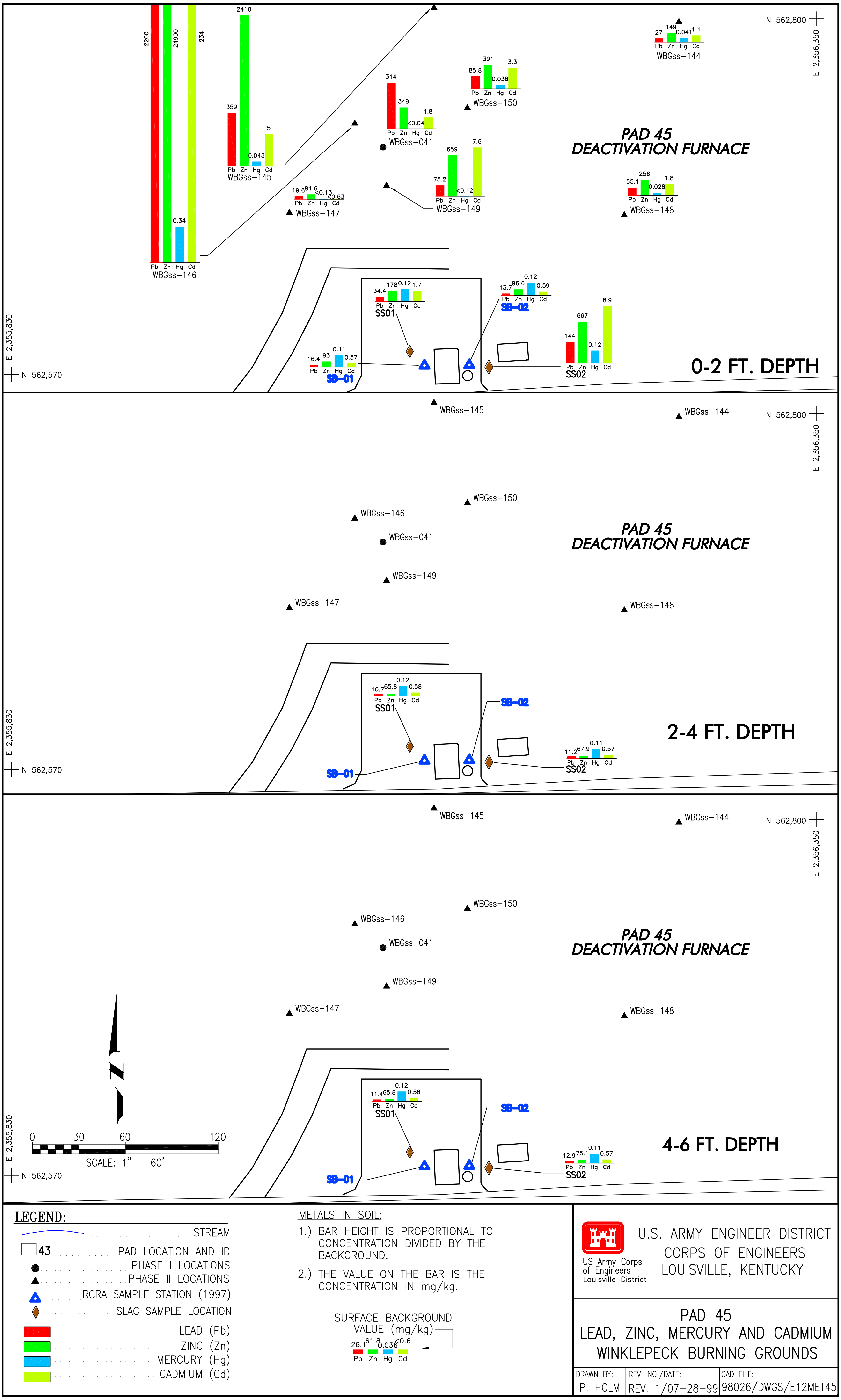

Figure 4-14. Selected Metals in Soil at Pad #45, WBG

not present above background values in the RCRA investigation samples. WBGss-146 contains the greatest number of metals detected over background and the highest concentrations of eight of the detected metals, including cadmium, copper, lead, mercury, nickel, selenium, silver, and zinc. Maximum concentrations of cobalt, magnesium, and thallium came from the surface soil samples collected in 1997. **Figure 4-14** shows the distributions of four inorganic SRCs at the Deactivation Furnace Area. Cyanide was detected twice, at a concentration of 0.63 mg/kg in WBGss-146, and 0.73 mg/kg in WBGss-150.

Samples from the Deactivation Furnace Area were not analyzed for organic compounds in the Phase II RI, in accordance with the *SAP Addendum for the Phase II Remedial Investigation at Winklepeck Burning Grounds and Determination of Facility-wide Background at RVAAP* (USACE 1998a)

Subsurface Soils

Subsurface soils were not collected at the Deactivation Furnace Area and vicinity during the Phase I or Phase II RI. However, two soil borings were sampled in 0.6-m (2-ft) intervals to a depth of 3 m (10 ft) bgs in the RCRA Field Investigation (USACE 1998b). One sample, from the 0.6- to 1.2-m (2- to 4-ft) interval at SB01, was analyzed for explosives; however, none were detected.

Metals were detected above the facility-wide background criteria in both 1997 soil borings in nearly all subsurface intervals. Generally these concentrations were lower than those encountered in the surface soil samples, and concentrations tend to decrease with depth. In both the 0.6- to 1.2-m (2- to 4-ft) and 1.2- to 1.8-m (4- to 6-ft) intervals, chromium, copper, iron, magnesium, nickel, and zinc were present at concentrations less than two times the background criteria. The maximum concentrations of chromium (23.0 mg/kg), nickel (28.6 mg/kg), and vanadium (30.1 mg/kg) detected in Deactivation Furnace Area soils during the RCRA Field Investigation came from the 1.2- to 1.8-m (4- to 6-ft) interval at SB02. At 1.8 to 2.4 m (6 to 8 ft) bgs, copper in both borings and magnesium in SB01 were present at concentrations above background. At 2.4 to 3.0 m (8 to 10 ft) bgs, detections above background were limited to copper (22.5 mg/kg), nickel (22.7 mg/kg), and zinc (71.4 mg/kg) in SB02. **Figure 4-14** shows the distribution of metals in subsurface soils.

Metals never detected in the subsurface soils at the Deactivation Furnace Area include antimony, cadmium, cobalt, mercury, selenium, silver, and thallium.

Discussion

- The highest concentrations of explosives and metals observed in surface soils at the Deactivation Furnace Area were located north of the pad area.

- The horizontal extent of explosives and metals contamination cannot be determined based on the available data.

- Explosives are not present in the subsurface soil sample collected from 0.6 to 1.2 m (2 to 4 ft) at the Deactivation Furnace Area.

- Site-related metals are present above background concentrations in two soil samples at the Deactivation Furnace Area. With the exception of magnesium, which is present at greater than two times the background down to the 1.2- to 18-m (4- to 6-ft) interval, concentrations of metals tend to diminish or remain stable with increased depth. These occurrences were found within the RCRA unit boundary, and as such, are not considered further in the CERCLA RI Process.

4.3.7 Pad #58

Surface Soils

A total of six surface soil samples were collected during the Phase I and II RIs at Pad #58. WBGss-054 and WBGss-116 were sent for laboratory analysis, and the remaining samples were field screened for TNT and RDX. Neither explosives nor propellants were detected by either the field screening or laboratory analyses. **Figure 4-15** illustrates the distribution of explosives in surface soils at Pad #58.

Metals detected above background at Pad #58 included antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, silver, and zinc. Arsenic, cadmium, copper, lead, mercury, and zinc were present in concentrations many times greater than the background criteria in all six samples. Cyanide was detected in WBGss-116 at a concentration of 0.064 mg/kg. With the exception of sample WBGss-054 (Phase I), for which a limited number of metals were requested for analysis, at least eight metals are detected above background in each sample. The maximum values of all detected metals (except silver, cadmium, lead, and zinc) occurred in samples WBGss-170, -114, or -116, suggesting that the western portion of the pad has a greater potential for inorganic contamination. Mercury appeared to be more prevalent at Pad #58 than at any other pad investigated (**Figure 4-16**).

Surface samples from Pad # 58 were not analyzed for organic compounds.

Subsurface Soils

One subsurface sample was collected from the Phase I sampling location at the center of Pad #58. WBGso-054 was collected from 0.6 to 1.2 m (2 to 4 ft) and analyzed for explosives, nitroglycerine, and TAL metals. Field screening indicated the absence of TNT and RDX. Based upon this observation, a deeper subsurface soil sample was not collected. The laboratory results show detections of explosives including TNT (0.065 mg/kg); 3-nitrotoluene (0.086 mg/kg); 2,4-DNT (0.084 mg/kg) and HMX (0.11 mg/kg). Nitroglycerine was not detected (see **Figure 4-15**).

Lead was present above background at a concentration of 20.7 mg/kg in the subsurface soil. No other inorganic elements or compounds are detected above background criteria (see **Figure 4-16**).

Discussion

- No explosives were detected above 1 mg/kg in either surface or subsurface soils. Low concentrations of explosives in the 0.6- to 1.2-m (2- to 4-ft) interval suggest a near-surface occurrence.

- Metals were present above background in concentrations that were generally uniform across the pad. High lead and mercury levels relative to background did not appear to persist in the subsurface.

4.3.8 Pad #59

Surface Soils

Seven surface soil samples were collected at Pad #59 during the Phase I and II RIs. Two Phase I samples (WBGss-055 and WBGss-056) were analyzed for explosives. All Phase II samples were field screened for TNT and RDX. Field screening results indicated the presence of RDX at a concentration of 4 mg/kg in sample WBGss-117. Surface soil from this sample location was also submitted to the off-site analytical laboratory for analysis of propellants and explosives. Analytical results for this sample, however, only indicated the

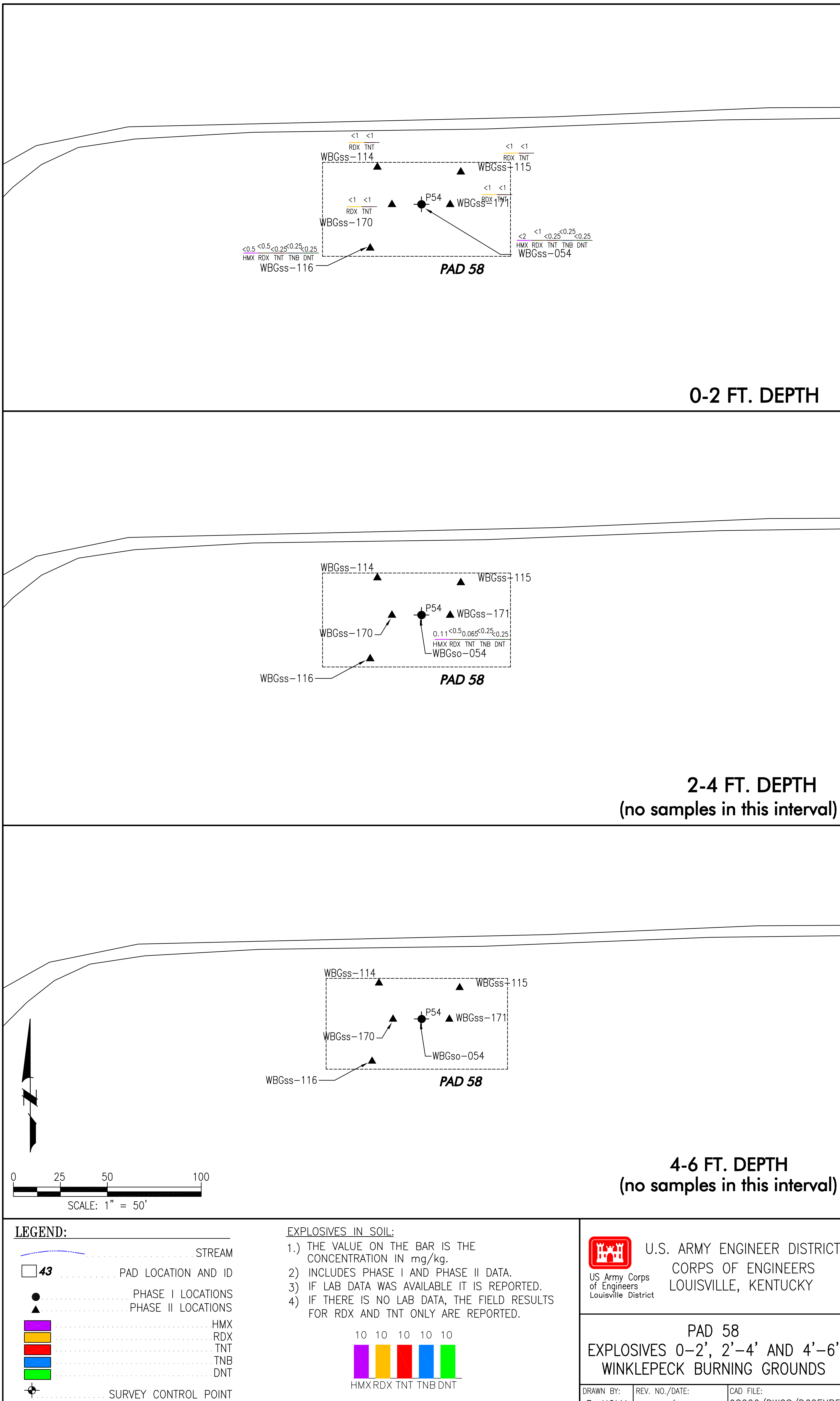

Figure 4-15. Explosives in Soil at Pad #58, WBG

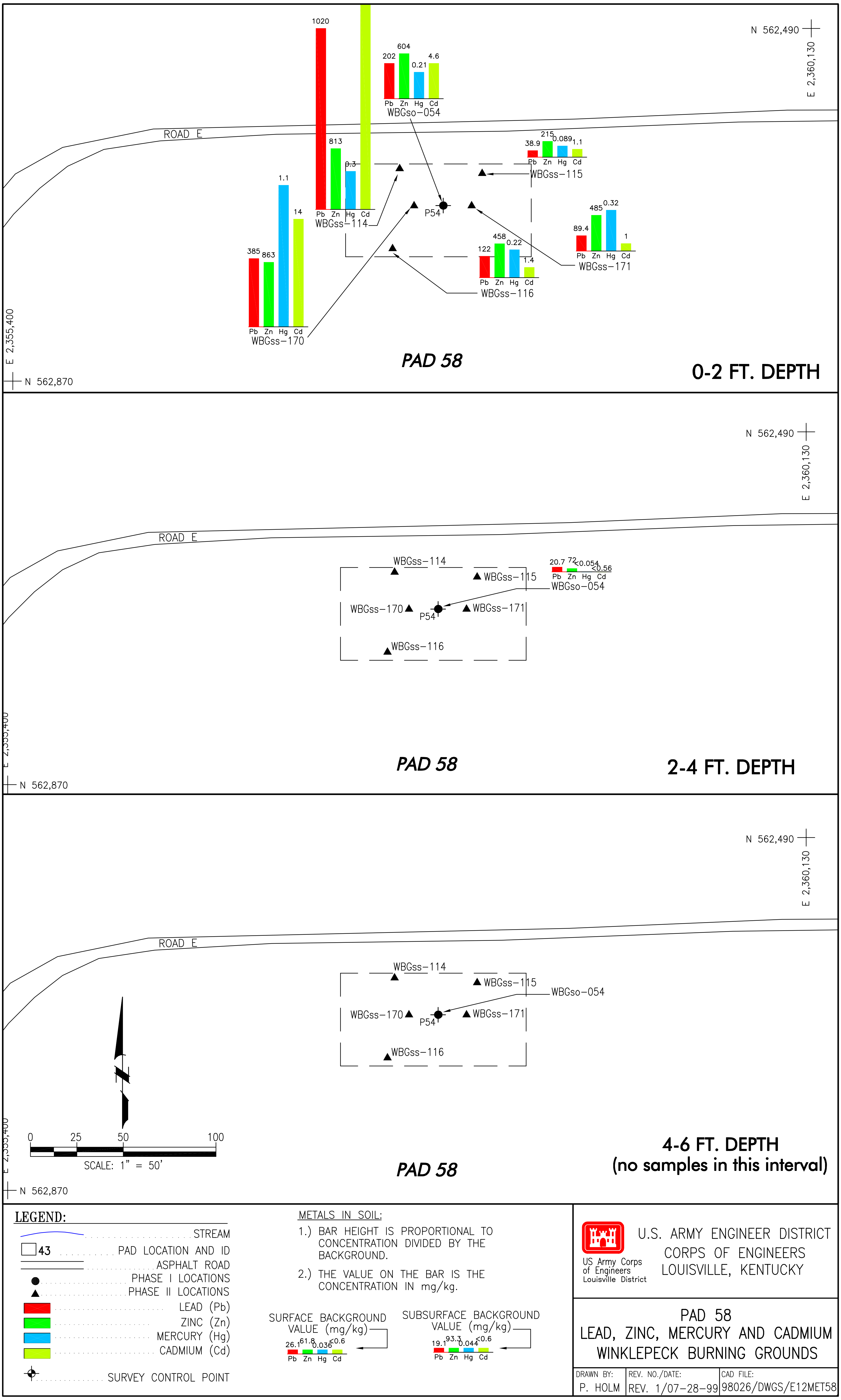

Figure 4-16. Selected Metals in Soil at Pad #58, WBG

presence of HMX at a low concentration of 0.120 mg/kg. TNT was detected at 33 mg/kg in WBGss-055. No other propellants or explosives were detected. **Figure 4-17** indicates the distribution of explosives at Pad #59.

Metals detected at concentrations above background criteria in the seven Pad #59 surface soil samples included antimony, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, silver, and zinc. Antimony, cadmium, copper, lead, and zinc occurred at concentrations more than twice the background criteria in five of the samples. Cobalt, iron, and nickel were only present above background criteria in sample WBGss-118. The maximum detected concentrations of antimony and zinc also occurred in this sample. **Figure 4-18** illustrates the distribution of site-related metals at Pad #59.

Surface soil samples from Pad #59 were not analyzed for organic compounds.

Subsurface Soils

WBGso-055 was collected from the Phase I sampling location on the western half of Pad #59, from 0.6 to 1.2 m (2 to 4 ft). Field screening of this interval for TNT and RDX indicated nondetects for these compounds; however, in laboratory analysis, TNT was detected at a concentration of 0.062 mg/kg (see **Figure 4-19**). This is the only explosive compound detected in this interval. A sample from the 1.2- to 1.8-m (4- to 6-ft) interval was also collected from this location. In this interval, nitrobenzene was detected at a concentration of 0.039 mg/kg. (see **Figure 4-17**). Nitroglycerine was not detected in either of the subsurface soil intervals.

In the 0.6- to 1.2-m (2- to 4-ft) interval, the only inorganic element or compound detected above background values was lead (30.8 mg/kg). Copper and lead were present in concentrations slightly above background in the 1.2- to 1.9- m (4- to 6-ft) interval, (33.6 and 30.4 mg/kg, respectively) (see **Figure 4-18**).

Pad #59 is one of the four locations from the Phase II investigation where subsurface soils were analyzed for VOCs and SVOCs. In the 0.6- to 1.2-m (2- to 4-ft) interval at WBGso-055, 2-methylnaphthalene and phenanthrene were present at concentrations of 62 and 93 μg/kg, respectively. No other organic compounds were detected.

Discussion

- Contamination with respect to explosives at Pad #59 was confined to the center of the pad.
- Subsurface soils did not appear to be contaminated with concentrations of explosives that exceed 1 mg/kg.
- High concentrations of metals above background were confined to the surface soils; lower values in the subsurface suggest some degree of attenuation by adsorption.
- The center of the pad and the adjacent area to the southeast appear to have the greatest contamination with respect to metals.
- The vertical and horizontal extent of contamination are well defined with the surface and subsurface data.

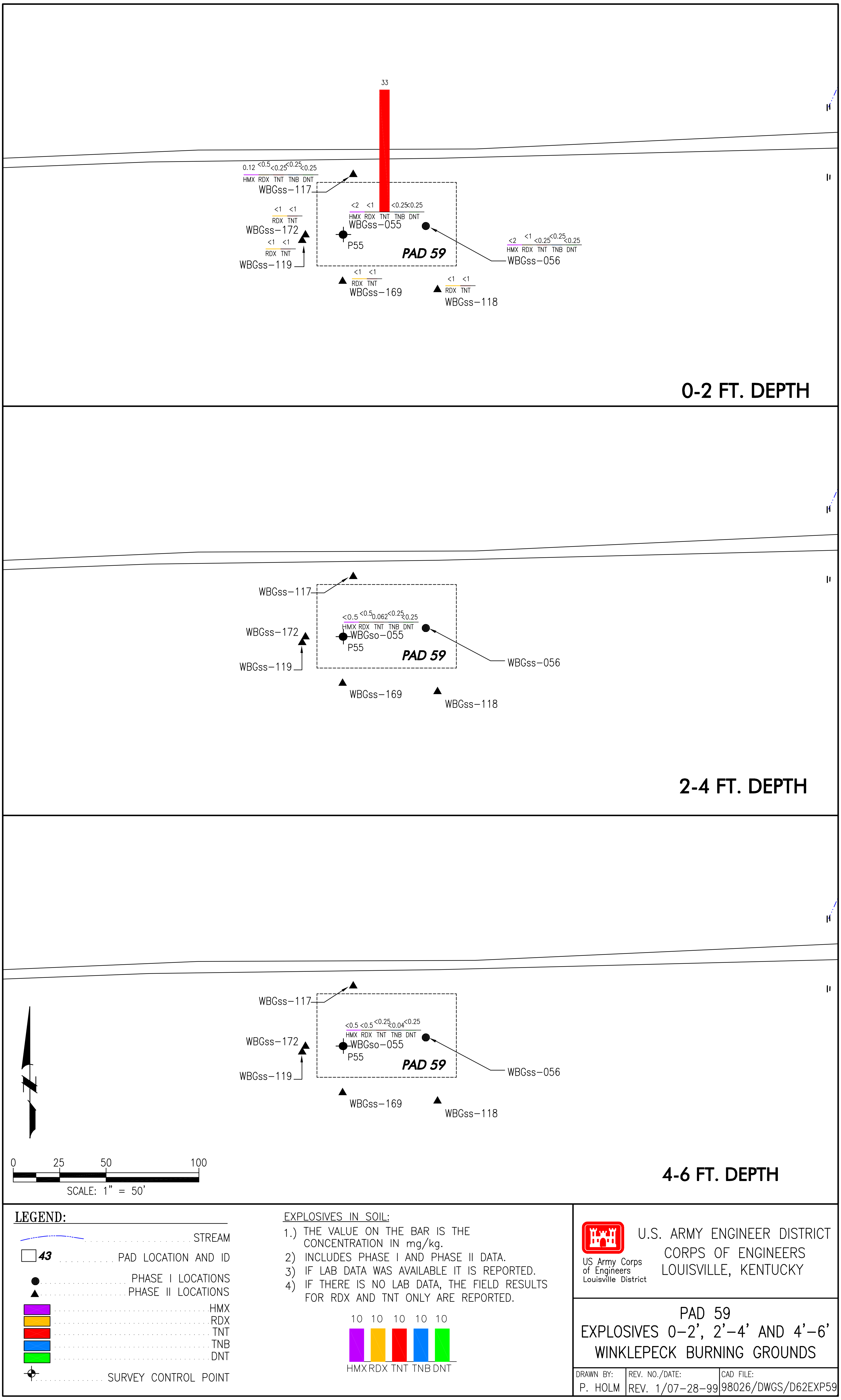

Figure 4-17. Explosives in Soil at Pad #59, WBG

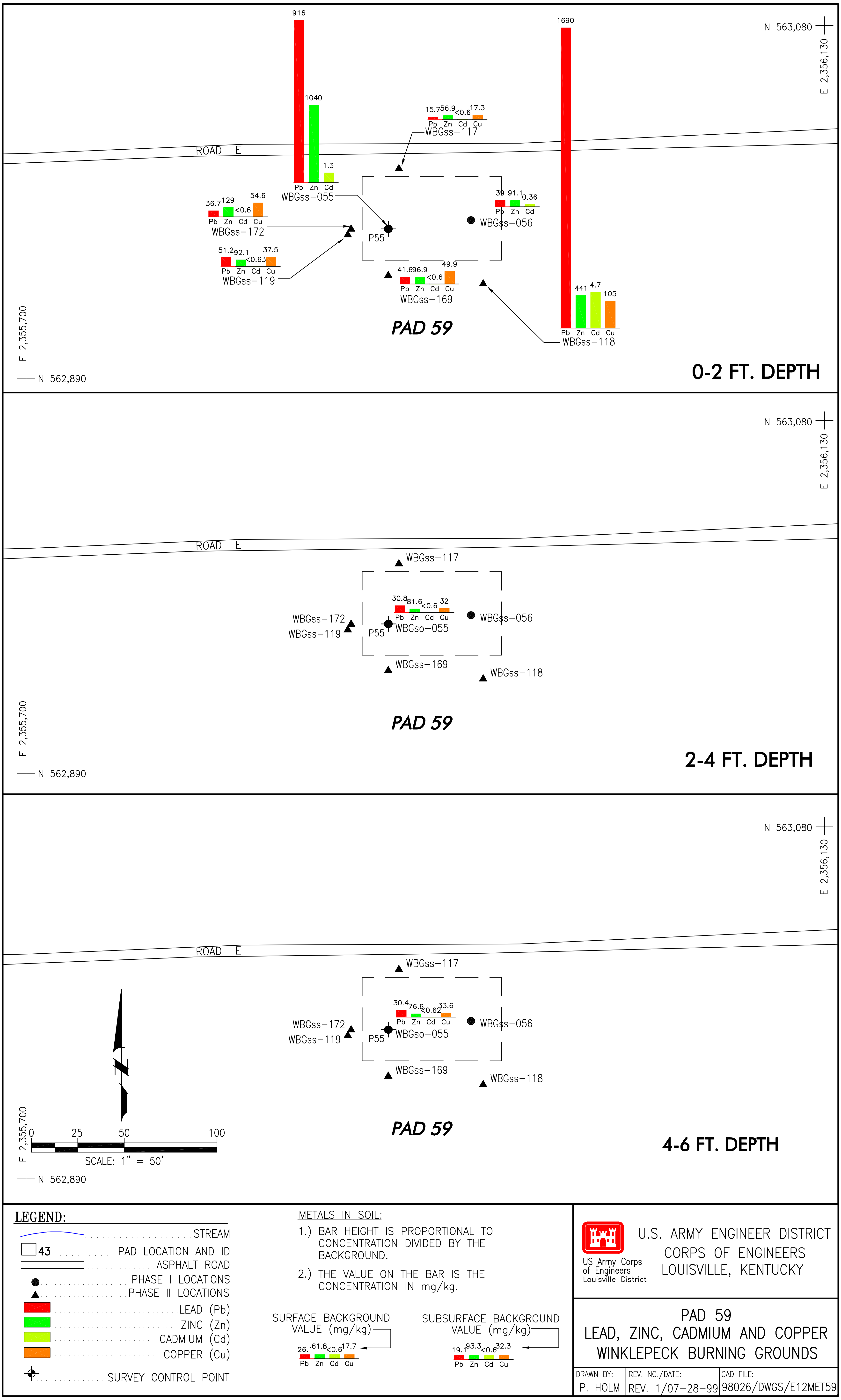

Figure 4-18. Selected Metals in Soil at Pad #59, WBG

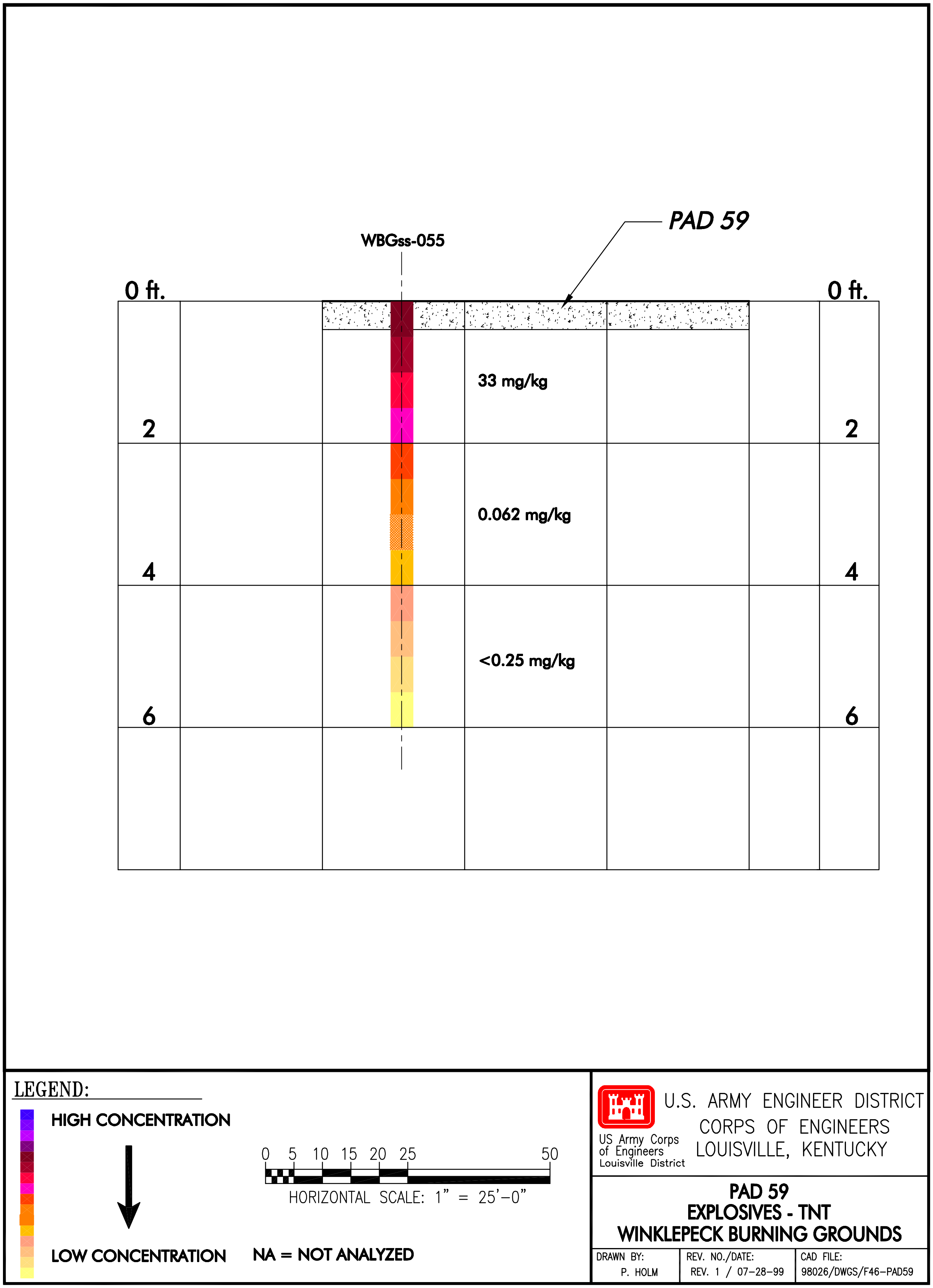

Figure 4-19. Explosive Concentration with Depth at Pad #59

4.3.9 Pad #60

Surface Soils

During the Phase I field investigation, two surface soil samples were collected for explosives analyses. TNT was detected in sample WBGss-057 at a concentration of 0.3 mg/kg. During the Phase II investigation, six additional surface soil samples were collected and field screened for TNT and RDX. One sample (WBGss-122) was additionally sent for laboratory analyses. Field screening detected TNT in samples WBGss-122 and WBGss-123 at concentrations of 3.4 and 1.0 mg/kg, respectively. Laboratory analytical results for sample WBGss-122 indicated the presence of TNB (0.13 mg/kg); 2,4-dinitrobenzene (0.065 mg/kg); DNT (0.065 mg/kg); HMX (0.240 mg/kg); nitrocellulose (5.8 mg/kg); and tetryl (0.48 mg/kg). **Figure 4-20** illustrates the occurrence of five explosives at Pad #60.

Eight surface soil samples from the Phase I and II investigations were submitted for inorganic analyses. Fifteen metals were detected at concentrations above background criteria in at least one of these samples, including aluminum, antimony, barium, beryllium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, vanadium, and zinc. Antimony, cadmium, and copper were detected above background criteria in all samples analyzed for these parameters. Barium, chromium, iron, lead, silver, and zinc were each detected above background in all samples except one or two, where analyzed. Mercury was present above background in four samples. Selenium and vanadium were each detected in one sample. In general, the most elevated concentrations of detected metals were found in samples WBGss-120 and -122, indicating that the greatest potential for inorganic contamination exists along the southwest side of the pad (**Figure 4-21).**

WBGss-122 was the only surface soil sample at Pad #60 submitted for organic analysis. The sample was submitted for SVOC analysis only. Detected SVOCs include 2-methylnaphthalene (150 µg/kg) as well as PAH compounds benzo(*a*)anthracene (43 µg/kg), benzo(*a*)pyrene (60 µg/kg), benzo(*b*)fluoranthene, (93 µg/kg), chrysene (50 µg/kg), fluoranthene (88 µg/kg), phenanthrene (140 µg/kg), and pyrene (110 µg/kg). These compounds may be present in soils because of site disposal practices such as the open burning of explosives-contaminated sawdust or ash disposal, or because of vehicle exhaust deposition along the roadways and pads at the burning ground.

Subsurface Soils

Three subsurface soil samples were collected at Pad #60. Two of these were collected from the Phase I sampling location on the eastern half of the pad (WBGso-057). The 0.6- to 1.2-m (2- to 4-ft) interval at WBGso-057 showed evidence of explosives and propellants. Field screening for TNT and RDX indicated these compounds were not present. Laboratory analyses reported concentrations of 0.430 mg/kg TNT, 0.26 mg/kg RDX, and 7.4 mg/kg nitroglycerine, as well as detections of four other explosives. Field screening of the 1.2- to 1.9-m (4- to 6-ft) interval indicated nondetects of TNT and RDX. Laboratory analysis showed 0.042 mg/kg, 1,3,5-TNB and 0.24 mg/kg tetryl. No other explosives were observed above detection levels. WBGso-057 had the highest detections of 3-nitrotoluene (0.12 mg/kg) and tetryl (0.24 mg/kg) encountered in the WBG subsurface samples. WBGso-122 was collected west of the pad to determine vertical and lateral extent of contamination. In WBGso-122, collected from 1.2 to 1.9 m (4 to 6 ft), HMX was present at 0.12 mg/kg. No other explosives or nitroglycerine were identified (see **Figure 4-20**).

Five inorganic elements were present at concentrations exceeding background criteria in the 0.6- to 1.2-m (2- to 4-ft) interval, including antimony, cadmium, copper, lead, and silver. Lead is present above background in the 0.6- to 1.2- m (2- to 4-ft) interval of WBGso-057 (105 mg/kg). In the 1.2- to 1.9-m (4- to 6-ft) interval, zinc and lead were also present above background criteria (see **Figure 4-21**).

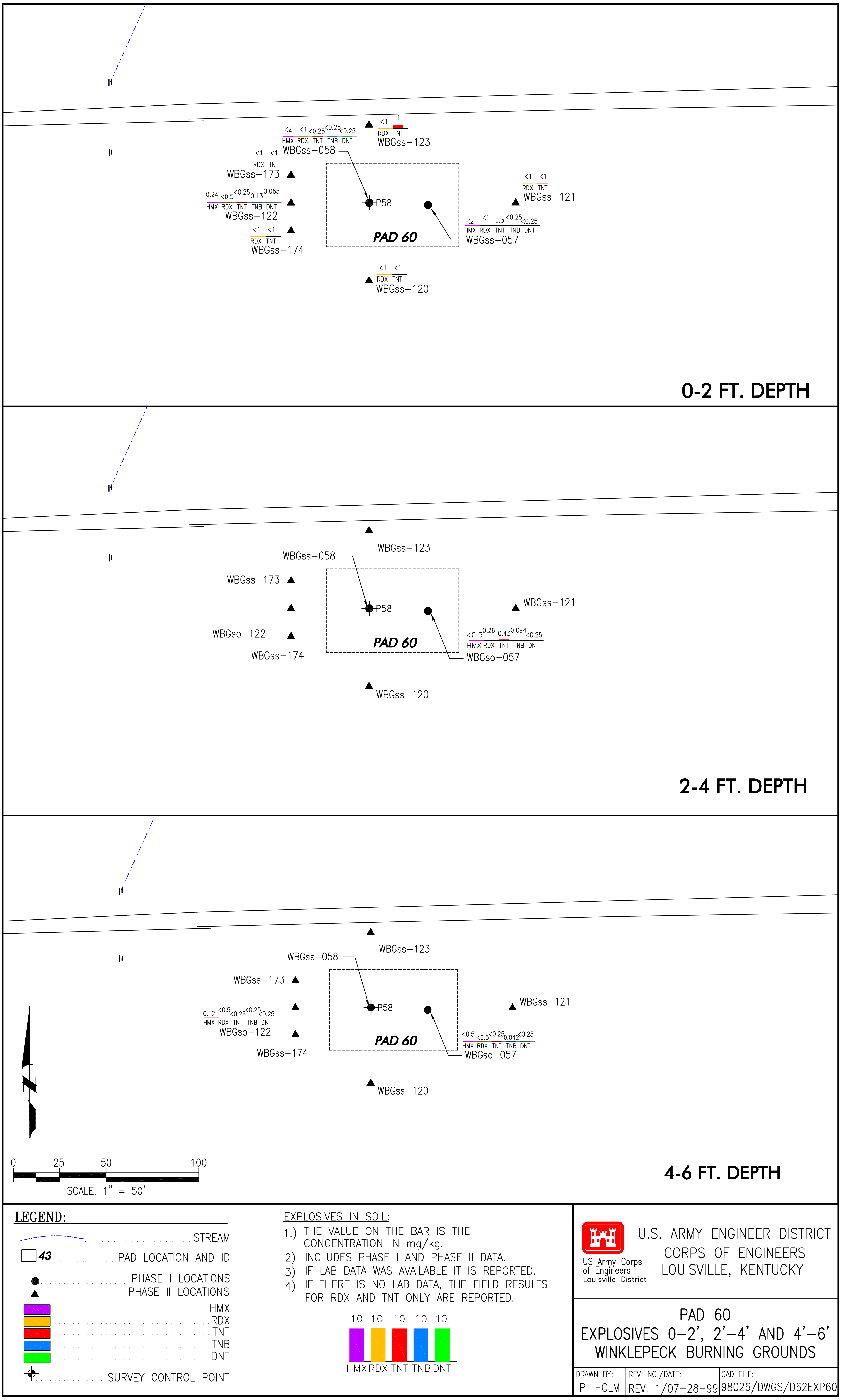

Figure 4-20. Explosives in Soil at Pad #60, WBG

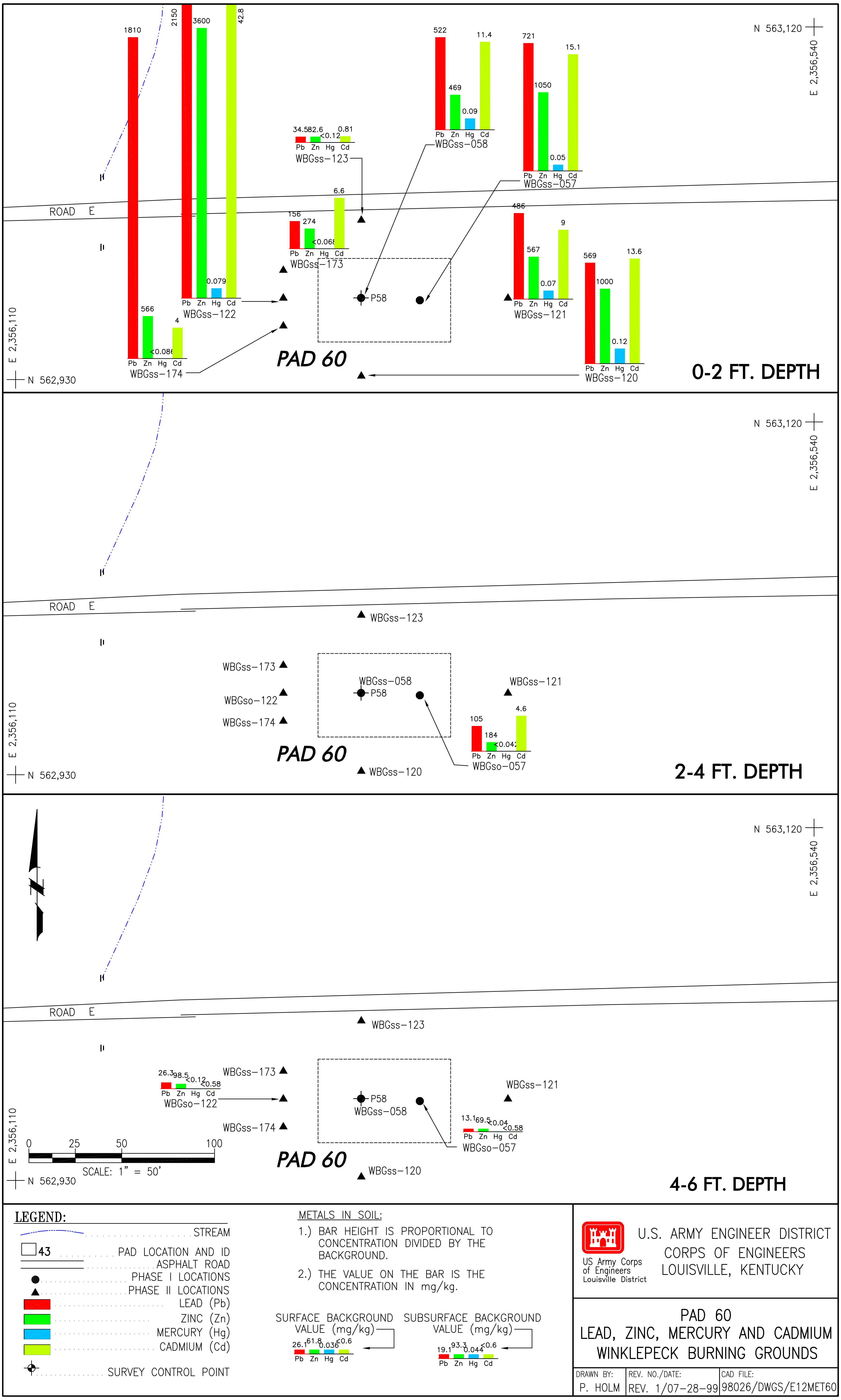

Figure 4-21. Selected Metals in Soil at Pad #60, WBG

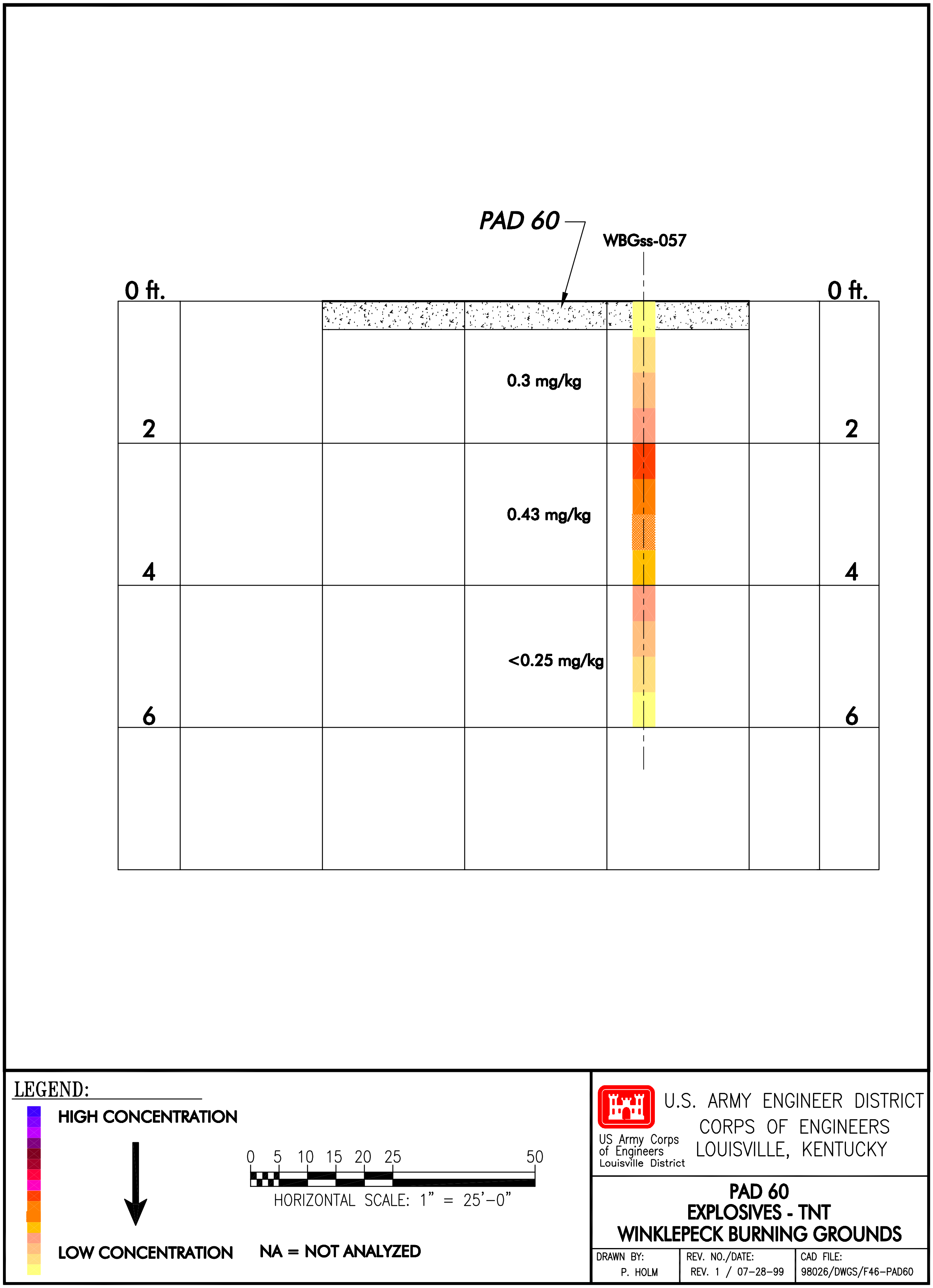

Figure 4-22. Explosive Concentration with Depth at Pad #60

Discussion

- Metals occurred well above background values in every surface soil sampling location. Cadmium, lead, and zinc were present at high concentrations.
- Concentrations of metals diminished with depth to levels slightly above background.
- The vertical and horizontal extent of metals contamination have not been defined at Pad #60.
- Explosives were present at concentrations greater than 1 mg/kg in two surface samples. Nitroglycerine was present at 7.4 mg/kg in the 0.6- to 1.2-m (2- to 4-ft) interval, but all other detections of explosives in this interval, and in the 1.2- to 1.9-m (4- to 6-ft) interval, were below 1 mg/kg. **Figure 4-22** presents a vertical profile of TNT concentrations with depth at WBGso-057.

4.3.10 Pad #61

Surface Soils

TNT was detected in one of two Phase I surface soil samples (WBGss-059), at a concentration of 0.38 mg/kg. During the Phase II RI, six additional surface soil samples were collected. TNT and RDX were not detected in any of the six surface soil samples screened for these contaminants. Two samples submitted for laboratory analysis had detections of explosive or propellants. Sample WBGss-126 contained TNB (0.055 mg/kg), 2-nitrotoluene (0.12 mg/kg), and HMX (0.14 mg/kg). HMX was additionally detected in sample WBGss-196 at a concentration of 0.11 mg/kg. **Figure 4-23** illustrates the distribution of explosive compounds.

Twelve metals were detected at concentrations above background criteria in at least one of the eight surface soil samples collected at Pad #61. Each sample collected exhibited at least one element exceeding background levels. Constituents detected above background included barium, cadmium, copper, chromium, iron, lead, magnesium, mercury, nickel, selenium, silver, and zinc. Copper and zinc were commonly detected at concentrations many times greater than the background criteria. Maximum concentrations of cadmium, copper, chromium, iron, lead, mercury, and nickel occurred in sample WBGss-126. This sample also exhibited the greatest number of metals occurring above background (**Figure 4-24**).

Surface soil samples from Pad # 61 were not analyzed for organic compounds.

Subsurface Soils

Two samples were collected from the 0.6- to 1.2-m (2- to 4-ft) interval at Pad #61. Field screening for TNT and RDX was negative. Based upon these results, no deeper sampling was performed. WBGso-059 was collected from the Phase I sampling location on the western half of the pad. The other sample, WBGso-196, was collected from the southeast quadrant of the pad for determination of vertical and lateral extent. 1,3,5-TNB was detected in WBGso-059 at a concentration of 0.099 mg/kg. TNT, HMX, and nitrobenzene were detected in WBGso-196, at concentrations of 0.044, 0.12, and 0.033 mg/kg, respectively (see **Figure 4-23**). No other explosive compounds or nitroglycerine were detected in either sample.

Both samples contained cadmium and lead at concentrations slightly above background criteria. WBGss-196 also contained thallium at 1.1 mg/kg, slightly higher than the background value (see **Figure 4-24**).

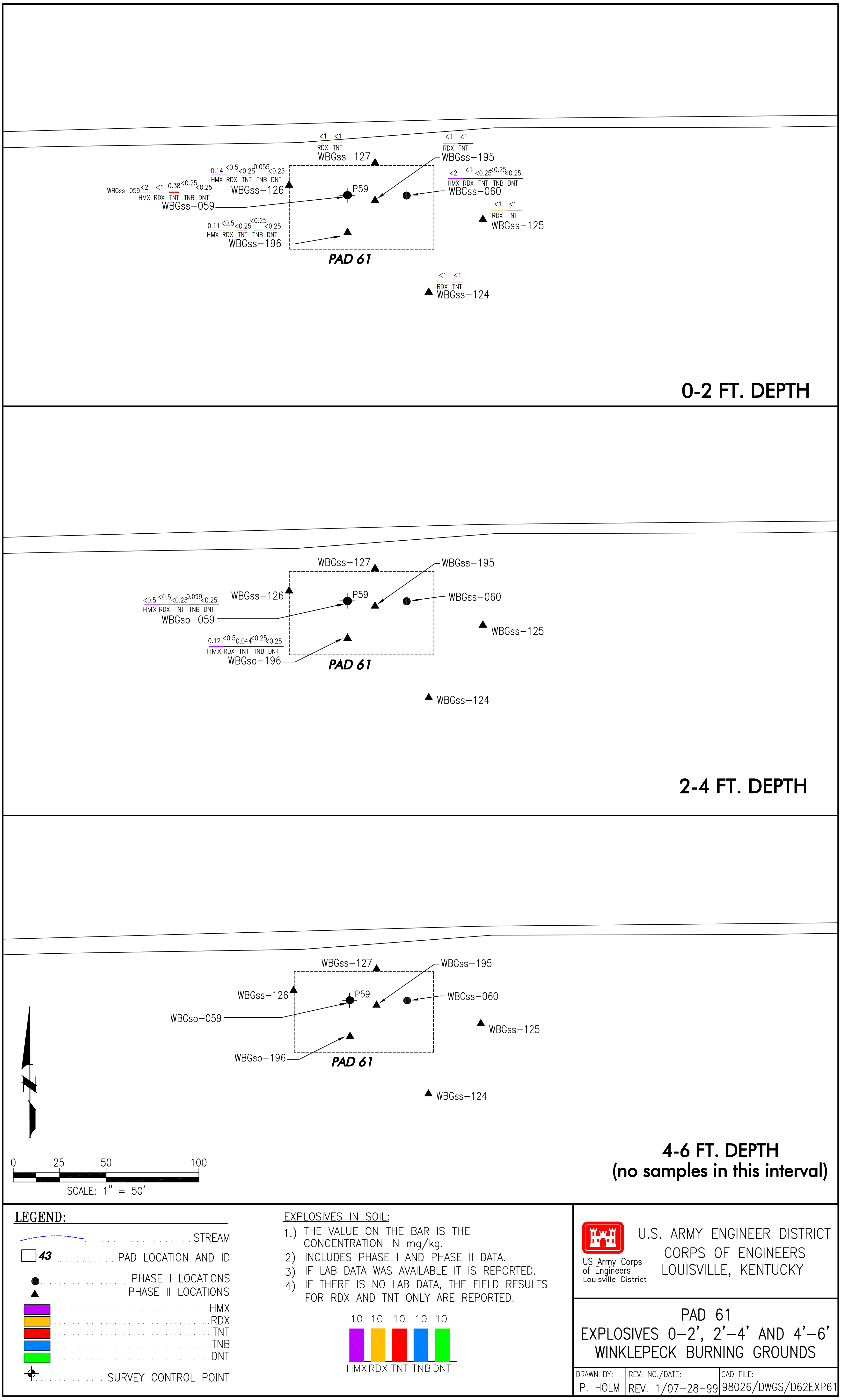

Figure 4-23. Explosives in Soil at Pad #61, WBG

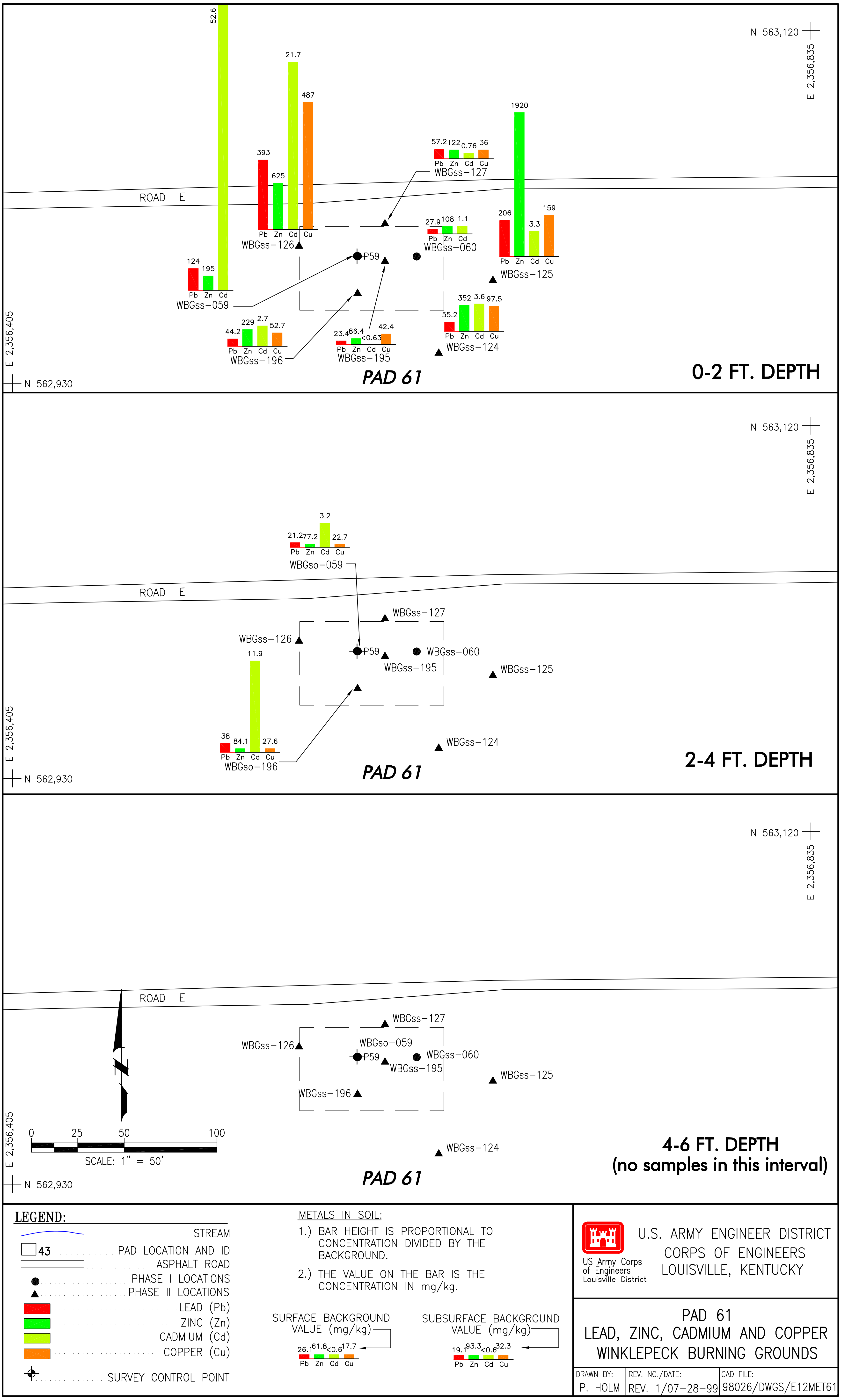

Figure 4-24. Selected Metals in Soil at Pad #61, WBG

Discussion

- No explosives occurred in soils at concentrations above 1 mg/kg. Probably no significant explosives contamination is present on this pad.

- The greatest contamination with respect to metals occurred in the adjacent areas east and west of Pad #61. Concentrations of metals were highest in the surface soils, and diminished in the 0.6- to 1.2- m (2- to 4-ft) interval. This indicates some degree of attenuation of metals contamination by adsorption in the soils.

4.3.11 Pad #62

Surface Soils

Explosives occur in one of two Phase I samples (WBGss-062). Analytical results for sample WBGss-062 indicated the presence of TNT (36 mg/kg), HMX (38 mg/kg), and RDX (270 mg/kg). During the Phase II investigation, four additional samples were collected (WBGss-128, -129, -130, and -194). Field screening of these samples for TNT and RDX did not indicate the presence of these compounds. However, confirmatory laboratory analysis showed concentrations of TNB (0.13 mg/kg), TNT (0.24 mg/kg), RDX (0.29 mg/kg), and tetryl (0.23 mg/kg) in sample WBGss-129; and TNB (0.071 mg/kg), HMX (0.120 mg/kg), and tetryl (0.883 mg/kg) in sample WBGss-194. **Figure 4-25** shows the distribution of five explosive compounds in the surface soils at this pad.

Twelve inorganic elements were detected at concentrations above background criteria in at least one surface soil sample collected at Pad #62. Metals detected above background included antimony, barium, cadmium, chromium, copper, iron, lead, magnesium, mercury, nickel, silver, and zinc. Cadmium, copper, lead, and zinc were detected above background in all samples analyzed for these parameters. Copper, lead, and zinc were commonly detected at concentrations many times higher than the background criteria. Antimony, barium, iron, magnesium, mercury, nickel, and silver were detected in two to three samples each. Maximum concentrations of cadmium, chromium, copper, lead, nickel, and zinc at Pad #62 all occurred in sample WBGss-128 (**Figure 4-26**).

Samples from Pad #62 were not analyzed for organic compounds.

Subsurface Soils

A 0.6- to 1.2-m (2- to 4-ft) sample and a 1.2- to 1.9-m (4- to 6-ft) sample were collected from the Phase I sampling location (WBGso-062) on the eastern half of Pad #62. Field screening results for TNT and RDX were negative in both samples (including the field duplicate). However, laboratory analysis indicates both depth intervals contain explosive compounds. 1,3,5-TNB (0.51 mg/kg), RDX (7 mg/kg), and HMX (1.4 mg/kg) occurred in the 0.6- to 1.2-m (2- to 4-ft) interval. In the 1.2- to 1.9-m (4- to 6- ft) interval, RDX was present at a concentration of 0.55 mg/kg, and TNT at 0.048 mg/kg. No other explosive compounds or nitroglycerine were present above detection levels in either sample. **Figure 4-25** shows the distribution of four explosives at Pad #62.

Inorganic elements were present at concentrations above background in the 0.6- to 1.2-m (2- to 4-ft) sample. These included barium, beryllium, cobalt, lead, manganese, and vanadium. The concentrations of these analytes in the 1.2- to 1.9-m (4- to 6-ft) interval were less than half of those observed in the 0.6- to 1.2-m (2- to 4-ft) interval. **Figure 4-26** shows the distribution of inorganic SRCs.

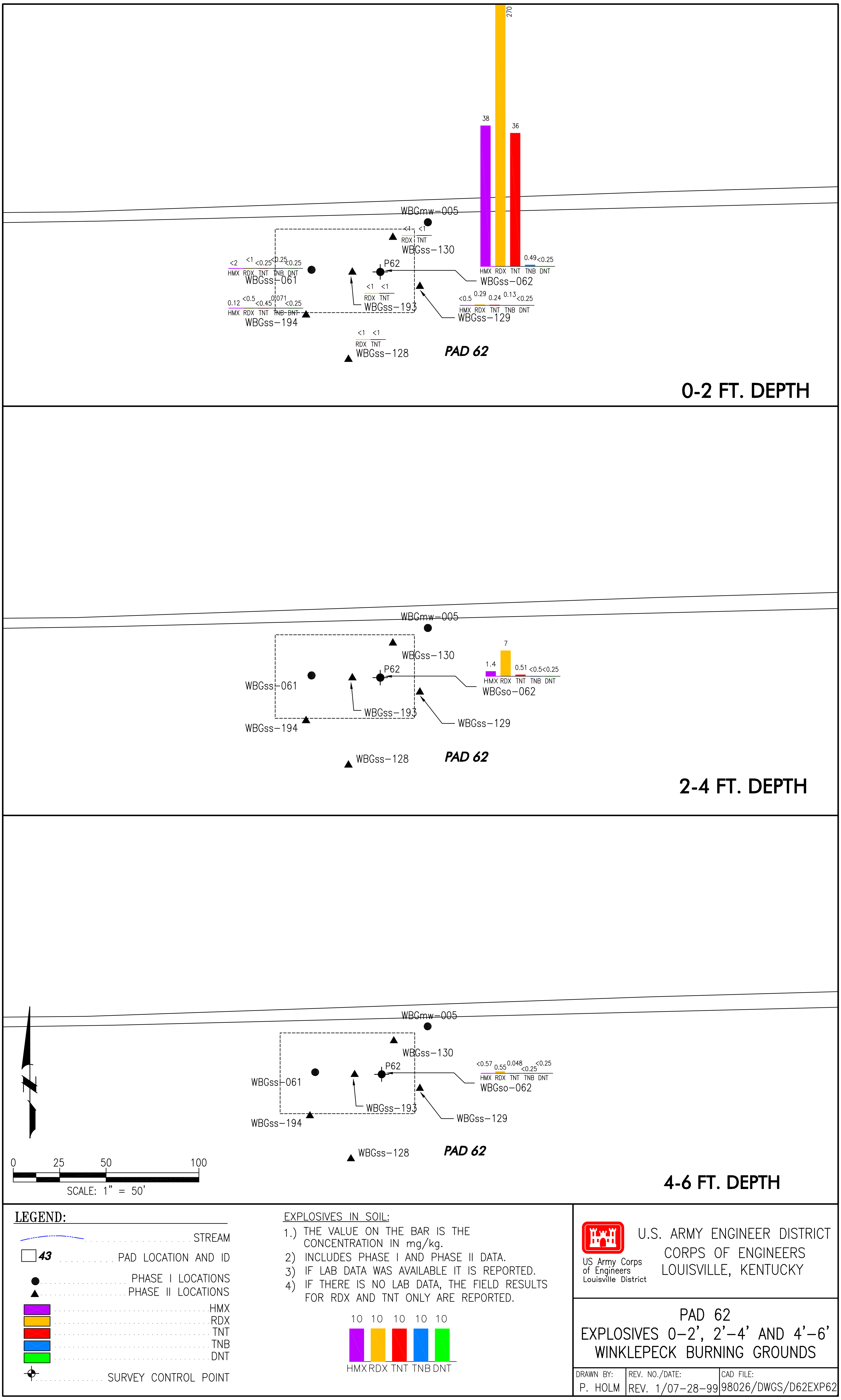

Figure 4-25. Explosives in Soil at Pad #62, WBG

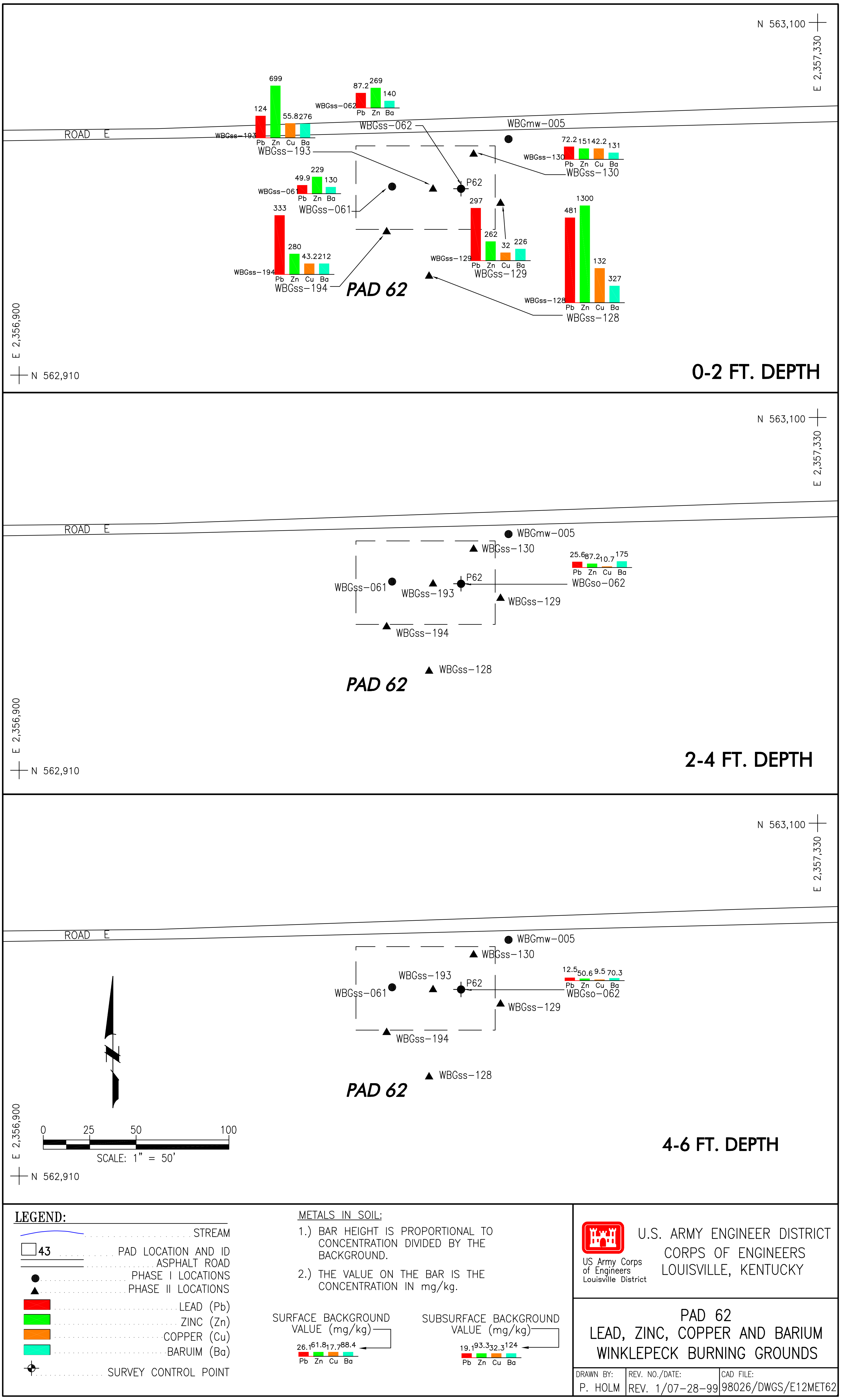

Figure 4-26. Selected Metals in Soil at Pad #62, WBG

Discussion

- Explosives were identified at high concentrations in one surface soil sample, and were also present at concentrations greater than 1 mg/kg in the 0.6- to 1.2- m (2- to 4-ft) interval at WBGso-062. **Figure 4-27** presents a vertical profile of explosives concentrations at WBGso-062.

- The horizontal extent of explosives contamination has been characterized, but the vertical extent is not known.

- Metals were present at concentrations above background at each surface soil location. As such, horizontal extent is not known.

Concentrations of metals diminished with depth to concentrations that are generally equal to or below background. The eastern half of the pad shows the greatest potential for subsurface contamination with metals.

4.3.12 Pad #66

Surface Soils

Explosives were detected in both of the Phase I surface soil samples. Field screening of six additional samples collected during the Phase II RI did not indicate the presence of TNT or RDX. Laboratory analysis of sample WBGss-068 shows TNT at a concentration of 0.47 mg/kg. Sample WBGss-069, also collected during Phase I, had highly elevated concentrations of TNT (3800 mg/kg) and TNB (76 mg/kg). Five explosives were detected in sample WBGss-134, and six explosives and one propellant were detected in sample WBGss-168 (see **Table 4-19b**). Nitrocellulose was present in this sample at one of the highest concentrations (32.2 mg/kg) of this material identified in WBG. The distribution of the detected explosives indicates that potential contamination is primarily located in the central and eastern portion of the pad. **Figure 4-28** illustrates the distribution of explosives at Pad #66.

Eleven inorganic elements were detected at concentrations above background criteria in six surface soil samples at Pad #66, including antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, silver, and zinc. Each sample exhibited at least one metal occurring above background. Maximum concentrations of arsenic, barium, cadmium, and zinc at this pad occurred in sample WBGss-069, and maximum concentrations of antimony, chromium, copper, lead, and silver occurred in adjacent sample WBGss-168, indicating that the greatest potential for inorganic contamination appears to be along east side of the pad (**Figure 4-29**). Antimony, barium, cadmium, copper, lead, mercury, and zinc were commonly present in concentrations many times higher than the background values in the six samples. Lead was also present at a concentration greater than 100 mg/kg at WBGss-132, southwest of the pad. Cyanide was detected in WBGss-168, at a concentration of 0.78 mg/kg.

One sample from Pad #66 (WBGss-131) was analyzed for SVOCs. Analytical results showed the presence of numerous PAHs ranging in concentration from 54 µg/kg [dibenzo(*a,h*)anthracene] to 2000 µg/kg (fluoranthene). The presence of PAHs may reflect former disposition by burning of explosives and other materials at WBG.

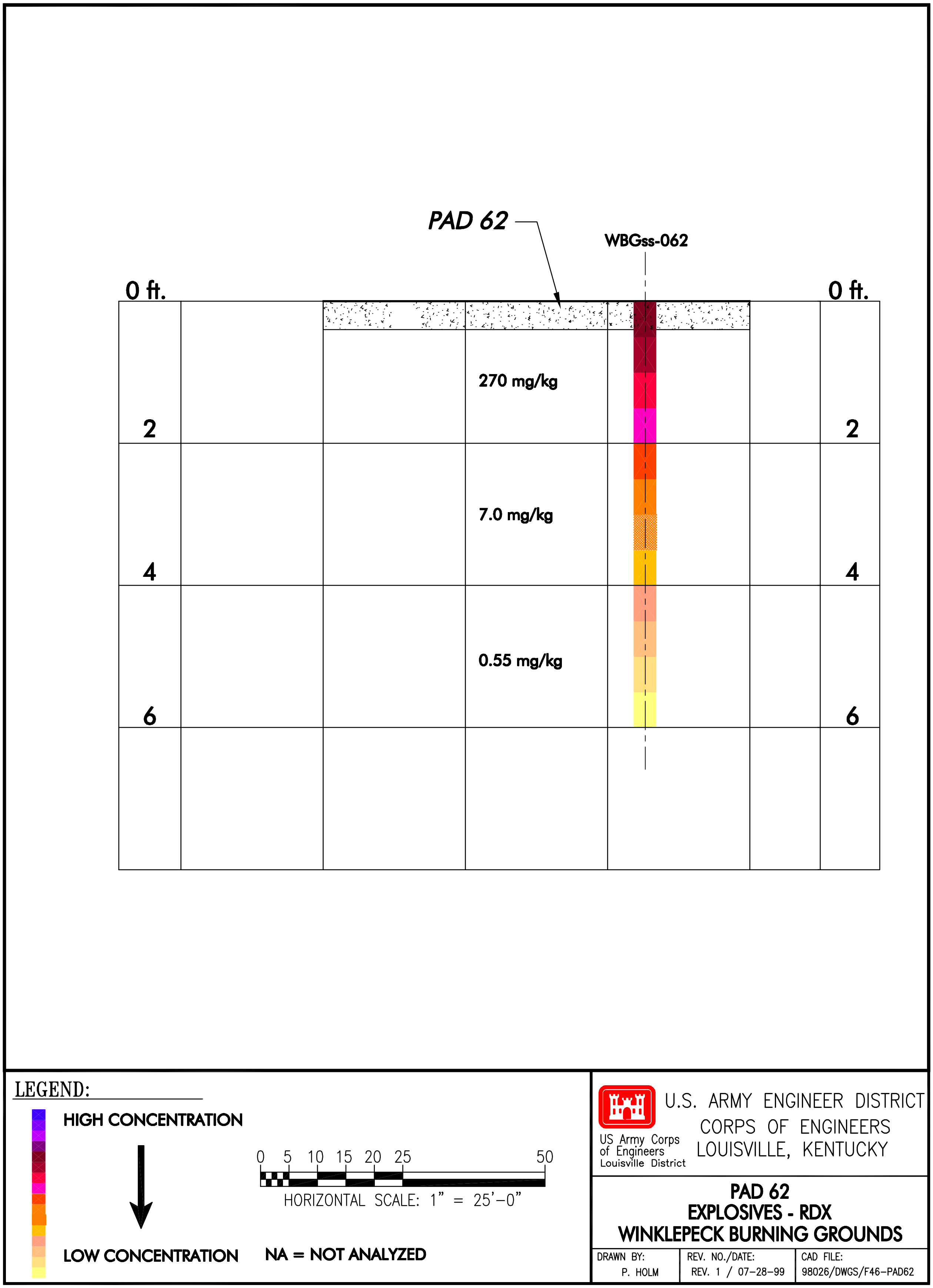

Figure 4.27. Explosive Concentration with Depth at Pad #62

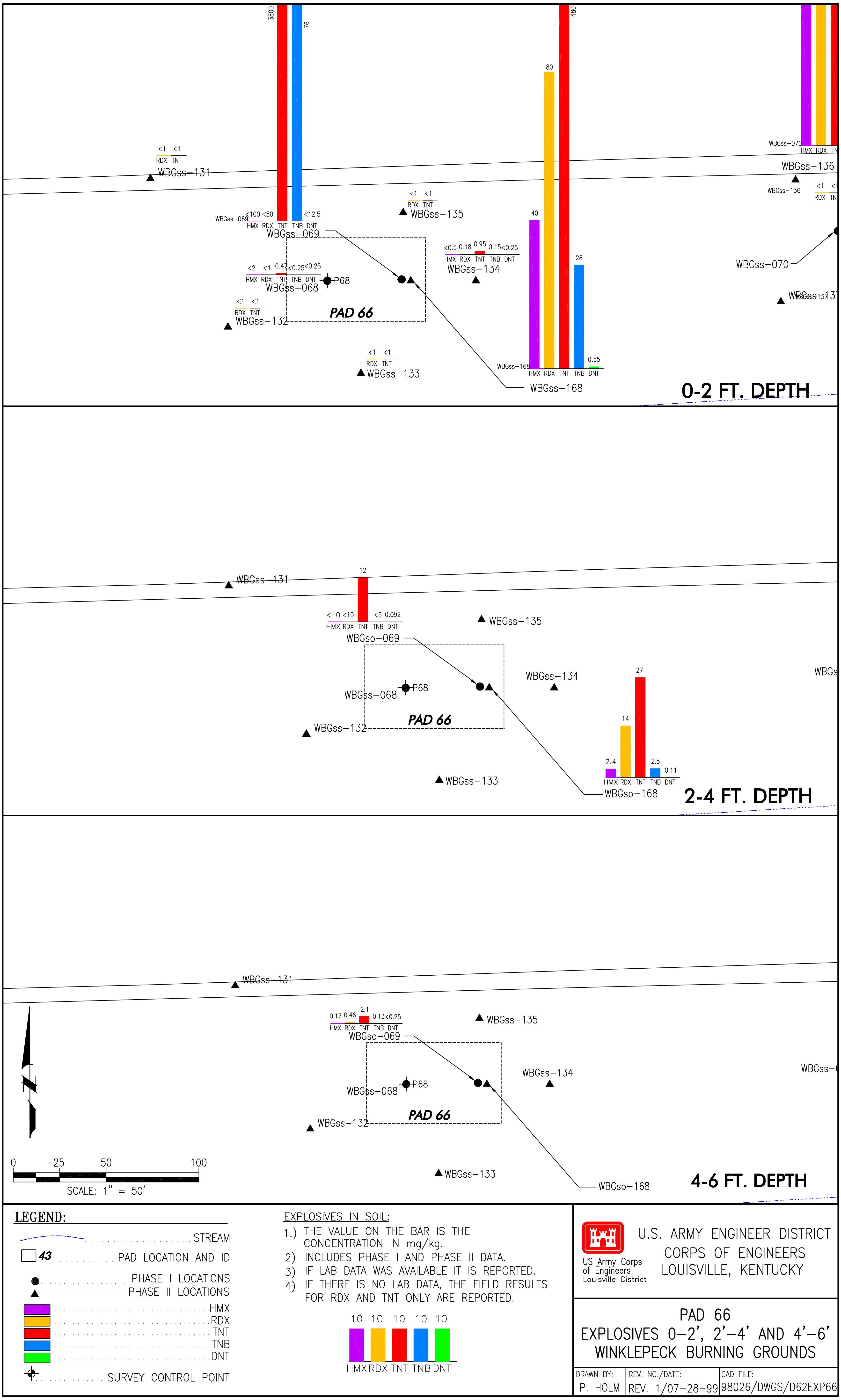

Figure 4-28. Explosives in Soil at Pad #66, WBG

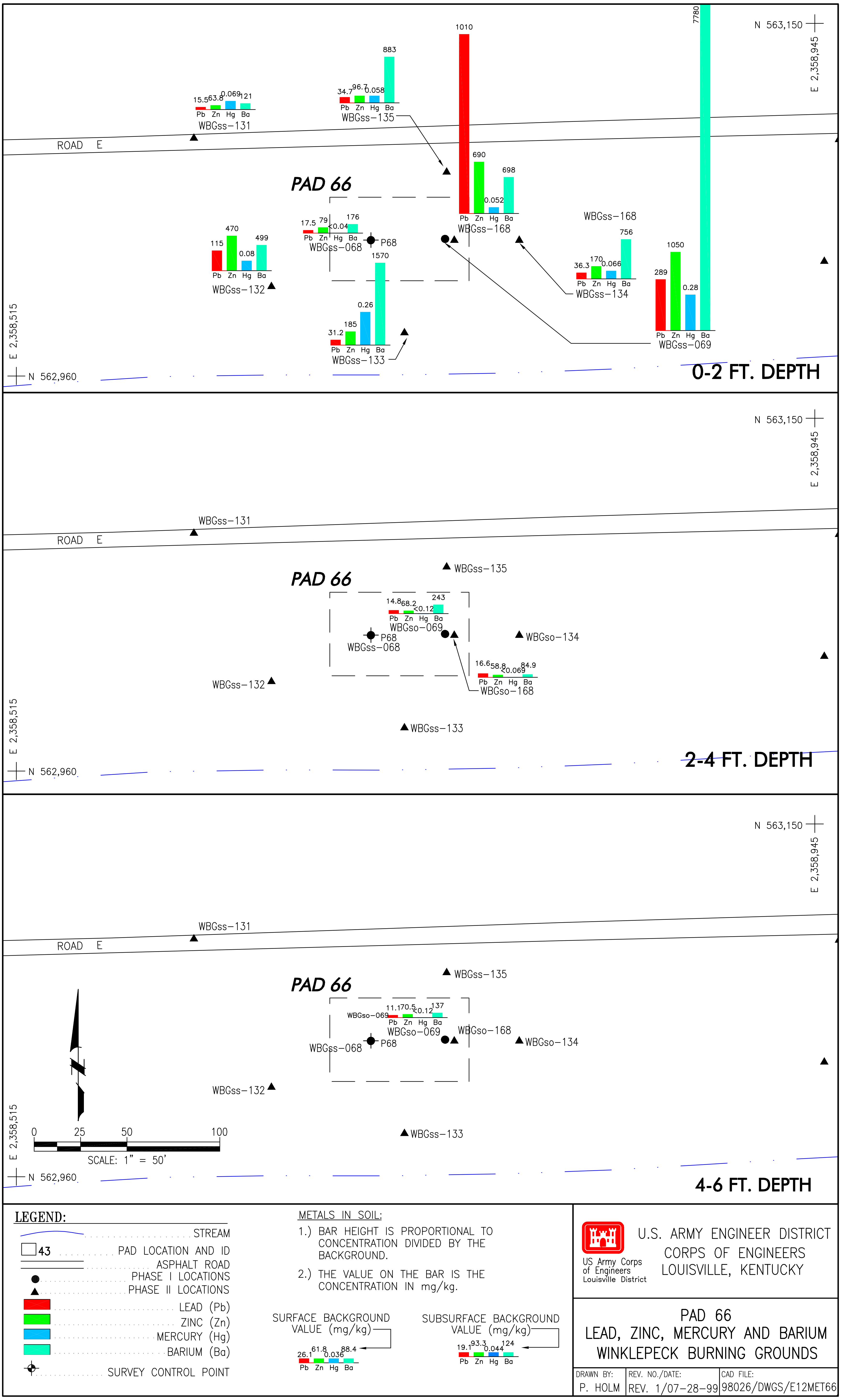

Figure 4-29. Selected Metals in Soil at Pad #66, WBG

Subsurface Soils

A 0.6- to 1.2-m (2- to 4-ft) sample and a 1.2- to 1.6-m (4- to 5-ft) sample were collected from WBGso-069 on the eastern half of Pad #66. An additional 0.6- to 1.2-m (2- to 4-ft) sample (WBGso-168) was collected immediately east of that location to verify extent. Field screening for RDX showed positive results in all three samples for TNT, and one positive result for RDX. Laboratory analysis indicated the presence of nine explosives among the three subsurface samples at elevated concentrations. WBGso-069 showed TNT in the 0.6- to 1.2- m (2- to 4-ft) interval, at a concentration of 12 mg/kg. 2,4-DNT was detected at 0.092 mg/kg. In the interval from 1.2 to 1.6 m (4 to 5 ft), 1,3,5-TNB, TNT, 2,6-DNT, HMX, RDX, and other explosives were detected at concentrations ranging from 0.065 to 2.1 mg/kg. WBGso-168, on the eastern half of the pad, contained the highest concentrations of 2,6-DNT (0.220 mg/kg), TNT (27 mg/kg), and nitrobenzene (0.360 mg/kg) found in the subsurface samples at WBG in the 0.6- to 1.2-m (2- to 4-ft) interval. RDX was also present at 14 mg/kg, and nitrocellulose was detected at a concentration of 6.6 mg/kg (see **Figure 4-28**).

Inorganic elements and compounds analyzed in the three subsurface samples at Pad #66 were generally present at concentrations below the background criteria, with the following exceptions. Antimony was detected (1 mg/kg) above the background concentration in WBGso-168. Barium was present above background in both the 0.6- to 1.2-m (2- to 4-ft) and 1.2- to 1.6-m (4- to 5-ft) samples at WBGso-069, at concentrations of 243 and 137 mg/kg, respectively (see **Figure 4-29**).

Discussion

- Explosives and propellants were present in both surface and subsurface soils in relatively high concentrations, at locations on the east side of the pad (see **Figure 4-30**). Explosives greater than 1 mg/kg were encountered in the 1.2- to 1.9- m (4- to 6-ft) interval; therefore, vertical extent is not known.

- Metals detected above background were most concentrated on the east side of the pad, in both the surface and the subsurface. However, horizontal extent is not known.

- Metals concentrations appeared to decrease with depth, suggesting some degree of vertical attenuation.

4.3.13 Pad #67

Surface Soils

Explosives were detected in both of the surface soil samples collected during the Phase I investigation, one of which was located off the pad to the west (WBGss-070). This sample showed highly elevated concentrations of TNB (490 mg/kg), TNT (3400 mg/kg), HMX (1700 mg/kg), and RDX (9500 mg/kg). TNT was detected at a concentration of 2.3 mg/kg in sample WBGss-071. During the Phase II investigation, seven additional samples were collected. Field screening of samples WBGss-140 and WBGss-178, both taken from the drainage area south of the pad, indicated positive results for TNT (6.2 mg/kg and 1 mg/kg, respectively). RDX was not detected in the screening of any of the samples. Both of these samples were sent for confirmatory laboratory analysis. Laboratory analysis for sample WBGss-140 showed TNT at a concentration of 75 mg/kg and 2,4-dinitrotoluene at a concentration of 0.220 mg/kg. Laboratory results for sample WBGss-178 confirmed the presence of TNT at a concentration of 1.6 mg/kg, and showed detections of TNB (0.12 mg/kg), HMX (0.35 mg/kg), nitrobenzene (0.035 mg/kg), nitrocellulose (2.5 mg/kg), RDX (0.24 mg/kg), and tetryl (0.093 mg/kg). **Figure 4-31** presents the distribution of explosive compounds in the surface soil.

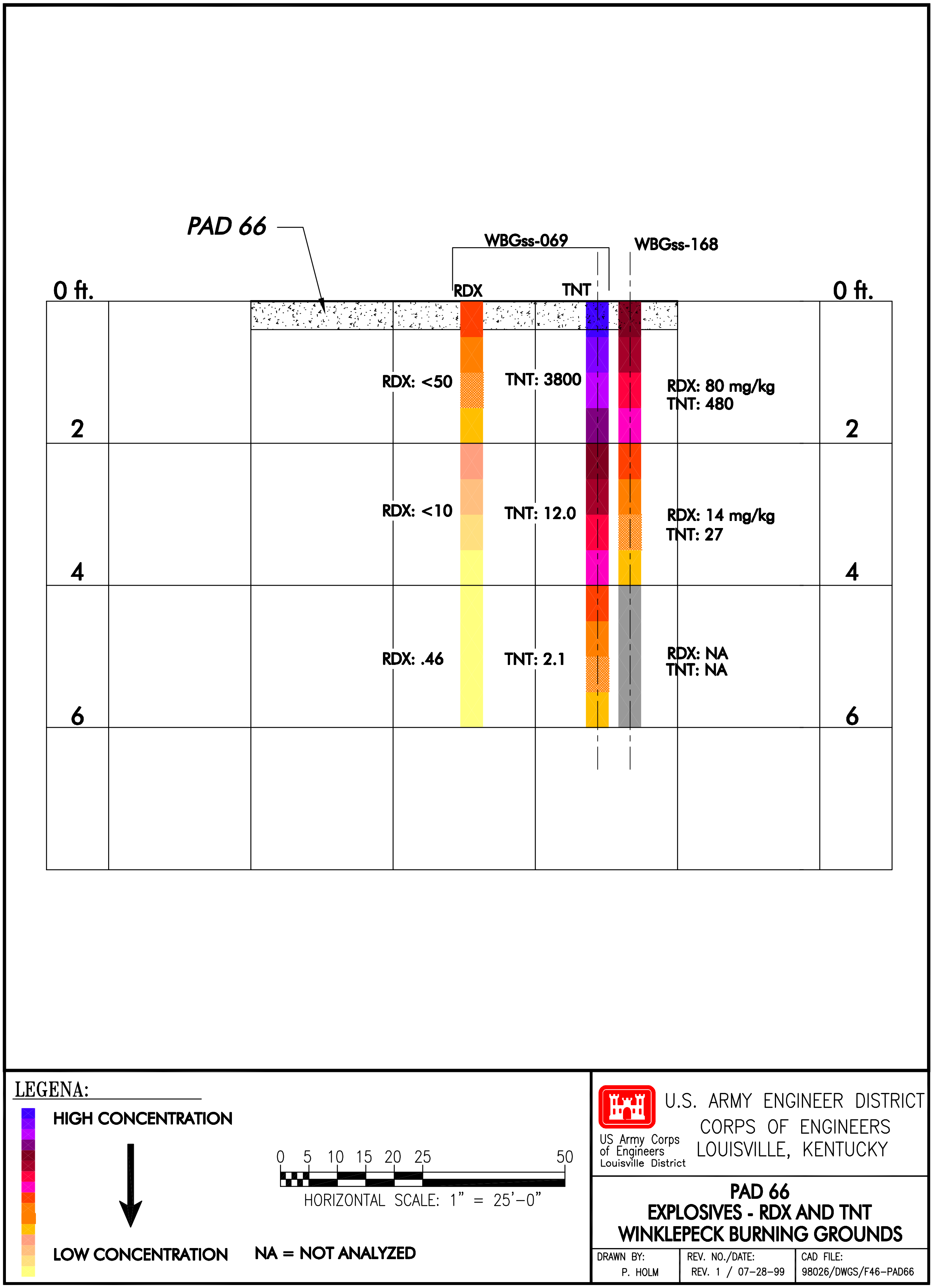

Figure 4-30. Explosive Concentration with Depth at Pad #66

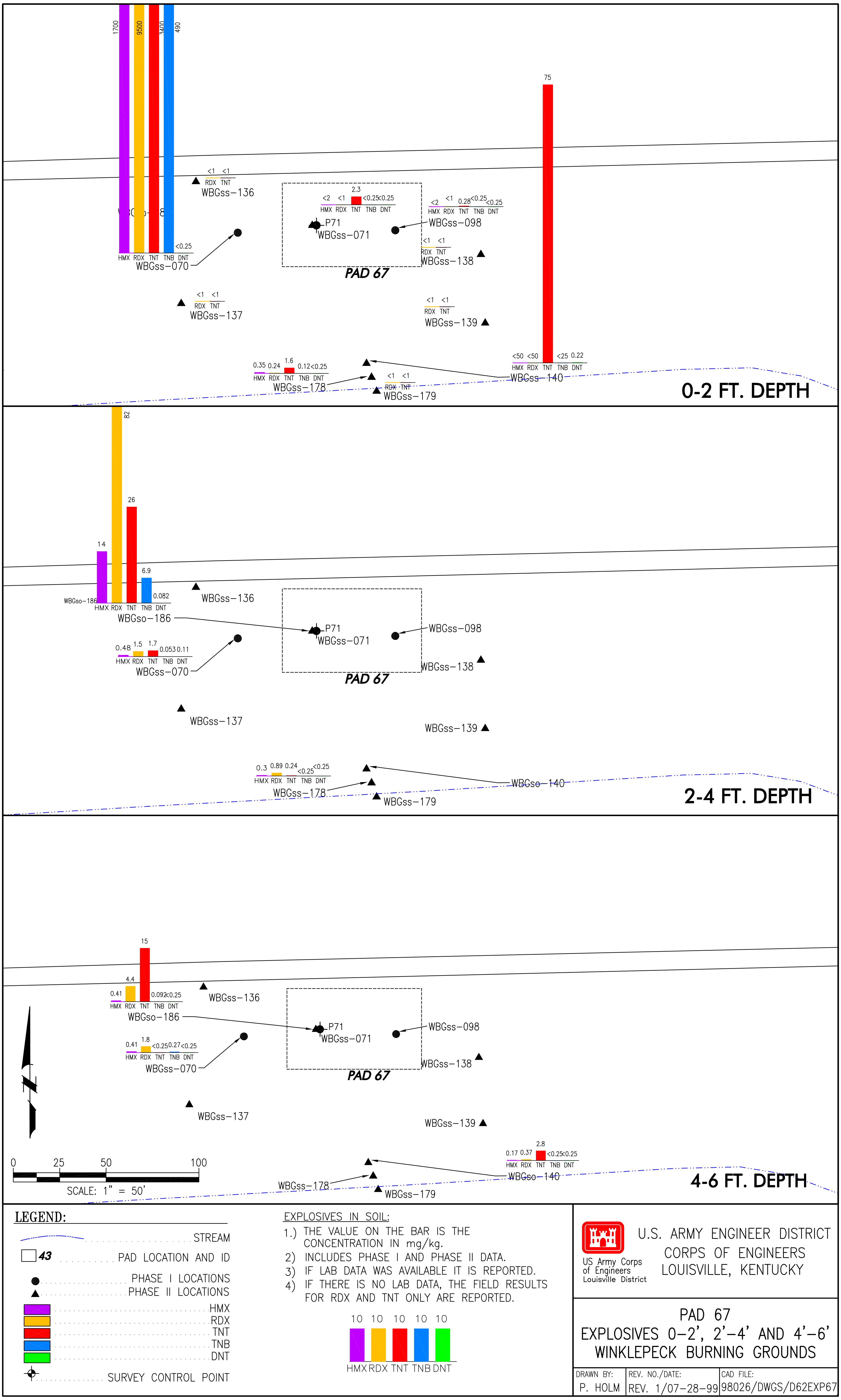

Figure 4-31. Explosives in Soil at Pad #67, WBG

Twelve inorganic elements were detected at concentrations above background criteria among the nine surface soil samples from Pad #67. Between three and eight metals were detected above background in each sample, and included antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, selenium, and zinc. Cobalt, selenium, and vanadium were each detected above background in only one or two samples. Barium, copper, mercury, and zinc were detected at background or at concentrations many times greater than the background criteria in each of the nine samples collected. In general, the greatest number of metals detected above background and the highest concentrations of detected metals occurred in samples WBGss-140, -178, and -179 directly south of the pad (**Figure 4-32**).

Surface soil samples from Pad #67 were not analyzed for organic compounds.

Subsurface Soils

Three samples from the 0.6- to 1.2-m (2- to 4-ft) interval and three from the 1.2- to 1.9-m (4- to 6-ft) interval were collected at Pad #67. Field screening results indicated that the samples from the two subsurface intervals at WBGso-186 tested positive for explosives in the field; the remaining samples were negative. Based on those results, no further sampling was performed. Laboratory analysis reported that explosives and/or propellants, most notably TNT, RDX, HMX, nitroglycerine, and nitrocellulose, were present in all of these samples. RDX was detected in every sample, in concentrations ranging from 0.370 mg/kg at WBGso-140 to 82 mg/kg in WBGso-186 [0.6 to 1.2 m (2 to 4 ft)]. HMX was also present in every sample, in concentrations from 0.170 mg/kg at WBGso-140 to 14 mg/kg at WBGso-186. TNT was detected in four of the five 0.6- to 1.2-m (2- to 4-ft) samples and in two out of three 1.2- to 1.9-m (4- to 6-ft) samples. TNT was found in the 0.6- to 1.2-m (2- to 4-ft) interval at WBGso-186 at 26 mg/kg, at WBGso-140 at 2.8 mg/kg, and at WBGso-070 at 1.7 mg/kg. It was also present in the 1.2- to 1.9-m (4- to 6-ft) sample at WBGso-186 at 15 mg/kg. WBGso-186 [0.6 to 1.2 m (2 to 4 ft)] appears to be the locus of the maximum values for 1,3,5-TNB (6.9 mg/kg), 2-nitrotoluene (4.8 mg/kg), and RDX (82 mg/kg) in the subsurface soils at WBG. Nitrocellulose was also present in WBGso-186 at 88.4 mg/kg. The occurrence of explosives in the subsurface appears to extend vertically to the 1.2- to 1.9-m (4- to 6-ft) interval, both on the western half of the pad and off the pad to the west and south. The extent of explosive contamination is presented graphically in **Figure 4-31**.

Inorganic elements were detected frequently in subsurface soils at Pad #67, but with few occurrences of concentrations above background criteria. Most of these were only slightly elevated with respect to background values, e.g., 20.6 mg/kg arsenic at WBGso-070 and 1.3 mg/kg antimony at WBGso-186 [both in the 0.6 to 1.1 m (2 to 4 ft) interval]. Detections of barium at 0.6 to 1.1 m (2 to 4 ft) in WBGso-186 and WBGso-140 at 1.2 to 1.9 m (4 to 6 ft) exceeded the background criteria by more than two times, at 275 and 367 mg/kg, respectively. **Figure 4-32** depicts the distribution of four inorganic SRCs at Pad #67.

Two subsurface samples were analyzed for SVOCs at Pad #67 – WBGso-178 [0.6 to 1.1 m (2 to 4 ft)] and WBGso-186 [1.2 to 1.9 m (4 to 6 ft)]. SVOCs were not detected in either sample.

Discussion

- Explosives contamination—most notably RDX and TNT—was present in the surface soils on the pad and in the adjacent areas south and west of the pad (**Figure 4-33**).

- Explosives were present in elevated concentrations in WBGss-070 and WBGss-186 down to the 1.2- to 1.9-m (4- to 6-ft) interval. As such, vertical extent has not been defined.

- High concentrations of metals were observed in the area south of the pad. Barium was found at a concentration greater than twice the background criterion in the 1.2- to 1.9-m (4- to 6-ft) interval. Thus, the vertical extent of contamination is not known.

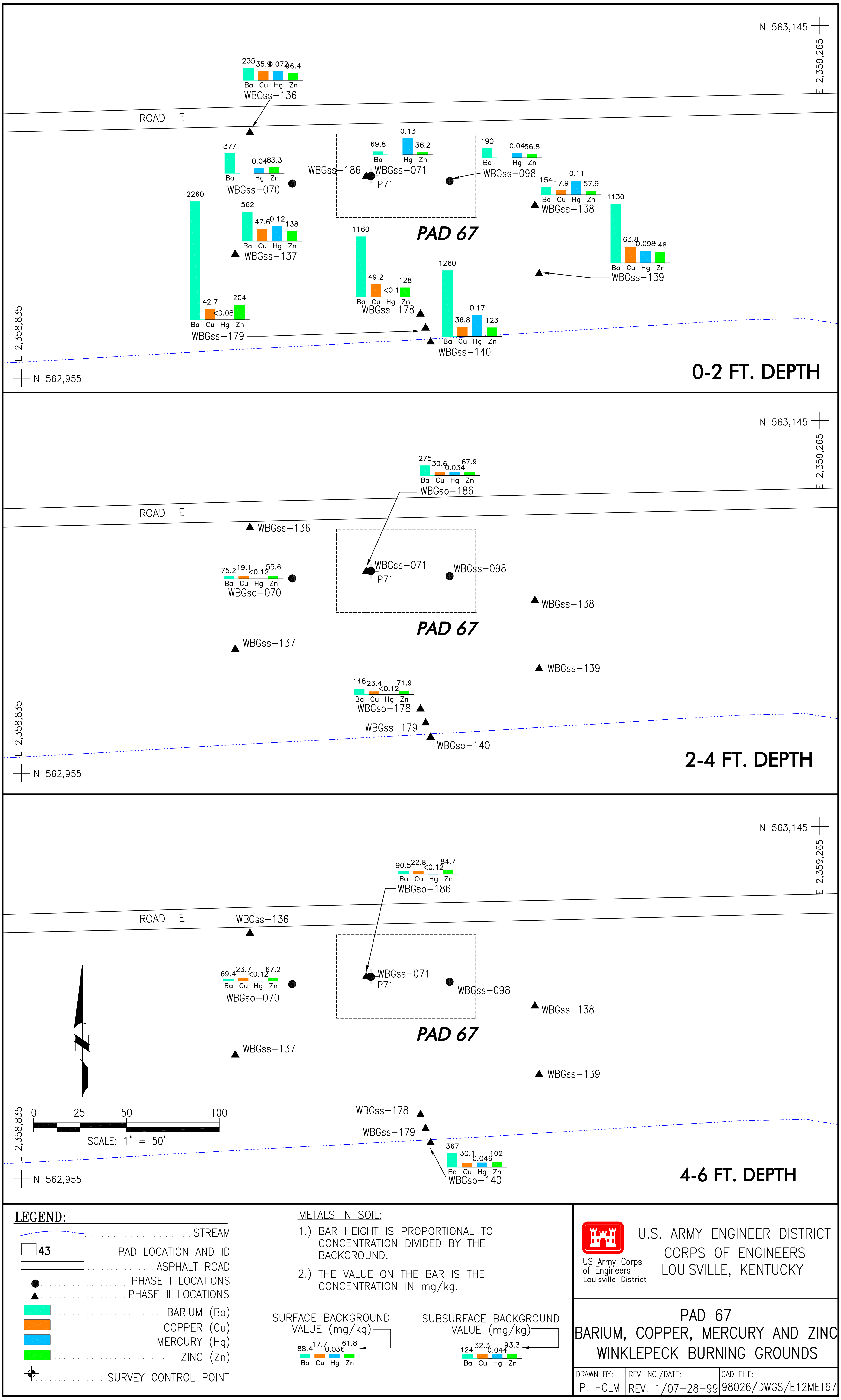

Figure 4-32. Selected Metals in Soil at Pad #67, WBG

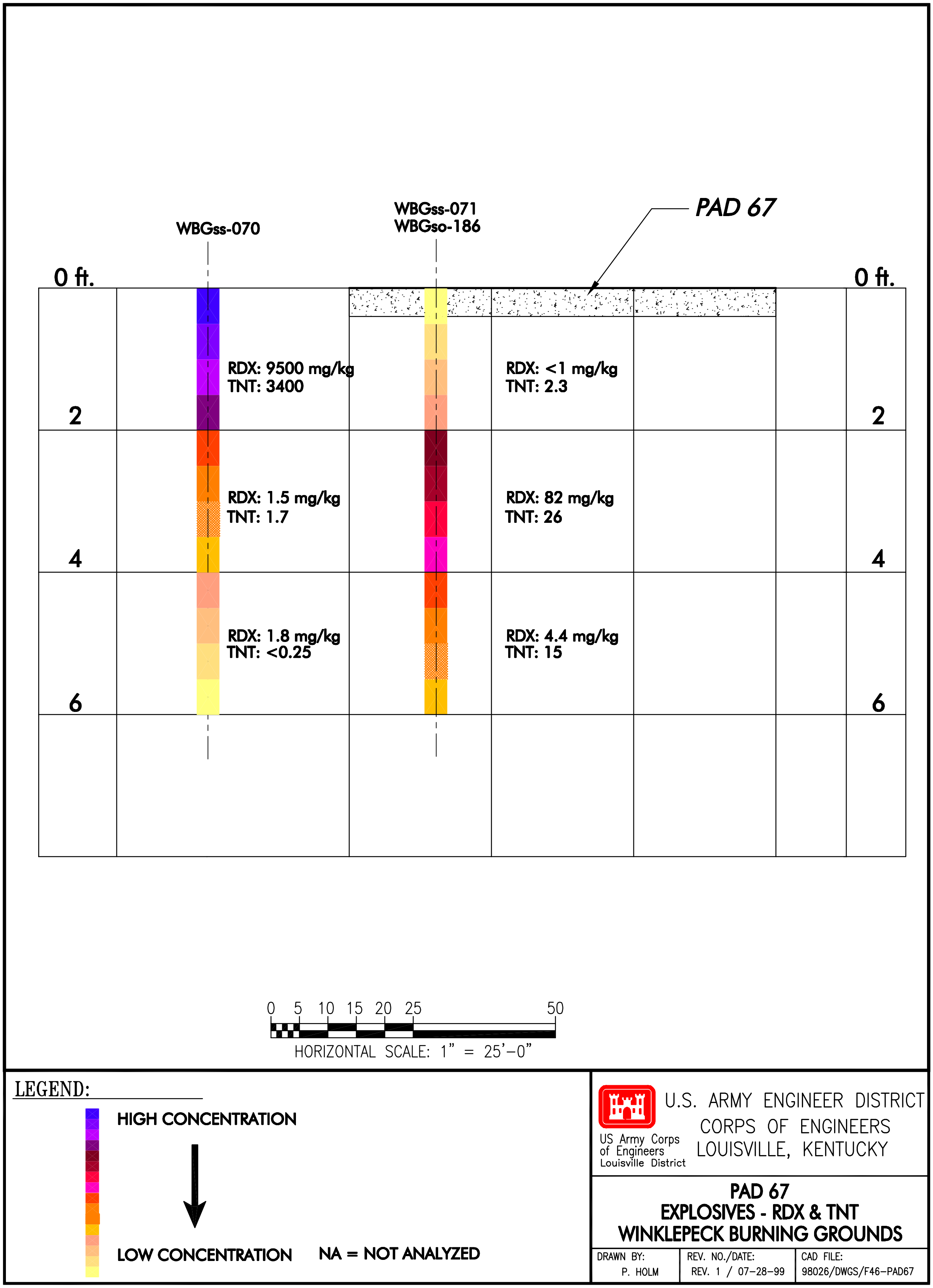

Figure 4-33. Explosive Concentration with Depth at Pad #67

Contamination with SVOCs does not occur at Pad # 67.

4.3.14 Pad #68

Surface Soils

TNT was detected during the Phase I RI at a concentration of 0.48J mg/kg in sample WBGss-073. During the Phase II RI, five additional surface soil samples were collected. Field screening of these samples indicated the presence of TNT at concentrations of 1.6 mg/kg and 135 mg/kg in samples WBGss-141 and WBGss-142 (respectively). Confirmatory laboratory analyses for these samples indicated the presence of several additional explosives and one propellant. Explosive compounds detected in sample WBGss-141 included TNB (0.62 mg/kg); 1,3-dinitrobenzene (0.084 mg/kg); TNT (1.5 mg/kg); 2,4-dinitrobenzene (0.12 mg/kg); 4-nitrotoluene (0.13 mg/kg); HMX (0.24 mg/kg); nitrocellulose (11 mg/kg); and RDX (0.34 mg/kg). Compounds detected in sampleWBGss-142 included TNT (17 mg/kg), 2,4-dinitrotoluene (0.36 mg/kg); and nitrocellulose (3 mg/kg). **Figure 4-34** illustrates the distribution of these explosives.

Eleven inorganic elements and compounds were detected at concentrations above background criteria in at least one of seven surface soil samples collected at Pad #68. Each sample collected contained at least three metals at concentrations exceeding background. Metals detected above background included antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, thallium, and zinc. Arsenic, iron, and thallium were each detected above background in one sample. Maximum detections of antimony, chromium, copper, iron, and lead occurred in sample WBGss-141. Maximum concentrations of barium, cadmium, mercury, and zinc occurred in sample WBGss-142. WBGss-141 and WBGss-142 are located on the south and east sides of Pad #68 (respectively), downgradient from the pad. WBGss-176 also showed antimony, barium, copper, mercury, and zinc in concentrations many times greater than the background criteria (**Figure 4-35**). Lead was present at concentrations greater than 100 mg/kg in five of the seven samples. Cyanide was detected at a concentration of 1.2 mg/kg in WBGss-141.

Surface soil sample WBGss-072 was analyzed for VOCs, SVOCs, pesticides, and PCBs in the Phase I RI. Toluene, with a concentration of 81 μg/kg, was the only contaminant detected in this sample.

Subsurface Soils

Two samples were collected from the 0.6- to 1.2-m (2- to 4-ft) interval at Pad #68 – one at sampling station WBGso-073, and one due east of the pad (WBGso-142). Field screening for TNT and RDX indicated these compounds were not present above detection levels. In addition, a sample from the 1.2- to 1.9-m (4- to 6-ft) interval was collected off the south boundary of the pad in a topographic low spot, at WBGso-141. This sample also tested negative for RDX and TNT based on field screening analysis. Based upon these results, no further sampling was performed. However, laboratory analysis indicated the presence of 1,3,5-TNB, TNT, and HMX in the three samples. The concentrations of TNT and 1,3,5-TNB in the subsurface at Pad #68 are higher in the 1.2- to 1.9-m (4- to 6-ft) interval at WBGso-141, at 0.710 and 1.60 mg/kg, respectively, than in the 0.6- to 1.2-m (2- to 4-ft) interval for any sample. 2,4-DNT and RDX were each detected once, at concentrations of 0.063mg/kg in WBGso-073 and 0.170 mg/kg in WBGso-141. Tetryl was detected in WBGso-073 and WBGso-141 at 0.093 and 0.150 mg/kg. Nitroglycerine was not detected in any of the samples. **Figure 4-34** shows the distribution of explosives.

The only inorganic elements or compounds detected at concentrations above background criteria were barium and mercury. Barium was present in WBGso-141 [1.2 to 1.9 m (4 to 6 ft)] and WBGso-142 [0.6 to 1.2 m (2 to 4 ft)] at 159 and 400 mg/kg (respectively), and mercury occurs slightly above the background value of 0.04 mg/kg, at 0.065 mg/kg, at WBGso-141 (see **Figure 4-35**).

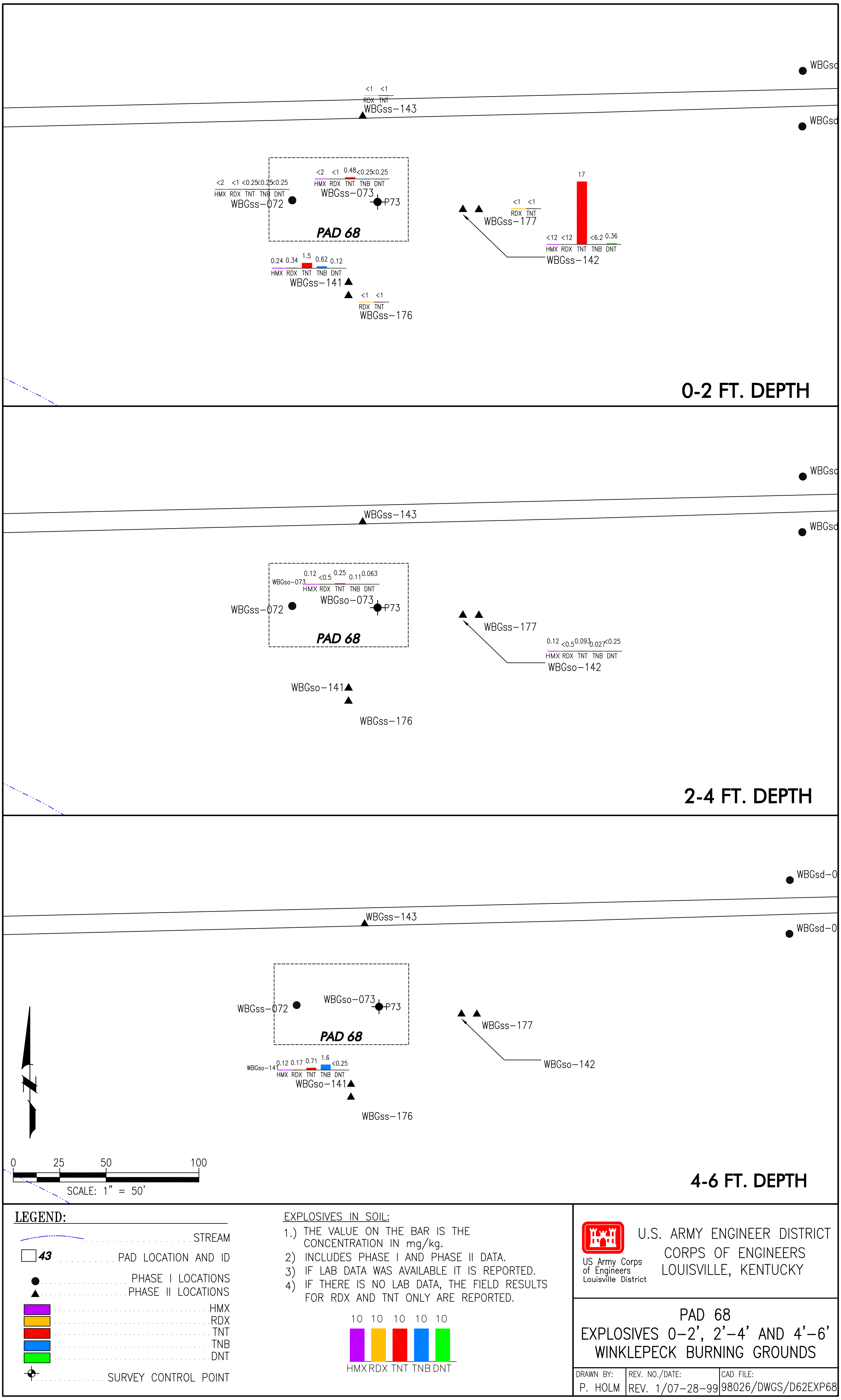

Figure 4-34. Explosives in Soil at Pad #68, WBG

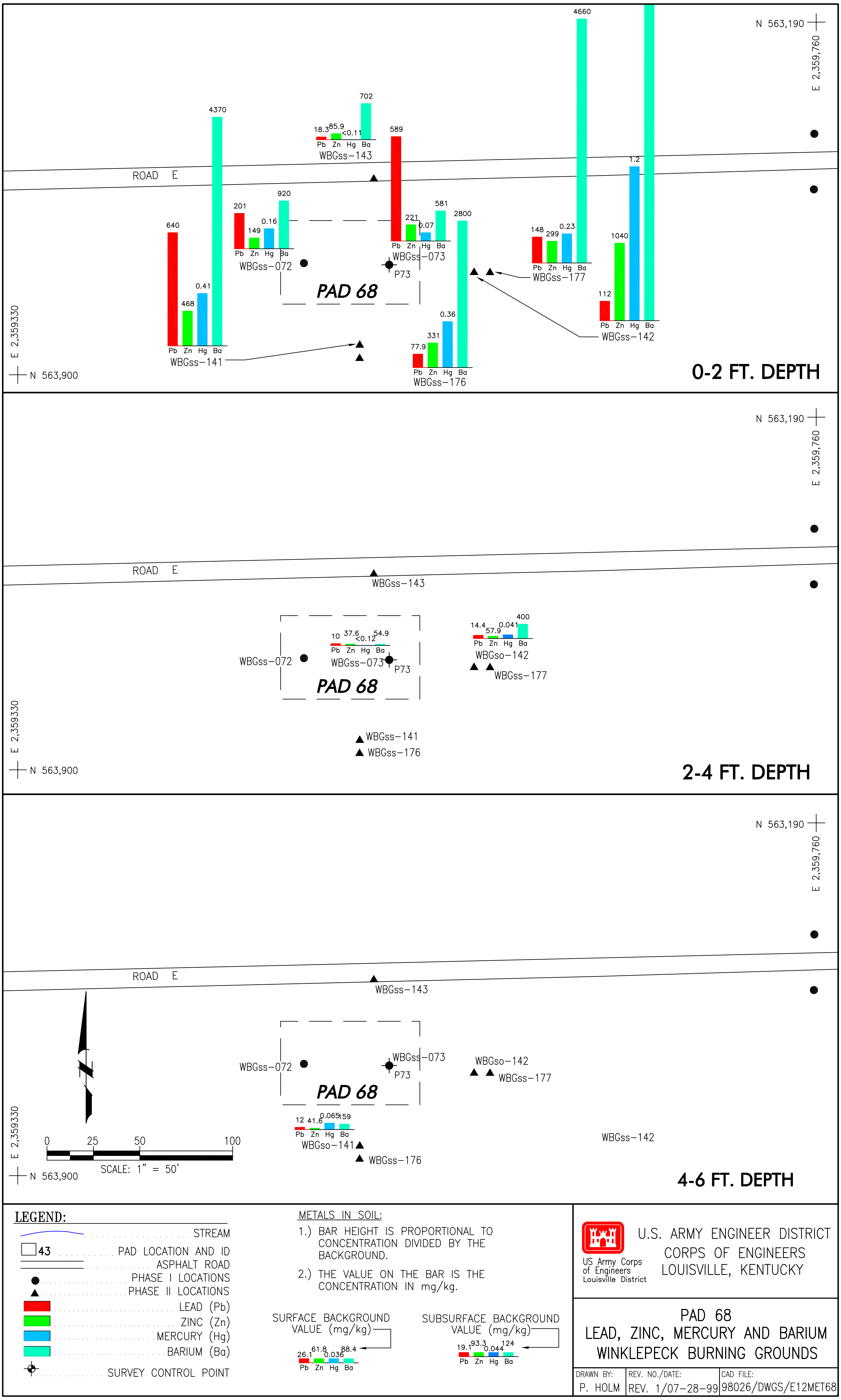

Figure 4-35. Selected Metals in Soil at Pad #68, WBG

One subsurface sample from the 0.6- to 1.2-m (2- to 4-ft) interval at WBGso-073 was analyzed for SVOCs. There were no detections of SVOCs in the sample.

Discussion

- There were four occurrences of explosives or propellant above 1 mg/kg in surface soils. These results came from sample points located east and south of the burning pad.
- There was an occurrence of an explosive at 1.6 mg/kg in the 1.2- to 1.9-m (4- to 6-ft) interval at WBGso-141, although there were no corresponding detections greater than 1 mg/kg in the shallower intervals (**Figure 4-36**). Thus, vertical extent of explosives contamination is not known.
- The highest concentrations of metals in surface soils were found at sample points located east and south of the burning pad.
- Concentrations of metals were generally lower in the subsurface soils than in surface soils.

4.3.15 Pad #70

Surface Soils

No explosives were detected in Phase I sample WBGss-076. Five additional samples collected during the Phase II RI indicated negative results for TNT and RDX in field screening analysis. Based upon these results, no Phase II surface soil samples from Pad #70 were sent for confirmatory laboratory analysis of explosives or propellants. **Figure 4-37** illustrates the results of the field explosives analyses.

Twelve inorganic elements were detected at concentrations above background criteria in surface soil samples collected at Pad #70, including: aluminum, barium, beryllium, cadmium, chromium, copper, iron, magnesium, nickel, selenium, thallium, and zinc. Chromium, copper, magnesium, nickel, and zinc occurred above background in more than one sample, while iron, selenium, and thallium were present above background in only one sample each (**Figure 4-38**).

Four surface soil samples from Pad #70 were submitted for laboratory organics analysis. Samples WBGss-190, WBGss-191, and WBGss-192 were analyzed for VOCs and SVOCs, and sample WBGss-076 was additionally analyzed for pesticides/PCBs, which analytical results show were not present. Toluene was detected in each of the four surface soil samples at concentrations ranging from 0.79 µg/kg to 170 µg/kg. Toluene was the only organic contaminant detected in sample WBGss-192. Toluene and chloroform were the only organic contaminants detected in sample, WBGss-076. These compounds may be associated with former waste disposal practices; however, their source is unknown. Samples WBGss-190 and WBGss-191 each contained numerous PAHs, which are common in areas with vehicle traffic and open burning.

Subsurface Soils

Five samples were collected in the 0.6- to 1.2-m (2- to 4-ft) interval, and two were collected in the 1.2- to 1.9-m (4- to 6-ft) interval, at Pad #70. All samples were field screened for explosives, and three subsurface samples at Pad #70 received only field screening analysis. All samples showed negative results for explosives in the field screening except for WBGso-188 [1.2 to 1.9 m (4 to 6 ft)] which tested positive for TNT. Confirmatory laboratory analysis indicates TNT was present at 0.73 mg/kg, and HMX at 0.140 mg/kg, in WBGso-188. Additionally, 1,3,5-TNB was detected at 0.043 mg/kg in WBGso-189. Propellants were not detected in the 0.6- to 1.2-m (2- to 4-ft) samples (see **Figure 4-37**).

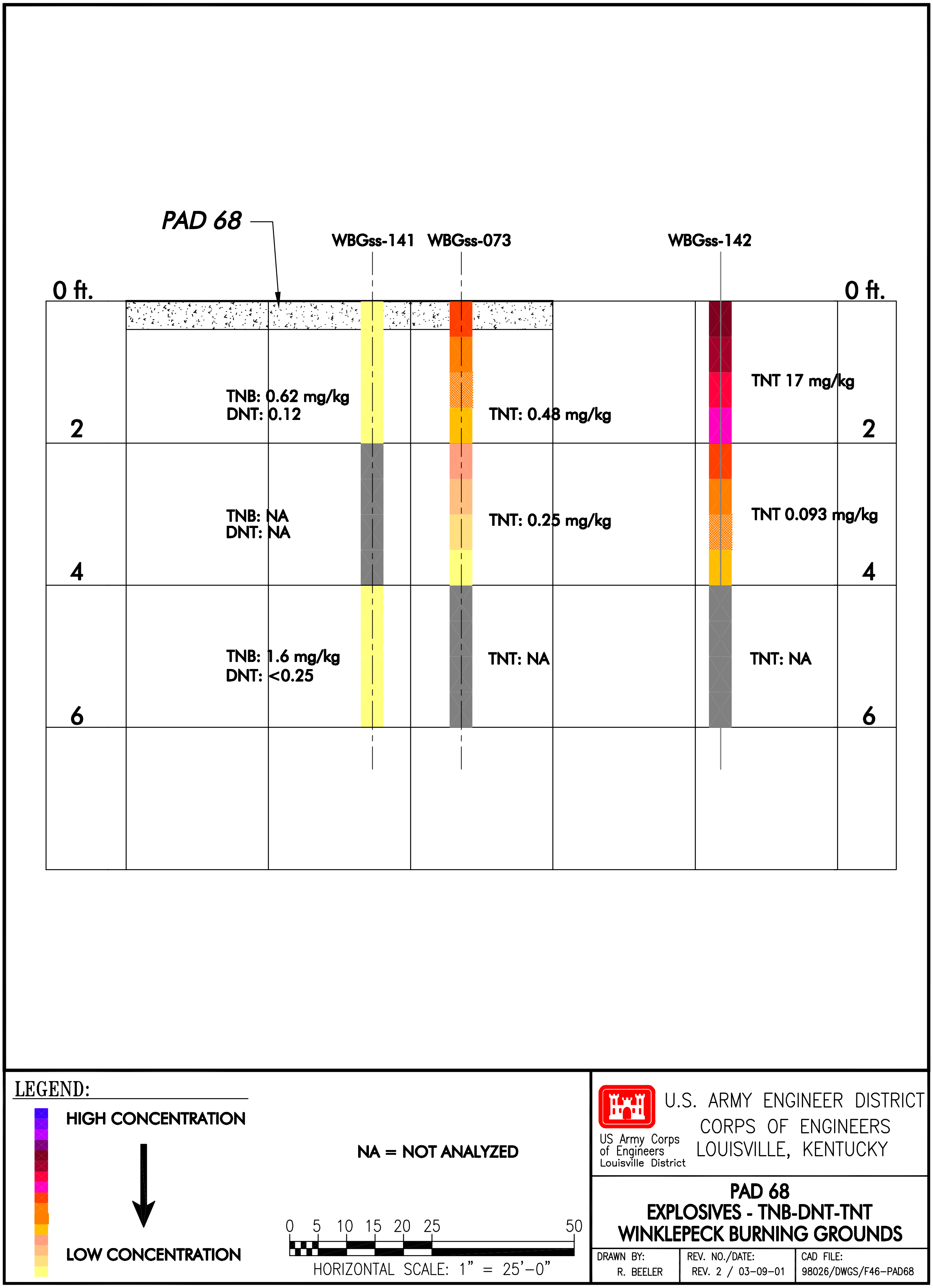

Figure 4-36. Explosive Concentration with Depth at Pad #68

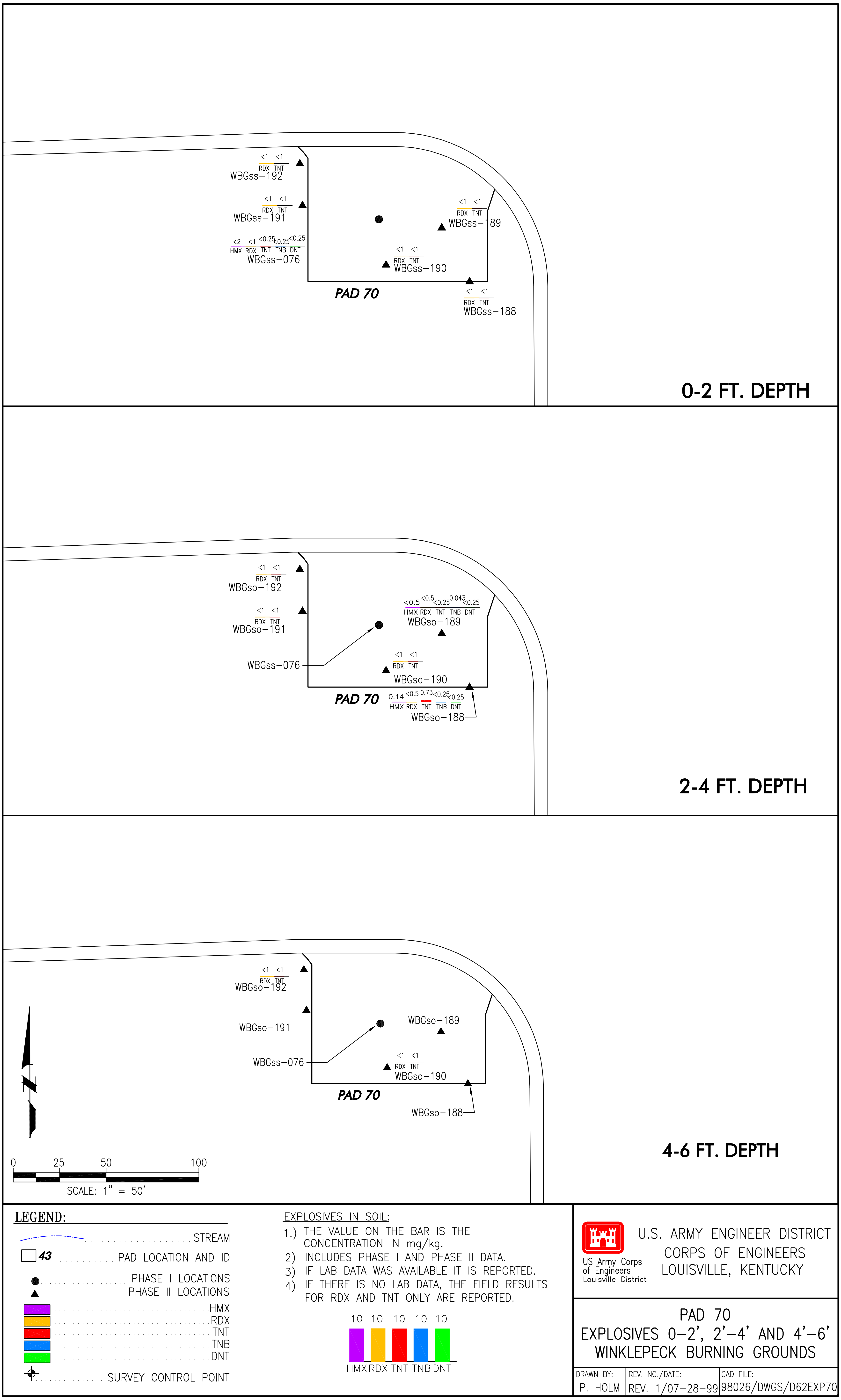

Figure 4-37. Explosives in Soil at Pad #70, WBG

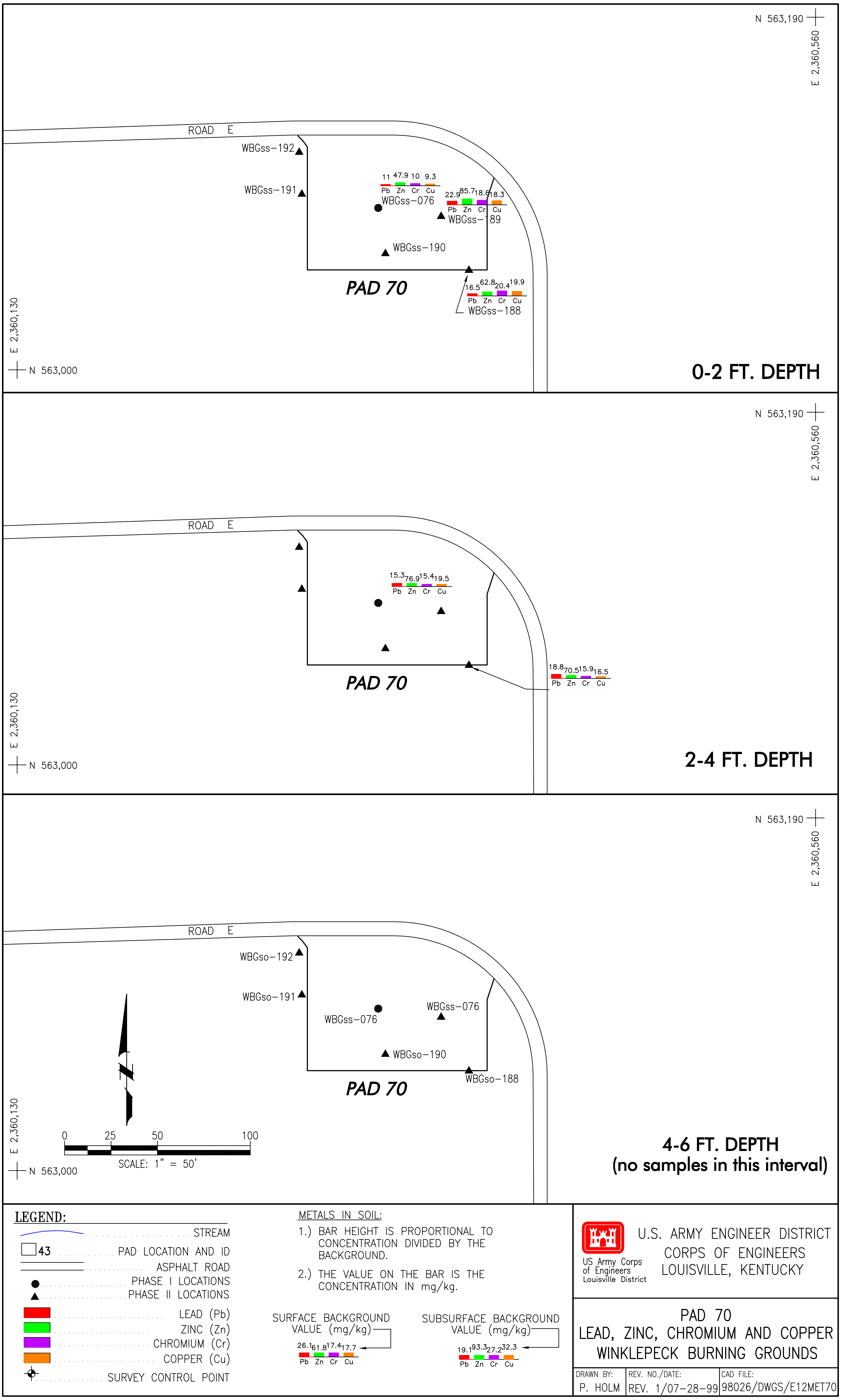

Figure 4-38. Selected Metals in Soil at Pad #70, WBG

There were no inorganic elements or compounds detected at concentrations above background criteria in the subsurface samples from 0.6- to 1.2-m (2- to 4-ft) at Pad #70. Samples from the 1.2- to 1.9-m (4- to 6-ft) interval were not analyzed for TAL metals (see **Figure 4-38**).

At WBGso-190, both the 0.6- to 1.2-m (2- to 4-ft) and 1.2- to 1.9-m (4- to 6-ft) intervals were evaluated for SVOCs. A total of 13 PAH compounds occur in the 0.6- to 1.2-m (2- to 4-ft) interval at concentrations ranging from 0.076 mg/kg for anthracene to 1.20 mg/kg for fluoranthene. The 1.2- to 1.9-m (4- to 6-ft) interval has no detections of SVOCs in the soil. This interval was also analyzed for VOCs, and toluene was detected at a low concentration of 0.0012 mg/kg. The origin of toluene at Pad #70 is unknown. Its occurrence in soils approximately 30 years after the presumed active period of WBG argues against an origin in waste disposal.

Discussion

- Based upon the field screening results, there was no surface soil contamination with explosives.

- Subsurface soils exhibit no detections of explosives greater than 1 mg/kg.

- Several metals were detected above background in every surface soil sample analyzed; however, most concentrations were close to the background values.

- Metals were not present in the subsurface above background. The extent of metals contamination is thus well defined.

- The origin of chloroform and toluene is unknown.

4.4 SUMMARY OF SOIL RESULTS – EXTENT OF CONTAMINATION

The objectives of the Phase II RI, stated in the *SAP Addendum for the Phase II RI at Winklepeck Burning Grounds and Determination of Facility-Wide Background at RVAAP* (USACE 1998a), included the characterization of nature and extent of explosives, propellants, and site-related metals contamination at 14 former burning pads and the Deactivation Furnace Area. These sites are locations where contamination had been detected in previous investigations. A biased sampling strategy, field screening, and laboratory analytical methods were used to define the extent of explosives contamination >1 ppm in surface and subsurface soils. While it is acknowledged that this strategy may have created some data gaps, these will be addressed if the human health and ecological risk assessments (discussed in Sections 6.0 and 7.0 of this report) determine that additional data are warranted. The extent of lead contamination in excess of 100 ppm was an objective of the Phase II RI, and the analytical results show that it was limited to one occurrence.

4.4.1 Surface Soils

The results of the surface soil investigation at WBG are as follows:

- On most pads, the occurrences of explosives and metals are strongly correlated. That is, explosives tend to occur in elevated concentrations and in larger numbers where metals are also commonly detected in elevated concentrations.

- Explosives are not present in surface soils at Pad #58; Pads #38, 40, and 59 each had one detection of explosives, all below 1 mg/kg. Pad #37 surface soils exhibit potential explosive contamination mainly off the eastern boundary of the pad.

- Potential surface soil contamination with explosives is greatest at Pads # 66 and 67.

- Propellants appear to be a minor constituent in surface soils. Nitrocellulose is present in one sample each at Pads #60 and 67, and in two samples at Pad #68. Concentrations of propellants are generally below 20 mg/kg.

- Metals in surface soil seem to be present in high concentrations both on and off the pads. The highest concentrations of metals in surface soils are identified at Pads #58, 60, 61, 66, and 68. Lead occurs at concentrations in excess of 100 mg/kg in surface soils at the Deactivation Furnace Area, and Pads #37, 38, 40, 58, 59, 60, 61, 62, 66, and 68.

- Organic compounds were evaluated at Pads #37, 60, 66, 68, and 70. PAHs are encountered in the samples from Pads #60 and 66, to a maximum of 2000 µg/kg. The PAHs are byproducts of incomplete combustion of organic compounds, such as those found in fossil fuels, wood products, and petroleum products. These compounds may be present at the observed concentrations in soils because of site disposal practices, such as open burning of explosives-contaminated sawdust and ash disposal, or because of vehicle exhaust that was deposited on the surface and mobilized by surface runoff.

- Other organic compounds unrelated to the practices at WBG [e.g., bis(2-ethylhexyl)phthalate] are sporadically detected in surface soil samples at very low concentrations.

4.4.2 Subsurface Soils

In the 0.6- to 1.2-m (2- to 4-ft) interval, several of the soil samples collected tested negative for explosives in the field. Based upon those results, deeper subsurface sampling was not performed. At Pads # 5, 6, 40, the laboratory analysis confirmed that explosives and propellants are not present in the soils at 0.6 to 1.2 m (2 to 4 ft). Laboratory analytical data for Pads #38, 58, 59, 60, 61, 68, and 70 indicate the presence of one or more explosives in the 0.6- to 1.2-m (2- to 4-ft) interval, but their concentrations are generally below 1 mg/kg. Pads #37, 62, 66, and 67, however, have explosives above 1 mg/kg in this interval.

At Pads #59, 60, 62, 67, and 68, at least one sample was collected in the 1.2- to 1.9-m (4- to 6-ft) interval and submitted to the laboratory even though the samples from the 0.6- to 1.2-m (2- to 4-ft) interval tested negative for explosives in the field [at Pad #66, the 1.2- to 1.9-m (4- to 6-ft) interval was sampled based on positive results for field explosives at one location]. Pads #67 and 68 are the only two pads for which at least one explosive or propellant is detected above 1 mg/kg in this depth interval. The sampling efforts have been inconclusive at Pads #37, 38, 58, 61, and 70, because there is no information on the 1.2- to 1.9-m (4- to 6-ft) interval. However, among these five pads, only Pad #37 exhibits explosive concentrations greater than 1 mg/kg.

The results of the analysis of subsurface soils are as follows:

- Pad #67 exhibits the greatest concentrations and numbers of explosives. Pads #60, 62, and 66 also host concentrations of explosives greater than 1 mg/kg in the subsurface soil. Most of the subsurface detections of explosives are in the 0.6- to 1.2-m (2- to 4-ft) depth interval. At Pad #66, there is one occurrence of TNT greater than 1 mg/kg in the 1.2- to 1.6-m (4- to 5-ft) interval. Generally, explosives concentrations are lower in subsurface soils than in surface soils.

- Propellants are present in the subsurface soils only at Pads #60, 66, and 67. Concentrations are generally low (< 20 mg/kg).

- Organics were analyzed only at Pads #59, 67, 68, and 70, mainly for SVOCs, but in some instances for pesticides/PCBs and VOCs. SVOCs, mainly PAHs, are present in the subsurface soils at Pads #59 and 70 in the 0.6- to 1.2-m (2- to 4-ft) interval at concentrations generally below 100 µg/kg. Because PAHs are known to be immobile in soils, their presence in the subsurface suggests some reworking or mixing of soils. No other site-related organic compounds were detected at the four pads.

- Metals appear to be less concentrated in the subsurface soils than in the surface soils. Analysis of the data indicates that Pads #5, 6, 37, and 70 have no exceedances of background criteria for the TAL metals in the 0.6- to 1.2-m (2- to 4-ft) depth range. It is presumed that the vertical extent of metals contamination at these four pads has been defined. Pads #38, 40, 58, 59, 61, 66, 67, and 68, exhibited three or fewer TAL metals each above background criteria in samples from the 0.6- to 1.2-m (2- to 4-ft) interval. At Pad #62, six metals are present above the background values in this depth range. From 1.2 to 1.9 m (4 to 6 ft), there are two or fewer exceedances of background criteria at Pads #59, 60, 62, 66, 67, and 68.

- Lead occurs at concentrations greater than 100 mg/kg at Pad #60, in the 0.6- to 1.2-m (2- to 4-ft) interval only.

4.5 SEDIMENT

In the Phase I RI, discrete sediment samples were collected at 13 locations (WBGsd-078 through -090) in the roadside ditches and intermittent drainages at WBG (**Figure 2-4**). Of these, 11 samples were analyzed for the 11 process-related metals; the remaining two samples received analyses for the full TAL metals suite, cyanide, VOCs, SVOCs, and PCBs/pesticides. The Phase I RI samples were collected from 0 to 0.3 m (0 to 0.9 ft). The four Phase II RI sediment sampling locations at WBG (WBGsd-155 through 158) are shown in **Figure 2-4.** All Phase II RI samples were collected from 0 to 0.2 m (0 to 0.5 ft) and composited from three subsamples, as described in Section 2.0, and analyzed for explosives, TAL metals, and cyanide. One sample received additional analyses for VOCs and SVOCs. The Phase II sediment samples were also subjected to field screening (colorimetric) analysis for TNT and RDX.

The analytical results for sediments at WBG are summarized in **Tables 4-20a – 4-20c** and presented in their entirety in Appendix F.

4.5.1 Explosives and Propellants

Explosives were generally not detected or are detected in concentrations less than 1 mg/kg in the Phase II RI sediment samples. 1.3.5-TNB was detected in all four samples, at concentrations ranging from 0.082 to 0.015 mg/kg. 1,3-DNB and TNT were detected in WBGsd-155, upstream of Mack's Pond, at 0.044 and 0.094 mg/kg, respectively. 2,4-DNT is detected at WBGsd-156 at 0.037 mg/kg. Nitrobenzene and HMX were both detected at WBGsd-158 at 0.071 mg/kg. TNT was detected in three discrete samples collected during the Phase I RI. WBGsd-078, -079, and -081 had concentrations of 0.36, 0.97, and 0.42 mg/kg of TNT, respectively. These samples are located along Pallet Road D, East. The propellant nitroglycerine was evaluated in the four Phase II samples, but was not detected. No other explosives were detected in sediment samples at WBG. **Figure 4-39** illustrates the explosives results for the Phase I and Phase II sediment samples.

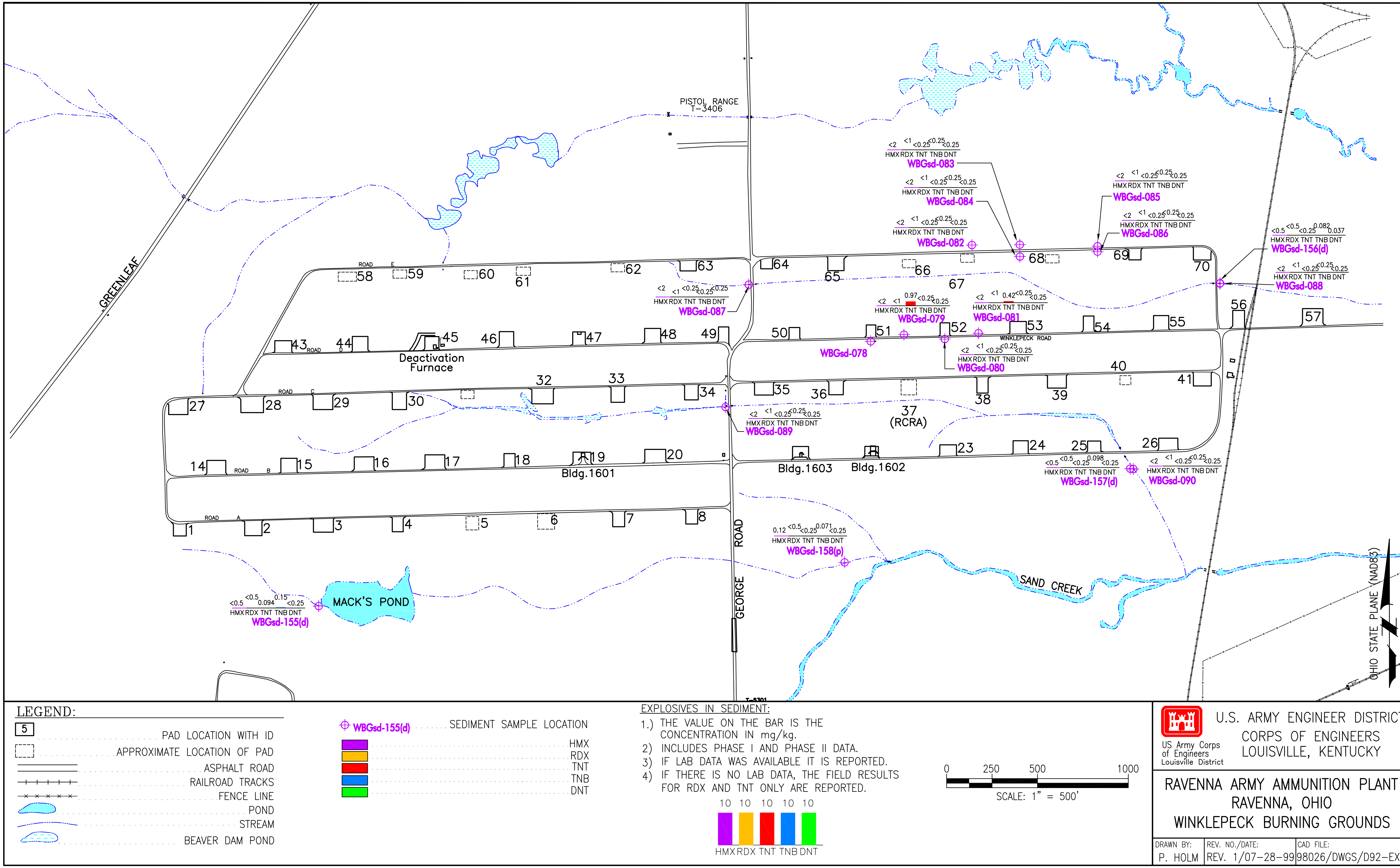

Figure 4-39. Explosives in Sediment at WBG

4.5.2 Inorganics

The distribution of inorganic constituents above the background criteria is displayed in **Figure 4-40.** Among the four Phase II RI samples collected, there are only eight results exceeding background values. Of these, seven come from sample WBGsd-155, located at the upstream end of Mack's Pond. The remaining detection above background (144 mg/kg barium) comes from sample WBGsd-156, at the extreme eastern end of WBG. No other inorganic elements or compounds were detected at concentrations exceeding background criteria in sediments.

4.5.3 Organics

WBGsd-080 and WBGsd-083 were analyzed for organic compounds during the Phase I RI. The only VOCs detected in these samples were 0.002 mg/kg chloroform in WBGsd-083 and 0.025 mg/kg toluene in WBGsd-080. In the Phase II investigation, organic compounds were evaluated in a single sample (WBGsd-156). No VOCs were detected either by field screening methods, or with laboratory analytical methods with the exception of acetone, which was detected at 21 µg/kg. These compounds are not related to any known waste disposal processes at WBG.

Eleven PAH compounds were identified in WBGsd-156. Benzo(*a*)anthracene and benzo(*b*)fluoranthene were both present at a concentration of 560 µg/kg. Phenanthrene and pyrene were present at concentrations of 640 and 940 µg/kg, respectively. The remaining seven compounds [benzo(*a*)pyrene, anthracene, benzo(*g,h,i*)perylene, benzo(*k*)fluoranthene, chrysene, fluoranthene, and indeno(1,2,3-*cd*)pyrene] were present in concentrations ranging from 130 to 510 µg/kg. No other SVOCs were detected in sediment samples.

4.5.4 Summary of Sediment Results

Two sediment samples from the Phase I RI and one sample from the Phase II RI received the full suite of analyses. The remaining three samples collected in the Phase II RI were analyzed for explosives, TAL metals, and cyanide, and the remaining nine from the Phase II RI were analyzed for 11 metals. Sediment sampling locations capture potential contaminants from roadside ditches, intermittent streams, and permanent water bodies (e.g., Mack's Pond), and target areas of surface runoff from the most highly contaminated pads. The results of the sampling and analysis are as follows:

- Explosives have been evaluated in 4 of 15 sediment samples. Five explosives have been detected in the four Phase II samples. In particular, TNT was detected in three Phase II samples, as well as in one Phase I sample. All concentrations were within the range of 0.015 to 0.97 mg/kg.

- Seven of eight detections of metals above background in the Phase II samples come from WBGsd-155, located at the inlet to Mack's Pond. Barium is present at concentrations well above background in Phase I samples in the drainage from Pad #67, west of Pad #69, and west of Pad #70.

- Two samples from the Phase I and one from the Phase II were analyzed for VOCs and/or SVOCs. One VOC was identified in WBGsd-080, WBGsd-083, and WBGsd-156, at very low concentrations. Their origins are unknown. Several PAHs were detected in WBGsd-156.

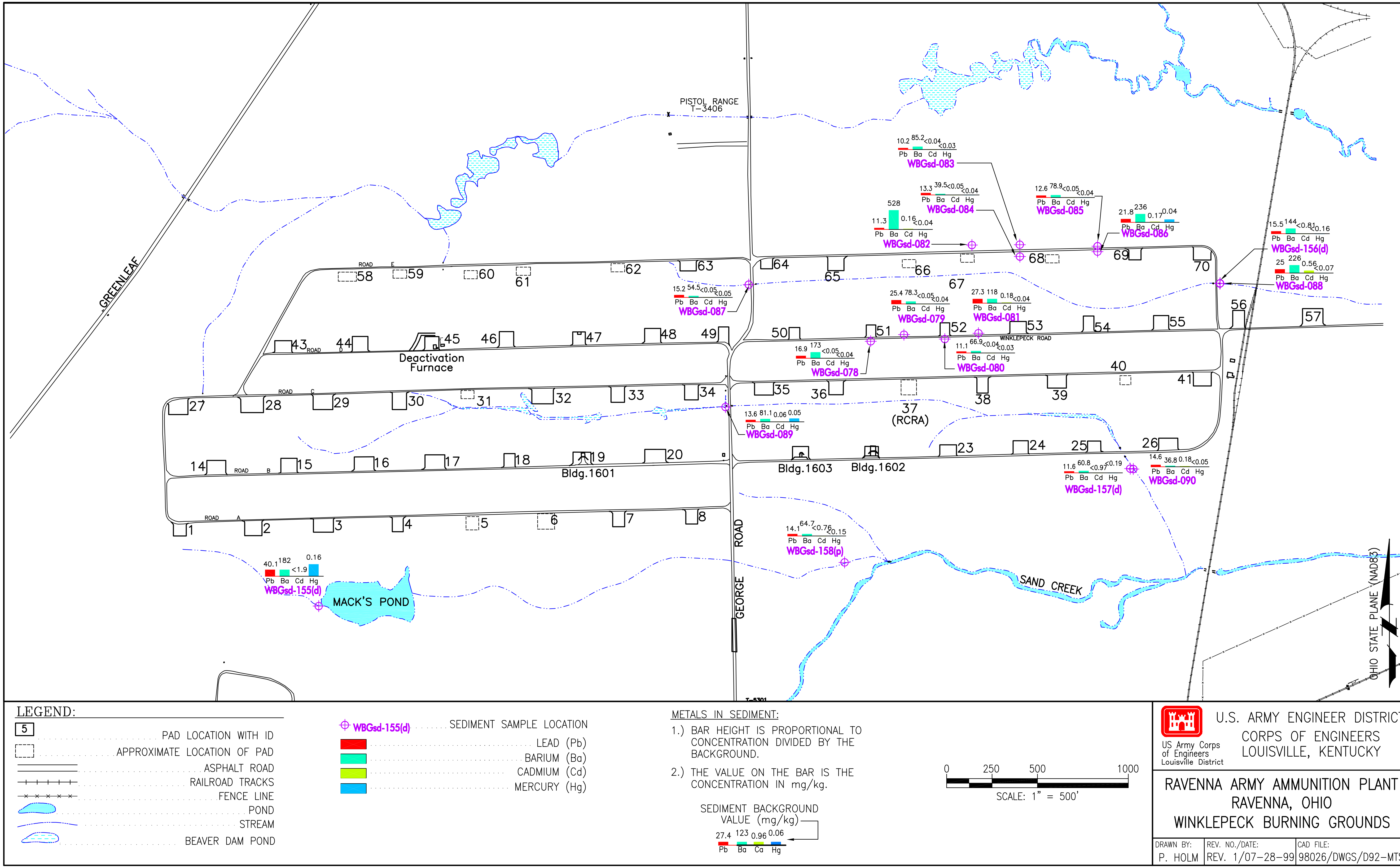

Figure 4-40. Selected Metals in Sediment at WBG

4.6 SURFACE WATER

A surface water sample was collected from Mack's Pond during the Phase II RI to capture accumulated surface water runoff from the western half of the AOC. The sample was collected at the outlet of the pond (**Figure 2-4**). The surface water sample was analyzed for inorganic elements and compounds (TAL metals and cyanide), in both filtered and unfiltered specimens, as well as explosives, propellants, VOCs, and SVOCs. Results for inorganic analyses were compared to the surface water background. The analytical results for surface water at WBG are summarized in **Table 4-21**.

4.6.1 Explosives

Explosives were not detected in WBGsw-157.

4.6.2 Inorganics

Inorganic elements and compound were evaluated in both filtered and unfiltered samples from Mack's Pond. The unfiltered water sample, which should contain higher concentrations of metals than the filtered specimen, contains 7.9 µg/L barium, 867 µg/L iron, 103 µg/L manganese, 1750 µg/L magnesium, and 18.4 µg/L zinc. None of these concentrations exceed the background criteria, or Ohio surface water quality standards for drinking water. Inorganics in the filtered sample include 5.8 µg/L barium, 422 µg/L iron, 1960 µg/L magnesium, 105 µg/L manganese, and 16 µg/L zinc. No other inorganic elements or compounds were detected in the surface water sample.

4.6.3 Organics

With the exception of acetone at a low concentration of 7 µg/L, no organic compounds were detected in surface water from Mack's Pond. Acetone is not associated with any known waste disposal practice at WBG, and its origin is unknown.

4.6.4 Summary of Surface Water Results

One surface water sample was collected for the Phase II RI, and came from Mack's Pond. The sample was analyzed for total and dissolved TAL metals, cyanide, explosives, propellants, VOCs, and SVOCs. Results of these analyses are as follows:

- No explosives or propellants were detected.
- No metals were detected above background in either the filtered or unfiltered samples.
- No SVOCs were detected, and acetone was present at a low concentration. Its origin is unknown.

4.7 GROUNDWATER

Groundwater samples were collected from both the newly installed wells (WBGmw-005 through WBGmw-009) and the previously existing RCRA wells at Pad #37 (OBG-1 through OBG-4). WBGmw-009 is located at Pad #7. WBGmw-007 is downgradient of most of WBG (see **Figure 3-2,** potentiometric surface map). WBGmw-005 is located at Pad #62. WBGmw-006 is located downgradient from Pad #67. WBGmw-008 is located at Pad #25, which is downgradient from Pads #37 and 38. The nine wells are all completed in unconsolidated glacial sediment. Because there is a small number of data points distributed across a large area with laterally discontinuous glacial stratigraphy, these wells probably do not fully characterize what is undoubtedly a very complex flow system within the AOC.

Filtered and unfiltered samples from each well were analyzed. All groundwater samples were analyzed for total and dissolved TAL metals, cyanide, VOCs, explosives, and propellants. For metals, only filtered results are discussed due to high turbidity in groundwater samples. The analytical results for groundwater are summarized by analyte and by sampling station in **Table 4-22a – 4-22c**. For comparison, analytical results for groundwater from RVAAP background wells (metals and organics only; explosives were not analyzed in background wells) are provided in **Tables 4-22d and 4-22e**.

4.7.1 Explosives and Propellants

The groundwater samples were analyzed for explosives and propellants to evaluate whether soil contamination is causing a release to groundwater beneath WBG. Low concentrations of explosives were detected in seven of the nine monitoring wells:

- 2,4-Dinitrotoluene was present in OBG-1, OBG-4, and WBGmw-007 at 0.041, 0.044, and 0.033 µg/L, respectively.

- 1,3-Dinitrobenzene was detected once, at OBG-2, at 0.034 µg/L.

- Nitrobenzene was detected at 0.059 µg/L at WBGmw-009.

- 3-Nitrotoluene was detected at 0.076 µg/L in WBGmw-005 and 0.11 µg/L in WBGmw-006.

- Concentrations of explosives above 1 µg/L were observed in samples from WBGmw-006 and WBGmw–009. Specifically, HMX and RDX occurred at 8 and 32 µg/L in WBGmw-006; and RDX occurred at 1.1 µg/L in WBGmw-009. As mentioned previously, WBGmw-007 is downgradient of most of WBG and shows no explosives concentrations >1 ppb.

- RDX was also present at WBGmw-009, at a concentration of 1.1 µg/L.

No other explosives or propellants were identified in groundwater at WBG during the Phase II RI. **Figure 4-41** shows the distribution of explosive contamination in WBG groundwater.

4.7.2 Inorganics

Inorganic elements and compounds (TAL metals and cyanide) were evaluated in all groundwater samples collected. Unfiltered samples from wells screened in unconsolidated glacial materials had higher concentrations than the filtered samples. As such, the data from the unfiltered samples were not usable for characterizing groundwater quality with respect to metals at WBG. However, all results are reported in Appendix F.

Eight detections of analytes above background were found in filtered samples. These are as follows:

- 3.1 µg/L lead in OBG-2,
- 98.1 µg/L barium in OBG-3,
- 0.08 µg/L mercury in OBG-4,
- 9.8 µg/L copper in WBGmw-005,
- 159 µg/L zinc in WBGmw-007,
- 2920 µg/L manganese in WBGmw-008,
- 3.3 µg/L copper in WBGmw-009, and
- 0.019 µg/L cyanide in WBGmw-009.

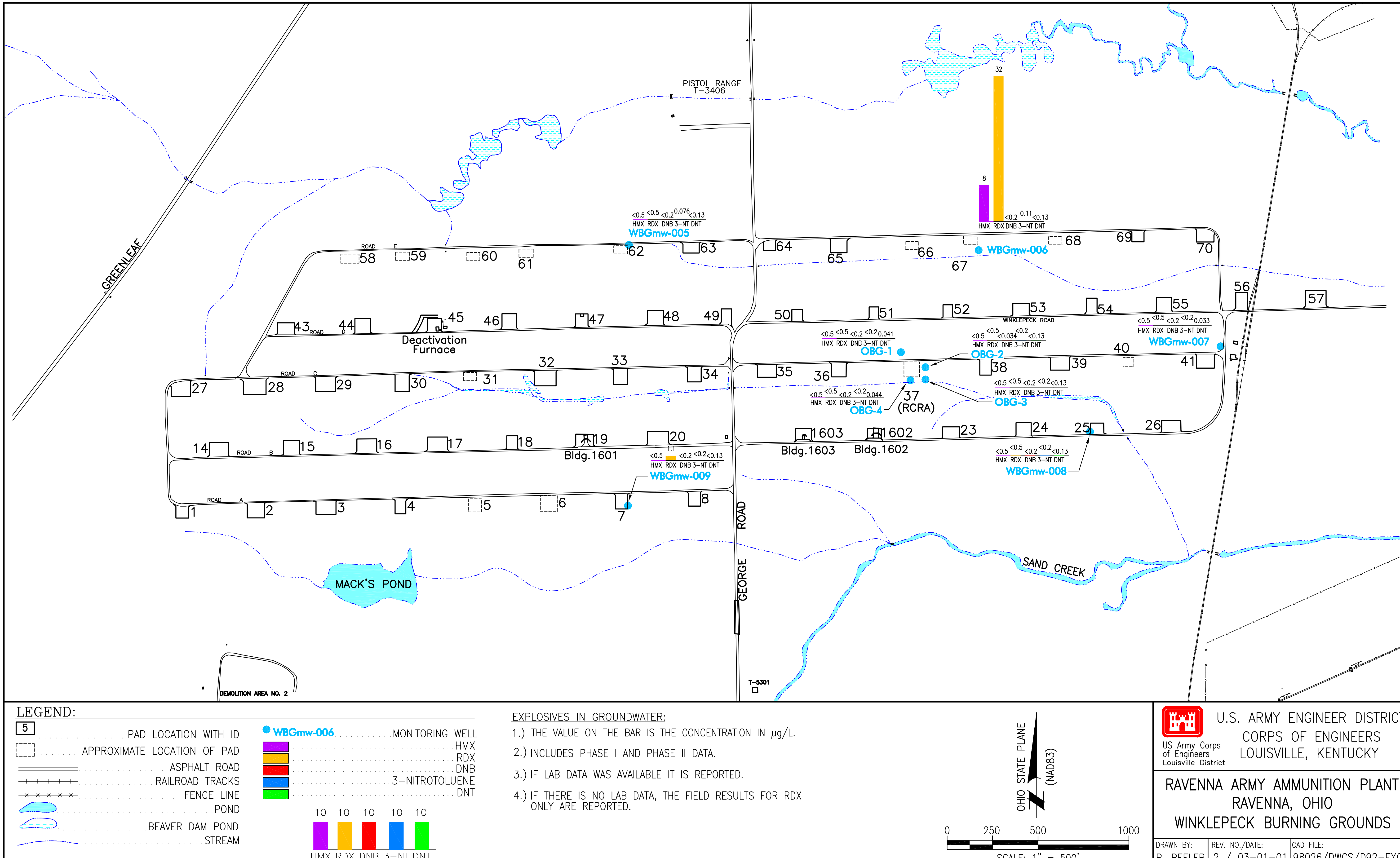

Figure 4-41. Explosives in Groundwater at WBG

Most of these detections are only slightly higher than the background values for these constituents. The concentration of zinc in WBGmw-007 was more than two times the background value; the concentration of manganese in WBGmw-008 was about two times the background value. Inorganic analytes were not detected in WBG filtered groundwater in concentrations that exceed MCLs.

4.7.3 Organic Compounds

VOCs were analyzed in all nine monitoring wells at WBG. Results for VOCs in groundwater are all non-detects, with the exception of the presence of chloroform in WBGmw-005, -008, and -009, at concentrations of 1.7, 0.64, and 1.1 µg/L, respectively, and bis(2-ethylhexyl)phthalate in WBGmw-006 at 4.5 µg/L. These compounds may not be related to known site activities.

4.7.4 Summary of Groundwater Results

Monitoring well WBGmw-006, located downgradient of Pad #67, has apparently been impacted by soil contamination with explosives, most notably HMX and RDX. OBG-1, OBG-2, and OBG-4, as well as WBGmw-005, -007, and -009, also bear some evidence of nitroaromatics contamination, but low concentrations (generally < 1 µg/L) of these compounds are scattered among these six wells. OBG-3 and WBG-008 have no detectable quantities of any explosive. Both are located downgradient of the former burn trays at Pad #37, historically one of the longest-used pads at WBG.

The filtered samples show no exceedances of primary federal or state drinking water standards. However, concentrations of manganese exceeded the secondary MCL of 50 µg/L in all wells except OBG-1. There were no inorganic analytes detected above background in monitoring wells OBG-1 or WBGmw-006. The remaining wells each had one constituent detected above background values. The sole occurrence of cyanide in groundwater is in WBGmw-009.

VOCs and SVOCs are minor contaminants in WBG groundwater. Although they were evaluated in the four previously existing and the five newly installed monitoring wells, the only detections of these compounds are chloroform (occurring in three wells), and one occurrence of bis (2-ethylhexyl) phthalate.

4.8 SLAG

Two samples of slag (WBGss-153 and -154), which is commonly used for gravel roads and driveways as well as the burn pads at RVAAP, were collected at Pad #37 (see **Figure 2-1**). The slag was analyzed for TAL metals. These samples are identified as WBGss-0153 and WBGss-0154. Seven of the TAL metals were not detected in either sample: cadmium, copper, mercury, nickel, silver, thallium, and zinc.

The remaining metals were detected in one or both of the slag samples. They were compared against the background criteria for surface soils to determine whether the slag represents a significant source of metals contamination on the ground surface. Seven of the TAL metals were present in the slag at concentrations exceeding the background criteria for surface soils: aluminum, barium, beryllium, chromium, magnesium, manganese, and selenium. Of these, aluminum, barium, beryllium, magnesium, and selenium were present above the background criteria in both samples. Aluminum was present at 29,200 and 30,700 mg/kg (1.6 and 1.7 times background). Barium was present at 301 and 495 mg/kg (3.4 and 5.6 times background); beryllium was present at 7.8 and 10.9 mg/kg (8 and 12 times background); magnesium was present at 49,700 and 53,700 mg/kg (16 and 17 times background). Selenium occurs at 1.5 and 2 mg/kg, slightly higher than the background value of 1.4 mg/kg. The analytical results for these samples are presented in their entirety in Appendix F and summarized in **Table 4-19a–e**.

4.9 CONCEPTUAL SITE MODEL

Information gathered during the Phase I RI and the Phase II RI of WBG and the 1997 RCRA Investigation (USACE 1998b) has been used to develop CSM for WBG. The elements of the CSM are:

- The topography of WBG consists of gently undulating slopes and level areas that decrease in elevation from west to east. Elevations range from 1084.9 to 993.2 ft above mean sea level.

- Low-permeability soils and glacial sediments cover much of the ground surface of WBG, except where the natural materials have been either eroded, removed, reworked, or covered during RVAAP operations. The glacial material present at WBG is presumed to be tens of feet thick. The deepest boring at WBG extended to 43 ft, and bedrock was not encountered.

- Groundwater is present in the sandy interbeds found in glacial materials that occur within about 25 ft of the ground surface at WBG. The more permeable sand units may be laterally discontinuous. Whether the monitoring wells installed during the Phase II RI are in hydraulic communication with one another is unknown. Groundwater is determined to flow from the western side of WBG to the east, based on the topography of the site and potentiometric surface data for the four existing and five newly installed monitoring wells at the site. The water-bearing units behave as unconfined systems. However, because of the small number and wide spacing of monitoring wells at WBG, the groundwater system has not been completely characterized.

- Surface water flows from west to east across WBG in three small streams that are all tributaries that form Sand Creek. Mack's Pond is located in the southwest quadrant of WBG. It is fed by the southernmost surface water channel, which drains the western end of the WBG. The pond drains eastward to an unnamed creek that eventually joins Sand Creek east of George Road. The stream north of Pallet Road B runs behind Pads #29 through 39, in the center of WBG. The northernmost stream runs from Pad #63 eastward beyond the AOC boundary. A small drainage channel runs northward from Pads #58 through 61. Beaver ponds are also present in low areas in the southeast quadrant of WBG.

- Contaminant sources at WBG are the individual burning pads and roadside ditches that were used periodically to destroy explosives and other materials by burning. Some pads were used regularly, while others were rarely, or perhaps never, used. Burning of waste munitions may have caused detonations that disturbed the native soils below the burning pads and introduced contaminants into the subsurface soils. The crushed slag that was used throughout WBG for roads, pads, and driveways may also be a source of aluminum, antimony, arsenic, barium, beryllium, cadmium, copper, lead, magnesium, potassium, sodium, and zinc contamination. Contaminants released at WBG through these non-localized, non-permanent sources include heavy metals, explosives, and propellants.

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TABLE 4-19a METALS

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Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG

Location	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	DEAC.FURN-	PAD-01	PAD-02	PAD-03	PAD-04	PAD-05	PAD-05
Station	WBGso-145	WBGso-145	WBGso-144	WBGso-146	WBGso-147	WBGso-148	WBGso-149	WBGso-150	WBGso-001	WBGso-002	WBGso-003	WBGso-004	WBGso-005	WBGso-005
Sample ID	WBGss-145-0734-SO	WBGss-145-0876-FD	WBGss-144-0733-SO	WBGss-146-0735-SO	WBGss-147-0736-SO	WBGss-148-0737-SO	WBGss-149-0738-SO	WBGss-150-0739-SO	WBGss-001-0456-SO	WBGss-002-0457-SO	WBGss-003-0458-SO	WBGss-004-0459-SO	WBGss-005-0460-SO	WBGso-005-0765-SO
Date	04/23/98	04/23/98	04/23/98	04/23/98	04/23/98	04/23/98	04/23/98	04/23/98	07/31/96	07/31/96	07/31/96	07/30/96	07/30/96	04/25/98
Depth (ft)	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2	2 to 4
Field Type	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab
Analyte (mg/kg)														
Cyanide	0.66 U	0.66 U	0.68 U	0.68 = *	0.63 U	0.62 U	0.62 U	0.73 = *						0.58 U
Aluminum	20400 = *	18000 = *	15400 =	28500 = *	18700 = *	11800 =	12400 =	13300 =	10100 =	10600 =	9000 =	1410 =	7570 =	12100 =
Antimony	24.8 J *	4.4 J *	0.68 UJ	19.4 J *	0.63 UJ	1.5 J *	0.89 J	1.1 J *						0.58 UJ
Arsenic	15.5 = *	20.8 = *	17.8 = *	11.8 =	17.2 = *	15.7 = *	9.2 =	12.6 =	11 =	14.2 =	16.4 = *	21.3 J *	20.4 J *	14.5 =
Barium	145 = *	123 = *	76 =	290 = *	54.8 =	74 =	77 =	87.6 =	48.5 =	53.4 =	30 =	11.7 =	24 =	38.7 =
Beryllium	0.59 U	0.66 U	0.58 U	0.57 U	0.62 U	0.51 U	1.2 = *	0.98 = *						0.36 U
Cadmium	5 = *	4.3 = *	1.1 = *	234 = *	0.63 U	1.8 = *	7.6 = *	3.3 = *	0.04 U	0.05 U	0.04 U	0.15 J *	0.06 J *	0.58 U
Calcium	1750 =	1560 =	1080 =	24200 = *	1060 =	2290 =	28800 = *	13200 =						333 J
Chromium	23.1 = *	19.7 = *	18.9 = *	22.7 = *	25 = *	15.8 =	11.8 =	17.1 =	13.2 =	14.4 =	10.4 =	5.4 =	8.8 =	13.5 =
Cobalt	9.7 J	10.2 J	10 J	5.4 J	8.6 J	9.9 J	4.6 J	8.8 J						7.1 J
Copper	2230 J *	491 J *	36 J *	16800 J *	32.8 J *	62.5 J *	261 J *	140 J *						16 =
Iron	32800 = *	24700 = *	27600 = *	26900 = *	34700 = *	20400 =	16300 =	27400 = *						20100 =
Lead	359 J *	83.8 J *	27 J *	2200 J *	19.6 J	55.1 J *	75.2 J *	85.8 J *	11 =	14.7 =	12.8 =	21.1 =	12.4 =	11.5 J
Magnesium	2610 =	2990 =	2780 =	4150 = *	3970 = *	2370 =	5320 = *	4100 = *						2120 =
Manganese	803 =	1010 =	722 =	998 =	209 =	751 =	535 =	828 =	299 =	275 =	342 =	65.4 =	269 =	211 =
Mercury	0.043 J *	0.041 J *	0.041 J *	0.34 = *	0.13 U	0.028 J	0.12 U	0.038 J *	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.045 U
Nickel	30.4 J *	24.8 J *	22.2 J *	43.7 J *	24.1 J *	19.5 J	14.7 J	23.3 J *						17 =
Potassium	1650 = *	1710 = *	1470 = *	1030 = *	1860 = *	1080 = *	1430 = *	1130 = *						1300 =
Selenium	1.1 =	0.66 U	0.68 U	1.6 = *	0.63 U	0.62 U	0.62 U	0.61 U	0.82 =	1 =	0.79 =	1 =	1.6 = *	0.58 U
Silver	1.3 U	1.3 U	1.4 U	33.2 = *	1.3 U	1.2 U	1.2 U	1.2 U	0.19 U	0.22 U	0.21 U	0.2 U	0.21 U	1.2 U
Sodium	75.8 U	65.8 U	65.3 U	179 J *	77.8 U	72.5 U	230 J *	196 J *						31.4 R
Thallium	0.66 UJ	0.66 UJ	0.68 UJ	0.56 UJ	0.63 UJ	0.62 UJ	0.62 UJ	0.61 UJ						0.58 U
Vanadium	24.3 =	28.1 =	27.4 =	11.9 =	31.7 = *	22 =	14.6 =	19.8 =						18.8 =
Zinc	2410 J *	774 J *	149 J *	24900 J *	81.6 J *	256 J *	659 J *	391 J *	46.6 =	57.5 =	56.7 =	28.6 =	51.4 =	60.8 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

Location	PAD-05-1	PAD-05-2	PAD-05-3	PAD-06	PAD-06	PAD-06-1	PAD-06-1	PAD-06-2	PAD-06-3	PAD-07	PAD-08	PAD-14	PAD-15	PAD-16	PAD-17
Station	WBGso-100	WBGso-101	WBGso-102	WBGso-006	WBGso-006	WBGso-103	WBGso-103	WBGso-104	WBGso-105	WBGso-007	WBGso-008	WBGso-009	WBGso-010	WBGso-011	WBGso-012
Sample ID	WBGss-100-0689-SO	WBGss-101-0690-SO	WBGss-102-0691-SO	WBGss-006-0461-SO	WBGso-006-0764-SO	WBGss-103-0692-SO	WBGss-103-0873-FD	WBGss-104-0693-SO	WBGss-105-0694-SO	WBGss-007-0462-SO	WBGss-008-0463-SO	WBGss-009-0464-SO	WBGss-010-0465-SO	WBGss-011-0466-SO	WBGss-012-0467-SO
Date	04/23/98	04/23/98	04/23/98	07/30/96	04/25/98	04/23/98	04/23/98	04/23/98	04/23/98	07/30/96	07/30/96	08/05/96	08/05/96	08/05/96	08/05/96
Depth (ft)	0 to 1	0 to 1	0 to 1	0 to 2	2 to 4	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (mg/kg)															
Cyanide	0.63 U	0.63 U	0.59 U		0.61 U	0.63 U	0.62 U	0.61 U	0.63 U		0.59 = *				
Aluminum	9730 =	12600 =	8260 =	10400 =	9290 =	9830 =	12800 =	10400 =	12600 =	8070 =	8420 =	9880 =	9030 =	11400 =	14000 =
Antimony	0.63 UJ	0.63 UJ	0.59 UJ		0.61 UJ	0.63 UJ	0.62 UJ	0.61 UJ	0.63 UJ		0.31 U				
Arsenic	13.1 J	15.3 J	13.9 J	16.5 J *	12 =	9.4 J	12.6 J	9.8 J	11.9 J	14.3 J	16.7 = *	12.6 =	15.3 =	14 =	11.1 =
Barium	60.7 J	76.8 J	26.7 UJ	59.6 =	31.1 =	49.4 J	42.9 J	41.5 J	75.5 J	32.2 =	45.2 =	52.6 =	53 =	46.9 =	59.1 =
Beryllium	0.53 UJ	0.62 UJ	0.41 J		0.29 U	0.39 UJ	0.4 UJ	0.26 UJ	0.5 UJ		0.65 =				
Cadmium	0.63 UJ	0.63 UJ	0.59 UJ	0.43 J *	0.61 U	0.63 UJ	0.62 UJ	0.61 UJ	0.63 UJ	0.07 J *	0.13 J *	0.47 U	0.05 U	0.05 U	0.05 U
Calcium	12900 J	8990 J	992 J		453 J	4660 J	1680 J	1260 J	3250 J		2330 =				
Chromium	12.8 J	17.4 J	10.2 J	12.4 =	11.6 =	12.9 J	16.5 J	12.1 J	16.1 J	9.5 =	9.8 =	13.9 =	11.4 =	13.3 =	16.1 =
Cobalt	7.2 J	8.5 J	5.7 J		8 J	6.3 J	5.5 J	7 J	8.9 J		8.9 =				
Copper	17.1 J	22.5 J *	18.3 J *		12.6 =	12.5 J	14 J	12.5 J	17.3 J		14.4 =				
Iron	20600 =	25600 = *	16700 =		17800 =	18700 =	22700 =	15000 =	21200 =		22600 =				
Lead	16.8 J	20.5 J	13.7 J	18.4 =	9.9 J	15.9 J	12.3 J	12.7 J	19.5 J	14 =	15.7 =	13.4 =	17.7 =	17.1 =	15.9 =
Magnesium	1910 J	2530 J	1410 J		1920 =	1810 J	2110 J	1670 J	2340 J		1480 =				
Manganese	355 J	334 J	261 J	334 =	246 =	368 J	211 J	274 J	842 J	307 =	639 =	396 =	1120 =	278 =	201 =
Mercury	0.025 J	0.036 J	0.028 J	0.25 = *	0.055 U	0.035 J	0.03 J	0.026 J	0.088 J *	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U
Nickel	16.4 J	22.3 J *	14.6 J		14.7 =	13.8 J	13 J	14.2 J	19.7 J		13 =				
Potassium	962 J *	1360 J *	762 J		982 =	582 J	792 J	737 J	1040 J *		493 J				
Selenium	0.63 UJ	0.63 UJ	0.59 UJ	1.5 = *	0.61 U	0.63 UJ	1.2 J	0.61 UJ	0.63 UJ	1.4 =	2.1 = *	1.7 = *	1.1 =	1.1 =	0.4 J
Silver	1.3 U	1.3 U	1.2 U	0.22 U	1.2 U	1.3 U	1.2 U	1.2 U	1.3 U	0.21 U	0.2 U	0.21 U	0.22 U	0.22 U	0.22 U
Sodium	43.4 U	59 U	28.2 U		34.9 R	45.3 U	37.2 U	40.2 U	45.8 U		168 J *				
Thallium	0.63 UJ	0.63 UJ	0.59 UJ		0.61 U	0.63 UJ	0.62 UJ	0.61 UJ	0.63 UJ		3.1 = *				
Vanadium	18.4 =	22.7 =	14.3 =		16.6 =	19.2 =	24.2 =	19.8 =	23.7 =		16 =				
Zinc	59.5 J	66.7 J *	48.6 J	56.8 =	52.5 =	67.2 J *	39.1 J	48.7 J	59.9 J	48.7 =	41.8 =	54.4 =	37.8 =	51 =	54.3 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-18	PAD-19	PAD-20	PAD-23	PAD-24	PAD-25	PAD-26	PAD-26	PAD-27	PAD-28	PAD-29	PAD-30	PAD-31	PAD-32	PAD-32
WBGso-013	WBGso-014	WBGso-015	WBGso-016	WBGso-017	WBGso-018	WBGso-019	WBGso-019	WBGso-020	WBGso-021	WBGso-022	WBGso-023	WBGso-024	WBGso-025	WBGso-077
WBGss-013-0468-SO	WBGss-014-0469-SO	WBGss-015-0470-SO	WBGss-016-0471-SO	WBGss-017-0472-SO	WBGss-018-0473-SO	WBGss-019-0474-SO	WBGss-019-0475-FD	WBGss-020-0477-SO	WBGss-021-0478-SO	WBGss-022-0479-SO	WBGss-023-0480-SO	WBGss-024-0481-SO	WBGss-025-0482-SO	WBGss-077-0542-SO
08/05/96	08/08/96	08/05/96	08/06/96	08/06/96	08/06/96	08/06/96	08/06/96	08/05/96	08/05/96	08/05/96	08/05/96	08/05/96	08/05/96	08/13/96
0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 1	0 to 1
Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
									0.1 U					
10400 =	8090 =	11800 =	10300 =	11500 =	8250 =	9490 =	9520 =	11400 =	12500 =	17400 =	8500 =	12300 =	10600 =	20500 = *
									0.3 UJ					
15 =	12 =	14 =	11 J	13.7 J	12.3 J	12.5 J	11.2 J	12.9 =	15.1 =	7.9 =	19.8 = *	16.1 = *	7.6 =	9.7 J
81 =	34.8 =	57.9 =	74 J	54.8 J	47.6 J	31.2 J	30.6 J	75.7 =	42.7 =	100 = *	39.2 =	55.6 =	132 = *	263 = *
									0.58 =					
0.1 U	0.04 U	0.19 U	0.34 J *	0.22 J *	0.34 J *	0.2 J *	0.18 J *	0.57 J *	0.07 U	0.07 U	0.05 U	0.12 U	8.2 = *	3 = *
									805 =					
12.9 =	8.5 =	14.8 =	10.8 J	14.1 J	10.2 J	10.3 J	9.8 J	13.7 =	15.2 J	18.4 = *	12.4 =	14.7 =	9.1 =	11.2 =
									7.2 =					
									18.8 = *					
									27300 = *					
15.6 =	12.7 =	18.9 =	13.7 =	11.4 =	15.1 =	12.5 =	12.6 =	12.9 =	13.7 =	15.8 =	13.2 =	17.9 =	56.2 = *	28.1 J *
									2640 =					
613 =	453 =	411 =	464 =	206 =	301 =	223 =	233 =	723 =	116 =	147 =	320 =	257 =	1820 = *	3910 J *
0.04 U	0.04 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 = *
									18.5 J					
									824 =					
0.96 =	0.33 U	1.4 =	0.44 J	0.69 J	0.55 J	0.88 J	0.78 J	2.1 = *	1.8 = *	0.79 =	0.69 =	1.4 =	1 =	0.85 =
0.22 U	0.21 U	0.22 U	0.21 U	0.19 U	0.21 U	0.21 U	0.21 U	0.21 U	0.19 U	0.23 U	0.21 U	0.24 U	0.2 U	0.21 U
									162 J *					
									1.8 = *					
									19.6 =					
49 =	39 =	50.5 =	51.5 J	45.2 J	36 =	45.4 J	45.2 J	47.4 =	49.6 =	57.7 =	65.4 = *	54 =	329 = *	81.7 = *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-33	PAD-34	PAD-35	PAD-36	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37
WBGso-026	WBGso-027	WBGso-028	WBGso-029	WBGso-030	WBGso-031	WBGso-032	WBGso-033	WBGso-107	WBGso-175	WBGso-185	WBGso-187	WBGso-187	WBGso-187	WBGso-153
WBGss-026-0483-SO	WBGss-027-0484-SO	WBGss-028-0485-SO	WBGss-029-0486-SO	WBGss-030-0487-SO	WBGss-031-0488-SO	WBGss-032-0489-SO	WBGss-033-0490-SO	WBGso-107-0766-SO	WBGss-175-0887-SO	WBGso-185-0762-SO	WBGss-187-0912-SO	WBGso-187-0940-SO	WBGso-187-0941-FD	WBGss-153-0742-SO
08/06/96	08/06/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96	08/06/96	04/28/98	05/04/98	04/25/98	05/06/98	05/08/98	05/08/98	05/06/98
0 to 1	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2	2 to 4	0 to 1	2 to 4	0 to 1	2 to 4	2 to 4	0 to 0
Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab	Grab	Grab	Field Duplicate	Grab Composite
					0.23 J *			0.66 U	0.68 U	0.63 U	0.64 U	0.58 U	0.61 U	0.5 U
14900 =	13100 =	12800 =	12300 =	12300 =	16900 =	30400 = *	10700 =	10700 =	14900 =	15300 =	12300 =	12900 J	9370 J	29200 J *
					0.3 U			0.66 UJ	1.7 J *	0.57 J	2.1 J *	0.34 J	0.39 J	0.5 UJ
16.9 J *	14.2 J	12.2 J	11.4 J	17.7 J *	8.9 =	2.5 J	14.7 J	15.7 =	14.1 =	5.8 =	12.4 =	14 =	15.9 =	0.31 J
64.2 J	112 J *	56.4 =	54.5 =	65.8 =	173 = *	466 = *	93.3 J *	47.4 =	117 J *	121 =	97.2 = *	74.3 J	46.2 J	495 = *
					2.6 = *			0.49 J	0.44 UJ	0.61 U	0.34 U	0.5 U	0.44 U	7.8 = *
0.37 J *	0.42 J *	0.16 J *	0.16 J *	0.58 = *	1.8 = *	26.8 = *	6.7 J *	0.66 U	4.1 = *	0.63 U	9.8 = *	0.58 U	0.61 U	0.5 U
					88900 = *			657 U	7530 =	4140 =	6320 =	1330 J	871 J	228000 = *
18 J *	17.9 J *	15.2 =	14.2 =	17.8 = *	11.1 =	37.6 = *	16.9 J	13.8 =	24.9 = *	15.3 =	19.2 = *	17.6 =	14.8 =	27.3 = *
					4.6 =			9.3 J	8.1 J	6.4 J	7.7 J	9.5 J	10.9 J	15 U
					13 =			8.3 =	54.6 = *	11.6 =	50.2 = *	21.7 J	24.1 J	3.4 U
					12800 =			26200 =	25800 = *	17900 =	22200 =	24900 J	25900 J	1350 =
15.5 =	18.5 =	17 J	18.6 J	108 J *	21.5 =	23.8 J	436 = *	15.7 =	118 = *	14.7 J	68.9 = *	11.1 =	12.5 =	5.6 =
					13100 = *			2010 =	2960 J	2380 =	2780 =	2990 J	2590 J	53700 = *
304 =	782 =	419 =	327 =	351 =	1840 = *	2580 = *	637 =	524 J	511 J	616 =	551 J	269 J	309 J	4270 = *
0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03 J	0.04 U	0.03 U	0.037 J	0.062 U	0.059 U	0.063 U	0.12 U	0.12 U	0.1 U
					7.4 =			13.7 =	20 =	14.1 =	16.9 =	22.2 J	21.4 J	4 UJ
					1600 = *			725 =	2040 = *	974 =	988 = *	1500 =	918 =	3710 = *
1.1 J	0.85 J	0.69 =	0.64 =	0.62 =	0.58 =	2.4 = *	0.91 J	0.66 U	0.68 U	0.63 U	0.64 U	0.98 =	0.64 =	1.5 = *
0.2 U	0.21 U	0.22 U	0.22 U	0.21 U	0.19 U	1.5 = *	0.2 U	1.3 U	1.4 U	1.3 U	1.3 U	1.2 U	1.2 U	1 U
					962 = *			18.9 J	80.3 U	80.3 R	105 U	72.1 U	61.9 U	2320 = *
					2.7 = *			0.66 U	0.68 U	0.63 U	0.64 U	0.58 U	0.61 U	1 U
					12.7 =			24.1 =	28 =	21.5 =	21.9 =	22.4 J	15.6 J	23.2 =
69 J *	68.6 J *	48.5 =	54.6 =	133 = *	41.8 =	315 = *	248 J *	50.8 =	208 J *	67.5 =	149 J *	64.2 J	65.7 J	9.3 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-37	PAD-37-1	PAD-37-1	PAD-37-2	PAD-38	PAD-38	PAD-38	PAD-38-1	PAD-38-2	PAD-38-3	PAD-39	PAD-40	PAD-40	PAD-40-1	PAD-40-2
WBGso-154	WBGso-106	WBGso-106	WBGso-107	WBGso-034	WBGso-035	WBGso-035	WBGso-108	WBGso-109	WBGso-110	WBGso-036	WBGso-037	WBGso-037	WBGso-111	WBGso-112
WBGss-154-0743-SO	WBGss-106-0695-SO	WBGss-106-0871-FD	WBGss-107-0696-SO	WBGss-034-0491-SO	WBGss-035-0492-SO	WBGso-035-0763-SO	WBGss-108-0697-SO	WBGss-109-0698-SO	WBGss-110-0699-SO	WBGss-036-0493-SO	WBGss-037-0494-SO	WBGso-037-0761-SO	WBGss-111-0700-SO	WBGss-112-0701-SO
05/06/98	04/23/98	04/23/98	04/23/98	08/06/96	08/06/96	04/25/98	04/23/98	04/23/98	04/23/98	08/06/96	08/06/96	04/25/98	04/23/98	04/23/98
0 to 0	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	2 to 4	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	2 to 4	0 to 1	0 to 1
Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite
0.5 U	0.61 U	0.59 U	0.6 U			0.58 U	0.63 U	0.67 U	0.63 U			0.63 U	0.6 U	0.62 U
30700 J *	22500 = *	17000 =	14600 =	15300 =	22200 = *	13900 =	12000 =	12800 =	20300 = *	10200 =	8730 =	17500 =	10600 =	10900 =
0.4 J	0.61 UJ	0.36 J	2.5 J *			0.73 J	0.63 UJ	1.3 J *	0.63 UJ			0.63 UJ	0.6 UJ	0.62 UJ
0.59 =	6.1 J	6.9 J	13 J	10.5 J	7.1 J	14.5 =	16.1 J *	12.6 J	9.2 J	12.3 J	16.1 J *	20.5 = *	17.8 J *	35.8 J *
301 = *	250 J *	203 J *	115 J *	596 J *	255 J *	87.3 =	70.7 J	136 J *	117 J *	41.9 J	67.3 J	72.7 =	90.7 J *	63.9 J
10.9 = *	3.4 J *	2.7 J *	1.1 J *			0.65 U	0.54 UJ	0.43 UJ	1.6 J *			0.78 U	0.64 UJ	0.54 UJ
0.5 U	0.82 J *	0.68 J *	15.9 J *	877 J *	63.4 J *	0.62 = *	0.63 UJ	3.3 J *	13.2 J *	0.24 J *	0.42 J *	0.63 U	0.6 UJ	0.62 UJ
247000 = *	111000 J *	81000 J *	31700 J *			1900 =	1090 J	3310 J	56400 J *			1030 =	29100 J *	10900 J
3.4 =	17.5 J *	14.7 J	19 J *	26.6 J *	27.2 J *	17.6 =	16.5 J	21.9 J *	15.2 J	11.6 J	10.5 J	23.3 =	14.3 J	12.7 J
0.92 J	3.5 J	5.1 J	6.3 J			16 J	8.3 J	9 J	4.9 J			9.6 J	9.5 J	5.7 J
0.63 U	10.6 J	13.3 J	59 J *			19.3 =	18.9 J *	82 J *	15.7 J			25.8 =	22.5 J *	14.8 J
2720 =	9450 =	12500 =	19800 =			24700 =	25100 = *	24100 = *	15600 =			37100 = *	23200 = *	26400 = *
0.3 U	16.1 J	17.9 J	1490 J *	504 = *	236 = *	15.5 J	18.3 J	300 J *	43.2 J *	18.1 =	189 = *	12.5 J	17.5 J	22.7 J
49700 = *	16700 J *	17100 J *	5940 J *			3530 =	2610 J	2070 J	8220 J *			3610 =	3080 J *	1490 J
1190 =	3150 J *	1660 J *	874 J	1480 = *	2170 = *	481 =	278 J	628 J	1240 J	275 =	861 =	232 =	412 J	314 J
0.1 U	0.026 J	0.12 U	0.025 J	0.03 U	0.03 U	0.042 U	0.13 U	0.034 J	0.13 U	0.04 U	0.04 U	0.054 U	0.12 U	0.03 J
4 UJ	22.6 J *	14.3 J	17.1 J			29.9 =	20.5 J	21.2 J *	15.8 J			25.8 =	29.2 J *	13 J
1920 = *	2210 J *	1140 J *	1410 J *			1700 =	1060 J *	1070 J *	1670 J *			1720 =	1120 J *	559 J
2 = *	0.61 UJ	0.59 UJ	0.6 UJ	5 J *	1.4 J	0.58 U	0.63 UJ	0.67 UJ	0.71 J	0.64 J	0.89 J	0.63 U	0.6 UJ	0.62 UJ
1 U	1.2 U	1.2 U	1.2 U	0.2 U	0.19 =	1.2 U	1.3 U	1.3 U	1.3 U	0.21 U	0.2 U	1.3 U	1.2 U	1.2 U
1770 = *	997 = *	592 = *	268 J *			70.7 R	47.3 U	64 U	328 J *			38.6 R	71.7 U	56.2 U
0.5 U	0.61 UJ	0.59 UJ	0.6 UJ			0.58 U	0.63 UJ	0.67 UJ	0.63 UJ			0.63 U	0.6 UJ	0.62 UJ
4.8 J	11.2 =	15.5 =	20.4 =			19.9 =	20.7 =	22.5 =	19.7 =			29 =	17.7 =	22.8 =
2 U	37.6 J	46.8 J	171 J *	342 J *	316 J *	72.9 =	70.5 J *	877 J *	61.1 J	82.2 J *	317 J *	71.8 =	68.7 J *	50.3 J

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-40-3	PAD-41	PAD-41	PAD-43	PAD-43	PAD-44	PAD-44	PAD-45	PAD-46	PAD-47	PAD-48	PAD-49	PAD-50	PAD-51	PAD-52
WBGso-113	**WBGso-038**	**WBGso-097**	**WBGso-039**	**WBGso-053**	**WBGso-040**	**WBGso-040**	**WBGso-041**	**WBGso-042**	**WBGso-043**	**WBGso-044**	**WBGso-045**	**WBGso-046**	**WBGso-047**	**WBGso-048**
WBGss-113-0702-SO	**WBGss-038-0495-SO**	**WBGss-097-0564-SO**	**WBGss-039-0496-SO**	**WBGss-053-0513-SO**	**WBGss-040-0497-SO**	**WBGss-040-0498-FD**	**WBGss-041-0499-SO**	**WBGss-042-0500-SO**	**WBGss-043-0501-SO**	**WBGss-044-0502-SO**	**WBGss-045-0503-SO**	**WBGss-046-0504-SO**	**WBGss-047-0505-SO**	**WBGss-048-0506-SO**
04/23/98	**08/06/96**	**08/13/96**	**07/31/96**	**08/13/96**	**07/31/96**	**07/31/96**	**07/31/96**	**08/07/96**	**08/07/96**	**08/07/96**	**08/07/96**	**08/07/96**	**08/07/96**	**08/07/96**
0 to 1	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 1**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 1**	**0 to 2**	**0 to 2**	**0 to 2**
Grab Composite	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
0.57 U														
10200 =	8980 =	8740 =	13500 =	15200 =	12400 =	13000 =	9910 =	8320 =	10000 =	10100 =	12600 =	12400 =	12800 =	11300 =
0.74 J														
14.8 =	21.6 J *	13.3 J	14.1 =	12.5 =	12.4 =	15.6 = *	12.1 =	16.5 J *	14 J	13.1 J	17.6 J *	16.4 = *	15.6 = *	13.5 =
57.2 =	55.8 J	41.4 =	63.7 =	59.2 =	41.8 =	68.1 =	99.9 = *	36.5 =	43.5 =	31.8 =	38.8 =	65.7 =	53 =	62.9 =
0.44 U														
0.57 U	0.36 J *	0.19 J *	0.04 UJ	0.31 J *	0.04 J	0.05 U	1.8 = *	0.37 J *	5.7 = *	0.14 J *	0.88 = *	0.28 J *	0.43 J *	0.2 J *
1760 =														
11.9 =	9.2 J	10.3 =	16.6 =	17.2 =	15.4 =	16.8 =	6.8 =	11.4 =	12.1 =	11.8 =	15.4 =	16.6 =	15.9 =	13.4 =
8.7 J														
25 J *														
18800 =														
53.7 J *	18.1 =	17.9 J	13.4 =	11.4 =	13.7 =	15.8 =	314 = *	12.4 J	13.7 J	14.4 J	17.7 J	14.4 J	14.9 J	14.4 J
1410 =														
440 =	359 =	221 J	241 J	169 =	133 J	318 =	798 =	230 =	213 =	194 =	160 =	321 =	273 =	269 =
0.063 J *	0.04 U	0.06 = *	0.03 U	0.04 U	0.03 U	0.04 = *	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 J *	0.04 U
16.7 J														
465 J														
1.2 =	1.7 J *	0.56 J	0.56 J	0.35 U	0.72 J	1.2 =	0.82 =	0.7 =	0.51 J	0.75 =	0.97 =	0.77 =	0.92 =	0.34 U
1.1 U	0.2 U	0.22 U	0.2 U	0.22 U	0.19 U	0.22 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.23 U	0.21 U
63.3 U														
0.57 UJ														
19.5 =														
159 J *	45 J	46.7 =	69.4 = *	58.3 =	55.6 =	65.4 = *	349 = *	54.2 =	79.2 = *	50.5 =	60.4 =	65 = *	57 =	58.2 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-53	PAD-54	PAD-55	PAD-55	PAD-56	PAD-58	PAD-58	PAD-58	PAD-58-1	PAD-58-1	PAD-58-2	PAD-58-3	PAD-58A	PAD-59	PAD-59
WBGso-049	WBGso-050	WBGso-051	WBGso-051	WBGso-052	WBGso-054	WBGso-054	WBGso-170	WBGso-114	WBGso-114	WBGso-115	WBGso-116	WBGso-171	WBGso-055	WBGso-055
WBGss-049-0507-SO	WBGss-050-0508-SO	WBGss-051-0509-SO	WBGss-051-0510-FD	WBGss-052-0512-SO	WBGss-054-0514-SO	WBGso-054-0753-SO	WBGss-170-0881-SO	WBGss-114-0703-SO	WBGss-114-0875-FD	WBGss-115-0704-SO	WBGss-116-0705-SO	WBGss-171-0882-SO	WBGss-055-0515-SO	WBGso-055-0754-SO
08/07/96	08/07/96	08/08/96	08/08/96	08/07/96	08/08/96	05/05/98	05/04/98	04/23/98	04/23/98	04/23/98	04/23/98	05/04/98	08/08/96	04/24/98
0 to 2	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	2 to 4	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	2 to 4
Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab
		0.1 U	0.19 J *			0.56 U	0.69 U	0.61 U	0.58 U	0.61 U	0.064 J *	0.61 U		0.6 U
14600 =	11600 =	8270 =	9380 =	9320 =	12500 =	6330 =	9530 =	10300 =	9820 =	11700 =	17700 =	14000 =	11600 =	16000 =
		0.43 U	0.31 U			0.56 UJ	12.9 J *	3.3 J *	2.3 J *	1.3 J *	6.1 J *	2.9 J *		0.64 J
14.6 =	15.2 =	9.7 J	11.6 J	12 =	19 = *	12.3 =	23.5 = *	15.9 J *	13.9 J	14.1 J	16.9 J *	14.3 =	12.1 =	14.2 =
57.5 =	63.3 =	41.5 =	44.5 =	66.6 =	174 = *	31.1 =	204 J *	102 J *	82.6 J	87.2 J	149 J *	101 J *	96.1 = *	86.4 =
		0.43 U	0.51 U			0.28 U	0.62 J	0.59 UJ	0.51 UJ	0.6 UJ	0.81 UJ	0.43 J		0.78 U
10 = *	0.41 J *	0.18 U	0.22 U	0.31 J *	4.6 = *	0.56 U	14 = *	80 J *	28.7 J *	1.1 J *	1.4 J *	1 = *	1.3 = *	0.6 U
		2100 =	2340 =			913 =	13500 =	3220 J	2460 J	17500 J *	8820 J	3870 =		1540 =
15.9 =	14 =	10.1 =	12 =	15.5 J	29.3 = *	9.4 =	46.4 = *	189 J *	103 J *	19.3 J *	31.3 J *	23.7 = *	118 = *	21.5 =
		5.5 J	6.4 J			6.5 J	7.8 J	11.2 J *	10.4 J	11.2 J *	12.7 J *	8.4 J		12.6 J
		13.1 =	15.6 =			21.8 =	653 = *	252 J *	123 J *	46.9 J *	109 J *	138 = *		32 =
		17600 =	21800 =			18500 =	21500 =	26400 J *	24500 = *	29800 = *	32800 = *	25100 = *		27300 =
21.5 J	32.5 J *	10.2 =	11.4 =	45.2 J *	202 = *	20.7 = *	385 = *	1020 J *	398 J *	38.9 J *	122 J *	89.4 = *	916 = *	30.8 J *
		1930 =	2180 =			1850 =	3080 J *	2940 J	2840 J	5260 J *	5170 J *	2810 =		4090 =
194 =	401 =	208 J	244 J	276 =	575 =	593 J	522 J	480 J	411 J	453 J	453 J	436 J	405 =	304 =
0.04 J *	0.04 = *	0.04 = *	0.03 U	0.04 J *	0.21 = *	0.054 U	1.1 = *	0.3 = *	0.59 = *	0.089 J *	0.22 = *	0.32 = *	0.04 U	0.046 U
		12.2 =	15 =			15.7 =	25.4 = *	32.1 J *	28.9 J *	29.8 J *	37.2 J *	24.1 = *		27.7 =
		543 =	559 =			868 =	1080 = *	1330 = *	1130 J *	1660 J *	2670 J *	1550 = *		2210 =
0.72 =	0.96 =	0.79 =	1.2 =	1.2 =	1.3 =	0.56 U	0.77 U	0.61 UJ	0.58 UJ	0.61 UJ	0.71 UJ	0.61 U	1.1 =	0.6 U
0.24 U	0.22 U	0.2 U	0.2 U	0.21 U	6.4 = *	1.1 U	5.8 = *	1.4 = *	0.62 U	1.2 = *	3 = *	1.9 = *	0.54 J *	1.2 U
		163 J *	170 J *			42 U	223 J *	92.8 J	70.1 U	78.8 U	111 J	76.2 U		148 J *
		1.4 = *	2.1 = *			0.56 U	0.69 U	0.61 UJ	0.58 UJ	0.61 UJ	0.71 UJ	0.93 U		0.6 U
		13.8 =	15.9 =			11.7 =	15.1 =	17.6 =	16.6 =	20.1 =	27.9 =	23.9 =		24.9 =
67.7 = *	67.2 = *	39.9 =	48.1 =	58.1 =	604 = *	72 J	863 J *	813 J *	367 J *	215 J *	458 J *	485 J *	1040 = *	81.6 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-59	PAD-59	PAD-59	PAD-59-1	PAD-59-2	PAD-59-3	PAD-59A	PAD-59A	PAD-60	PAD-60	PAD-60	PAD-60	PAD-60	PAD-60	PAD-60-1
WBGso-055	WBGso-056	WBGso-172	WBGso-117	WBGso-118	WBGso-119	WBGso-169	WBGso-169	WBGso-057	WBGso-057	WBGso-057	WBGso-058	WBGso-122	WBGso-173	WBGso-120
WBGso-055-0755-SO	WBGss-056-0516-SO	WBGss-172-0883-SO	WBGss-117-0706-SO	WBGss-118-0707-SO	WBGss-119-0708-SO	WBGss-169-0884-SO	WBGss-169-0897-FD	WBGss-057-0517-SO	WBGso-057-0756-SO	WBGso-057-0757-SO	WBGss-058-0520-SO	WBGso-122-0767-SO	WBGss-173-0885-SO	WBGss-120-0709-SO
04/24/98	08/08/96	05/04/98	04/22/98	04/22/98	04/22/98	04/26/98	04/26/98	08/07/96	04/24/98	04/24/98	08/07/96	04/28/98	04/26/98	04/22/98
4 to 6	0 to 2	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	2 to 4	4 to 6	0 to 1	4 to 6	0 to 1	0 to 1
Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab	Field Duplicate	Grab Composite	Grab	Grab	Grab Composite	Grab	Grab	Grab Composite
0.62 U		0.6 U	0.6 U	0.7 U	0.63 U	0.6 U	0.59 U		0.58 U	0.58 U		0.58 U	0.6 U	0.66 U
14100 =	7070 =	12700 =	9300 =	16600 =	10800 =	14700 =	12300 =	9130 =	13800 =	16200 =	11300 =	16400 =	50100 = *	13600 =
0.58 J		8.3 J *	0.6 UJ	27.9 J *	2 J *	3.8 J *	12.2 J *		2.4 J *	0.58 UJ		0.55 J	2.9 J *	22.5 J *
14.2 =	7.4 =	11.4 =	10.4 =	14.6 =	10 =	11.6 =	12.1 =	10.1 =	14.1 =	13.8 =	11.6 =	13.6 =	9.1 =	14.9 =
66.2 =	43.1 =	56.2 J	36.3 =	186 = *	49.8 =	56.4 =	58 =	207 = *	91.4 =	72.7 =	138 = *	123 =	84.8 J	231 = *
0.64 U		0.3 UJ	0.19 U	0.34 U	0.31 U	0.39 U	0.37 U		0.6 U	0.69 U		0.8 =	0.33 UJ	0.53 U
0.62 U	0.36 J *	0.6 U	0.6 U	4.7 = *	0.63 U	0.6 U	0.59 = *	15.1 = *	4.6 = *	0.58 U	11.4 = *	0.58 U	6.6 = *	13.6 = *
8870 =		1070 =	1290 =	2810 =	2200 =	1120 =	1280 =		14700 =	17900 =		2190 =	1490 =	3730 =
19.9 =	11.5 =	18.6 = *	11.7 =	28.1 = *	15.2 =	17.4 =	17.8 = *	27.8 J *	23.1 =	21.5 =	27.4 J *	22.8 =	15.6 =	49.4 = *
12.3 J		8.8 J	7.1 J	10.5 J *	6.9 J	8.8 J	8.9 J		14.3 J	13.9 J		12.6 J	9.3 J	9.4 J
33.6 = *		54.6 = *	17.3 =	105 = *	37.5 = *	49.9 = *	120 = *		46.9 = *	22.9 =		29.8 =	132 = *	4100 = *
26100 =		22700 =	17500 =	26100 = *	21200 =	21800 =	21700 =		27600 =	27000 =		27900 =	18700 =	26300 = *
30.4 J *	39 = *	36.7 = *	15.7 =	1690 = *	51.2 = *	41.6 J *	95.5 J *	721 J *	105 J *	13.1 J	522 J *	26.3 = *	156 = *	569 = *
5050 =		2460 J	1720 =	3420 = *	1990 =	2580 =	2290 =		5420 =	6520 =		4210 =	1730 J	2990 =
551 =	177 =	243 J	373 =	485 =	280 =	605 =	329 =	428 =	569 =	452 =	261 =	451 J	663 J	399 =
0.039 U	0.04 U	0.063 U	0.026 J	0.059 J *	0.072 J *	0.063 U	0.064 U	0.05 = *	0.042 U	0.04 U	0.09 = *	0.12 U	0.068 U	0.12 J *
27.7 =		20 =	12.9 =	26.6 = *	17.3 =	19.4 =	22 = *		31.2 =	28.3 =		34.1 =	13.2 =	45.7 = *
2590 =		1120 = *	753 =	2030 = *	951 = *	1180 = *	868 =		2250 =	3490 = *		2910 =	721 =	1690 = *
0.62 U	0.34 U	0.6 U	0.6 U	1.4 =	0.97 =	0.6 U	0.59 U	1.7 = *	0.58 U	0.58 U	1.3 =	0.58 U	0.6 U	2.5 = *
1.2 U	0.22 J *	1.2 U	1.2 U	4.3 = *	1.3 U	1.2 U	0.84 J *	5 = *	1.5 = *	1.2 U	4.7 = *	1.2 U	1.2 U	7.1 = *
151 J *		87.4 U	58.1 U	171 J *	55 U	79.2 R	68.6 R		227 J *	128 J		142 J	61.5 U	188 J *
0.62 U		0.6 U	0.6 U	0.7 U	0.63 U	0.6 U	0.59 U		0.58 U	0.58 U		0.76 =	0.6 U	0.66 U
22.9 =		22.4 =	16.6 =	29.3 =	21 =	24.3 =	19.2 =		22.3 =	26.5 =		26.3 =	20.3 =	23.2 =
76.6 =	91.1 = *	129 J *	56.9 J	441 J *	92.1 J *	96.9 = *	205 = *	1050 = *	184 = *	69.5 =	469 = *	98.5 = *	274 J *	1000 J *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-60-2	PAD-60-3	PAD-60-3	PAD-60-4	PAD-60A	PAD-61	PAD-61	PAD-61	PAD-61	PAD-61	PAD-61-1	PAD-61-2	PAD-61-3	PAD-61-4	PAD-61A
WBGso-121	WBGso-122	WBGso-122	WBGso-123	WBGso-174	WBGso-059	WBGso-059	WBGso-059	WBGso-060	WBGso-195	WBGso-124	WBGso-125	WBGso-126	WBGso-127	WBGso-196
WBGss-121-0710-SO	WBGss-122-0711-SO	WBGss-122-0869-FD	WBGss-123-0712-SO	WBGss-174-0886-SO	WBGss-059-0518-FD	WBGss-059-0521-SO	WBGss-059-0760-SO	WBGss-060-0522-SO	WBGss-195-0936-SO	WBGss-124-0713-SO	WBGss-125-0714-SO	WBGss-126-0715-SO	WBGss-127-0716-SO	WBGss-196-0937-SO
04/22/98	04/22/98	04/22/98	04/22/98	04/26/98	08/08/96	08/08/96	04/25/98	08/08/96	05/07/98	04/22/98	04/22/98	04/22/98	04/22/98	05/07/98
0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	2 to 4	0 to 2	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab	Field Duplicate	Grab Composite	Grab	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab
0.64 U	0.64 U	0.61 U	0.59 U	0.63 U			0.64 U		0.63 U	0.62 U	0.64 U	0.65 U	0.62 U	0.63 U
18000 = *	17800 = *	15600 =	8650 =	20100 = *	10600 =	12100 =	12700 =	10300 =	12300 J	9300 =	9480 =	10500 =	11900 =	10100 J
7.4 J *	18.2 J *	7.3 J *	0.59 UJ	9.3 J *			0.64 UJ		0.48 J	0.6 UJ	0.97 UJ	1.2 UJ	0.62 UJ	0.68 J
10.6 =	13.9 =	10.8 =	12.1 =	13.4 =	14.5 =	14.3 =	12.5 =	11.5 =	14.5 =	15.1 =	10.7 =	10.4 =	12.3 =	12.3 =
170 = *	401 = *	199 = *	46.2 =	140 J *	100 = *	138 = *	71.6 =	58 =	64.7 =	77.6 J	289 J *	237 J *	63.3 =	91 = *
0.52 U	0.39 U	0.15 U	0.3 U	0.27 UJ			0.53 U		0.35 J	0.23 U	0.35 U	0.29 U	0.4 U	0.23 J
9 = *	42.8 = *	19.5 = *	0.81 = *	4 = *	27.1 = *	52.6 = *	3.2 = *	1.1 = *	0.63 U	3.6 = *	3.3 = *	21.7 = *	0.76 = *	2.7 = *
2500 =	5400 =	3790 =	5750 =	3730 =			5070 =		1360 =	6160 =	3460 =	2580 =	10100 =	2210 =
39.6 = *	47.1 = *	33.7 = *	11.9 =	36.4 = *	14.8 =	18.5 = *	18.7 =	13.1 =	17.2 =	16.1 =	16.4 =	52 = *	14.7 =	15.6 =
8.5 J	10.2 J	8.8 J	6.1 J	8.3 J			11.9 J		8.4 J	9.8 J	7.7 J	10 J	8.7 J	7.8 J
152 = *	1520 = *	996 = *	44.2 = *	316 = *			22.7 =		42.4 = *	97.5 = *	159 = *	487 = *	36 = *	52.7 = *
23300 = *	39100 = *	26800 = *	16600 =	29700 = *			26300 =		24500 = *	26800 = *	19400 =	26800 = *	20100 =	23600 = *
486 = *	2150 = *	884 = *	34.5 = *	1810 = *	89.5 = *	124 = *	21.2 J *	27.9 = *	23.4 =	55.2 = *	206 = *	393 = *	57.2 = *	44.2 = *
3150 = *	2920 =	2760 =	2070 =	2980 J			4230 =		2510 =	3560 J *	2260 J	2430 J	3410 = *	2390 =
349 =	638 =	505 =	381 =	441 J	417 =	435 =	400 =	525 =	546 =	371 =	447 =	491 =	565 =	377 =
0.07 J *	0.079 J *	0.065 J *	0.12 U	0.086 U	0.05 = *	0.04 = *	0.13 U	0.04 = *	0.04 J *	0.057 J *	0.073 J *	0.083 J *	0.032 J	0.039 J *
27.2 = *	37.4 = *	27.1 = *	13.7 =	22.5 = *			28 =		17.3 J	22.2 = *	17.8 =	133 = *	15.7 =	16.5 J
2050 = *	1400 = *	1190 = *	765 =	3050 = *			1810 =		997 = *	1550 J *	953 J *	1100 J *	952 = *	660 =
1.2 =	2.3 = *	1.5 = *	1.2 =	0.63 U	2.6 = *	3.7 = *	0.64 U	0.85 =	1.1 =	1 =	1.2 =	3.1 = *	0.95 =	1.3 =
2.9 = *	5.6 = *	6.9 = *	1.2 U	1.4 = *	0.35 J *	0.48 J *	1.3 U	0.22 J	1.3 U	1.2 U	0.75 J *	1.3 U	1.2 U	1.3 U
180 J *	199 J *	147 J *	68.6 U	1080 = *			110 J		65.8 U	108 J	65.9 J	92.3 J	82.1 U	64.4 U
0.64 U	0.64 U	0.61 U	0.59 U	0.63 U			0.64 U		0.63 U	0.62 U	0.64 U	0.65 U	0.62 U	0.63 U
29 =	26 =	26.4 =	14 =	34 = *			20.2 =		22.6 =	19.4 =	17.6 =	19.1 =	19 =	19.1 =
567 J *	3600 J *	4170 J *	82.6 J *	566 J *	187 = *	195 = *	77.2 =	108 = *	86.4 = *	352 J *	1920 J *	625 J *	122 J *	229 = *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-61A	PAD-62	PAD-62	PAD-62	PAD-62	PAD-62	PAD-62	PAD-62	PAD-62-1	PAD-62-2	PAD-62-3	PAD-62A	PAD-63	PAD-63	PAD-64
WBGso-196	WBGso-061	WBGso-062	WBGso-062	WBGso-062	WBGso-062	WBGso-193	WBGso-193	WBGso-128	WBGso-129	WBGso-130	WBGso-194	WBGso-063	WBGso-064	WBGso-065
WBGss-196-0943-SO	WBGss-061-0523-SO	WBGss-062-0524-SO	WBGso-062-0758-SO	WBGso-062-0759-SO	WBGso-062-0880-FD	WBGss-193-0932-SO	WBGss-193-0933-FD	WBGss-128-0717-SO	WBGss-129-0718-SO	WBGss-130-0719-SO	WBGss-194-0935-SO	WBGss-063-0525-SO	WBGss-064-0526-SO	WBGss-065-0527-SO
05/08/98	08/08/96	08/08/96	04/25/98	04/25/98	04/25/98	05/07/98	05/07/98	04/22/98	04/22/98	04/22/98	05/07/98	08/07/96	08/07/96	08/09/96
2 to 4	0 to 2	0 to 2	2 to 4	4 to 6	4 to 6	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	0 to 2
Grab	Grab Composite	Grab Composite	Grab	Grab	Field Duplicate	Grab	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite
			0.66 U	0.62 U	0.62 U	0.72 U	0.71 U	0.59 U	0.65 U	0.61 U	0.63 U			
12500 J	12700 =	10200 =	17000 =	9280 =	8030 =	10500 J	10000 J	12900 =	12500 =	11900 =	10600 J	14300 =	13500 =	11300 =
0.47 J			0.62 J	0.62 UJ	0.62 UJ	1.3 J *	1.3 J *	1.6 UJ	1.4 UJ	1.1 UJ	1.5 J *			
13.5 =	12.1 =	10.4 =	16.9 =	12.2 =	9.9 =	11.1 =	11.1 =	12.6 =	12.8 =	8.5 =	9.9 =	14.9 =	14.3 =	14.8 =
75.6 J	130 = *	140 = *	175 = *	70.3 =	62.7 =	276 = *	290 = *	327 J *	226 J *	131 J *	212 = *	79.7 =	69.2 =	180 = *
0.44 U			1.3 = *	0.63 U	0.4 U	0.32 J	0.36 J	0.26 U	0.47 U	0.97 J *	0.35 J			
11.9 = *	5.5 = *	2.2 = *	0.66 U	0.62 U	0.62 U	2.8 = *	2.7 = *	7.8 = *	0.99 = *	2.9 = *	2.1 = *	0.35 J *	0.5 J *	0.23 J *
2910 J			1730 =	846 =	755 =	4770 =	13500 =	9600 =	12600 =	41000 = *	3070 =			
19.6 =	16.8 =	15.4 =	18.5 =	13 =	10.1 =	18.5 = *	17.2 =	24.8 = *	21.8 = *	14.9 =	20 = *	20 J *	18.6 J *	13.3 =
13.2 J			25.4 = *	8 J	7.8 J	8.3 J	8.2 J	8.2 J	8.6 J	4.9 J	8.4 J			
27.6 J			10.7 =	9.5 =	11.5 =	55.8 = *	68.3 = *	132 = *	32 = *	42.2 = *	43.2 = *			
28000 J			32900 =	19900 =	16300 =	20800 =	21500 =	22300 =	25000 = *	13400 =	23200 = *			
38 = *	49.9 = *	87.2 = *	25.6 J *	12.5 J	10.4 J	124 = *	132 = *	481 = *	297 = *	72.2 = *	333 = *	40.1 J *	57.7 J *	31.9 = *
4100 J			2110 =	1430 =	1350 =	2490 =	2570 =	2900 J	2630 J	5010 J *	1950 =			
502 J	596 =	863 =	3470 = *	1090 =	1050 =	591 =	628 =	455 =	525 =	749 =	777 =	566 =	581 =	603 =
0.13 U	0.05 = *	0.09 = *	0.063 U	0.049 U	0.047 U	0.033 J	0.037 J *	0.12 U	0.07 J *	0.067 J *	0.048 J *	0.05 = *	0.04 J *	0.04 U
31.2 J			19.6 =	12.4 =	12.8 =	19.1 J	18.6 J	24 = *	18.4 =	11.9 =	17.6 J			
2130 =			1280 =	1000 =	933 =	1120 = *	968 = *	1860 J *	1140 J *	1150 J *	1010 = *			
0.64 U	1 =	0.92 =	0.66 U	0.62 U	0.62 U	1.1 =	0.75 =	1.2 =	1.2 =	0.61 U	0.94 =	1.3 =	1.8 = *	0.5 J
1.3 U	0.22 J	0.23 J *	1.3 U	1.2 U	1.2 U	1.4 U	1.4 U	0.52 J *	1.3 U	0.58 J *	1.3 U	0.23 U	0.23 U	0.23 U
151 J *			42.3 R	40 R	45.6 R	80.7 U	98.7 U	181 J *	72.7 J	272 J *	114 J			
1.1 = *			0.66 U	0.62 U	0.62 U	0.72 U	0.71 U	0.59 U	0.65 U	0.61 U	0.63 U			
21.1 J			40.5 = *	21.2 =	15.2 =	21.6 =	20.4 =	26.1 =	23.5 =	13.7 =	27.3 =			
84.1 J	229 = *	269 = *	87.2 =	50.6 =	50.2 =	699 = *	729 = *	1300 J *	262 J *	151 J *	280 = *	79 = *	288 = *	68.5 = *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-64	PAD-65	PAD-65	PAD-66	PAD-66	PAD-66	PAD-66	PAD-66	PAD-66	PAD-66-1	PAD-66-2	PAD-66-3	PAD-66-4	PAD-66-5	PAD-67
WBGso-066	**WBGso-067**	**WBGso-067**	**WBGso-068**	**WBGso-069**	**WBGso-069**	**WBGso-069**	**WBGso-168**	**WBGso-168**	**WBGso-131**	**WBGso-132**	**WBGso-133**	**WBGso-134**	**WBGso-135**	**WBGso-070**
WBGss-066-0528-SO	**WBGss-067-0529-SO**	**WBGss-067-0530-FD**	**WBGss-068-0532-SO**	**WBGss-069-0533-SO**	**WBGso-069-0750-SO**	**WBGso-069-0751-SO**	**WBGss-168-0768-SO**	**WBGso-168-0773-SO**	**WBGss-131-0720-SO**	**WBGss-132-0721-SO**	**WBGss-133-0722-SO**	**WBGss-134-0723-SO**	**WBGss-135-0724-SO**	**WBGss-070-0534-SO**
08/09/96	**08/09/96**	**08/09/96**	**08/09/96**	**08/09/96**	**04/24/98**	**04/24/98**	**04/29/98**	**05/05/98**	**04/21/98**	**04/21/98**	**04/21/98**	**04/21/98**	**04/21/98**	**08/09/96**
0 to 2	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**2 to 4**	**4 to 5**	**0 to 1**	**2 to 4**	**0 to 1**	**0 to 1**	**0 to 1**	**0 to 1**	**0 to 1**	**0 to 2**
Grab Composite	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
0.1 UJ					0.6 U	0.58 U	0.78 = *	0.64 U	0.61 U	0.7 U	0.67 U	0.61 U	0.58 U	
9890 =	17500 =	15900 =	12900 =	14800 =	14400 =	14400 =	11200 =	15000 =	15200 =	13200 =	11500 =	12900 =	12800 =	10500 =
0.31 U					0.6 UJ	0.58 UJ	11.2 J *	1 J *	0.61 UJ	5 J *	0.67 UJ	0.74 UJ	0.91 UJ	
12.6 =	17.2 = *	13.1 =	11.7 =	15.6 = *	14 =	15.6 =	15.1 =	17.9 =	13.6 =	12.3 =	12.1 =	12.4 =	12.2 =	10.7 =
83.1 =	170 = *	154 = *	176 = *	7780 = *	243 = *	137 = *	698 = *	84.9 J	121 J *	499 J *	1570 J *	756 J *	883 J *	377 = *
0.55 =					0.53 U	0.77 =	0.39 U	0.22 UJ	0.45 U	0.35 U	0.36 U	0.43 U	0.58 U	
0.04 U	0.12 J *	0.1 J *	0.05 U	4.8 = *	0.6 U	0.58 U	1.2 = *	0.64 U	0.61 U	0.72 = *	1.4 = *	0.61 U	0.58 U	0.23 J *
1310 J					861 J	1860 J	12100 =	1080 =	4960 =	2260 =	1280 =	3440 =	46600 = *	
10.6 =	23 = *	20.6 = *	14.9 =	16.5 =	18.7 =	19.6 =	26.6 = *	21.1 =	19.3 = *	18.9 = *	14.5 =	18.9 = *	15.7 =	12.5 =
8.7 =					7.6 J	11 J	7.6 J	6.7 J	6.8 J	8.3 J	7.1 J	8.4 J	5.9 J	
9.9 =					19.6 =	23.3 =	1920 = *	18.1 =	16.6 =	130 = *	87 = *	56.3 = *	49.6 = *	
18500 =					27500 =	28000 =	27400 = *	33000 =	23600 = *	24600 = *	23900 = *	22300 =	18100 =	
16 =	49.2 = *	37 = *	17.5 =	289 = *	14.8 =	11.1 =	1010 = *	16.6 =	15.5 =	115 = *	31.2 = *	36.3 = *	34.7 = *	54.7 = *
1660 =					3130 =	4310 =	3330 = *	2630 J	3460 J *	2870 J	1950 J	3010 J	3970 J *	
712 =	390 =	409 =	358 =	784 =	274 =	329 =	799 J	313 J	337 =	464 =	730 =	437 =	584 =	568 =
0.03 U	0.04 U	0.04 U	0.04 U	0.28 = *	0.12 U	0.12 U	0.052 J *	0.069 U	0.069 J *	0.08 J *	0.26 = *	0.066 J *	0.058 J *	0.04 J *
11 =					18.5 J	31.6 J	21.3 = *	16.6 =	16.9 =	19.9 =	14.2 =	20.6 =	17.4 =	
622 =					1650 =	1840 =	1360 = *	1480 =	1790 J *	1350 J *	943 J *	1480 J *	1830 J *	
0.31 U	0.35 U	0.35 U	0.36 U	0.37 U	0.6 U	0.58 U	0.62 U	0.64 U	0.92 =	1.3 =	1.3 =	1.1 =	0.92 =	0.42 J
0.2 U	0.27 J *	0.22 U	0.23 U	0.33 J *	1.2 U	1.2 U	1.8 = *	1.3 U	1.2 U	1.4 U	1.3 U	1.2 U	1.2 U	0.23 U
169 J *					64.9 U	91.2 U	187 J *	76 U	106 J	59 J	43.5 J	74 J	162 J *	
1.9 = *					0.6 UJ	0.58 UJ	0.62 U	0.64 U	1 U	0.7 U	0.67 U	1.2 U	0.58 U	
19.1 =					25.2 =	22.1 =	17.6 =	30.9 =	26.9 =	23.4 =	22.2 =	22 =	18.7 =	
43.5 =	170 = *	191 = *	79 = *	1050 = *	68.2 =	70.5 =	690 = *	58.8 J	63.8 J *	470 J *	185 J *	170 J *	96.7 J *	83.3 = *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67-1	PAD-67-2	PAD-67-2	PAD-67-3	PAD-67-4
WBGso-070	WBGso-070	WBGso-070	WBGso-071	WBGso-098	WBGso-098	WBGso-140	WBGso-178	WBGso-178	WBGso-186	WBGso-136	WBGso-137	WBGso-137	WBGso-138	WBGso-139
WBGso-070-0748-SO	WBGso-070-0877-FD	WBGso-070-0749-SO	WBGss-071-0535-SO	WBGss-098-0565-SO	WBGss-098-0566-FD	WBGso-140-0769-SO	WBGss-178-0890-SO	WBGso-178-0928-SO	WBGso-186-0770-SO	WBGss-136-0725-SO	WBGss-137-0726-SO	WBGss-137-0867-FD	WBGss-138-0727-SO	WBGss-139-0728-SO
04/24/98	04/24/98	04/24/98	08/09/96	08/14/96	08/14/96	04/28/98	05/04/98	05/06/98	04/28/98	04/22/98	04/22/98	04/22/98	04/22/98	04/22/98
2 to 4	2 to 4	4 to 6	0 to 1	0 to 2	0 to 2	4 to 6	0 to 1	2 to 4	2 to 4	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Grab	Field Duplicate	Grab	Grab Composite	Grab Composite	Field Duplicate	Grab	Grab Composite	Grab	Grab	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite
0.58 U	0.56 U	0.59 U				0.62 U	0.68 U	0.58 U	0.64 U	0.66 U	0.68 U	0.68 U	0.59 U	0.66 U
11200 =	11700 =	13500 =	6330 =	11000 =	9840 =	10300 =	11700 =	7960 J	12900 =	13200 =	12800 =	11600 =	7570 =	10700 =
0.58 UJ	0.56 UJ	0.59 UJ				0.62 UJ	1.6 J *	0.58 UJ	1.3 J *	1.3 UJ	0.68 UJ	0.68 UJ	1.7 J *	0.73 UJ
14.7 =	20.6 = *	14.5 =	15.8 = *	10.3 J	16.1 J *	16.1 =	13.3 =	16.2 =	11.4 =	8.5 =	9.5 =	10.2 =	8.8 =	12.7 =
75.2 =	71.1 =	69.4 =	69.8 =	190 = *	323 = *	367 = *	1160 J *	148 = *	275 = *	235 J *	562 J *	858 J *	154 J *	1130 J *
0.46 U	0.58 U	0.57 U				0.35 U	0.45 UJ	0.37 J	0.39 U	0.53 U	0.58 U	0.57 U	0.25 U	0.43 U
0.58 U	0.56 U	0.59 U	0.07 J *	0.14 J *	0.34 J *	0.62 U	0.68 U	0.58 U	0.64 U	0.66 U	0.68 U	0.69 = *	0.59 U	1 = *
1310 J	1150 J	20500 J				953 =	1500 =	755 =	1600 =	3170 =	1230 =	1330 =	1030 =	999 =
15.3 =	16.7 =	19.1 =	7 =	11.1 =	9.5 =	14.3 =	17.8 = *	11.9 =	16.9 =	19.7 = *	15.4 =	14.4 =	9.9 =	14.6 =
9.5 J	10.4 J	11.2 J				11.8 J	11.1 J *	9.8 J	9.4 J	7.6 J	7.5 J	7.9 J	5.4 J	9 J
19.1 =	19.5 =	23.7 =				30.1 =	49.2 = *	23.4 =	30.6 =	35.9 = *	47.6 = *	66.5 = *	17.9 = *	63.8 = *
23000 =	32600 =	27200 =				24200 =	26600 = *	22300 =	21400 =	17400 =	18600 =	19300 =	14700 =	21300 =
10.5 =	15.9 =	10.8 =	16.1 =	14.5 J	15.9 J	18.2 =	32 = *	14.1 =	29.2 = *	48.5 = *	24 =	27.1 = *	25 =	24.3 =
2860 =	2750 =	6240 =				2570 =	2350 J	2200 =	2130 =	2140 J	1990 J	1870 J	1480 J	1910 J
310 =	406 =	372 =	165 =	389 J	290 J	1050 J	801 J	452 =	296 J	473 =	898 =	1130 =	221 =	770 =
0.12 U	0.11 U	0.12 U	0.13 = *	0.04 = *	0.04 = *	0.046 J *	0.1 U	0.12 U	0.034 J	0.072 J *	0.12 J *	0.11 J *	0.11 J *	0.098 J *
24.9 J	22.8 J	27.7 J				21.9 =	16.6 =	19.1 J	13.9 =	14 =	14.1 =	14.6 =	11.2 =	12.5 =
1090 =	1020 =	2050 =				1260 =	1190 = *	921 =	1080 =	1430 J *	1050 J *	860 J	538 J	870 J
0.58 U	0.56 U	0.59 U	0.34 U	0.36 J	0.49 J	0.62 U	0.68 U	0.58 U	0.64 U	0.83 =	1.6 = *	1.5 = *	0.59 U	1.3 =
1.2 U	1.1 U	1.2 U	0.22 U	0.22 U	0.22 U	1.2 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 U	1.4 U	1.2 U	1.3 U
69.5 U	60.4 U	103 U				49.4 J	71.9 U	61.9 U	63.3 J	72.9 J	46.7 J	40.8 J	44 J	46.6 J
0.58 UJ	0.56 UJ	0.59 UJ				0.62 U	0.68 U	0.79 =	0.64 U	0.66 U	0.68 U	0.68 U	0.59 U	0.66 U
18.4 =	22.2 =	22.2 =				18.3 =	24.9 =	13.3 =	22.9 =	23.9 =	24.6 =	23.6 =	13.7 =	24.6 =
55.6 =	56 =	67.2 =	36.2 =	56.8 =	54.8 =	102 = *	128 J *	71.9 =	67.9 =	96.4 J *	138 J *	157 J *	57.9 J	148 J *

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-67-5	PAD-67A	PAD-67B	PAD-68	PAD-68	PAD-68	PAD-68	PAD-68-1	PAD-68-1	PAD-68-2	PAD-68-2	PAD-68-3	PAD-68A	PAD-69	PAD-69
WBGso-140	WBGso-179	WBGso-186	WBGso-072	WBGso-073	WBGso-073	WBGso-176	WBGso-141	WBGso-141	WBGso-142	WBGso-142	WBGso-143	WBGso-177	WBGso-074	WBGso-075
WBGss-140-0729-SO	WBGss-179-0891-SO	WBGso-186-0927-SO	WBGss-072-0536-SO	WBGss-073-0537-SO	WBGso-073-0752-SO	WBGss-176-0888-SO	WBGss-141-0730-SO	WBGso-141-0771-SO	WBGss-142-0731-SO	WBGso-142-0772-SO	WBGss-143-0732-SO	WBGss-177-0889-SO	WBGss-074-0538-SO	WBGss-075-0539-SO
04/22/98	05/04/98	05/06/98	08/09/96	08/09/96	04/24/98	04/26/98	04/22/98	04/28/98	04/22/98	04/28/98	04/22/98	05/04/98	08/09/96	08/09/96
0 to 1	0 to 1	4 to 6	0 to 2	0 to 2	2 to 4	0 to 1	0 to 1	4 to 6	0 to 1	2 to 4	0 to 1	0 to 1	0 to 1	0 to 2
Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab	Grab	Grab Composite	Grab	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite
0.7 U	0.65 U	0.59 U	0.76 U		0.59 U	0.63 U	1.2 = *	0.61 U	0.64 U	0.59 U	0.57 U	0.61 U		
15800 =	12800 =	9250 J	7420 =	7700 =	9360 =	8270 =	11500 =	9610 =	15400 =	9090 =	11500 =	9950 =	7420 =	6000 =
0.82 UJ	2.3 J *	0.44 J	2.6 = *		0.59 UJ	2.8 J *	22.3 J *	0.41 J	2.8 J *	0.59 UJ	0.57 UJ	4.1 J *		
12.5 =	16.4 = *	17.5 =	9.3 =	7.8 =	11.9 =	11.1 =	11.4 =	9.4 =	10.1 =	9.4 =	10.6 =	22.7 = *	11.7 =	10.8 =
1260 J *	2260 J *	90.5 =	920 = *	581 = *	54.9 =	2800 J *	4370 J *	159 = *	10400 J *	400 = *	702 J *	4660 J *	38.1 =	35.6 =
0.46 U	0.41 UJ	0.78 =	0.47 =		0.39 U	0.35 UJ	2 J *	0.23 J	0.54 U	0.26 J	0.52 U	0.21 UJ		
0.7 U	0.65 U	0.59 U	1 = *	0.96 = *	0.59 U	0.68 = *	2.4 = *	0.61 U	4.2 = *	0.59 U	0.57 U	1.1 = *	0.16 J *	0.16 J *
1640 =	1530 =	3760 =	3600 J		595 J	1920 =	17800 = *	700 =	5530 =	540 J	11200 =	5670 =		
20.2 = *	18.2 = *	15.2 =	14 =	23 = *	11.8 =	12.3 =	38 = *	10.7 =	17.9 = *	12.3 =	15 =	21.1 = *	9.3 =	10.2 =
10.3 J	9.9 J	17.1 J	5.8 =		8.8 J	6.4 J	1.4 J	5.4 J	19.1 U	7.7 J	6.9 J	1.2 J		
36.8 = *	42.7 = *	22.8 =	29.3 = *		16.2 =	44.1 = *	183 = *	13.9 =	158 = *	17.4 =	22.8 = *	43.5 = *		
24700 = *	32200 = *	35300 = *	15100 =		19000 =	19100 =	23600 = *	13300 =	18400 =	16100 =	21100 =	15300 =		
24.9 =	31.5 = *	14.6 =	201 = *	589 = *	10 =	77.9 = *	640 = *	12 =	112 = *	14.4 =	18.3 =	148 = *	19.7 =	11.7 =
2910 J	2670 J	3310 =	1690 =		1770 =	1600 J	3980 J *	1660 =	5470 J *	1880 =	2850 J	2470 J		
639 =	1070 J	439 =	443 =	246 =	340 =	734 J	763 =	236 J	596 =	235 J	447 =	349 J	309 =	438 =
0.17 = *	0.081 U	0.12 U	0.16 = *	0.07 = *	0.12 U	0.36 = *	0.41 = *	0.065 J *	1.2 = *	0.041 J	0.11 U	0.23 = *	0.04 J *	0.04 U
15.9 =	15.7 =	46.8 J	10.2 =		12.4 J	11.5 =	16.2 =	11.4 =	12.5 =	11.5 =	16.8 =	12.6 =		
1540 J *	1120 = *	1100 =	400 J		771 =	537 J	962 J *	1040 =	747 J	1060 =	1300 J *	497 J		
0.94 =	0.65 U	0.81 =	0.37 J	0.36 U	0.59 U	0.97 U	1.2 =	0.61 U	0.91 =	0.59 U	1 =	0.68 U	0.33 U	0.34 J
1.4 U	1.3 U	1.2 U	0.2 U	0.23 U	1.2 U	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.1 U	1.2 U	0.21 U	0.21 U
65 J	91.2 U	76.9 U	86.5 J		55.3 U	58.5 U	280 J *	46.4 J	171 J *	45.2 J	116 J	116 U		
0.7 U	0.65 U	0.59 U	1.9 = *		0.59 UJ	0.63 U	0.66 U	0.61 U	0.64 U	0.59 U	0.57 U	0.61 U		
31.8 = *	28.8 =	18 =	13.1 =		18.7 =	17.2 =	14.1 =	16 =	18.8 =	19.1 =	21.1 =	15.5 =		
123 J *	204 J *	84.7 =	149 = *	221 = *	37.6 =	331 J *	468 J *	41.6 =	1040 J *	57.9 =	85.9 J *	299 J *	59.3 =	54 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-19a. Metals Results for Phases I and II Soil Samples from WBG (continued)

PAD-69	PAD-70	PAD-70	PAD-70	PAD-70	PAD-70-1	PAD-70-1
WBGso-075	WBGso-076	WBGso-188	WBGso-188	WBGso-188	WBGso-189	WBGso-189
WBGss-075-0540-FD	WBGss-076-0541-SO	WBGss-188-0913-SO	WBGss-188-0923-FD	WBGso-188-0918-SO	WBGss-189-0914-SO	WBGso-189-0919-SO
08/09/96	08/09/96	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98
0 to 1	0 to 2	0 to 1	0 to 1	2 to 4	0 to 1	2 to 4
Field Duplicate	Grab Composite	Grab	Field Duplicate	Grab	Grab	Grab
	0.13 U	0.64 U	0.59 U	0.63 U	0.61 U	0.61 U
6440 =	9980 =	13500 =	15200 =	12300 =	14000 =	11600 =
	0.3 U	0.64 UJ	0.59 UJ	0.63 UJ	0.61 UJ	0.61 UJ
6.2 =	7.8 =	12.3 =	11.9 =	11.2 =	11 =	10.4 =
64.6 =	49.9 =	87.6 =	93 = *	80.6 =	88.4 =	61.8 =
	0.47 =	0.39 U	0.71 =	0.45 J	0.63 =	0.45 J
0.14 J *	0.1 J *	0.64 U	0.59 U	0.63 U	0.61 U	0.61 U
	1200 J	7980 =	22500 = *	8050 =	13500 =	10700 =
6.7 =	10 =	20.4 = *	18.8 = *	15.9 =	18.6 = *	15.4 =
	7.2 =	9.8 J	9.9 J	9.8 J	9.8 J	8.6 J
	9.3 =	19.9 = *	18.7 = *	16.5 =	18.3 = *	19.5 =
	14400 =	25300 = *	22900 =	22000 =	22500 =	21200 =
11 =	11 =	16.5 =	16.4 =	18.8 J	22.9 =	15.3 =
	1710 =	4180 = *	5870 = *	3320 =	4080 = *	3610 =
530 =	464 =	457 J	811 J	818 J	579 J	489 J
0.04 J *	0.03 U	0.058 U	0.045 U	0.077 U	0.039 U	0.049 U
	11.1 =	23.6 = *	22.7 = *	19.3 =	21.6 = *	20.3 =
	559 =	1600 = *	2320 = *	1110 =	1990 = *	1080 =
0.33 U	0.6 =	0.64 U	0.59 U	0.63 U	0.61 U	0.61 U
0.21 U	0.19 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U
	77.8 J	85.4 U	153 J *	88.4 U	94.4 U	86.7 U
	1.9 = *	0.64 U	0.59 U	0.63 U	0.61 U	0.61 U
	16.4 =	23.6 =	23.9 =	23.5 =	24 =	20.3 =
41.3 =	47.9 =	62.8 J *	65.5 J *	70.5 J	85.7 J *	76.9 J

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

TABLE 4-19b. EXPLOSIVES

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Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG

Location	DEAC.FURN-	PAD-01	PAD-02	PAD-03	PAD-04	PAD-05	PAD-05	PAD-05-3	PAD-06	PAD-06
Station	WBGso-144	WBGso-001	WBGso-002	WBGso-003	WBGso-004	WBGso-005	WBGso-005	WBGso-102	WBGso-006	WBGso-006
Sample ID	WB0733	WBGSS-001-0456-	WBGSS-002-0457-	WBGSS-003-0458-	WBGSS-004-0459-	WBGSS-005-0460-	WB0765	WB0691	WBGSS-006-0461-	WB0764
Customer ID	WBGss-144-0733-	WBGss-001-0456-	WBGss-002-0457-	WBGss-003-0458-	WBGss-004-0459-	WBGss-005-0460-	WBGso-005-0765-	WBGss-102-0691-	WBGss-006-0461-	WBGso-006-0764-
Date	04/23/98	07/31/96	07/31/96	07/31/96	07/30/96	07/30/96	04/25/98	04/23/98	07/30/96	04/25/98
Depth (ft)	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2	4 to 6	0 to 1	0 to 2	2 to 4
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	34 J	85 J	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	30 J	250 U	250 U	250 U	230 J	1100 =	250 U	250 U	2700 =	250 U
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	32 J	250 U	250 U	250 U
2,6-Dinitrotoluene	75 J	260 U	260 U	260 U	260 U	260 U	250 U	250 U	260 U	250 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	74 J	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	91 J	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	120 J	2000 U	2000 U	2000 U	2000 U	2000 U	500 U	500 U	2000 U	500 U
Nitrobenzene	250 U	260 U	260 U	260 U	260 U	260 U	250 U	250 U	260 U	250 U
Nitrocellulose as N	2000 UJ	(1)	(1)	(1)	(1)	(1)	(2)	2000 UJ	(1)	(2)
Nitroglycerin	2500 U	(1)	(1)	(1)	(1)	(1)	2500 U	2500 U	(1)	2500 U
Nitroguanidine	250 UJ	(1)	(1)	(1)	(1)	(1)	(2)	250 UJ	(1)	(2)
RDX	500 U	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	1000 U	500 U
Tetryl	650 U	650 U	650 U	650 U	650 UJ	650 UJ	650 U	650 U	650 UJ	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-06-2	PAD-07	PAD-08	PAD-14	PAD-15	PAD-16	PAD-17	PAD-18	PAD-19	PAD-20
Station	WBGso-104	WBGso-007	WBGso-008	WBGso-009	WBGso-010	WBGso-011	WBGso-012	WBGso-013	WBGso-014	WBGso-015
Sample ID	WB0693	WBGSS-007-0462-	WBGSS-008-0463-	WBGSS-009-0464-	WBGSS-010-0465-	WBGSS-011-0466-	WBGSS-012-0467-	WBGSS-013-0468-	WBGSS-014-0469-	WBGSS-015-0470-
Customer ID	WBGss-104-0693-	WBGss-007-0462-	WBGss-008-0463-	WBGss-009-0464-	WBGss-010-0465-	WBGss-011-0466-	WBGss-012-0467-	WBGss-013-0468-	WBGss-014-0469-	WBGss-015-0470-
Date	04/23/98	07/30/96	07/30/96	08/05/96	08/05/96	08/05/96	08/05/96	08/05/96	08/08/96	08/05/96
Depth (ft)	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 UJ	250 U
2,4,6-Trinitrotoluene	250 U	340 =	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 U	250 U	250 U	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ
2,6-Dinitrotoluene	250 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	250 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	2000 UJ	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	2500 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	250 UJ	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	500 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	650 UJ	650 UJ	650 U	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-23	PAD-24	PAD-25	PAD-26	PAD-26	PAD-27	PAD-28	PAD-29	PAD-30	PAD-31
Station	WBGso-016	WBGso-017	WBGso-018	WBGso-019	WBGso-019	WBGso-020	WBGso-021	WBGso-022	WBGso-023	WBGso-024
Sample ID	WBGSS-016-0471-	WBGSS-017-0472-	WBGSS-018-0473-	WBGSS-019-0474-	WBGSS-019-0475-	WBGSS-020-0477-	WBGSS-021-0478-	WBGSS-022-0479-	WBGSS-023-0480-	WBGSS-024-0481-
Customer ID	WBGss-016-0471-	WBGss-017-0472-	WBGss-018-0473-	WBGss-019-0474-	WBGss-019-0475-	WBGss-020-0477-	WBGss-021-0478-	WBGss-022-0479-	WBGss-023-0480-	WBGss-024-0481-
Date	08/06/96	08/06/96	08/06/96	08/06/96	08/06/96	08/05/96	08/05/96	08/05/96	08/05/96	08/05/96
Depth (ft)	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-32	PAD-32	PAD-33	PAD-34	PAD-35	PAD-36	PAD-37	PAD-37	PAD-37	PAD-37
Station	WBGso-025	WBGso-077	WBGso-026	WBGso-027	WBGso-028	WBGso-029	WBGso-030	WBGso-031	WBGso-032	WBGso-033
Sample ID	WBGSS-025-0482-	WBGSS-077-0542-	WBGSS-026-0483-	WBGSS-027-0484-	WBGSS-028-0485-	WBGSS-029-0486-	WBGSS-030-0487-	WBGSS-031-0488-	WBGSS-032-0489-	WBGSS-033-0490-
Customer ID	WBGss-025-0482-	WBGss-077-0542-	WBGss-026-0483-	WBGss-027-0484-	WBGss-028-0485-	WBGss-029-0486-	WBGss-030-0487-	WBGss-031-0488-	WBGss-032-0489-	WBGss-033-0490-
Date	08/05/96	08/13/96	08/06/96	08/06/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96	08/06/96
Depth (ft)	0 to 1	0 to 1	0 to 1	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	6500 =
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37	PAD-37-1	PAD-37-2	PAD-38	PAD-38	PAD-38
Station	WBGso-107	WBGso-185	WBGso-187	WBGso-187	WBGso-187	WBGso-106	WBGso-107	WBGso-034	WBGso-035	WBGso-035
Sample ID	WB0766	WB0762	WB0912	WB0940	WB0941	WB0695	WB0696	WBGSS-034-0491-	WBGSS-035-0492-	WB0763
Customer ID	WBGso-107-0766-	WBGso-185-0762-	WBGss-187-0912-	WBGso-187-0940-	WBGso-187-0941-	WBGss-106-0695-	WBGss-107-0696-	WBGss-034-0491-	WBGss-035-0492-	WBGso-035-0763-
Date	04/28/98	04/25/98	05/06/98	05/08/98	05/08/98	04/23/98	04/23/98	08/06/96	08/06/96	04/25/98
Depth (ft)	2 to 4	2 to 4	0 to 1	2 to 4	2 to 4	0 to 1	0 to 1	0 to 2	0 to 2	4 to 6
Field Type	Grab	Grab	Grab	Grab	Field Duplicate	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	58 J	120 J	250 U	250 U	250 U	250 U	140 J	250 U	250 UJ	42 J
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 UJ	250 U
2,4,6-Trinitrotoluene	250 U	3500 =	1900 =	250 U	250 U	250 U	1500 =	250 U	2800 J	37 J
2,4-Dinitrotoluene	250 U	51 J	140 J	250 U	250 U	250 U	300 =	310 J	250 UJ	47 J
2,6-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	260 U	260 UJ	250 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 UJ	250 U
3-Nitrotoluene	250 U	120 J	250 U	250 U	250 U	250 U	120 J	250 U	250 UJ	250 U
4-Nitrotoluene	250 U	110 J	250 U	250 U	250 U	250 U	190 J	250 U	250 UJ	250 U
HMX	100 J	500 U	610 =	120 J	140 J	500 U	1200 =	2000 U	2000 U	500 U
Nitrobenzene	250 U	250 U	250 U	250 U	250 U	54 J	250 U	260 U	260 UJ	250 U
Nitrocellulose as N	(2)	(2)	315000 =	(2)	(2)	(2)	177000 J	(1)	(1)	(2)
Nitroglycerin	2500 U	2500 U	12000 =	2500 U	2500 U	2500 U	5500 =	(1)	(1)	2500 U
Nitroguanidine	(2)	(2)	250 U	(2)	(2)	(2)	250 UJ	(1)	(1)	(2)
RDX	500 U	500 U	2400 =	140 J	500 U	500 U	2400 =	1000 U	1000 UJ	500 U
Tetryl	650 U	54 J	650 U	650 U	650 U	650 U	650 U	650 U	650 UJ	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-38-1	PAD-39	PAD-40	PAD-40	PAD-40-3	PAD-41	PAD-41	PAD-43	PAD-43	PAD-44
Station	WBGso-108	WBGso-036	WBGso-037	WBGso-037	WBGso-113	WBGso-038	WBGso-097	WBGso-039	WBGso-053	WBGso-040
Sample ID	WB0697	WBGSS-036-0493-	WBGSS-037-0494-	WB0761	WB0702	WBGSS-038-0495-	WBGSS-097-0564-	WBGSS-039-0496-	WBGSS-053-0513-	WBGSS-040-0497-
Customer ID	WBGss-108-0697-	WBGss-036-0493-	WBGss-037-0494-	WBGso-037-0761-	WBGss-113-0702-	WBGss-038-0495-	WBGss-097-0564-	WBGss-039-0496-	WBGss-053-0513-	WBGss-040-0497-
Date	04/23/98	08/06/96	08/06/96	04/25/98	04/23/98	08/06/96	08/13/96	07/31/96	08/13/96	07/31/96
Depth (ft)	0 to 1	0 to 2	0 to 2	4 to 6	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	57 J	250 U	250 U	250 U	64 J	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	450 J	250 U
2,4-Dinitrotoluene	250 U	250 UJ	250 UJ	250 U	250 U	250 UJ	250 UJ	250 U	250 UJ	250 U
2,6-Dinitrotoluene	250 U	260 U	260 U	250 U	250 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	2000 U	2000 U	500 U	500 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	250 U	260 U	260 U	250 U	250 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	2000 UJ	(1)	(1)	(2)	2000 UJ	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	2500 U	(1)	(1)	2500 U	2500 U	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	250 UJ	(1)	(1)	(2)	250 UJ	(1)	(1)	(1)	(1)	(1)
RDX	500 U	1000 U	1000 U	500 U	500 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 UJ	650 U	650 UJ

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-44	PAD-45	PAD-46	PAD-47	PAD-48	PAD-49	PAD-50	PAD-51	PAD-52	PAD-53
Station	WBGso-040	WBGso-041	WBGso-042	WBGso-043	WBGso-044	WBGso-045	WBGso-046	WBGso-047	WBGso-048	WBGso-049
Sample ID	WBGSS-040-0498-	WBGSS-041-0499-	WBGSS-042-0500-	WBGSS-043-0501-	WBGSS-044-0502-	WBGSS-045-0503-	WBGSS-046-0504-	WBGSS-047-0505-	WBGSS-048-0506-	WBGSS-049-0507-
Customer ID	WBGss-040-0498-	WBGss-041-0499-	WBGss-042-0500-	WBGss-043-0501-	WBGss-044-0502-	WBGss-045-0503-	WBGss-046-0504-	WBGss-047-0505-	WBGss-048-0506-	WBGss-049-0507-
Date	07/31/96	07/31/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96	08/07/96
Depth (ft)	0 to 2	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Field Duplicate	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 UJ	250 UJ	250 UJ	250 UJ
2,4-Dinitrotoluene	250 U	250 U	250 UJ	250 UJ	250 UJ	250 UJ	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 UJ	650 UJ	650 UJ	650 UJ

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-54	PAD-55	PAD-55	PAD-56	PAD-58	PAD-58	PAD-58-3	PAD-59	PAD-59	PAD-59
Station	WBGso-050	WBGso-051	WBGso-051	WBGso-052	WBGso-054	WBGso-054	WBGso-116	WBGso-055	WBGso-055	WBGso-055
Sample ID	WBGSS-050-0508-	WBGSS-051-0509-	WBGSS-051-0510-	WBGSS-052-0512-	WBGSS-054-0514-	WB0753	WB0705	WBGSS-055-0515-	WB0754	WB0755
Customer ID	WBGss-050-0508-	WBGss-051-0509-	WBGss-051-0510-	WBGss-052-0512-	WBGss-054-0514-	WBGso-054-0753-	WBGss-116-0705-	WBGss-055-0515-	WBGso-055-0754-	WBGso-055-0755-
Date	08/07/96	08/08/96	08/08/96	08/07/96	08/08/96	05/05/98	04/23/98	08/08/96	04/24/98	04/24/98
Depth (ft)	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	2 to 4	0 to 1	0 to 2	2 to 4	4 to 6
Field Type	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab	Grab Composite	Grab Composite	Grab	Grab
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 UJ	250 U	250 U	250 UJ	250 U	65 J	250 U	33000 J	62 J	250 U
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	250 U	250 U	260 U	250 U	250 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	310 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	86 J	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	84 J	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	110 J	500 U	2000 U	500 U	500 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	250 U	250 U	260 U	250 U	39 J
Nitrocellulose as N	(1)	(1)	(1)	(1)	(1)	(2)	2000 UJ	(1)	(2)	(2)
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	2500 U	2500 U	(1)	2500 U	2500 U
Nitroguanidine	(1)	(1)	(1)	(1)	(1)	(2)	250 UJ	(1)	(2)	(2)
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	1000 U	500 U	500 U
Tetryl	650 UJ	650 U	650 U	650 UJ	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-59	PAD-59-1	PAD-60	PAD-60	PAD-60	PAD-60	PAD-60	PAD-60-3	PAD-60-3	PAD-61
Station	WBGso-056	WBGso-117	WBGso-057	WBGso-057	WBGso-057	WBGso-058	WBGso-122	WBGso-122	WBGso-122	WBGso-059
Sample ID	WBGSS-056-0516-	WB0706	WBGSS-057-0517-	WB0756	WB0757	WBGSS-058-0520-	WB0767	WB0711	WB0869	WBGSS-059-0518-
Customer ID	WBGss-056-0516-	WBGss-117-0706-	WBGss-057-0517-	WBGso-057-0756-	WBGso-057-0757-	WBGss-058-0520-	WBGso-122-0767-	WBGss-122-0711-	WBGss-122-0869-	WBGss-059-0518-
Date	08/08/96	04/22/98	08/07/96	04/24/98	04/24/98	08/07/96	04/28/98	04/22/98	04/22/98	08/08/96
Depth (ft)	0 to 2	0 to 1	0 to 2	2 to 4	4 to 6	0 to 1	4 to 6	0 to 1	0 to 1	0 to 1
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab	Grab	Grab Composite	Grab	Grab Composite	Field Duplicate	Field Duplicate
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	94 J	42 J	250 U	250 U	130 J	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	300 J	430 =	250 U	250 UJ	250 U	250 U	110 J	760 J
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	65 J	68 J	250 U
2,6-Dinitrotoluene	260 U	250 U	260 U	200 J	250 U	260 U	250 U	250 U	250 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	170 J	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	120 J	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	120 J	2000 U	500 U	500 U	2000 U	120 J	240 J	190 J	2000 U
Nitrobenzene	260 U	250 U	260 U	78 J	250 U	260 U	250 U	250 U	250 U	260 U
Nitrocellulose as N	(1)	2000 UJ	(1)	(2)	(2)	(1)	(2)	5800 J	2000 UJ	(1)
Nitroglycerin	(1)	2500 U	(1)	7400 =	2500 U	(1)	2500 U	2500 U	4500 U	(1)
Nitroguanidine	(1)	250 UJ	(1)	(2)	(2)	(1)	(2)	250 UJ	250 UJ	(1)
RDX	1000 U	500 U	1000 U	260 J	500 U	1000 U	500 U	500 U	500 U	1000 U
Tetryl	650 U	650 U	650 U	650 U	240 J	650 UJ	650 U	480 J	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-61	PAD-61	PAD-61	PAD-61-3	PAD-61A	PAD-61A	PAD-62	PAD-62	PAD-62	PAD-62
Station	WBGso-059	WBGso-059	WBGso-060	WBGso-126	WBGso-196	WBGso-196	WBGso-061	WBGso-062	WBGso-062	WBGso-062
Sample ID	WBGSS-059-0521-	WB0760	WBGSS-060-0522-	WB0715	WB0937	WB0943	WBGSS-061-0523-	WBGSS-062-0524-	WB0758	WB0759
Customer ID	WBGss-059-0521-	WBGso-059-0760-	WBGss-060-0522-	WBGss-126-0715-	WBGss-196-0937-	WBGss-196-0943-	WBGss-061-0523-	WBGss-062-0524-	WBGso-062-0758-	WBGso-062-0759-
Date	08/08/96	04/25/98	08/08/96	04/22/98	05/07/98	05/08/98	08/08/96	08/08/96	04/25/98	04/25/98
Depth (ft)	0 to 1	2 to 4	0 to 2	0 to 1	0 to 1	2 to 4	0 to 2	0 to 2	2 to 4	4 to 6
Field Type	Grab Composite	Grab	Grab Composite	Grab Composite	Grab	Grab	Grab Composite	Grab Composite	Grab	Grab
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	99 J	250 U	55 J	250 U	250 U	250 U	490 J	500 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	500 U	250 U
2,4,6-Trinitrotoluene	380 J	250 U	250 U	250 U	250 U	44 J	250 U	36000 J	510 =	48 J
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	260 U	250 U	260 U	250 U	250 U	250 U	260 U	260 U	250 U	250 U
2-Nitrotoluene	250 U	250 U	250 U	120 J	250 U	250 U	250 U	250 U	500 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	500 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	500 U	250 U
HMX	2000 U	500 U	2000 U	140 J	110 J	120 J	2000 U	38000 =	1400 =	570 U
Nitrobenzene	260 U	250 U	260 U	250 U	250 U	33 J	260 U	260 U	500 U	250 U
Nitrocellulose as N	(1)	(2)	(1)	2000 UJ	2000 U	(2)	(1)	(1)	(2)	(2)
Nitroglycerin	(1)	2500 U	(1)	2500 U	2500 U	2500 U	(1)	(1)	2500 U	2500 U
Nitroguanidine	(1)	(2)	(1)	250 UJ	250 U	(2)	(1)	(1)	(2)	(2)
RDX	1000 U	500 U	1000 U	500 U	500 U	500 U	1000 U	270000 J	7000 =	550 J
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	1300 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-62	PAD-62-2	PAD-62A	PAD-63	PAD-63	PAD-64	PAD-64	PAD-65	PAD-65	PAD-66
Station	WBGso-062	WBGso-129	WBGso-194	WBGso-063	WBGso-064	WBGso-065	WBGso-066	WBGso-067	WBGso-067	WBGso-068
Sample ID	WB0880	WB0718	WB0935	WBGSS-063-0525-	WBGSS-064-0526-	WBGSS-065-0527-	WBGSS-066-0528-	WBGSS-067-0529-	WBGSS-067-0530-	WBGSS-068-0532-
Customer ID	WBGso-062-0880-	WBGss-129-0718-	WBGss-194-0935-	WBGss-063-0525-	WBGss-064-0526-	WBGss-065-0527-	WBGss-066-0528-	WBGss-067-0529-	WBGss-067-0530-	WBGss-068-0532-
Date	04/25/98	04/22/98	05/07/98	08/07/96	08/07/96	08/09/96	08/09/96	08/09/96	08/09/96	08/09/96
Depth (ft)	4 to 6	0 to 1	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Field Duplicate	Grab Composite	Grab	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	130 J	71 J	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ
2,4,6-Trinitrotoluene	250 U	240 J	450 U	250 UJ	250 UJ	420 J	250 U	530 =	440 =	470 =
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ
2,6-Dinitrotoluene	250 U	250 U	250 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	150 J	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	520 U	500 U	120 J	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	250 U	250 U	250 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitrocellulose as N	(2)	2000 UJ	2000 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroglycerin	2500 U	2500 U	2500 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitroguanidine	(2)	250 UJ	250 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	790 =	290 J	500 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	230 J	88 J	650 UJ	650 UJ	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-66	PAD-66	PAD-66	PAD-66	PAD-66	PAD-66-4	PAD-67	PAD-67	PAD-67	PAD-67
Station	WBGso-069	WBGso-069	WBGso-069	WBGso-168	WBGso-168	WBGso-134	WBGso-070	WBGso-070	WBGso-070	WBGso-070
Sample ID	WBGSS-069-0533-	WB0750	WB0751	WB0768	WB0773	WB0723	WBGSS-070-0534-	WB0748	WB0877	WB0749
Customer ID	WBGss-069-0533-	WBGso-069-0750-	WBGso-069-0751-	WBGss-168-0768-	WBGso-168-0773-	WBGss-134-0723-	WBGss-070-0534-	WBGso-070-0748-	WBGso-070-0877-	WBGso-070-0749-
Date	08/09/96	04/24/98	04/24/98	04/29/98	05/05/98	04/21/98	08/09/96	04/24/98	04/24/98	04/24/98
Depth (ft)	0 to 2	2 to 4	4 to 5	0 to 1	2 to 4	0 to 1	0 to 2	2 to 4	2 to 4	4 to 6
Field Type	Grab Composite	Grab	Grab	Grab	Grab	Grab Composite	Grab Composite	Grab	Field Duplicate	Grab
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	76000 =	5000 U	130 J	28000 J	2500 =	150 J	490000 =	53 J	250 UJ	270 J
1,3-Dinitrobenzene	12500 UJ	5000 U	250 U	62000 U	260 J	250 U	250 UJ	250 U	250 UJ	250 UJ
2,4,6-Trinitrotoluene	3800000 =	12000 =	2100 =	480000 =	27000 =	950 J	3400000 =	1700 =	680 =	250 UJ
2,4-Dinitrotoluene	12500 UJ	92 J	250 U	550 =	110 J	250 U	250 UJ	110 J	120 J	250 UJ
2,6-Dinitrotoluene	13000 U	250 U	65 J	620 =	220 J	87 J	260 U	250 U	250 U	250 UJ
2-Nitrotoluene	12500 U	5000 U	250 U	62000 U	2500 U	250 U	250 U	250 U	250 U	82 J
3-Nitrotoluene	12500 U	5000 U	65 J	21000 J	2500 U	250 U	250 U	250 U	250 U	250 UJ
4-Nitrotoluene	12500 U	5000 U	250 U	62000 U	2500 U	250 U	250 U	250 U	250 U	93 J
HMX	100000 U	10000 U	170 J	40000 J	2400 J	500 U	1700000 =	480 J	420 J	410 J
Nitrobenzene	13000 U	5000 U	250 U	62000 U	360 J	250 U	260 U	250 U	250 U	250 UJ
Nitrocellulose as N	(1)	2000 UJ	2000 UJ	32200 J	6600 =	5900 UJ	(1)	(2)	(2)	(2)
Nitroglycerin	(1)	2500 U	2500 U	2500 U	2500 U	2500 U	(1)	2500 U	2500 U	2500 UJ
Nitroguanidine	(1)	250 UJ	250 UJ	250 UJ	250 U	250 UJ	(1)	(2)	(2)	(2)
RDX	50000 U	10000 U	460 J	80000 J	14000 =	180 J	9500000 =	1500 =	1700 =	1800 J
Tetryl	32500 U	13000 U	77 J	160000 U	6500 U	160 J	650 U	650 U	80 J	650 UJ

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67	PAD-67-5	PAD-67B	PAD-68
Station	**WBGso-071**	**WBGso-098**	**WBGso-098**	**WBGso-140**	**WBGso-178**	**WBGso-178**	**WBGso-186**	**WBGso-140**	**WBGso-186**	**WBGso-072**
Sample ID	**WBGSS-071-0535-**	**WBGSS-098-0565-**	**WBGSS-098-0566-**	**WB0769**	**WB0890**	**WB0928**	**WB0770**	**WB0729**	**WB0927**	**WBGSS-072-0536-**
Customer ID	**WBGss-071-0535-**	**WBGss-098-0565-**	**WBGss-098-0566-**	**WBGso-140-0769-**	**WBGss-178-0890-**	**WBGso-178-0928-**	**WBGso-186-0770-**	**WBGss-140-0729-**	**WBGso-186-0927-**	**WBGss-072-0536-**
Date	**08/09/96**	**08/14/96**	**08/14/96**	**04/28/98**	**05/04/98**	**05/06/98**	**04/28/98**	**04/22/98**	**05/06/98**	**08/09/96**
Depth (ft)	**0 to 1**	**0 to 2**	**0 to 2**	**4 to 6**	**0 to 1**	**2 to 4**	**2 to 4**	**0 to 1**	**4 to 6**	**0 to 2**
Field Type	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab**	**Grab Composite**	**Grab**	**Grab**	**Grab Composite**	**Grab**	**Grab Composite**
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	120 J	250 U	6900 J	25000 U	92 J	250 U
1,3-Dinitrobenzene	250 UJ	250 U	250 U	250 U	250 U	250 U	12000 U	25000 U	250 U	250 UJ
2,4,6-Trinitrotoluene	2300 =	280 =	340 =	2800 =	1600 =	240 J	26000 =	75000 =	15000 =	250 U
2,4-Dinitrotoluene	250 UJ	250 UJ	250 UJ	250 U	250 U	250 U	82 J	220 J	250 U	250 UJ
2,6-Dinitrotoluene	260 U	260 U	260 U	250 U	250 U	250 U	250 U	250 U	250 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	4800 J	25000 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	12000 U	25000 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	12000 U	25000 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	170 J	350 J	300 J	14000 J	50000 U	410 J	2000 U
Nitrobenzene	260 U	260 U	260 U	250 U	35 J	250 U	12000 U	25000 U	250 U	260 U
Nitrocellulose as N	(1)	(1)	(1)	(2)	2500 J	(2)	88400 J	2000 UJ	3200 =	(1)
Nitroglycerin	(1)	(1)	(1)	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	(1)
Nitroguanidine	(1)	(1)	(1)	(2)	250 U	(2)	250 UJ	250 UJ	250 U	(1)
RDX	1000 U	1000 U	1000 U	370 J	240 J	890 =	82000 =	50000 U	4400 =	1000 U
Tetryl	650 U	650 U	650 U	650 U	93 J	60 J	32000 U	65000 U	130 J	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-68	PAD-68	PAD-68-1	PAD-68-1	PAD-68-2	PAD-68-2	PAD-68-2	PAD-69	PAD-69	PAD-70
Station	WBGso-073	WBGso-073	WBGso-141	WBGso-141	WBGso-142	WBGso-142	WBGso-142	WBGso-075	WBGso-075	WBGso-076
Sample ID	WBGSS-073-0537-	WB0752	WB0730	WB0771	WB0731	WB0868	WB0772	WBGSS-075-0539-	WBGSS-075-0540-	WBGSS-076-0541-
Customer ID	WBGss-073-0537-	WBGso-073-0752-	WBGss-141-0730-	WBGso-141-0771-	WBGss-142-0731-	WBGss-142-0868-	WBGso-142-0772-	WBGss-075-0539-	WBGss-075-0540-	WBGss-076-0541-
Date	08/09/96	04/24/98	04/22/98	04/28/98	04/22/98	04/22/98	04/28/98	08/09/96	08/09/96	08/09/96
Depth (ft)	0 to 2	2 to 4	0 to 1	4 to 6	0 to 1	0 to 1	2 to 4	0 to 2	0 to 1	0 to 2
Field Type	Grab Composite	Grab	Grab Composite	Grab	Grab Composite	Field Duplicate	Grab	Grab Composite	Field Duplicate	Grab Composite
Analyte (µg/kg)										
1,3,5-Trinitrobenzene	250 U	110 J	620 =	1600 =	6200 U	6200 U	27 J	250 U	250 U	250 U
1,3-Dinitrobenzene	250 UJ	250 U	84 J	250 U	6200 U	6200 U	250 U	250 UJ	250 UJ	250 UJ
2,4,6-Trinitrotoluene	480 J	250 =	1500 =	710 =	17000 =	27000 =	93 J	480 J	730 J	250 U
2,4-Dinitrotoluene	250 UJ	63 J	120 J	250 U	360 =	430 =	250 U	250 UJ	250 UJ	250 UJ
2,6-Dinitrotoluene	260 U	250 U	250 U	250 U	250 U	250 U	250 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	6200 U	6200 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	6200 U	6200 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	130 J	250 U	6200 U	6200 U	250 U	250 U	250 U	250 U
HMX	2000 U	120 J	240 J	120 J	12000 U	12000 U	120 J	1900 J	17000 =	2000 U
Nitrobenzene	260 U	250 U	250 U	250 U	6200 U	6200 U	250 U	260 U	260 U	260 U
Nitrocellulose as N	(1)	(2)	11000 J	(2)	3000 J	6300 J	(2)	(1)	(1)	(1)
Nitroglycerin	(1)	2500 U	5200 U	2500 U	2500 U	1500 J	2500 U	(1)	(1)	(1)
Nitroguanidine	(1)	(2)	250 UJ	(2)	250 UJ	250 UJ	(2)	(1)	(1)	(1)
RDX	1000 U	500 U	340 J	170 J	12000 U	12000 U	500 U	1000 U	34000 =	1000 U
Tetryl	650 U	93 J	650 U	150 J	16000 U	16000 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory request.

Table 4-19b. Explosives Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-70	PAD-70-1
Station	WBGso-188	WBGso-189
Sample ID	WB0918	WB0919
Customer ID	WBGso-188-0918-	WBGso-189-0919-
Date	05/06/98	05/06/98
Depth (ft)	2 to 4	2 to 4
Field Type	Grab	Grab
Analyte (µg/kg)		
1,3,5-Trinitrobenzene	250 U	43 J
1,3-Dinitrobenzene	250 U	250 U
2,4,6-Trinitrotoluene	730 =	250 U
2,4-Dinitrotoluene	250 U	250 U
2,6-Dinitrotoluene	250 U	250 U
2-Nitrotoluene	250 U	250 U
3-Nitrotoluene	250 U	250 U
4-Nitrotoluene	250 U	250 U
HMX	140 J	500 U
Nitrobenzene	250 U	250 U
Nitrocellulose as N	2000 U	(2)
Nitroglycerin	2500 U	2500 U
Nitroguanidine	250 U	(2)
RDX	500 U	500 U
Tetryl	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Propellents not requested for Phase I samples.
(2) Nitrocellulose and nitroguanidine were not analyzed for some Phase II samples because they were not included in the initial laboratory reques

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TABLE 4-19c. SVOCs

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Table 4-19c. SVOC Results for Phases I and II Soil Samples at the WBG

Location	PAD-06-2	PAD-08	PAD-28	PAD-37	PAD-40-1	PAD-55	PAD-55	PAD-59	PAD-60-3	PAD-60-3	PAD-64
Station	WBGso-104	WBGso-008	WBGso-021	WBGso-031	WBGso-111	WBGso-051	WBGso-051	WBGso-055	WBGso-122	WBGso-122	WBGso-066
Sample ID	WBGss-104-0693-SO	WBGss-008-0463-SO	WBGss-021-0478-SO	WBGss-031-0488-SO	WBGss-111-0700-SO	WBGss-051-0509-SO	WBGss-051-0510-FD	WBGso-055-0754-	WBGss-122-0711-SO	WBGss-122-0869-FD	WBGss-066-0528-SO
Date	04/23/98	07/30/96	08/05/96	08/07/96	04/23/98	08/08/96	08/08/96	04/24/98	04/22/98	04/22/98	08/09/96
Depth (ft)	0 to 1	0 to 2	0 to 2	0 to 2	0 to 1	0 to 2	0 to 2	2 to 4	0 to 1	0 to 1	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab	Grab Composite	Field Duplicate	Grab Composite
Analyte (mg/kg)											
1,2,4-Trichlorobenzene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
1,2-Dichlorobenzene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 UJ	420 U	400 U	340 U
1,3-Dichlorobenzene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
1,4-Dichlorobenzene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2,2'-oxybis (1-chloropropane)	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2,4,5-Trichlorophenol	400 U	1700 U	810 U	800 U	390 U	830 U	820 U	400 U	420 U	400 U	830 U
2,4,6-Trichlorophenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2,4-Dichlorophenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2,4-Dimethylphenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2,4-Dinitrophenol	970 U	1700 U	810 U	800 U	950 U	830 U	820 U	960 U	1000 U	970 U	830 UJ
2,4-Dinitrotoluene	400 U	(1)	(1)	(1)	390 U	(1)	(1)	400 UJ	420 U	400 U	(1)
2,6-Dinitrotoluene	400 U	(1)	(1)	(1)	390 U	(1)	(1)	400 U	420 U	400 U	(1)
2-Chloronaphthalene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2-Chlorophenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2-Methylnaphthalene	400 U	80 J	330 U	330 U	390 U	340 U	340 U	62 J	150 J	160 J	340 U
2-Methylphenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
2-Nitroaniline	970 U	1700 U	810 U	800 U	950 U	830 U	820 U	960 U	1000 U	970 U	830 U
2-Nitrophenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
3,3'-Dichlorobenzidine	400 U	1700 U	810 U	800 U	390 U	830 U	820 U	400 U	420 U	400 U	830 U
3-Nitroaniline	970 U	1700 U	810 U	800 U	950 U	830 U	820 U	960 UJ	1000 U	970 U	830 U
4,6-Dinitro-*o*-Cresol	970 U	690 U	330 U	330 U	950 U	340 U	340 U	960 U	1000 U	970 U	340 U
4-Bromophenyl-phenyl Ether	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
4-Chloroaniline	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
4-Chlorophenyl-phenylether	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
4-Methylphenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
4-Nitroaniline	970 U	1700 U	810 U	800 U	950 U	830 U	820 U	960 UJ	1000 U	970 U	830 U
4-Nitrophenol	970 U	1700 U	810 U	800 U	950 U	830 U	820 U	960 UJ	1000 U	970 U	830 U
4-chloro-3-methylphenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Acenaphthene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Acenaphthylene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Anthracene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Benzo(*a*)anthracene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	43 J	43 J	340 U
Benzo(*a*)pyrene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	60 J	400 U	340 U
Benzo(*b*)fluoranthene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	93 J	64 J	340 U
Benzo(*g,h,i*)perylene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Benzo(*k*)fluoranthene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Bis(2-chloroethoxy)methane	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Bis(2-chloroethyl)ether	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 UJ	420 U	400 U	340 U
Bis(2-ethylhexyl)phthalate	400 U	690 U	330 U	34 J	390 U	340 U	340 U	400 UJ	420 U	400 U	340 U
Butyl Benzyl Phthalate	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Carbazole	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Chrysene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	50 J	66 J	340 U
Di-n-butyl Phthalate	400 U	690 U	330 U	53 J	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Di-n-octyl Phthalate	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 UJ	420 U	400 U	340 U
Dibenzo(*a,h*)anthracene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 UJ	420 U	400 U	340 U
Dibenzofuran	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Diethyl Phthalate	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Dimethyl Phthalate	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Fluoranthene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	88 J	69 J	40 J
Fluorene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Hexachlorobenzene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Hexachlorobutadiene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Hexachlorocyclopentadiene	400 U	690 U	330 U	330 UJ	390 U	340 U	340 U	400 U	420 U	400 U	340 UJ
Hexachloroethane	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Indeno(1,2,3-*cd*)pyrene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Isophorone	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
N-Nitroso-di-*n*-propylamine	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
N-Nitrosodiphenylamine	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Naphthalene	400 U	76 J	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Nitrobenzene	400 U	(2)	(2)	(2)	390 U	(2)	(2)	400 U	420 U	400 U	(2)
Pentachlorophenol	400 U	1700 U	810 U	800 U	390 U	830 U	820 U	400 U	420 U	400 U	830 U
Phenanthrene	400 U	70 J	330 U	330 U	390 U	340 U	340 U	93 J	140 J	110 J	340 U
Phenol	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	420 U	400 U	340 U
Pyrene	400 U	690 U	330 U	330 U	390 U	340 U	340 U	400 U	110 J	130 J	36 J

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 2,4- and 2,6-Dinitrotoluene were reported as explosives only for Phase I data.
(2) Nitrobenzene not requested for Phase II samples.

Table 4-19c. SVOC Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-66-1	PAD-67	PAD-67B	PAD-68	PAD-68	PAD-70	PAD-70-2	PAD-70-2	PAD-70-2	PAD-70-2
Station	**WBGso-131**	**WBGso-178**	**WBGso-186**	**WBGso-072**	**WBGso-073**	**WBGso-076**	**WBGso-190**	**WBGso-190**	**WBGso-190**	**WBGso-190**
Sample ID	**WBGss-131-0720-SO**	**WBGso-178-0928-**	**WBGso-186-0927-**	**WBGss-072-0536-SO**	**WBGso-073-0752-**	**WBGss-076-0541-SO**	**WBGss-190-0915-SO**	**WBGso-190-0920-**	**WBGso-190-0930-**	**WBGso-190-0931-**
Date	**04/21/98**	**05/06/98**	**05/06/98**	**08/09/96**	**04/24/98**	**08/09/96**	**05/06/98**	**05/06/98**	**05/06/98**	**05/06/98**
Depth (ft)	**0 to 1**	**2 to 4**	**4 to 6**	**0 to 2**	**2 to 4**	**0 to 2**	**0 to 1**	**2 to 4**	**4 to 6**	**4 to 6**
Field Type	**Grab Composite**	**Grab**	**Grab**	**Grab Composite**	**Grab**	**Grab Composite**	**Grab**	**Grab**	**Grab**	**Field Duplicate**
Analyte (µg/kg)										
1,2,4-Trichlorobenzene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
1,2-Dichlorobenzene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
1,3-Dichlorobenzene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
1,4-Dichlorobenzene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2,2'-oxybis (1-chloropropane)	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2,4,5-Trichlorophenol	400 U	380 U	390 U	820 U	390 U	800 U	400 U	390 U	390 U	390 U
2,4,6-Trichlorophenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2,4-Dichlorophenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2,4-Dimethylphenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2,4-Dinitrophenol	980 U	920 U	940 U	820 UJ	950 U	800 UJ	980 U	940 U	950 U	940 U
2,4-Dinitrotoluene	400 U	380 U	390 U	(1)	390 U	(1)	400 U	390 U	390 U	390 U
2,6-Dinitrotoluene	400 U	380 U	390 U	(1)	390 U	(1)	400 U	390 U	390 U	390 U
2-Chloronaphthalene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2-Chlorophenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2-Methylnaphthalene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2-Methylphenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
2-Nitroaniline	980 U	920 U	940 U	820 U	950 U	800 U	980 U	940 U	950 U	940 U
2-Nitrophenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
3,3'-Dichlorobenzidine	400 U	380 U	390 U	820 U	390 U	800 U	400 U	390 U	390 U	390 U
3-Nitroaniline	980 U	920 U	940 U	820 U	950 U	800 U	980 U	940 U	950 U	940 U
4,6-Dinitro-*o*-Cresol	980 U	920 U	940 U	340 U	950 U	330 U	980 U	940 U	950 U	940 U
4-Bromophenyl-phenyl Ether	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
4-Chloroaniline	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
4-Chlorophenyl-phenylether	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
4-Methylphenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
4-Nitroaniline	980 U	920 U	940 U	820 U	950 U	800 U	980 U	940 U	950 U	940 U
4-Nitrophenol	980 U	920 U	940 U	820 U	950 U	800 U	980 U	940 U	950 U	940 U
4-chloro-3-methylphenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Acenaphthene	140 J	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Acenaphthylene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Anthracene	440 =	380 U	390 U	340 U	390 U	330 U	400 U	98 J	390 U	390 U
Benzo(*a*)anthracene	630 =	380 U	390 U	340 U	390 U	330 U	160 J	480 =	390 U	390 U
Benzo(*a*)pyrene	530 =	380 U	390 U	340 U	390 U	330 U	160 J	500 =	390 U	390 U
Benzo(*b*)fluoranthene	690 =	380 U	390 U	340 U	390 U	330 U	230 J	700 =	390 U	390 U
Benzo(*g,h,i*)perylene	170 J	380 U	390 U	340 U	390 U	330 U	110 J	310 J	390 U	390 U
Benzo(*k*)fluoranthene	350 J	380 U	390 U	340 U	390 U	330 U	91 J	290 J	390 U	390 U
Bis(2-chloroethoxy)methane	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Bis(2-chloroethyl)ether	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Bis(2-ethylhexyl)phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Butyl Benzyl Phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Carbazole	200 J	380 U	390 U	340 U	390 U	330 U	400 U	86 J	390 U	390 U
Chrysene	620 =	380 U	390 U	340 U	390 U	330 U	180 J	560 =	390 U	390 U
Di-*n*-butyl Phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Di-*n*-octyl Phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Dibenzo(*a,h*)anthracene	54 J	380 U	390 U	340 U	390 U	330 U	400 U	76 J	390 U	390 U
Dibenzofuran	110 J	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Diethyl Phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Dimethyl Phthalate	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Fluoranthene	2000 =	380 U	390 U	340 U	390 U	330 U	390 J	1200 =	390 U	390 U
Fluorene	180 J	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Hexachlorobenzene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Hexachlorobutadiene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Hexachlorocyclopentadiene	400 U	380 U	390 U	340 UJ	390 U	330 UJ	400 U	390 U	390 U	390 U
Hexachloroethane	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Indeno(1,2,3-*cd*)pyrene	210 J	380 U	390 U	340 U	390 U	330 U	130 J	370 J	390 U	390 U
Isophorone	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
N-Nitroso-di-*n*-propylamine	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
N-Nitrosodiphenylamine	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Naphthalene	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Nitrobenzene	400 U	380 U	390 U	(2)	390 U	(2)	400 U	390 U	390 U	390 U
Pentachlorophenol	400 U	380 U	390 U	820 U	390 U	800 U	400 U	390 U	390 U	390 U
Phenanthrene	1400 =	380 U	390 U	340 U	390 U	330 U	170 J	530 =	390 U	390 U
Phenol	400 U	380 U	390 U	340 U	390 U	330 U	400 U	390 U	390 U	390 U
Pyrene	1300 =	380 U	390 U	340 U	390 U	330 U	300 J	910 =	390 U	390 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 2,4- and 2,6-Dinitrotoluene were reported as explosives only for Phase I data.
(2) Nitrobenzene not requested for Phase II samples.

Table 4-19c. SVOC Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-70-3	PAD-70-3	PAD-70-4	PAD-70-4	PAD-70-4
Station	WBGso-191	WBGso-191	WBGso-192	WBGso-192	WBGso-192
Sample ID	WBGss-191-0916-SO	WBGso-191-0921-	WBGss-192-0917-SO	WBGso-192-0922-	WBGso-192-0929-
Date	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98
Depth (ft)	0 to 1	2 to 4	0 to 1	2 to 4	4 to 6
Field Type	Grab	Grab	Grab	Grab	Grab
Analyte (mg/kg)					
1,2,4-Trichlorobenzene	410 U	410 U	370 U	400 U	400 U
1,2-Dichlorobenzene	410 U	410 U	370 U	400 U	400 U
1,3-Dichlorobenzene	410 U	410 U	370 U	400 U	400 U
1,4-Dichlorobenzene	410 U	410 U	370 U	400 U	400 U
2,2'-oxybis (1-chloropropane)	410 U	410 U	370 U	400 U	400 U
2,4,5-Trichlorophenol	410 U	410 U	370 U	400 U	400 U
2,4,6-Trichlorophenol	410 U	410 U	370 U	400 U	400 U
2,4-Dichlorophenol	410 U	410 U	370 U	400 U	400 U
2,4-Dimethylphenol	410 U	410 U	370 U	400 U	400 U
2,4-Dinitrophenol	1000 U	1000 U	890 U	960 U	960 U
2,4-Dinitrotoluene	410 U	410 U	370 U	400 U	400 U
2,6-Dinitrotoluene	410 U	410 U	370 U	400 U	400 U
2-Chloronaphthalene	410 U	410 U	370 U	400 U	400 U
2-Chlorophenol	410 U	410 U	370 U	400 U	400 U
2-Methylnaphthalene	47 J	410 U	370 U	400 U	400 U
2-Methylphenol	410 U	410 U	370 U	400 U	400 U
2-Nitroaniline	1000 U	1000 U	890 U	960 U	960 U
2-Nitrophenol	410 U	410 U	370 U	400 U	400 U
3,3'-Dichlorobenzidine	410 U	410 U	370 U	400 U	400 U
3-Nitroaniline	1000 U	1000 U	890 U	960 U	960 U
4,6-Dinitro-*o* -Cresol	1000 U	1000 U	890 U	960 U	960 U
4-Bromophenyl-phenyl Ether	410 U	410 U	370 U	400 U	400 U
4-Chloroaniline	410 U	410 U	370 U	400 U	400 U
4-Chlorophenyl-phenylether	410 U	410 U	370 U	400 U	400 U
4-Methylphenol	410 U	410 U	370 U	400 U	400 U
4-Nitroaniline	1000 U	1000 U	890 U	960 U	960 U
4-Nitrophenol	1000 U	1000 U	890 U	960 U	960 U
4-chloro-3-methylphenol	410 U	410 U	370 U	400 U	400 U
Acenaphthene	150 J	410 U	370 U	400 U	400 U
Acenaphthylene	410 U	410 U	370 U	400 U	400 U
Anthracene	480 =	410 U	370 U	400 U	400 U
Benzo(*a*)anthracene	1000 =	51 J	370 U	400 U	400 U
Benzo(*a*)pyrene	800 =	60 J	370 U	400 U	400 U
Benzo(*b*)fluoranthene	1100 =	78 J	370 U	400 U	400 U
Benzo(*g,h,i*)perylene	390 J	410 U	370 U	400 U	400 U
Benzo(*k*)fluoranthene	500 =	410 U	370 U	400 U	400 U
Bis(2-chloroethoxy)methane	410 U	410 U	370 U	400 U	400 U
Bis(2-chloroethyl)ether	410 U	410 U	370 U	400 U	400 U
Bis(2-ethylhexyl)phthalate	410 U	410 U	370 U	400 U	400 U
Butyl Benzyl Phthalate	410 U	410 U	370 U	400 U	400 U
Carbazole	270 J	410 U	370 U	400 U	400 U
Chrysene	1000 =	62 J	370 U	400 U	400 U
Di-*n* -butyl Phthalate	410 U	410 U	370 U	400 U	400 U
Di-*n* -octyl Phthalate	410 U	410 U	370 U	400 U	400 U
Dibenzo(*a,h*)anthracene	110 J	410 U	370 U	400 U	400 U
Dibenzofuran	160 J	410 U	370 U	400 U	400 U
Diethyl Phthalate	410 U	410 U	370 U	400 U	400 U
Dimethyl Phthalate	410 U	410 U	370 U	400 U	400 U
Fluoranthene	2700 =	110 J	370 U	400 U	400 U
Fluorene	240 J	410 U	370 U	400 U	400 U
Hexachlorobenzene	410 U	410 U	370 U	400 U	400 U
Hexachlorobutadiene	410 U	410 U	370 U	400 U	400 U
Hexachlorocyclopentadiene	410 U	410 U	370 U	400 U	400 U
Hexachloroethane	410 U	410 U	370 U	400 U	400 U
Indeno(1,2,3-*cd*)pyrene	480 =	410 U	370 U	400 U	400 U
Isophorone	410 U	410 U	370 U	400 U	400 U
N-Nitroso-di-*n* -propylamine	410 U	410 U	370 U	400 U	400 U
N-Nitrosodiphenylamine	410 U	410 U	370 U	400 U	400 U
Naphthalene	410 U	410 U	370 U	400 U	400 U
Nitrobenzene	410 U	410 U	370 U	400 U	400 U
Pentachlorophenol	410 U	410 U	370 U	400 U	400 U
Phenanthrene	2400 =	410 U	370 U	400 U	400 U
Phenol	410 U	410 U	370 U	400 U	400 U
Pyrene	2100 =	83 J	370 U	400 U	400 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 2,4- and 2,6-Dinitrotoluene were reported as explosives only for Phase I data.
(2) Nitrobenzene not requested for Phase II samples.

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TABLE 4-19d. PESTICIDES/PCBs

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Table 4-19d. Pesticides/PCB Results for Phases I and II Soil Samples at the WBG

Location	PAD-08	PAD-28	PAD-37	PAD-55	PAD-55	PAD-64	PAD-68	PAD-70
Station	**WBGso-008**	**WBGso-021**	**WBGso-031**	**WBGso-051**	**WBGso-051**	**WBGso-066**	**WBGso-072**	**WBGso-076**
Sample ID	**WBGss-008-0463-**	**WBGss-021-0478-**	**WBGss-031-0488-**	**WBGss-051-0509-**	**WBGss-051-0510-**	**WBGss-066-0528-**	**WBGss-072-0536-**	**WBGss-076-0541-**
Date	**07/30/96**	**08/05/96**	**08/07/96**	**08/08/96**	**08/08/96**	**08/09/96**	**08/09/96**	**08/09/96**
Depth (ft)	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**
Field Type	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte (mg/kg)								
4,4'-DDD	2.6 UJ	2.5 UJ	2.5 U	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
4,4'-DDE	2.6 U	2.5 U	2.5 U	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
4,4'-DDT	2.6 UJ	2.5 UJ	2.5 UJ	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Aldrin	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Alpha Chlordane	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Alpha-BHC	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Aroclor-1016	34 U	33 U	33 U	34 U	34 U	34 U	34 U	33 U
Aroclor-1221	34 U	33 U	33 U	34 U	34 U	34 U	34 U	33 U
Aroclor-1232	34 U	33 U	33 U	34 U	34 U	34 U	34 U	33 U
Aroclor-1242	34 U	33 U	33 U	34 U	34 U	34 U	34 U	33 U
Aroclor-1248	34 U	33 U	33 U	34 U	34 U	34 U	34 U	33 U
Aroclor-1254	70 U	68 U	67 U	70 U	69 U	70 U	69 U	67 U
Aroclor-1260	70 U	68 U	67 U	70 U	69 U	70 U	69 U	67 U
Beta-BHC	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Delta-BHC	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Dieldrin	2.6 U	2.5 U	2.5 U	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Endosulfan I	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Endosulfan II	2.6 U	2.5 U	2.5 UJ	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Endosulfan Sulfate	2.6 U	2.5 U	2.5 UJ	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Endrin	2.6 U	2.5 U	2.5 UJ	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Endrin Aldehyde	2.6 U	2.5 U	2.5 UJ	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Endrin Ketone	2.6 U	2.5 U	2.5 U	2.6 U	2.6 U	2.6 U	2.6 U	2.5 U
Gamma Chlordane	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Gamma-BHC (Lindane)	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Heptachlor	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Heptachlor Epoxide	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U
Methoxychlor	14 UJ	13 UJ	13 UJ	14 U	13 U	14 U	13 U	13 U
Toxaphene	86 U	84 U	83 U	86 U	86 U	86 U	86 U	83 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.

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TABLE 4-19e. VOCs

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Table 4-19e. VOC Results for Phases I and II Soil Samples at the WBG

Location	PAD-04	PAD-08	PAD-28	PAD-37	PAD-37	PAD-55	PAD-55	PAD-60
Station	WBGso-004	WBGso-008	WBGso-021	WBGso-030	WBGso-031	WBGso-051	WBGso-051	WBGso-057
Sample ID	WBGss-004-0672-SO	WBGss-008-0463-SO	WBGss-021-0478-SO	WBGss-030-0673-SO	WBGss-031-0488-SO	WBGss-051-0509-SO	WBGss-051-0510-FD	WBGss-057-0674-SO
Date	08/13/96	07/30/96	08/05/96	08/13/96	08/07/96	08/08/96	08/08/96	08/13/96
Depth (ft)	0 to 1	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	2 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab
Analyte (mg/kg)								
1,1,1-Trichloroethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,1,2,2-Tetrachloroethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	31 UJ
1,1,2-Trichloroethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,1-Dichloroethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,1-Dichloroethene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,2-Dichloroethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,2-Dichloroethene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-Dichloropropane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,2-*cis* -Dichloroethene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,2-*trans* -Dichloroethene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,3-*cis* -Dichloropropene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
1,3-*trans* -Dichloropropene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
2-Butanone	6 UJ	5 UJ	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
2-Hexanone	6 UJ	5 UJ	5 U	6 UJ	5 UJ	5 U	5 UJ	31 UJ
4-Methyl-2-pentanone	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	31 UJ
Acetone	6 UJ	5 R	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Benzene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	32 J
Bromodichloromethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Bromoform	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Bromomethane	6 UJ	5 U	5 UJ	6 UJ	5 UJ	5 UJ	5 UJ	31 UJ
Carbon Disulfide	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Carbon Tetrachloride	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Chlorobenzene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	31 UJ
Chloroethane	6 UJ	5 UJ	5 UJ	6 UJ	5 UJ	5 UJ	5 UJ	31 UJ
Chloroform	3 J	5 U	5 U	3 J	5 UJ	5 U	5 U	23 J
Chloromethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Dibromochloromethane	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Ethylbenzene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	160 J
Methylene Chloride	12 UJ	5 U	5 U	15 UJ	5 UJ	12 =	12 =	68 UJ
Styrene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	36 J
Tetrachloroethene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	31 UJ
Toluene	6 UJ	5 U	40 =	6 UJ	17 J	5 U	65 J	190 J
Trichloroethene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Vinyl Chloride	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 U	31 UJ
Xylenes, Total	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	20 J
o-Xylene	6 UJ	5 U	5 U	6 UJ	5 UJ	5 U	5 UJ	20 J

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 1,2-Dichloroethene was reported as cis and trans isomers for Phase I samples and total for Phase II samples.
(2) o-Xylene was not reported for Phase II samples.

Table 4-19e. VOC Results for Phases I and II Soil Samples at the WBG (continued)

Location	PAD-64	PAD-68	PAD-70	PAD-70-2	PAD-70-2	PAD-70-2	PAD-70-3	PAD-70-3	PAD-70-4	PAD-70-4	PAD-70-4
Station	WBGso-066	WBGso-072	WBGso-076	WBGso-190	WBGso-190	WBGso-190	WBGso-191	WBGso-191	WBGso-192	WBGso-192	WBGso-192
Sample ID	WBGss-066-0528-SO	WBGss-072-0536-SO	WBGss-076-0541-SO	WBGss-190-0915-SO	WBGso-190-0920-SO	WBGso-190-0930-SO	WBGss-191-0916-SO	WBGso-191-0921-SO	WBGss-192-0917-SO	WBGso-192-0922-SO	WBGso-192-0929-SO
Date	08/09/96	08/09/96	08/09/96	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98	05/06/98
Depth (ft)	0 to 2	0 to 2	0 to 2	0 to 1	2 to 4	4 to 6	0 to 1	2 to 4	0 to 1	2 to 4	4 to 6
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analyte (mg/kg)											
1,1,1-Trichloroethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,1,2-Trichloroethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,1-Dichloroethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,1-Dichloroethene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,2-Dichloroethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,2-Dichloroethene	(1)	(1)	(1)	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,2-Dichloropropane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,2-*cis*-Dichloroethene	5 U	5 UJ	5 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-*trans*-Dichloroethene	5 U	5 UJ	5 U	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,3-*cis*-Dichloropropene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
1,3-*trans*-Dichloropropene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
2-Butanone	5 UJ	5 UJ	5 UJ	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
2-Hexanone	5 UJ	5 UJ	5 UJ	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
4-Methyl-2-pentanone	5 U	5 UJ	5 U	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
Acetone	5 R	5 R	5 R	12 U	12 U	12 U	12 U	12 U	11 U	52 J	12 U
Benzene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Bromodichloromethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Bromoform	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Bromomethane	5 U	5 UJ	5 U	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
Carbon Disulfide	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Carbon Tetrachloride	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Chlorobenzene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Chloroethane	5 UJ	5 UJ	5 UJ	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
Chloroform	5 U	5 UJ	2 J	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Chloromethane	5 U	5 UJ	5 U	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
Dibromochloromethane	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Ethylbenzene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Methylene Chloride	9 U	20 UJ	12 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Styrene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Tetrachloroethene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Toluene	19 =	81 J	170 =	1.8 J	2.7 J	1.2 J	1.6 J	0.43 J	0.79 J	2.5 J	6 U
Trichloroethene	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
Vinyl Chloride	5 U	5 UJ	5 U	12 U	12 U	12 U	12 U	12 U	11 U	12 U	12 U
Xylenes, Total	5 U	5 UJ	5 U	6.1 U	5.9 U	5.9 U	6.2 U	6.2 U	5.6 U	6 U	6 U
o-Xylene	5 U	5 UJ	5 U	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 1,2-Dichloroethene was reported as cis and trans isomers for Phase I samples and total for Phase II samples.
(2) o-Xylene was not reported for Phase II samples.

TABLE 4-20a. METALS

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Table 4-20a. Metals Results for Phases I and II Sediment Samples from WBG

Station	WBGsd-078	WBGsd-079	WBGsd-080	WBGsd-081	WBGsd-082	WBGsd-083	WBGsd-084	WBGsd-084
Sample ID	WBGsd-078-0543-SD	WBGsd-079-0544-SD	WBGsd-080-0545-SD	WBGsd-081-0546-SD	WBGsd-082-0547-SD	WBGsd-083-0548-SD	WBGsd-084-0549-SD	WBGsd-084-0550-FD
Date	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96
Depth (ft)	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate
Analyte (mg/kg)								
Cyanide			0.1 U			0.11 J *		
Aluminum	16100 = *	7930 =	9900 =	12500 =	10600 =	7460 =	9960 =	9280 =
Antimony			0.3 U			0.32 J *		
Arsenic	11.7 =	18.1 =	15.5 =	15.1 =	13.1 =	12.1 =	14 =	12.5 =
Barium	173 = *	78.3 =	66.9 =	118 =	528 = *	85.2 =	39.5 =	41.1 =
Beryllium			0.6 = *			0.45 = *		
Cadmium	0.05 U	0.05 U	0.04 U	0.18 J *	0.16 J *	0.04 U	0.05 U	0.05 U
Calcium			1720 =			1080 =		
Chromium	14 =	10.6 =	13.3 =	16.9 =	14.2 =	9.9 =	12.1 =	10.1 =
Cobalt			10.4 = *			8.6 =		
Copper			18.8 =			18.6 =		
Iron			24000 =			18200 =		
Lead	16.9 =	25.4 =	11.1 =	27.3 =	11.3 =	10.2 =	13.3 =	12.2 =
Magnesium			3280 = *			2050 =		
Manganese	1050 =	328 =	362 =	897 =	728 =	318 =	242 =	232 =
Mercury	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 =
Nickel			28.3 = *			15.9 =		
Potassium			1030 =			665 =		
Selenium	0.37 U	0.36 U	0.3 U	0.59 U	0.49 J	0.37 J	0.38 J	0.35 U
Silver	0.23 U	0.23 U	0.19 U	0.23 U	0.22 U	0.19 U	0.22 U	0.22 U
Sodium			74 J			52.3 J		
Thallium			1.8 = *			1.5 = *		
Vanadium			15.9 =			13 =		
Zinc	64.8 =	79.7 =	57 =	64.8 =	51.9 =	51.9 =	38.3 =	40.8 =

Table 4-20a. Metals Results for Phases I and II Sediment Samples from WBG (continued)

Station	WBGsd-085	WBGsd-086	WBGsd-087	WBGsd-088	WBGsd-088	WBGsd-089	WBGsd-090	WBGsd-155(d)	WBGsd-156(d)
Sample ID	WBGsd-085-0551-SD	WBGsd-086-0552-SD	WBGsd-087-0553-SD	WBGsd-088-0554-SD	WBGsd-088-0555-FD	WBGsd-089-0556-SD	WBGsd-090-0557-SD	WBGsd-155(d)-0744-	WBGsd-156(d)-0745-
Date	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	08/11/96	04/27/98	04/27/98
Depth (ft)	0 to 2	0 to 2	0 to 2	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Field Type	Grab Composite	Grab Composite	Grab Composite	Grab Composite	Field Duplicate	Grab Composite	Grab Composite	Grab	Grab
Analyte (mg/kg)									
Cyanide								1.9 U	0.81 U
Aluminum	14100 = *	12100 =	10600 =	15100 = *	11300 =	14800 = *	4740 =	17900 = *	7310 =
Antimony								1.9 UJ	0.81 UJ
Arsenic	15.6 =	13.2 =	12.6 =	8.1 =	8.9 =	13.6 =	10.4 =	8.6 =	7.7 =
Barium	78.9 =	236 = *	54.5 =	226 = *	204 = *	81.1 =	36.8 =	182 = *	144 = *
Beryllium								0.91 U	0.33 U
Cadmium	0.05 U	0.17 J *	0.05 U	0.56 J *	0.55 J *	0.06 J *	0.18 J *	1.9 U	0.81 U
Calcium								1900 =	3910 =
Chromium	16.1 =	14.5 =	14.2 =	12.6 =	13 =	16.9 =	7.2 =	21.3 = *	9.3 =
Cobalt								8.7 J	5.7 J
Copper								49.1 = *	13.2 =
Iron								21000 =	13900 =
Lead	12.6 =	21.8 =	15.2 =	25 =	24.8 =	13.6 =	14.6 =	40.1 = *	15.5 =
Magnesium								2630 =	1650 =
Manganese	225 =	183 =	338 =	350 =	294 =	548 =	303 =	782 J	396 J
Mercury	0.04 U	0.04 =	0.05 U	0.07 U	0.07 = *	0.05 =	0.05 U	0.16 J *	0.16 U
Nickel								24.7 = *	10.1 =
Potassium								1580 J	684 J
Selenium	0.34 U	1.7 =	0.44 J	0.59 U	0.54 U	0.59 J	0.41 U	1.9 U	0.81 U
Silver	0.21 U	0.22 U	0.26 U	0.37 U	0.34 U	0.25 U	0.26 U	3.7 U	1.6 U
Sodium								107 J	25.9 J
Thallium								1.9 U	0.81 U
Vanadium								29.2 = *	14.4 =
Zinc	58.7 =	46.9 =	52.3 =	155 =	187 =	90.1 =	148 =	166 =	130 =

Table 4-20a. Metals Results for Phases I and II Sediment Samples from WBG (continued)

Station	WBGsd-157(d)	WBGsd-158(p)
Sample ID	WBGsd-157(d)-0746-	WBGsd-158(p)-0747-
Date	04/27/98	04/27/98
Depth (ft)	0 to 1	0 to 1
Field Type	Grab	Grab
Analyte (mg/kg)		
Cyanide	0.97 U	0.76 U
Aluminum	6200 =	7700 =
Antimony	0.97 UJ	0.76 UJ
Arsenic	9.1 =	10.5 =
Barium	60.8 =	64.7 =
Beryllium	0.24 U	0.4 U
Cadmium	0.97 U	0.76 U
Calcium	975 =	977 =
Chromium	9 =	9.7 =
Cobalt	7 J	7.3 J
Copper	10.4 =	7.8 =
Iron	14600 =	14000 =
Lead	11.6 =	14.1 =
Magnesium	1280 =	1180 =
Manganese	733 J	825 J
Mercury	0.19 U	0.15 U
Nickel	12.1 =	11.9 =
Potassium	666 J	863 =
Selenium	0.97 U	0.76 U
Silver	1.9 U	1.5 U
Sodium	966 U	26.7 J
Thallium	0.97 U	0.76 U
Vanadium	13.9 =	17.4 =
Zinc	60.9 =	58.4 =

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TABLE 4-20b. EXPLOSIVES

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Table 4-20b. Explosives Results for Sediment Samples at the WBG

Customer ID	WBGsd-078-0543-SD	WBGsd-079-0544-SD	WBGsd-080-0545-SD	WBGsd-081-0546-SD	WBGsd-082-0547-SD	WBGsd-083-0548-SD	WBGsd-084-0549-SD	WBGsd-084-0550-FD
Date	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**
Depth (ft)	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 2**
Field Type	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**
Analyte (mg/kg)								
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	360 J	970 =	250 U	420 J	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Nitroglycerin analysis not requested for Phase I samples.

Table 4-20b. Explosives Results for Sediment Samples at the WBG (continued)

Customer ID	WBGsd-085-0551-SD	WBGsd-086-0552-SD	WBGsd-087-0553-SD	WBGsd-088-0554-SD	WBGsd-088-0555-FD	WBGsd-089-0556-SD	WBGsd-090-0557-SD	WBGsd-155(d)-0744-
Date	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**08/11/96**	**04/27/98**
Depth (ft)	**0 to 2**	**0 to 2**	**0 to 2**	**0 to 1**	**0 to 1**	**0 to 1**	**0 to 1**	**0 to 1**
Field Type	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab**
Analyte (mg/kg)								
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	150 J
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	44 J
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	94 J
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	250 U
2-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	500 U
Nitrobenzene	260 U	260 U	260 U	260 U	260 U	260 U	260 U	250 U
Nitroglycerin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	2500 U
RDX	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	500 U
Tetryl	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Nitroglycerin analysis not requested for Phase I samples.

Table 4-20b. Explosives Results for Sediment Samples at the WBG (continued)

Customer ID	WBGsd-156(d)-0745-	WBGsd-157(d)-0746-	WBGsd-158(p)-0747-
Date	04/27/98	04/27/98	04/27/98
Depth (ft)	0 to 1	0 to 1	0 to 1
Field Type	Grab	Grab	Grab
Analyte (mg/kg)			
1,3,5-Trinitrobenzene	82 J	98 J	71 J
1,3-Dinitrobenzene	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U
2,4-Dinitrotoluene	37 J	250 U	250 U
2,6-Dinitrotoluene	250 U	250 U	250 U
2-Nitrotoluene	250 U	250 U	250 U
3-Nitrotoluene	250 U	250 U	250 U
4-Nitrotoluene	250 U	250 U	250 U
HMX	500 U	500 U	120 J
Nitrobenzene	250 U	250 U	71 J
Nitroglycerin	2500 U	2500 U	2500 U
RDX	500 U	500 U	500 U
Tetryl	650 U	650 U	650 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) Nitroglycerin analysis not requested for Phase I samples.

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TABLE 4-20c. ORGANICS

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Table 4-20c. Organics Results for Sediment Samples at the WBG

Customer ID	WBGsd-080-0545-	WBGsd-083-0548-	WBGsd-156(d)-0745-
Date	08/11/96	08/11/96	04/27/98
Depth (ft)	0 to 2	0 to 2	0 to 1
Field Type	Grab Composite	Grab Composite	Grab
Analyte (mg/kg)			
4,4'-DDD	2.5 U	2.5 U	
4,4'-DDE	2.5 U	2.5 U	
4,4'-DDT	2.5 UJ	2.5 UJ	
Aldrin	1.3 U	1.3 U	
Alpha Chlordane	1.3 UJ	1.3 UJ	
Alpha-BHC	1.3 U	1.3 U	
Aroclor-1016	33 U	33 U	
Aroclor-1221	33 U	33 U	
Aroclor-1232	33 U	33 U	
Aroclor-1242	33 U	33 U	
Aroclor-1248	33 U	33 U	
Aroclor-1254	67 U	68 U	
Aroclor-1260	67 U	68 U	
Beta-BHC	1.3 U	1.3 U	
Delta-BHC	1.3 U	1.3 U	
Dieldrin	2.5 U	2.5 U	
Endosulfan I	1.3 UJ	1.3 UJ	
Endosulfan II	2.5 UJ	2.5 UJ	
Endosulfan Sulfate	2.5 U	2.5 U	
Endrin	2.5 UJ	2.5 UJ	
Endrin Aldehyde	2.5 UJ	2.5 UJ	
Endrin Ketone	2.5 UJ	2.5 UJ	
Gamma Chlordane	1.3 UJ	1.3 UJ	
Gamma-BHC (Lindane)	1.3 U	1.3 U	
Heptachlor	1.3 UJ	1.3 UJ	
Heptachlor Epoxide	1.3 U	1.3 U	
Methoxychlor	13 UJ	13 UJ	
Toxaphene	83 U	84 U	
1,2,4-Trichlorobenzene	330 U	330 U	540 U
1,2-Dichlorobenzene	330 U	330 U	540 U
1,3-Dichlorobenzene	330 U	330 U	540 U
1,4-Dichlorobenzene	330 U	330 U	540 U
2,2'-oxybis (1-chloropropane)	330 U	330 U	540 U
2,4,5-Trichlorophenol	800 U	810 U	540 U
2,4,6-Trichlorophenol	330 U	330 U	540 U
2,4-Dichlorophenol	330 U	330 U	540 U
2,4-Dimethylphenol	330 U	330 U	540 U
2,4-Dinitrophenol	800 UJ	810 UJ	1300 U
2,4-Dinitrotoluene	(1)	(1)	540 U
2,6-Dinitrotoluene	(1)	(1)	540 U
2-Chloronaphthalene	330 U	330 U	540 U
2-Chlorophenol	330 U	330 U	540 U
2-Methylnaphthalene	330 U	330 U	540 U
2-Methylphenol	330 U	330 U	540 U
2-Nitroaniline	800 U	810 U	1300 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(1) 2,4- and 2,6-Dinitrotoluene were reported as explosives for Phase I samples.

Table 4-20c. Organics Results for Sediment Samples at the WBG (continued)

Customer ID	WBGsd-080-0545-	WBGsd-083-0548-	WBGsd-156(d)-0745-
Date	08/11/96	08/11/96	04/27/98
Depth (ft)	0 to 2	0 to 2	0 to 1
Field Type	Grab Composite	Grab Composite	Grab
Analyte (mg/kg)			
2-Nitrophenol	330 U	330 U	540 U
3,3'-Dichlorobenzidine	800 U	810 U	540 U
3-Nitroaniline	800 U	810 U	1300 U
4,6-Dinitro-o-Cresol	330 U	330 U	1300 U
4-Bromophenyl-phenyl Ether	330 U	330 U	540 U
4-Chloroaniline	330 U	330 U	540 U
4-Chlorophenyl-phenylether	330 U	330 U	540 U
4-Methylphenol	330 U	330 U	540 U
4-Nitroaniline	800 U	810 U	1300 U
4-Nitrophenol	800 U	810 U	1300 U
4-chloro-3-methylphenol	330 U	330 U	540 U
Acenaphthene	330 U	330 U	540 U
Acenaphthylene	330 U	330 U	540 U
Anthracene	330 U	330 U	150 J
Benzo(*a*)anthracene	330 U	330 U	560 =
Benzo(*a*)pyrene	330 U	330 U	390 J
Benzo(b)fluoranthene	330 U	330 U	560 =
Benzo(*g,h,i*)perylene	330 U	330 U	130 J
Benzo(*k*)fluoranthene	330 U	330 U	190 J
Bis(2-chloroethoxy)methane	330 U	330 U	540 U
Bis(2-chloroethyl)ether	330 U	330 U	540 U
Bis(2-ethylhexyl)phthalate	330 U	330 U	540 U
Butyl Benzyl Phthalate	330 U	330 U	540 U
Carbazole	330 U	330 U	540 U
Chrysene	330 U	330 U	510 J
Di-n-butyl Phthalate	330 U	330 U	540 U
Di-n-octyl Phthalate	330 U	330 U	540 U
Dibenzo(*a,h*)anthracene	330 U	330 U	540 U
Dibenzofuran	330 U	330 U	540 U
Diethyl Phthalate	330 U	330 U	540 U
Dimethyl Phthalate	330 U	330 U	540 U
Fluoranthene	330 U	330 U	1500 =
Fluorene	330 U	330 U	540 U
Hexachlorobenzene	330 U	330 U	540 U
Hexachlorobutadiene	330 U	330 U	540 U
Hexachlorocyclopentadiene	330 UJ	330 UJ	540 U
Hexachloroethane	330 U	330 U	540 U
Indeno(1,2,3-*cd*)pyrene	330 U	330 U	170 J
Isophorone	330 U	330 U	540 U
N-Nitroso-di-*n* -propylamine	330 U	330 U	540 U
N-Nitrosodiphenylamine	330 U	330 U	540 U
Naphthalene	330 U	330 U	540 U
Nitrobenzene	(2)	(2)	540 U
Pentachlorophenol	800 U	810 U	540 U
Phenanthrene	330 U	330 U	640 =

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(2) Nitrobenzene was not analyzed for Phase I samples.

Table 4-20c. Organics Results for Sediment Samples at the WBG (continued)

Customer ID	WBGsd-080-0545-	WBGsd-083-0548-	WBGsd-156(d)-0745-
Date	08/11/96	08/11/96	04/27/98
Depth (ft)	0 to 2	0 to 2	0 to 1
Field Type	Grab Composite	Grab Composite	Grab
Analyte (mg/kg)			
Phenol	330 U	330 U	540 U
Pyrene	330 U	330 U	940 =
1,1,1-Trichloroethane	5 U	5 U	8.1 U
1,1,2,2-Tetrachloroeth	5 UJ	5 U	8.1 U
1,1,2-Trichloroethane	5 U	5 U	8.1 U
1,1-Dichloroethane	5 U	5 U	8.1 U
1,1-Dichloroethene	5 U	5 U	8.1 U
1,2-Dichloroethane	5 U	5 U	8.1 U
1,2-Dichloroethene	(3)	(3)	8.1 U
1,2-Dichloropropane	5 U	5 U	8.1 U
1,2-*cis* -Dichloroethen	5 U	5 U	(3)
1,2-*trans* -Dichloroeth	5 U	5 U	(3)
1,3-*cis* -Dichloroprope	5 U	5 U	8.1 U
1,3-*trans* -Dichloropro	5 U	5 U	8.1 U
2-Butanone	5 UJ	5 U	16 U
2-Hexanone	5 UJ	5 U	16 U
4-Methyl-2-pentanone	5 UJ	5 U	16 U
Acetone	5 R	5 UJ	21 J
Benzene	5 U	5 U	8.1 U
Bromodichloromethan	5 U	5 U	8.1 U
Bromoform	5 U	5 U	8.1 U
Bromomethane	5 U	5 U	16 U
Carbon Disulfide	5 U	5 U	8.1 U
Carbon Tetrachloride	5 U	5 U	8.1 U
Chlorobenzene	5 UJ	5 U	8.1 U
Chloroethane	5 UJ	5 UJ	16 U
Chloroform	5 U	2 J	8.1 U
Chloromethane	5 U	5 U	16 U
Dibromochloromethan	5 U	5 U	8.1 U
Ethylbenzene	5 UJ	5 U	8.1 U
Methylene Chloride	6 U	5 U	8.1 U
Styrene	5 UJ	5 U	8.1 U
Tetrachloroethene	5 UJ	5 U	8.1 U
Toluene	25 J	5 U	8.1 U
Trichloroethene	5 U	5 U	8.1 U
Vinyl Chloride	5 U	5 U	16 U
Xylenes, Total	5 UJ	5 U	8.1 U
o-Xylene	5 UJ	5 U	(4)

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.
(3) 1,2-Dichloroethene was reported as cis and trans isomers for Phase I samples and total for Phase II samples.
(4) o-Xylene was not reported for Phase II samples.

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TABLE 4-21. SURFACE WATER

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Table 4-21. Results for Phase II Surface Water Samples from WBG

Station	WBGsw-157	WBGsw-157
Customer ID	WBGsw-157(p)-0783-SW	WBGsw-157(p)-0783-SW
Date	04/27/98	04/27/98
Filtered	Dissolved	Total
Field Type	Grab	Grab
Analyte (mg/L)		
Cyanide	10 U	10 U
1,3,5-Trinitrobenzene		0.2 UJ
1,3-Dinitrobenzene		0.2 UJ
2,4,6-Trinitrotoluene		0.2 UJ
2,4-Dinitrotoluene		0.13 UJ
2,6-Dinitrotoluene		0.13 UJ
2-Nitrotoluene		0.2 UJ
3-Nitrotoluene		0.2 UJ
4-Nitrotoluene		0.2 UJ
HMX		0.5 UJ
Nitrobenzene		0.2 UJ
Nitroglycerin		2.5 UJ
RDX		0.5 U
Tetryl		0.2 UJ
Aluminum	200 U	188 U
Antimony	5 U	5 U
Arsenic	5 U	5 U
Barium	5.8 J	7.9 J
Beryllium	4 U	4 U
Cadmium	5 U	5 U
Calcium	6080 J	5730 J
Chromium	10 U	10 U
Cobalt	50 U	50 U
Copper	25 U	5.5 J
Iron	422 =	867 =
Lead	3 U	3 U
Magnesium	1960 J	1750 J
Manganese	105 =	103 =
Mercury	0.2 U	0.2 U
Nickel	40 U	40 U
Potassium	588 J	524 J
Selenium	5 U	5 U
Silver	10 U	10 U
Sodium	700 J	1450 J
Thallium	2 U	2 U
Vanadium	50 U	50 U
Zinc	16 J	18.4 J
1,2,4-Trichlorobenzene		10 U
1,2-Dichlorobenzene		10 U
1,3-Dichlorobenzene		10 U
1,4-Dichlorobenzene		10 U
2,2'-oxybis (1-chloropropane)		10 U
2,4,5-Trichlorophenol		10 U
2,4,6-Trichlorophenol		10 U

Table 4-21. Results for Phase II Surface Water Samples from WBG (continued)

Station	WBGsw-157	WBGsw-157
Customer ID	WBGsw-157(p)-0783-SW	WBGsw-157(p)-0783-SW
Date	04/27/98	04/27/98
Filtered	Dissolved	Total
Field Type	Grab	Grab
Analyte (mg/L)		
2,4-Dichlorophenol		10 U
2,4-Dimethylphenol		10 U
2,4-Dinitrophenol		25 U
2,4-Dinitrotoluene		10 U
2,6-Dinitrotoluene		10 U
2-Chloronaphthalene		10 U
2-Chlorophenol		10 U
2-Methylnaphthalene		10 U
2-Methylphenol		10 U
2-Nitroaniline		25 U
2-Nitrophenol		10 U
3,3'-Dichlorobenzidine		10 U
3-Nitroaniline		25 U
4,6-Dinitro-o-Cresol		25 U
4-Bromophenyl-phenyl Ether		10 U
4-Chloroaniline		10 U
4-Chlorophenyl-phenylether		10 U
4-Methylphenol		10 U
4-Nitroaniline		25 U
4-Nitrophenol		25 U
4-chloro-3-methylphenol		10 U
Acenaphthene		10 U
Acenaphthylene		10 U
Anthracene		10 U
Benzo(a)anthracene		10 U
Benzo(a)pyrene		10 U
Benzo(b)fluoranthene		10 U
Benzo(g,h,i)perylene		10 U
Benzo(k)fluoranthene		10 U
Bis(2-chloroethoxy)methane		10 U
Bis(2-chloroethyl)ether		10 U
Bis(2-ethylhexyl)phthalate		10 U
Butyl Benzyl Phthalate		10 U
Carbazole		10 U
Chrysene		10 U
Di-n-butyl Phthalate		10 U
Di-n-octyl Phthalate		10 U
Dibenzo(a,h)anthracene		10 U
Dibenzofuran		10 U
Diethyl Phthalate		10 U
Dimethyl Phthalate		10 U
Fluoranthene		10 U
Fluorene		10 U
Hexachlorobenzene		10 U
Hexachlorobutadiene		10 U
Hexachlorocyclopentadiene		10 U
Hexachloroethane		10 U
Indeno(1,2,3-cd)pyrene		10 U
Isophorone		10 U
N-Nitroso-di-n-propylamine		10 U
N-Nitrosodiphenylamine		10 U
Naphthalene		10 U
Nitrobenzene		10 U

Table 4-21. Results for Phase II Surface Water Samples from WBG (continued)

Station	WBGsw-157	WBGsw-157
Customer ID	WBGsw-157(p)-0783-SW	WBGsw-157(p)-0783-SW
Date	04/27/98	04/27/98
Filtered	Dissolved	Total
Field Type	Grab	Grab
Analyte (mg/L)		
Pentachlorophenol		10 U
Phenanthrene		10 U
Phenol		10 U
Pyrene		10 U
1,1,1-Trichloroethane		5 U
1,1,2,2-Tetrachloroethane		5 U
1,1,2-Trichloroethane		5 U
1,1-Dichloroethane		5 U
1,1-Dichloroethene		5 U
1,2-Dichloroethane		5 U
1,2-Dichloroethene		5 U
1,2-Dichloropropane		5 U
1,3-cis-Dichloropropene		5 U
1,3-trans-Dichloropropene		5 U
2-Butanone		10 U
2-Hexanone		10 U
4-Methyl-2-pentanone		10 U
Acetone		7.2 J
Benzene		5 U
Bromodichloromethane		5 U
Bromoform		5 U
Bromomethane		10 U
Carbon Disulfide		5 U
Carbon Tetrachloride		5 U
Chlorobenzene		5 U
Chloroethane		10 U
Chloroform		5 U
Chloromethane		10 U
Dibromochloromethane		5 U
Ethylbenzene		5 U
Methylene Chloride		5 U
Styrene		5 U
Tetrachloroethene		5 U
Toluene		5 U
Trichloroethene		5 U
Vinyl Chloride		10 U
Xylenes, Total		5 U

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TABLE 4-22a. METALS

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Table 4-22a. Metals Results for Phases I and II Groundwater Samples from WBG

Station	OBG-1	OBG-2	OBG-3	OBG-4	WBGmw-005
Sample ID	WBGmw-164(u)-0779-	WBGmw-165(u)-0780-	WBGmw-166(u)-0781-	WBGmw-167(u)-0782-	WBGmw-159(u)-0774-
Date	05/21/98	05/21/98	05/21/98	05/21/98	05/20/98
Filtered	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved
Field Type	Grab	Grab	Grab	Grab	Grab
Analyte (mg/L)					
Cyanide	10 U	10 U	10 U	10 U	10 U
Aluminum	200 R	200 R	85.2 R	200 R	200 R
Antimony	5 U	5 U	5 U	5 U	5 U
Arsenic	5 U	5 U	5.2 U	5.4 U	5 U
Barium	7.6 J	41.3 J	98.1 J *	50.1 J	81.1 J
Beryllium	4 U	4 U	4 U	4 U	4 U
Cadmium	5 U	5 U	5 U	5 U	5 U
Calcium	54000 =	72600 =	59500 =	115000 =	118000 = *
Chromium	10 U	10 U	10 U	10 U	10 U
Cobalt	50 U	50 U	50 U	50 U	50 U
Copper	25 U	25 U	25 U	25 U	9.8 J *
Iron	100 U	100 U	182 U	58.7 U	155 =
Lead	3 U	3.1 = *	3 U	3 U	3 U
Magnesium	16500 =	20500 =	16100 =	34200 =	27800 =
Manganese	15 U	173 =	112 =	351 =	848 =
Mercury	0.2 U	0.2 U	0.2 U	0.08 J *	0.2 U
Nickel	40 U	40 U	40 U	40 U	40 U
Potassium	777 J	1280 J	942 J	2150 J	3250 J *
Selenium	5 U	5 U	5 U	5 U	5 U
Silver	10 U	10 U	10 U	10 U	10 U
Sodium	5050 =	8050 =	6800 =	15800 =	35800 =
Thallium	2 U	2 U	2 U	2 U	2 U
Vanadium	50 U	50 U	50 U	50 U	50 U
Zinc	46.2 U	56.8 U	42.1 U	37.3 U	32.7 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

Table 4-22a. Metals Results for Phases I and II Groundwater Samples from WBG (continued)

Station	WBGmw-006	WBGmw-007	WBGmw-007	WBGmw-008	WBGmw-009
Sample ID	WBGmw-160(u)-0775-	WBGmw-161(u)-0776-	WBGmw-161(u)-0944-FD	WBGmw-162(u)-0777-	WBGmw-163(u)-0778-
Date	05/20/98	05/19/98	05/19/98	05/20/98	05/20/98
Filtered	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved
Field Type	Grab	Grab	Field Duplicate	Grab	Grab
Analyte (mg/L)					
Cyanide	10 U	10 U	10 U	10 U	19 = *
Aluminum	200 R	200 R	200 R	200 R	200 R
Antimony	5 U	5 U	5 U	5 U	5 U
Arsenic	5 U	5 U	4.8 U	5 U	5 U
Barium	22.4 U	13.1 J	14.7 J	35.4 U	22.8 U
Beryllium	4 U	4 U	4 U	4 U	4 U
Cadmium	5 U	5 U	5 U	5 U	5 U
Calcium	63500 =	46500 =	48200 =	85300 =	50000 =
Chromium	10 U	10 U	10 U	10 U	10 U
Cobalt	50 U	50 U	50 U	50 U	50 U
Copper	25 R	25 U	25 U	25 R	3.3 J *
Iron	100 U	121 U	134 =	100 U	100 U
Lead	3 U	3 U	3 U	3 U	3 U
Magnesium	20500 =	10300 =	10600 =	22300 =	15200 =
Manganese	58 =	77.9 =	80.4 =	2920 = *	397 =
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	40 U	40 U
Potassium	1030 J	1010 J	1130 J	1790 J	2120 J
Selenium	5 U	5 U	5 U	5 U	5 U
Silver	10 U	10 U	10 U	10 U	10 U
Sodium	6570 =	3060 J	3310 J	13400 =	5710 U
Thallium	2 U	2 U	2 U	2 U	2 U
Vanadium	50 U	50 U	50 U	50 U	
Zinc	26.3 U	45.6 J	159 J *	16.9 U	22.3 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected, *-detected above the background criterion.

TABLE 4-22b. EXPLOSIVES

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Table 4-22b. Explosives Results for Groundwater Samples at the WBG

Station	OBG-1	OBG-2	OBG-3	OBG-4	WBGmw-005	WBGmw-006	WBGmw-007
Customer ID	WBGmw-164(u)-0779-GW	WBGmw-165(u)-0780-GW	WBGmw-166(u)-0781-GW	WBGmw-167(u)-0782-GW	WBGmw-159(u)-0774-GW	WBGmw-160(u)-0775-GW	WBGmw-161(u)-0776-GW
Date	05/21/98	05/21/98	05/21/98	05/21/98	05/20/98	05/20/98	05/19/98
Filtered	Total	Total	Total	Total	Total	Total	Total
Field Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analyte (µg/L)							
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2U	0.2 U
1,3-Dinitrobenzene	0.2 U	0.034 J	0.2 U	0.2 U	0.2 U	0.2U	0.2 U
2,4,6-Trinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2U	0.2 U
2,4-Dinitrotoluene	0.041 J	0.13 U	0.13 U	0.044 J	0.13 U	0.13U	0.033 J
2,6-Dinitrotoluene	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13U	0.13 U
2-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2U	0.2 U
3-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.076 J	0.11J	0.2 U
4-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.15J	0.2 U
HMX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	8 =	0.5 U
Nitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2U	0.2 U
Nitrocellulose as N	200 U	200 U	200 U	200 U	200 U	200 U	200 UJ
Nitroglycerin	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitroguanidine	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ
RDX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	32 =	0.5 U
Tetryl	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2U	0.2 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.

Table 4-22b. Explosives Results for Groundwater Samples at the WBG (continued)

Station	WBGmw-007	WBGmw-008	WBGmw-009
Customer ID	WBGmw-161(u)-0944-FD	WBGmw-162(u)-0777-GW	WBGmw-163(u)-0778-GW
Date	05/19/98	05/20/98	05/20/98
Filtered	Total	Total	Total
Field Type	Field Duplicate	Grab	Grab
Analyte (mg/L)			
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U
1,3-Dinitrobenzene	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene	0.2 U	0.2 U	0.2 U
2,4-Dinitrotoluene	0.13 U	0.13 U	0.13 U
2,6-Dinitrotoluene	0.13 U	0.13 U	0.13 U
2-Nitrotoluene	0.2 U	0.2 U	0.2 U
3-Nitrotoluene	0.2 U	0.2 U	0.2 U
4-Nitrotoluene	0.2 U	0.2 U	0.2 U
HMX	0.5 U	0.5 U	0.5 U
Nitrobenzene	0.2 U	0.2 U	0.059 J
Nitrocellulose as N	200 UJ	200 U	200 U
Nitroglycerin	2.5 U	2.5 U	2.5 U
Nitroguanidine	20 UJ	20 U	20 U
RDX	0.5 U	0.5 U	1.1 =
Tetryl	0.2 U	0.2 U	0.2 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.

TABLE 4-22c. ORGANICS

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Table 4-22c. Organics Results for Groundwater Samples at the WBG

Station	OBG-1	OBG-2	OBG-3	OBG-4	WBGmw-005	WBGmw-006	WBGmw-007	WBGmw-007	WBGmw-008	WBGmw-009
Customer ID	WBGmw-164(u)-0779-	WBGmw-165(u)-0780-	WBGmw-166(u)-0781-	WBGmw-167(u)-0782-	WBGmw-159(u)-0774-	WBGmw-160(u)-0775-	WBGmw-161(u)-0776-	WBGmw-161(u)-0944-	WBGmw-162(u)-0777-	WBGmw-163(u)-0778-
Date	05/21/98	05/21/98	05/21/98	05/21/98	05/20/98	05/20/98	05/19/98	05/19/98	05/20/98	05/20/98
Filtered	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Field Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab	Grab
Analyte (mg/L)										
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,2'-oxybis (1-chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
4,6-Dinitro-*o* -Cresol	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
4-Bromophenyl-phenyl Ether	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U			25 U	25 U
4-chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Benzo(*a*)anthracene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Benzo(*a*)pyrene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Benzo(*b*)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Benzo(*g,h,i*)perylene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Benzo(*k*)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Bis(2-chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Bis(2-chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	10 U	10 U	10 U	4.5 J			10 U	10 U
Butyl Benzyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Di-*n* -butyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Di-*n* -octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Dibenzo(*a,h*)anthracene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Diethyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.

Table 4-22c. Organics Results for Groundwater Samples at the WBG (continued)

Station	OBG-1	OBG-2	OBG-3	OBG-4	WBGmw-005	WBGmw-006	WBGmw-007	WBGmw-007	WBGmw-008	WBGmw-009
Customer ID	WBGmw-164(u)-0779-	WBGmw-165(u)-0780-	WBGmw-166(u)-0781-	WBGmw-167(u)-0782-	WBGmw-159(u)-0774-	WBGmw-160(u)-0775-	WBGmw-161(u)-0776-	WBGmw-161(u)-0944-	WBGmw-162(u)-0777-	WBGmw-163(u)-0778-
Date	05/21/98	05/21/98	05/21/98	05/21/98	05/20/98	05/20/98	05/19/98	05/19/98	05/20/98	05/20/98
Filtered	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Field Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab	Grab
Analyte (mg/L)										
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Indeno(1,2,3-*cd*)pyrene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
N-Nitroso-di-*n* -propylamine	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Pentachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U			10 U	10 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-*cis* -Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-*trans* -Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 U	10 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	1.7 J	5 U	5 U	5 U	0.64 J	1.1 J
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes, Total	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nondetect, =-detected.

TABLE 4-22d. BACKGROUND METALS

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Table 4-22d. Metals Results for Background Groundwater Samples at RVAAP

Station	BKGmw-004	BKGmw-004	BKGmw-004	BKGmw-004	BKGmw-005	BKGmw-005	BKGmw-006	BKGmw-006	BKGmw-008	BKGmw-008	BKGmw-010
Sample ID	**BKGmw-004(r)-0839-GW**	**BKGmw-004(r)-0839-GW**	**BKGmw-004(u)-0946-FD**	**BKGmw-004(u)-0946-FD**	**BKGmw-005(u)-0840-GW**	**BKGmw-005(u)-0840-GW**	**BKGmw-006(r)-0841-GW**	**BKGmw-006(r)-0841-GW**	**BKGmw-008(r)-0843-GW**	**BKGmw-008(r)-0843-GW**	**BKGmw-010(r)-0845-GW**
Date	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/18/98**
Field Type	**Grab**	**Grab**	**Field Duplicate**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte (mg/L)											
Cyanide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aluminum	200 R	48000 =	200 R	59700 =	200 R	8570 J	200 R	1100 J	200 R	9410 J	97 R
Antimony	5 U	4.3 J	5 U	3.9 J	5 U	5 UJ	5 U	5 U	5 U	5 UJ	5 U
Arsenic	5 U	215 =	5 U	233 =	5 U	14.1 =	5 U	5 U	5 U	19.1 =	5 U
Barium	17.7 J	215 =	17.4 J	252 =	13.8 J	59.6 J	7 U	13.5 U	5.8 J	46.3 J	19.9 J
Beryllium	4 U	1.7 U	4 U	2.1 U	4 U	4 U	4 U	4 U	4 U	0.86 U	4 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	15200 =	17200 =	15100 =	18500 =	115000 =	91800 =	53100 =	48200 =	29900 =	28500 =	12700 =
Chromium	10 U	85.2 =	10 U	102 =	7.3 J	15.5 =	10 U	10 U	10 U	19.5 =	10 U
Cobalt	50 U	46.3 J	50 U	50 =	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Copper	25 U	289 =	25 U	321 =	25 U	37.7 =	25 R	7.5 J	25 U	16.2 J	25 U
Iron	100 U	195000 =	187 =	217000 =	208 =	27500 =	100 U	2620 =	152 =	21500 =	105 U
Lead	3 U	183 =	3 U	205 =	3 U	17.6 =	3 U	3 U	3 U	23 =	3 U
Magnesium	4900 J	14000 =	4900 J	16100 =	22600 =	21300 =	15000 =	13700 =	11800 =	12700 =	14200 =
Manganese	1020 =	2860 =	1040 =	3020 =	428 =	876 =	98.8 =	121 =	21.2 =	380 =	1340 =
Mercury	0.2 U	0.25 =	0.2 U	0.27 =	0.2 U	0.081 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	117 =	40 U	132 =	40 U	27.1 J	40 U	40 U	40 U	23.5 J	83.4 =
Potassium	1310 J	6740 =	1300 J	9300 =	1480 J	3290 J	1090 J	1230 J	609 J	3210 J	1540 J
Selenium	5 U	5.7 =	5 U	4.6 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	20100 =	20000 =	20200 =	21900 =	6820 =	6440 =	18200 =	17500 =	11600 =	12200 =	4480 J
Thallium	2 U	2.4 =	2 U	2 =	2 U	2 U	1.1 U	1.3 U	2 U	2 U	2 U
Vanadium	50 U	98.1 =	50 U	120 =	50 U	17.1 J	50 U	50 U	50 U	15.5 J	50 U
Zinc	41.4 J	888 J	43.6 J	986 J	60.9 J	131 J	51.2 U	50.7 U	46.8 J	193 J	74.7 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nodetect, =-detected.

Table 4-22d. Metals Results for Background Groundwater Samples at RVAAP (continued)

Station	BKGmw-010	BKGmw-012	BKGmw-012	BKGmw-013	BKGmw-013	BKGmw-013	BKGmw-015	BKGmw-015	BKGmw-016	BKGmw-016	BKGmw-017
Sample ID	**BKGmw-010(r)-0845-GW**	**BKGmw-012(r)-0847-GW**	**BKGmw-012(r)-0847-GW**	**BKGmw-013(u)-0848-GW**	**BKGmw-013(u)-0848-GW**	**BKGmw-013(u)-0948-FD**	**BKGmw-015(u)-0850-GW**	**BKGmw-015(u)-0850-GW**	**BKGmw-016(u)-0842-GW**	**BKGmw-016(u)-0842-GW**	**BKGmw-017(u)-0846-GW**
Date	**05/18/98**	**05/18/98**	**05/18/98**	**05/16/98**	**05/16/98**	**05/18/98**	**05/21/98**	**05/21/98**	**05/18/98**	**05/18/98**	**05/19/98**
Field Type	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte (mg/L)											
Cyanide	10 U	10 U	10 U	10 U	10 U	10 U	15 =	10 U	10 U	10 U	10 U
Aluminum	2790 J	200 R	1690 J	200 R	14300 =	200 R	200 R	2840 J	200 R	31500 =	200 R
Antimony	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Arsenic	4.8 U	5 U	4.1 U	11.6 U	19.7 =	12.3 U	5 U	5.2 U	5 U	46.4 =	11.7 =
Barium	35.1 J	173 J	192 J	82.1 J	159 J	78.2 J	256 =	241 =	25.4 J	177 J	36.3 U
Beryllium	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	1.4 U	4 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	12600 =	19500 =	19900 =	74800 =	100000 =	74700 =	32000 =	30900 =	30400 =	52900 =	111000 =
Chromium	7.9 J	10 U	10 U	10 U	21.7 =	10 U	10 U	10 U	10 U	47.9 =	10 U
Cobalt	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	32.8 J	50 U
Copper	9 U	25 U	5.6 U	5.4 U	23.8 U	25 U	25 U	11.3 U	25 U	110 =	25 R
Iron	4100 =	100 U	2150 =	279 =	21600 =	132 U	100 U	6170 =	100 U	79900 =	278 =
Lead	3 U	3 U	3 U	3 U	10.1 =	3 U	3 U	4.6 =	3 U	55.6 =	3 U
Magnesium	13600 =	6670 =	6950 =	23600 =	30900 =	23700 =	13000 =	13000 =	6150 =	22200 =	43300 =
Manganese	1260 =	77.9 =	121 =	413 =	809 =	400 =	32.6 =	163 =	302 =	1410 =	273 =
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.11 J	0.2 U
Nickel	85.3 =	40 U	40 U	40 U	24.4 J	40 U	40 U	22.4 J	40 U	83.6 =	40 U
Potassium	2190 J	3920 J	4280 J	1990 J	6470 J	1890 J	5770 =	6060 =	726 J	7480 J	2890 J
Selenium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	4850 J	51400 =	49700 =	10600 =	11900 =	11300 =	14300 =	14300 =	2530 J	4710 J	24600 =
Thallium	1.1 U	2 U	2 U	1 U	1.3 U	2 U	2 U	2 U	2 U	1.9 U	2 U
Vanadium	50 U	50 U	50 U	50 U	24.3 J	50 U	50 U	50 U	50 U	57.1 =	50 U
Zinc	91.7 U	22.1 U	43.6 U	56.6 U	129 U	27.8 U	32.6 U	57.7 U	39.1 U	282 J	16.4 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nodetect, =-detected.

Table 4-22d. Metals Results for Background Groundwater Samples at RVAAP (continued)

Station	BKGmw-017	BKGmw-018	BKGmw-018	BKGmw-019	BKGmw-019	BKGmw-020	BKGmw-020	BKGmw-021	BKGmw-021
Sample ID	**BKGmw-017(u)-0846-GW**	**BKGmw-018(r)-0836-GW**	**BKGmw-018(r)-0836-GW**	**BKGmw-019(u)-0837-GW**	**BKGmw-019(u)-0837-GW**	**BKGmw-020(r)-0838-GW**	**BKGmw-020(r)-0838-GW**	**BKGmw-021(u)-0844-GW**	**BKGmw-021(u)-0844-GW**
Date	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**	**05/19/98**
Field Type	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte (mg/L)									
Cyanide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aluminum	22800 =	200 R	3960 J	200 R	31200 =	200 R	1810 J	59.1 R	5180 J
Antimony	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
Arsenic	49.3 =	5 U	5 U	5 U	90.2 =	5 U	5 U	5 U	7.9 =
Barium	135 J	14.6 U	32.3 U	29 U	327 =	95.8 J	149 J	40.1 U	71.9 J
Beryllium	4 U	4 U	4 U	4 U	1.2 U	4 U	4 U	4 U	4 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	148000 =	39600 =	39500 =	104000 =	194000 =	47700 =	43900 =	97400 =	97100 =
Chromium	35.3 =	10 U	10 U	10 U	53.7 =	10 U	10 U	10 U	10 U
Cobalt	24.6 J	50 U	50 U	50 U	40.8 J	50 U	50 U	50 U	50 U
Copper	58 J	25 R	17 J	25 R	138 J	25 U	7.6 J	25 R	16 J
Iron	60100 =	83.4 U	6170 =	76 U	121000 =	1430 =	4380 =	100 U	10700 =
Lead	29.4 =	3 U	7.5 =	3 U	72.8 =	3 U	2.2 J	3 U	8 =
Magnesium	58100 =	3630 J	3930 J	29500 =	58400 =	13700 =	12800 =	41200 =	40400 =
Manganese	1210 =	8.5 U	51 =	458 =	2430 =	476 =	511 =	5 U	306 =
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.094 J	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	58.4 =	40 U	40 U	40 U	93.6 =	40 U	40 U	40 U	40 U
Potassium	7460 J	699 J	1280 J	1970 J	7170 J	2830 J	3210 J	1100 J	2290 J
Selenium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	26900 =	1910 U	3240 U	8750 =	11100 =	7750 =	9770 =	45700 =	44700 =
Thallium	2 U	2 U	2 U	1.1 U	3 U	2 U	2 U	2 U	2 U
Vanadium	38.7 J	50 U	7.7 J	50 U	63.3 =	50 U	50 U	50 U	7.9 J
Zinc	204 J	58.2 U	113 U	21.6 U	536 J	52.3 J	72.8 J	28.1 U	66.7 U

Qualifiers: U-not detected, J-estimated, UJ-estimated nodetect, =-detected.

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TABLE 4-22e. BACKGROUND ORGANICS

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Table 22e. Organics Results for Background Groundwater Samples at RVAAP

Station	BKGmw-004	BKGmw-004	BKGmw-013
Sample ID	BKGmw-004(r)-0839-	BKGmw-004(u)-0946-	BKGmw-013(u)-0848-
Date	05/19/98	05/19/98	05/16/98
Filtered	Total	Total	Total
Field Type	Grab	Field Duplicate	Grab
Analyte (mg/L)			
4,4'-DDD	0.05 U	0.05 U	0.05 U
4,4'-DDE	0.05 U	0.05 U	0.05 U
4,4'-DDT	0.05 U	0.05 U	0.05 U
Aldrin	0.025 U	0.025 U	0.025 U
Alpha Chlordane	0.025 U	0.025 U	0.025 U
Alpha-BHC	0.025 U	0.025 U	0.025 U
Aroclor-1016	0.25 U	0.25 U	0.25 U
Aroclor-1221	0.25 U	0.25 U	0.25 U
Aroclor-1232	0.25 U	0.25 U	0.25 U
Aroclor-1242	0.25 U	0.25 U	0.25 U
Aroclor-1248	0.25 U	0.25 U	0.25 U
Aroclor-1254	0.5 U	0.5 U	0.5 U
Aroclor-1260	0.5 U	0.5 U	0.5 U
Beta-BHC	0.025 U	0.025 U	0.025 U
Delta-BHC	0.025 U	0.025 U	0.025 U
Dieldrin	0.05 U	0.05 U	0.05 U
Endosulfan I	0.025 U	0.025 U	0.025 U
Endosulfan II	0.05 U	0.05 U	0.05 U
Endosulfan Sulfate	0.05 U	0.05 U	0.05 U
Endrin	0.05 U	0.05 U	0.05 U
Endrin Aldehyde	0.05 U	0.05 U	0.05 U
Endrin Ketone	0.05 U	0.05 U	0.05 U
Gamma Chlordane	0.025 U	0.025 U	0.025 U
Gamma-BHC (Lindane)	0.025 U	0.025 U	0.025 U
Heptachlor	0.025 U	0.025 U	0.025 U
Heptachlor Epoxide	0.025 U	0.025 U	0.025 U
Methoxychlor	0.25 U	0.25 U	0.25 U
Toxaphene	1.2 U	1.2 U	1.2 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2,2'-oxybis (1-chloropropan	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U

Table 22e. Organics Results for Background Groundwater Samples at RVAAP

Station	BKGmw-004	BKGmw-004	BKGmw-013
Sample ID	BKGmw-004(r)-0839-	BKGmw-004(u)-0946-	BKGmw-013(u)-0848-
Date	05/19/98	05/19/98	05/16/98
Filtered	Total	Total	Total
Field Type	Grab	Field Duplicate	Grab
Analyte (mg/L)			
2-Chlorophenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-o-Cresol	25 U	25 U	25 U
4-Bromophenyl-phenyl Ethe	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
4-chloro-3-methylphenol	10 U	10 U	10 U
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U
Bis(2-chloroethoxy)methane	10 U	10 U	10 U
Bis(2-chloroethyl)ether	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	10 U
Butyl Benzyl Phthalate	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butyl Phthalate	10 U	10 U	10 U
Di-n-octyl Phthalate	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethyl Phthalate	10 U	10 U	10 U
Dimethyl Phthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U

Table 22e. Organics Results for Background Groundwater Samples at RVAAP

Station	BKGmw-004	BKGmw-004	BKGmw-013
Sample ID	BKGmw-004(r)-0839-	BKGmw-004(u)-0946-	BKGmw-013(u)-0848-
Date	05/19/98	05/19/98	05/16/98
Filtered	Total	Total	Total
Field Type	Grab	Field Duplicate	Grab
Analyte (mg/L)			
Isophorone	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
Pentachlorophenol	10 U	10 U	10 U
Phenanthrene	10 U	10 U	10 U
Phenol	10 UJ	10 UJ	10 UJ
Pyrene	10 U	10 U	10 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
1,2-Dichloroethene	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
1,3-cis-Dichloropropene	5 U	5 U	5 U
1,3-trans-Dichloropropene	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 U
Benzene	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U
Chloroform	0.74 J	0.7 J	5 U
Chloromethane	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
Methylene Chloride	5 U	0.33 J	5 U
Styrene	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Vinyl Chloride	10 U	10 U	10 U
Xylenes, Total	5 U	5 U	5 U

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