4.0 NATURE AND EXTENT OF CONTAMINATION

This chapter presents results of the Phase II RI data screening process used to identify constituents indicative of impacts from AOC operations. Those constituents that are found to be related to AOC operations are classified as SRCs. These SRCs are then evaluated to determine their occurrence and distribution in environmental media at Load Line 4. Section 4.1 of this chapter presents the statistical methods and screening criteria used to reduce and display data and to distinguish naturally occurring constituents from SRCs related to historical site operations. Sections 4.2 through 4.6 present the nature and extent of identified SRCs in each environmental media characterized.

For the purposes of this Phase II RI report, data aggregates were established based on environmental media (surface soil, subsurface soil, sediment, surface water, and groundwater) and site operational history and physical characteristics (spatial aggregates). These data aggregates form the basis for EUs addressed in the human health and ecological risk evaluations (Chapters 6.0 and 7.0, respectively). Section 4.7 addresses analytical results from the sanitary and storm sewer system characterization. Section 4.8 addresses special samples of soil, sediments, sludges, water, and debris materials (floor sweepings) collected beneath and within buildings and structures.

A summary of the results of the ordnance and explosives avoidance activities is presented in Section 4.9. A brief summary of a radiological survey of former radiography facilities (Building G-13A) by USACE is presented in Section 4.10. Field measurements of metals and explosives are compared with their respective laboratory measurements in Section 4.11. Section 4.12 provides a summary of the results of the contaminant nature and extent evaluation.

4.1 DATA EVALUATION METHODS

The processes used to evaluate Load Line 4 Phase II RI analytical data for each environmental media involve four general steps (1) defining background concentrations, (2) defining data aggregates, (3) data reduction and screening, and (4) data presentation.

4.1.1 Site Chemical Background

Chemicals occur naturally in soils, sediments, surface water, and groundwater. The natural levels of chemicals-called background levels-must be known in order to determine whether the concentrations measured at Load Line 4 are higher than would be expected if the load line operations had not occurred. Development of facility-wide background values for inorganic constituents in soil, sediment, surface water, and groundwater was conducted as part of a previous Phase II RI at WBG at RVAAP (USACE 1999). Although some organic compounds also occur under ambient conditions (i.e., some PAHs), the organic compounds of primary concern (e.g., explosives) are man-made; therefore, background for all organic compounds was set to zero, and any detected concentration of these compounds is considered as being above background.

For each environmental medium of interest, a RVAAP facility-wide background level was calculated for each inorganic constituent detected in the background sample population. The background level for a specific constituent is the lower of the maximum detected value in the background data set (for non-normally distributed data) or the 95% upper tolerance limit of the 95th percentile of the distribution of background concentrations (for normally distributed or log-normally distributed data). For all inorganics detected in the background data set, the background value selected was the maximum detected

value. If a measured concentration at an AOC is above the background criteria, it is likely that the concentration is elevated due to processes or operations that took place within that AOC.

The background criteria were set to zero for inorganics that were not detected in the background samples. For those metals that were not detected in the background samples, any detected result from Load Line 4 would be considered above background. RVAAP facility-wide background criteria for each medium are listed in Table 4-1.

4.1.2 Definition of Aggregates

The Load Line 4 data were grouped (aggregated) in two ways for evaluation of contaminant nature and extent and the human health and ecological risk evaluations. The initial aggregation of data is by environmental media: soil, sediment, surface water, and groundwater to facilitate evaluation of contaminant nature and extent and site risks. Data for the soil medium were further aggregated on the basis of depth for consistency with the human health risk assessment and EPA risk assessment guidance. For each media aggregate, an evaluation was conducted to determine if further aggregation was warranted on the basis of site characteristics, historical operations, ecological habitat, and potential future remedial strategy and land use (spatial aggregates).

Soil and Dry Sediment

Using the above data aggregation criteria, surface soil and subsurface soil within the geographic area of Load Line 4 are separated into six aggregates (Table 4-2). The first four soil aggregates (Explosives Handling Areas, Preparation and Receiving Areas, Packaging and Shipping Areas, and Change Houses) represent physically separated groupings of operations facilities with fundamentally different functions (Figure 4-1). These four aggregates contain all known or potential primary contaminant source terms and are expected to exhibit substantially different types and levels of contaminants. Intervening land area between the former operational facilities is relegated to the Perimeter Area Aggregate, which is expected to exhibit low levels or no contamination. A number of predominantly dry drainage ditches was characterized during the RI. These conveyances contain water only during precipitation events or during snow melt, but represent potential accumulation points for contaminants entrained within historical discharges and runoff from source areas. Accordingly, dry sediment samples were assigned to their respective soil source area aggregate, if the conveyance was within the aggregate boundary. Several dry sediment samples were collected from drainage ditches located south of Building G-13, which received runoff from portions of the explosives handling areas and effluent from the sedimentation basin. These samples were assigned to a separate soil aggregate (Melt-Pour Area Drainage Ditches Aggregate), as they are not primary sources and may have accumulated contaminants from a number of sources (Figure 4-1).

Surface Water Streams and Ponds

Data characterizing the surface drainage system at Load Line 4, inclusive of streams and surface impoundments, were aggregated with respect to likelihood of contaminant accumulation and the potential for human use/contact and viability of ecological habitat. The main stream entering Load Line 4 contains substantial perennial flow and the drainage basin from which the stream originates does not contain former production facilities or other known contaminant source areas. Using these above criteria and site knowledge, surface water and sediment data from the main stream and settling pond within Load Line 4 were grouped into three aggregates, as shown on Figure 4-1:

- the main stream segment upstream of the perimeter road bridge near Building G-19-19A,
- the main stream segment downstream of the perimeter road bridge and the settling pond, and
- the stream segment downstream of the settling pond to the RVAAP exit point at PF-8.

Table 4-1. RVAPP Facility-Wide Background Criteria

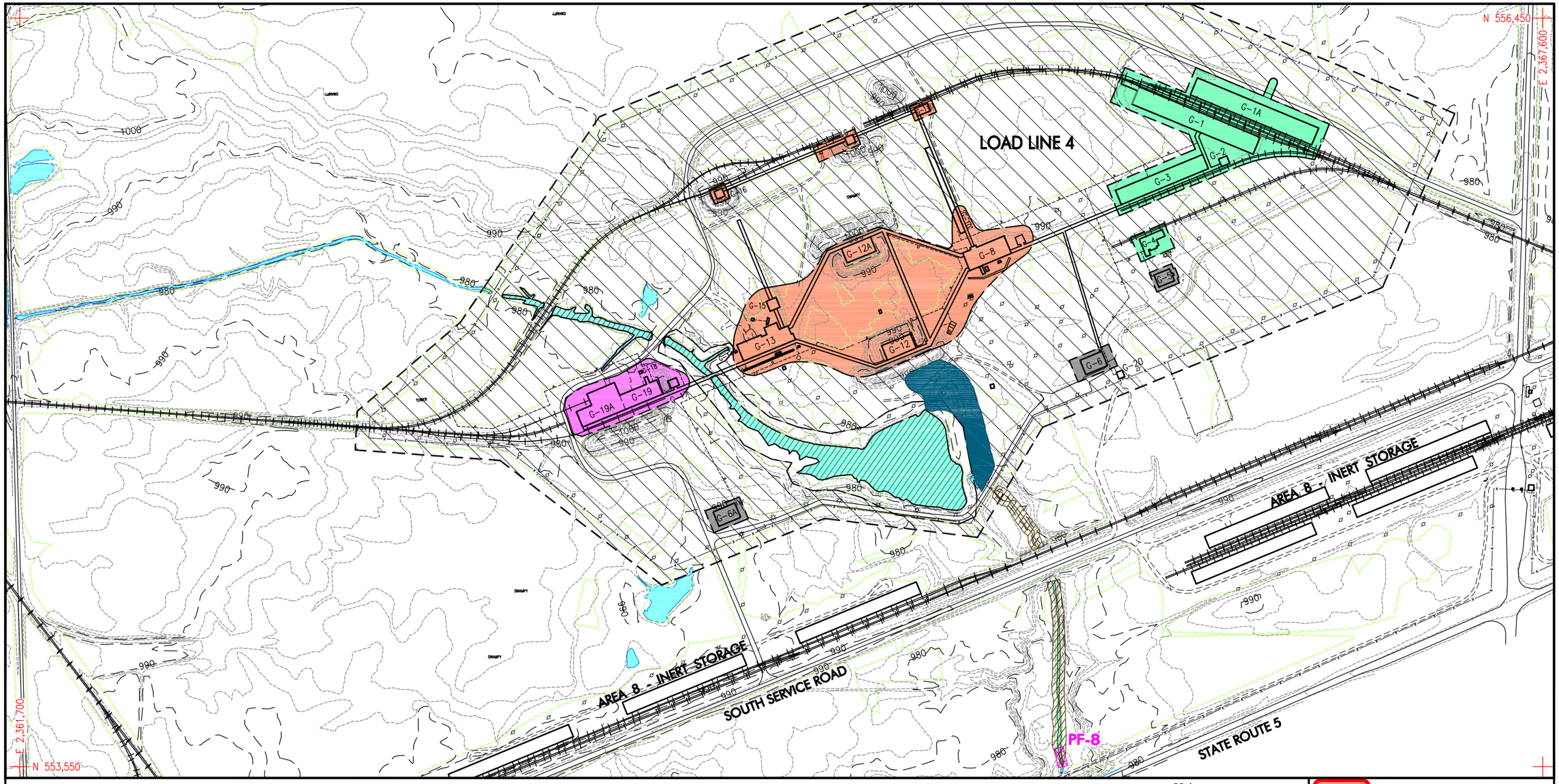
Media Units Analyte	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Sediment (mg/kg)	Surface Water (µg/L)	Groundwater Bedrock Zone Filtered (µg/L)	Groundwater Bedrock Zone Unfiltered (µg/L)	Groundwater Unconsolidated Zone Filtered (µg/L)	Groundwater Unconsolidated Zone Unfiltered (µg/L)
Cyanide	0	0	0	0	0	0	0	0
Aluminum	17,700	19,500	13,900	3,370	0	9,410	0	48,000
Antimony	0.96	0.96	0	0	0	0	0	4.3
Arsenic	15.4	19.8	19.5	3.2	0	19.1	11.7	215
Barium	88.4	124	123	47.5	256	241	82.1	327
Beryllium	0.88	0.88	0.38	0	0	0	0	0
Cadmium	0	0	0	0	0	0	0	0
Calcium	15,800	35,500	5,510	41,400	53,100	48,200	115,000	194,000
Chromium	17.4	27.2	18.1	0	0	19.5	7.3	85.2
Cobalt	10.4	23.2	9.1	0	0	0	0	46.3
Copper	17.7	32.3	27.6	7.9	0	17	0	289
Iron	23,100	35,200	28,200	2,560	1,430	21,500	279	195,000
Lead	26.1	19.1	27.4	0	0	23	0	183
Magnesium	3,030	8,790	2,760	10,800	15,000	13,700	43,300	58,400
Manganese	1,450	3,030	1,950	391	1,340	1,260	1,020	2,860
Mercury	0.036	0.044	0.059	0	0	0	0	0.25
Nickel	21.1	60.7	17.7	0	83.4	85.3	0	117
Potassium	927	3,350	1,950	3,170	5,770	6,060	2,890	7,480
Selenium	1.4	1.5	1.7	0	0	0	0	5.7
Silver	0	0	0	0	0	0	0	0
Sodium	123	145	112	21,300	51,400	49,700	45,700	44,700
Thallium	0	0.91	0.89	0	0	0	0	2.4
Vanadium	31.1	37.6	26.1	0	0	15.5	0	98.1
Zinc	61.8	93.3	532	42	52.3	193	60.9	888

RVAAP = Ravenna Army Ammunition Plant.

Table 4-2. Data Aggregates/Exposure Units for the Load Line 4 Phase II RI

Aggregate/Exposure Unit Name	Aggregate/Exposure Unit Basis
Surface and Subsurface Soil	
Explosives Handling Areas	Includes major explosives handling and processing facilities: Buildings G-8, G-9, G-12/-12A, G-11, G-13, G-15, and G-16 and adjacent soils
Preparation and Receiving Areas	Includes Buildings G-1/1A, G-2, G-3, G-4, and the powerhouse. Includes dry sediment collected at station LL4-185 in drainage ditch east of Building G-1A
Packaging and Shipping Areas	Includes Buildings G-19/19A
Change Houses	Includes Buildings G-5 (office area) and G-6/6A. Separated from perimeter areas for consistency of risk evaluations
Perimeter Area	Intervening land areas between source area aggregates
Melt-Pour Area Drainage Ditches	Dry sediments from drainage ditches south of Building G-8 and the former sedimentation basin. Potential accumulated contaminants not related to a specific source area
Sediment and Surface Water	
Main Stream Segment Upstream of Perimeter Road	Viable habitat, upstream of primary contaminant source areas
Main Stream Segment and Settling Pond	Viable habitat and primary surface water contaminant accumulation area
Exit Drainage	Viable habitat and contaminant accumulation area. Primary exit pathway from Load Line 4
Miscellaneous Surface Water	Water from non-viable habitat areas (intermittent flow drainage ditches, etc.) or upstream of Load Line 4. Associated sediment samples are addressed as soil
Groundwater	
Groundwater Aggregate	All shallow groundwater within the AOC
Storm and Sanitary Sewers	
Storm and Sanitary Sewer Sediment	All sediment accumulated within the storm and sanitary sewer system
Storm and Sanitary Sewer Water	All water accumulated within the storm and sanitary sewer system
Buildings and Structures	
Buildings and Structures Aggregate	Soil beneath floor slabs, sediment/sludge, and water from within sedimentation basins and washout basins

AOC = Area of Concern.
RI = Remedial Investigation.



LEGEND:

- PRIMARY BUILDING
- SECONDARY BUILDING
- ASPHALT ROAD
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- STREAM
- POND
- GROUND CONTOUR (10-FT INTERVAL)
- GROUND CONTOUR (2-FT INTERVAL)
- TREE OR TREELINE
- LOAD LINE 4 AOC BOUNDARY
- LL4ss ..... SURFACE SOIL SAMPLE LOCATION
- LL4sd ..... SEDIMENT SAMPLE LOCATION
- (d) ..... DITCH LINE/DRAINAGE CHANNEL SAMPLE
- (b) ..... SITE-SPECIFIC BACKGROUND SAMPLE
- (p) ..... POND/WETLAND SAMPLE
- PARSHALL FLUME
- PREPARATION AND RECEIVING AREAS AGGREGATE
- CHANGE HOUSES AGGREGATE
- EXPLOSIVES HANDLING AREAS AGGREGATE
- PACKAGING AND SHIPPING AREAS AGGREGATE
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE
- EXIT DRAINAGE AGGREGATE (WIDTH SHOWN EXAGGERATED)
- PERIMETER AREA AGRREGATE

OHIO STATE PLANE (NAD 83)

0 200 400 800

SCALE: 1" = 400'

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
W.M. / S.D.	C / 04/04/03	/00066/DWGS/R73LL04B

Figure 4-1. Soil, Sediment, and Surface Water Aggregates for Load Line 4

These three segments were distinguished on the basis of potential for accumulated contamination and the consequent impacts on future risk management and remedial decisions. The stream segment upstream of the perimeter road bridges lies upstream of the major source areas at Load Line 4 and was not thought to contain substantial levels of contaminants. The segment downstream of the perimeter road bridge and the large settling pond were deemed the most likely to contain accumulated contaminants and have a more extensive ecological habitat; thus, they were considered as a separate aggregate. The stream segment downstream of the settling pond was also considered separately due to the fact that contaminants within runoff or historical effluents were expected to be captured within the settling pond. Thus, the exit drainage from the pond was expected to have lower accumulated contaminants.

A few miscellaneous water samples were collected from ditch lines containing intermittent flow and from the main stream well upstream of Load Line 4. These samples either do not represent viable ecological habitat or do not represent conditions within the load lines and are combined as a Miscellaneous Water Aggregate (Table 4-2).

Groundwater

For this Phase II RI, groundwater media were not subdivided into spatial aggregates. All of the monitoring wells installed during the Phase II RI monitor the water table interval within the unconsolidated zone. Accordingly, no technical basis existed for aggregation of the data.

Storm and Sanitary Sewers

The storm and sanitary sewer systems sampled during the Phase II RI represent potential accumulation points, as well as potential migration pathways throughout the load line. Additionally, sediments and water within the utility system are not evaluated under the conventional risk exposure scenarios applied to other environmental media within the load line (e.g., soil, surface water, stream sediment, or groundwater). Because of these considerations, the utility systems are evaluated in the nature and extent assessment as a separate aggregate.

Buildings and Structures

Samples of soil beneath building floor slabs, accumulated sediment/sludge and water within sedimentation and washout basins, and accumulated debris on floor surfaces (floor sweep samples) are considered as a separate data aggregate from other environmental media. These samples were collected primarily to support future building demolition activities (e.g., to identify waste management and safety issues). As with storm and sanitary sewer systems, these data are not evaluated under the conventional risk scenarios applied to other environmental media.

4.1.3 Data Reduction and Screening

4.1.3.1 Data reduction

More than 258 environmental soil, sediment, surface water, and field QC samples were collected with approximately 17,520 discrete analyses (i.e., analytes) being obtained, reviewed, and integrated into this RI. These totals do not include field measurements and field descriptions. Analytical results were reported by the laboratory in electronic format and loaded into a database. As discussed in Section 3.6, verification of data was performed to ensure all requested data were received and complete. Data use qualifiers were

assigned to each result based on the laboratory QA review and verification criteria. Results were qualified as follows:

"U" Not detected.
"UJ" Not detected, detection limit estimated.
"J" Estimated concentration less than method reporting limits.
"R" Rejected result.
"=" Analyte present and concentration accurate.

In addition to assigning qualifiers, the verification process also selected the appropriate result to use when re-analyses or dilutions were performed. Where laboratory surrogate recovery data or laboratory quality control samples were outside of analytical method specifications, a determination was made regarding whether laboratory re-analysis should be used in place of an original reported result. If results were reported for both diluted and undiluted samples, results from the diluted sample were used only for those analytes that exceeded the calibration range of the undiluted sample. A complete discussion of the results of the verification process is contained in the data quality summary report (Appendix H). Independent validation of 10% of the Phase II RI data and 100% of the USACE QA laboratory data is performed by a third-party subcontractor to the USACE, Louisville District. Additional qualification of the Phase II RI data may be required based on the results of the validation process.

The data reduction process employed to identify SRCs involved first calculating data summary statistics. Site data were extracted from the database such that QC splits and field duplicates were excluded from the screening data sets. Rejected results were excluded from the screening process. All analytes having at least one detected value were included in the data reduction process. Summary statistics calculated for each data aggregate (Tables 4-3 through 4-10) included the minimum, maximum, and average (mean) detected values and the proportion of detected results to the total number of samples collected. Surrogate values for non-detected results were created using one-half of the method detection limit (MDL) during calculation of summary statistics. Non-detected results with elevated detection limits (more than 5 times the contract-required detection limit) were excluded from the summary statistics in order not to skew the calculation of mean values.

Following data reduction, the data were screened to identify SRCs using the processes outlined in the following sections. Additional screening of identified SRCs was conducted as part of the fate and transport evaluation to identify constituents of potential migration concern and as part of the risk assessments to identify human health and ecological chemical of potential concern (COPCs) (see Chapters 6.0 and 7.0).

4.1.3.2 Frequency of detection screen

For sample aggregates containing more than 20 samples, a frequency of detection criterion was applied to identify SRCs. Inorganic constituents, VOCs, SVOCs, pesticides, and PCBs with a frequency of detection greater than or equal to 5% (e.g., 1 in 20 samples) were carried forward to the facility-wide background screening and essential human nutrient screening steps, as applicable. If the frequency of detection for an analyte in one of these classes was less than 5%, a weight of evidence (WOE) approach was used to determine if the chemical was an SRC. The WOE approach involved examining the magnitude and locations of the detected results. If no clustering within a particular area was noted and concentrations were not substantially elevated relative to the detection limits, the detected results were considered spurious, and the compound was eliminated as an SRC. For sample populations comprised of less than 20 samples, all

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Change Houses Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	6/ 6	2.1E+03	1.2E+04	8.3E+03	N	1.8E+04	No	Below background
Arsenic	6/ 6	3.6E+00	1.3E+01	9.3E+00	N	1.5E+01	No	Below background
Barium	6/ 6	4.6E+01	1.3E+02	6.7E+01	X	8.8E+01	Yes	Above background
Beryllium	5/ 6	4.6E-01	8.1E-01	5.2E-01	N	8.8E-01	No	Below background
Cadmium	6/ 6	1.8E-01	1.1E+00	6.0E-01	L	0	Yes	Above background
Calcium	6/ 6	1.7E+03	1.6E+05	3.1E+04	L	1.6E+04	No	Essential element
Chromium	6/ 6	5.9E+00	2.6E+01	1.3E+01	L	1.7E+01	Yes	Above background
Cobalt	6/ 6	3.0E+00	9.7E+00	6.8E+00	N	1.0E+01	No	Below background
Copper	6/ 6	1.4E+01	3.6E+01	2.1E+01	L	1.8E+01	Yes	Above background
Iron	6/ 6	7.1E+03	2.3E+04	1.8E+04	N	2.3E+04	No	Essential element
Lead	6/ 6	2.0E+01	4.0E+02	1.4E+02	L	2.6E+01	Yes	Above background
Magnesium	6/ 6	1.7E+03	4.5E+03	2.9E+03	L	3.0E+03	No	Essential element
Manganese	6/ 6	3.2E+02	7.2E+02	5.0E+02	L	1.5E+03	No	Below background
Mercury	5/ 6	2.6E-02	5.0E-02	3.0E-02	N	3.6E-02	Yes	Above background
Nickel	6/ 6	1.1E+01	2.0E+01	1.7E+01	N	2.1E+01	No	Below background
Potassium	6/ 6	3.6E+02	8.6E+02	6.5E+02	N	9.3E+02	No	Essential element
Selenium	1/ 6	6.7E-01	6.7E-01	1.1E+00	D	1.4E+00	No	Below background
Sodium	1/ 6	7.0E+01	7.0E+01	2.6E+02	D	1.2E+02	No	Essential element
Thallium	4/ 6	4.9E-01	8.5E-01	5.1E-01	N	0	Yes	Above background
Vanadium	6/ 6	5.0E+00	2.0E+01	1.3E+01	N	3.1E+01	No	Below background
Zinc	6/ 6	5.4E+01	1.9E+02	1.1E+02	L	6.2E+01	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
PCB-1260	1/ 4	5.9E-02	5.9E-02	2.9E-02	D	0	Yes	Above background
Organics-Semivolatile (concentration units = mg/kg)								
2-Methylnaphthalene	1/ 1	2.7E-01	2.7E-01	2.7E-01	X	0	Yes	Above background
Anthracene	1/ 1	7.5E-02	7.5E-02	7.5E-02	X	0	Yes	Above background
Benz(*a*)anthracene	1/ 1	5.3E-01	5.3E-01	5.3E-01	X	0	Yes	Above background
Benzo(*a*)pyrene	1/ 1	5.0E-01	5.0E-01	5.0E-01	X	0	Yes	Above background
Benzo(*b*)fluoranthene	1/ 1	6.7E-01	6.7E-01	6.7E-01	X	0	Yes	Above background
Benzo(*g,h,i*)perylene	1/ 1	3.1E-01	3.1E-01	3.1E-01	X	0	Yes	Above background
Benzo(*k*)fluoranthene	1/ 1	2.9E-01	2.9E-01	2.9E-01	X	0	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Carbazole	1/ 1	6.5E-02	6.5E-02	6.5E-02	X	0	Yes	Above background
Chrysene	1/ 1	6.2E-01	6.2E-01	6.2E-01	X	0	Yes	Above background
Dibenz(*a,h*)anthracene	1/ 1	8.5E-02	8.5E-02	8.5E-02	X	0	Yes	Above background
Dibenzofuran	1/ 1	6.9E-02	6.9E-02	6.9E-02	X	0	Yes	Above background
Fluoranthene	1/ 1	9.3E-01	9.3E-01	9.3E-01	X	0	Yes	Above background
Indeno(1,2,3-*cd*)pyrene	1/ 1	3.0E-01	3.0E-01	3.0E-01	X	0	Yes	Above background
Naphthalene	1/ 1	1.8E-01	1.8E-01	1.8E-01	X	0	Yes	Above background
Phenanthrene	1/ 1	4.7E-01	4.7E-01	4.7E-01	X	0	Yes	Above background
Pyrene	1/ 1	8.7E-01	8.7E-01	8.7E-01	X	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
Benzene	1/ 1	2.6E-03	2.6E-03	2.6E-03	X	0	Yes	Above background
Dimethylbenzene	1/ 1	3.0E-03	3.0E-03	3.0E-03	X	0	Yes	Above background
Toluene	1/ 1	5.6E-03	5.6E-03	5.6E-03	X	0	Yes	Above background
Explosives Handling Areas Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	70/ 70	4.2E+03	3.9E+04	9.8E+03	X	1.8E+04	Yes	Above background
Antimony	1/ 36	2.2E+00	2.2E+00	5.8E-01	D	9.6E-01	No	<= 5% detects
Arsenic	70/ 70	2.0E+00	1.8E+01	8.8E+00	N	1.5E+01	Yes	Above background
Barium	70/ 70	1.7E+01	7.5E+02	8.7E+01	X	8.8E+01	Yes	Above background
Beryllium	28/ 40	2.7E-01	5.9E+00	8.8E-01	X	8.8E-01	Yes	Above background
Cadmium	61/ 70	4.0E-02	1.3E+01	8.3E-01	L	0	Yes	Above background
Calcium	40/ 40	4.4E+02	1.8E+05	1.7E+04	X	1.6E+04	No	Essential element
Chromium	70/ 70	5.2E+00	6.8E+01	1.3E+01	X	1.7E+01	Yes	Above background
Chromium, hexavalent	1/ 1	1.9E+00	1.9E+00	1.9E+00	X	0	Yes	Above background
Cobalt	40/ 40	1.8E+00	7.8E+01	8.7E+00	X	1.0E+01	Yes	Above background
Copper	40/ 40	5.9E+00	1.1E+02	2.1E+01	L	1.8E+01	Yes	Above background
Cyanide	5/ 17	2.0E-01	5.1E-01	2.4E-01	D	0	Yes	Above background
Iron	40/ 40	6.9E+03	3.0E+04	1.9E+04	N	2.3E+04	No	Essential element
Lead	70/ 70	7.2E+00	5.8E+03	1.4E+02	X	2.6E+01	Yes	Above background
Magnesium	40/ 40	8.6E+02	3.1E+04	4.8E+03	X	3.0E+03	No	Essential element
Manganese	70/ 70	4.4E+01	7.3E+03	7.0E+02	X	1.5E+03	Yes	Above background
Mercury	33/ 70	1.1E-02	3.6E-01	3.7E-02	D	3.6E-02	Yes	Above background
Nickel	40/ 40	3.0E+00	3.2E+01	1.6E+01	N	2.1E+01	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Potassium	40/ 40	3.7E+02	2.3E+03	8.9E+02	L	9.3E+02	No	Essential element
Selenium	42/ 70	3.2E-01	3.2E+00	9.7E-01	X	1.4E+00	Yes	Above background
Sodium	15/ 40	9.4E+01	8.3E+02	3.0E+02	D	1.2E+02	No	Essential element
Thallium	28/ 40	3.0E-01	1.3E+01	9.1E-01	X	0	Yes	Above background
Vanadium	40/ 40	5.5E+00	2.0E+01	1.4E+01	N	3.1E+01	No	Below background
Zinc	70/ 70	2.0E+01	3.7E+03	1.6E+02	X	6.2E+01	Yes	Above background
Organics-Explosives (concentration units = mg/kg)								
2,4,6-Trinitrotoluene	10/ 52	9.6E-02	2.2E+00	2.4E-01	D	0	Yes	Above background
HMX	2/ 52	1.0E+00	3.6E+00	8.9E-01	D	0	Yes	Above background
RDX	2/ 52	2.7E-01	1.9E+01	8.0E-01	D	0	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
4,4'-DDD	2/ 17	9.8E-03	1.0E-01	8.6E-03	D	0	Yes	Above background
4,4'-DDE	3/ 17	1.8E-02	4.9E-02	8.1E-03	D	0	Yes	Above background
4,4'-DDT	4/ 17	8.7E-03	2.9E-01	3.7E-02	D	0	Yes	Above background
Aldrin	2/ 17	1.7E-02	4.3E-02	6.4E-03	D	0	Yes	Above background
Dieldrin	3/ 17	4.8E-03	7.0E-02	7.8E-03	D	0	Yes	Above background
Endosulfan II	1/ 17	3.7E-02	3.7E-02	5.4E-03	D	0	Yes	Above background
Endrin	3/ 17	7.5E-03	1.8E-02	5.1E-03	D	0	Yes	Above background
Endrin Aldehyde	3/ 17	4.5E-03	8.4E-01	5.5E-02	D	0	Yes	Above background
Endrin Ketone	1/ 17	1.1E-02	1.1E-02	3.7E-03	D	0	Yes	Above background
Heptachlor	2/ 17	7.1E-03	6.7E-01	4.1E-02	D	0	Yes	Above background
Heptachlor Epoxide	1/ 17	5.2E-02	5.2E-02	4.8E-03	D	0	Yes	Above background
Methoxychlor	2/ 17	1.8E-02	2.1E-01	2.0E-02	D	0	Yes	Above background
PCB-1254	6/ 39	5.6E-02	3.2E+00	3.4E-01	D	0	Yes	Above background
PCB-1260	13/ 36	1.8E-01	2.8E+01	1.5E+00	D	0	Yes	Above background
alpha-Chlordane	3/ 17	5.6E-03	3.4E-02	6.6E-03	D	0	Yes	Above background
gamma-Chlordane	5/ 17	1.6E-03	8.3E-02	9.3E-03	D	0	Yes	Above background
Organics-Semivolatile (concentration units = mg/kg)								
Acenaphthylene	2/ 19	2.7E-01	5.6E-01	2.5E-01	D	0	Yes	Above background
Anthracene	4/ 19	1.5E-01	1.2E+00	3.1E-01	D	0	Yes	Above background
Benz(*a*)anthracene	9/ 19	7.8E-02	2.1E+00	4.5E-01	D	0	Yes	Above background
Benzo(*a*)pyrene	9/ 19	4.0E-02	2.7E+00	5.3E-01	D	0	Yes	Above background
Benzo(*b*)fluoranthene	10/ 19	4.0E-02	7.2E+00	1.1E+00	X	0	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Benzo(*g,h,i*)perylene	8/ 18	7.6E-02	3.8E+00	5.8E-01	D	0	Yes	Above background
Benzo(*k*)fluoranthene	8/ 19	1.0E-01	5.0E+00	6.8E-01	D	0	Yes	Above background
Bis(2-ethylhexyl)phthalate	9/ 19	4.3E-02	2.0E-01	1.9E-01	D	0	Yes	Above background
Carbazole	3/ 19	1.2E-01	1.4E+00	2.8E-01	D	0	Yes	Above background
Chrysene	11/ 19	3.8E-02	6.4E+00	8.7E-01	L	0	Yes	Above background
Di-n-butyl phthalate	1/ 19	9.2E-01	9.2E-01	2.9E-01	D	0	Yes	Above background
Dibenz(*a,h*)anthracene	4/ 19	1.4E-01	1.2E+00	3.2E-01	D	0	Yes	Above background
Fluoranthene	14/ 19	3.8E-02	8.1E+00	7.9E-01	L	0	Yes	Above background
Fluorene	2/ 19	6.4E-02	1.2E-01	2.3E-01	D	0	Yes	Above background
Indeno(1,2,3-*cd*)pyrene	8/ 18	8.2E-02	3.7E+00	5.5E-01	D	0	Yes	Above background
Naphthalene	1/ 19	5.8E-02	5.8E-02	2.4E-01	D	0	Yes	Above background
Phenanthrene	4/ 19	1.4E-01	2.3E+00	3.7E-01	D	0	Yes	Above background
Pyrene	11/ 19	3.5E-02	5.4E+00	7.1E-01	L	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
Acetone	1/ 16	5.0E-02	5.0E-02	1.1E-02	D	0	Yes	Above background
Chloroform	1/ 19	2.0E-03	2.0E-03	2.8E-03	D	0	Yes	Above background
Toluene	3/ 19	8.6E-04	1.2E-02	3.4E-03	D	0	Yes	Above background
Melt-Pour Area Drainage Ditches Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	15/ 15	2.7E+03	1.3E+04	6.6E+03	L	1.8E+04	No	Below background
Antimony	1/ 7	2.0E+00	2.0E+00	8.0E-01	D	9.6E-01	Yes	Above background
Arsenic	15/ 15	3.2E+00	1.6E+01	9.1E+00	N	1.5E+01	Yes	Above background
Barium	15/ 15	1.7E+01	8.4E+01	4.6E+01	N	8.8E+01	No	Below background
Beryllium	7/ 7	1.8E-01	4.5E-01	3.5E-01	N	8.8E-01	No	Below background
Cadmium	12/ 15	4.0E-02	3.2E-01	1.5E-01	N	0	Yes	Above background
Calcium	7/ 7	2.8E+03	6.8E+03	4.2E+03	L	1.6E+04	No	Essential element
Chromium	15/ 15	5.0E+00	1.7E+01	9.5E+00	L	1.7E+01	No	Below background
Cobalt	7/ 7	3.7E+00	9.9E+00	7.4E+00	N	1.0E+01	No	Below background
Copper	7/ 7	7.5E+00	2.0E+01	1.4E+01	N	1.8E+01	Yes	Above background
Cyanide	1/ 2	1.6E-01	1.6E-01	2.5E-01	N	0	Yes	Above background
Iron	7/ 7	8.5E+03	2.6E+04	1.7E+04	N	2.3E+04	No	Essential element
Lead	15/ 15	7.8E+00	2.7E+01	1.4E+01	L	2.6E+01	Yes	Above background
Magnesium	7/ 7	1.4E+03	3.5E+03	2.6E+03	N	3.0E+03	No	Essential element

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Manganese	15/ 15	9.2E+01	8.9E+02	4.2E+02	L	1.5E+03	No	Below background
Mercury	3/ 15	1.3E-02	2.6E-02	3.0E-02	D	3.6E-02	No	Below background
Nickel	7/ 7	7.3E+00	1.9E+01	1.5E+01	N	2.1E+01	No	Below background
Potassium	7/ 7	3.2E+02	8.8E+02	6.2E+02	N	9.3E+02	No	Essential element
Selenium	6/ 15	4.1E-01	6.0E-01	7.0E-01	D	1.4E+00	No	Below background
Sodium	1/ 7	2.0E+02	2.0E+02	3.2E+02	D	1.2E+02	No	Essential element
Thallium	6/ 7	2.8E-01	7.3E-01	4.6E-01	L	0	Yes	Above background
Vanadium	7/ 7	5.0E+00	1.3E+01	9.9E+00	N	3.1E+01	No	Below background
Zinc	15/ 15	3.9E+01	1.1E+02	7.2E+01	N	6.2E+01	Yes	Above background
Organics-Total Organic Carbon (concentration units = mg/kg)								
Total Organic Carbon	7/ 7	2.5E+03	1.7E+04	9.3E+03	N	2.4E+04	No	Below background
Organics-Semivolatile (concentration units = mg/kg)								
Fluoranthene	1/ 3	1.2E-01	1.2E-01	2.5E-01	D	0	Yes	Above background
Phenanthrene	1/ 3	1.6E-01	1.6E-01	2.7E-01	D	0	Yes	Above background
Pyrene	1/ 3	1.2E-01	1.2E-01	2.5E-01	D	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
Acetone	1/ 2	6.3E-03	6.3E-03	1.0E-02	N	0	Yes	Above background
Packaging and Shipping Areas Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	11/ 11	3.9E+03	1.5E+04	1.0E+04	N	1.8E+04	No	Below background
Antimony	3/ 7	6.8E-01	1.5E+00	7.9E-01	D	9.6E-01	Yes	Above background
Arsenic	11/ 11	4.5E+00	1.3E+01	8.3E+00	N	1.5E+01	No	Below background
Barium	11/ 11	2.5E+01	2.7E+02	1.1E+02	L	8.8E+01	Yes	Above background
Beryllium	4/ 10	1.4E+00	2.1E+00	8.3E-01	D	8.8E-01	Yes	Above background
Cadmium	7/ 11	1.9E-01	9.1E+00	1.9E+00	X	0	Yes	Above background
Calcium	10/ 10	1.1E+03	5.3E+04	2.2E+04	N	1.6E+04	No	Essential element
Chromium	11/ 11	4.5E+00	3.0E+01	1.2E+01	L	1.7E+01	Yes	Above background
Cobalt	10/ 10	3.2E+00	8.5E+00	5.4E+00	L	1.0E+01	No	Below background
Copper	10/ 10	1.0E+01	5.6E+01	2.5E+01	L	1.8E+01	Yes	Above background
Iron	10/ 10	7.9E+03	3.8E+04	1.8E+04	L	2.3E+04	No	Essential element
Lead	11/ 11	1.4E+01	5.0E+02	9.6E+01	X	2.6E+01	Yes	Above background
Magnesium	10/ 10	9.7E+02	1.3E+04	5.0E+03	L	3.0E+03	No	Essential element
Manganese	11/ 11	1.5E+02	1.9E+03	6.6E+02	L	1.5E+03	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Mercury	6/ 11	1.2E-02	7.8E-02	2.7E-02	L	3.6E-02	Yes	Above background
Nickel	10/ 10	7.4E+00	2.6E+01	1.4E+01	L	2.1E+01	Yes	Above background
Potassium	10/ 10	3.0E+02	1.4E+03	6.7E+02	L	9.3E+02	No	Essential element
Selenium	7/ 11	3.6E-01	1.4E+00	8.5E-01	N	1.4E+00	No	Below background
Sodium	5/ 10	1.0E+02	3.3E+02	2.6E+02	X	1.2E+02	No	Essential element
Thallium	5/ 10	2.9E-01	5.8E-01	3.0E-01	L	0	Yes	Above background
Vanadium	10/ 10	5.2E+00	2.4E+01	1.1E+01	L	3.1E+01	No	Below background
Zinc	11/ 11	4.9E+01	8.4E+02	2.3E+02	L	6.2E+01	Yes	Above Background
Organics-Explosives (concentration units = mg/kg)								
Nitrocellulose	1/ 1	9.0E+00	9.0E+00	9.0E+00	X	0	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
4,4'-DDE	1/ 1	3.8E-02	3.8E-02	3.8E-02	X	0	Yes	Above background
Dieldrin	1/ 1	1.4E-02	1.4E-02	1.4E-02	X	0	Yes	Above background
Endrin Aldehyde	1/ 1	5.7E-02	5.7E-02	5.7E-02	X	0	Yes	Above background
Methoxychlor	1/ 1	2.5E-02	2.5E-02	2.5E-02	X	0	Yes	Above background
PCB-1254	3/ 10	2.7E-01	7.5E-01	2.0E-01	D	0	Yes	Above background
PCB-1260	2/ 10	4.3E-02	1.3E+00	1.6E-01	D	0	Yes	Above background
alpha-Chlordane	1/ 1	1.4E-02	1.4E-02	1.4E-02	X	0	Yes	Above background
gamma-Chlordane	1/ 1	1.1E-02	1.1E-02	1.1E-02	X	0	Yes	Above background
Organics-Semivolatile (concentration units = mg/kg)								
Benz(*a*)anthracene	1/ 2	9.3E-02	9.3E-02	1.5E-01	N	0	Yes	Above background
Benzo(*a*)pyrene	1/ 2	1.0E-01	1.0E-01	1.5E-01	N	0	Yes	Above background
Benzo(*b*)fluoranthene	2/ 2	1.0E-01	1.3E-01	1.2E-01	N	0	Yes	Above background
Benzo(*g,h,i*)perylene	2/ 2	6.6E-02	1.0E-01	8.3E-02	N	0	Yes	Above background
Benzo(*k*)fluoranthene	1/ 2	8.0E-02	8.0E-02	1.4E-01	N	0	Yes	Above background
Bis(2-ethylhexyl)phthalate	1/ 2	7.8E-02	7.8E-02	1.4E-01	N	0	Yes	Above background
Chrysene	2/ 2	8.7E-02	1.4E-01	1.1E-01	N	0	Yes	Above background
Fluoranthene	2/ 2	1.3E-01	2.9E-01	2.1E-01	N	0	Yes	Above background
Phenanthrene	1/ 2	1.7E-01	1.7E-01	1.9E-01	N	0	Yes	Above background
Pyrene	1/ 2	1.8E-01	1.8E-01	1.9E-01	N	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
Toluene	1/ 3	1.6E-03	1.6E-03	2.5E-03	D	0	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Perimeter Area Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	24/ 24	6.2E+03	1.5E+04	1.1E+04	N	1.8E+04	No	Below background
Arsenic	24/ 24	2.3E+00	1.2E+01	8.1E+00	N	1.5E+01	No	Below background
Barium	24/ 24	2.1E+01	1.1E+02	5.7E+01	L	8.8E+01	Yes	Above background
Beryllium	3/ 20	5.3E-01	1.5E+00	3.8E-01	D	8.8E-01	Yes	Above background
Cadmium	12/ 24	5.5E-02	5.4E-01	2.2E-01	X	0	Yes	Above background
Calcium	20/ 20	1.6E+02	5.3E+04	5.8E+03	X	1.6E+04	No	Essential element
Chromium	24/ 24	6.2E+00	1.2E+02	1.9E+01	X	1.7E+01	Yes	Above background
Cobalt	20/ 20	2.2E+00	1.5E+01	6.8E+00	N	1.0E+01	Yes	Above background
Copper	20/ 20	4.8E+00	1.6E+01	1.1E+01	N	1.8E+01	No	Below background
Iron	20/ 20	6.4E+03	2.4E+04	1.6E+04	N	2.3E+04	No	Essential element
Lead	24/ 24	7.8E+00	1.3E+03	1.2E+02	X	2.6E+01	Yes	Above background
Magnesium	20/ 20	6.8E+02	8.2E+03	2.2E+03	L	3.0E+03	No	Essential element
Manganese	24/ 24	8.5E+01	1.8E+03	4.3E+02	L	1.5E+03	Yes	Above background
Mercury	18/ 23	1.2E-02	9.4E-02	4.4E-02	L	3.6E-02	Yes	Above background
Nickel	20/ 20	5.4E+00	1.9E+01	1.2E+01	N	2.1E+01	No	Below background
Potassium	20/ 20	3.5E+02	1.0E+03	6.5E+02	N	9.3E+02	No	Essential element
Selenium	14/ 24	3.5E-01	1.2E+00	8.8E-01	X	1.4E+00	No	Below Background
Sodium	2/ 20	8.7E+01	1.7E+02	2.8E+02	D	1.2E+02	No	Essential element
Thallium	18/ 20	3.0E-01	6.7E-01	4.3E-01	N	0	Yes	Above background
Vanadium	20/ 20	7.6E+00	2.3E+01	1.6E+01	N	3.1E+01	No	Below background
Zinc	24/ 24	2.7E+01	1.2E+02	5.7E+01	L	6.2E+01	Yes	Above background
Organics-Semivolatile (concentration units = mg/kg)								
Benz(*a*)anthracene	1/ 5	1.1E-01	1.1E-01	1.8E-01	D	0	Yes	Above background
Benzo(*a*)pyrene	1/ 5	1.4E-01	1.4E-01	1.9E-01	D	0	Yes	Above background
Benzo(*b*)fluoranthene	1/ 5	1.6E-01	1.6E-01	1.9E-01	D	0	Yes	Above background
Benzo(*g,h,i*)perylene	1/ 5	1.2E-01	1.2E-01	1.8E-01	D	0	Yes	Above background
Benzo(*k*)fluoranthene	1/ 5	7.8E-02	7.8E-02	1.7E-01	D	0	Yes	Above background
Bis(2-ethylhexyl)phthalate	4/ 5	1.2E-01	3.1E-01	2.0E-01	L	0	Yes	Above background
Chrysene	1/ 5	1.4E-01	1.4E-01	1.9E-01	D	0	Yes	Above background
Fluoranthene	2/ 5	8.5E-02	1.8E-01	1.7E-01	D	0	Yes	Above background
Indeno(1,2,3-*cd*)pyrene	1/ 5	9.9E-02	9.9E-02	1.8E-01	D	0	Yes	Above background
Pyrene	1/ 5	1.6E-01	1.6E-01	1.9E-01	D	0	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Organics-Volatile (concentration units = mg/kg)								
Toluene	1/ 5	6.2E-04	6.2E-04	2.5E-03	D	0	Yes	Above background
Preparation and Receiving Areas Aggregate								
Metals (concentration units = mg/kg)								
Arsenic	17/ 17	3.5E+00	2.7E+01	1.0E+01	L	1.5E+01	Yes	Above background
Barium	17/ 17	2.5E+01	2.0E+02	8.6E+01	L	8.8E+01	Yes	Above background
Beryllium	9/ 17	2.5E-01	1.6E+00	5.2E-01	L	8.8E-01	Yes	Above background
Cadmium	14/ 17	1.2E-01	4.6E+00	9.9E-01	L	0	Yes	Above background
Calcium	17/ 17	1.6E+03	1.7E+05	3.6E+04	L	1.6E+04	No	Essential element
Chromium	17/ 17	6.2E+00	1.6E+02	2.0E+01	X	1.7E+01	Yes	Above background
Cobalt	17/ 17	2.7E+00	1.4E+01	6.1E+00	L	1.0E+01	Yes	Above background
Copper	17/ 17	8.0E+00	5.1E+02	4.9E+01	X	1.8E+01	Yes	Above background
Cyanide	1/ 1	1.1E-01	1.1E-01	1.1E-01	X	0	Yes	Above background
Iron	17/ 17	7.5E+03	1.0E+05	2.2E+04	X	2.3E+04	No	Essential element
Lead	17/ 17	1.1E+01	9.9E+02	1.4E+02	L	2.6E+01	Yes	Above background
Magnesium	17/ 17	9.6E+02	8.8E+03	3.7E+03	L	3.0E+03	No	Essential element
Manganese	17/ 17	9.2E+01	1.8E+03	5.4E+02	L	1.5E+03	Yes	Above background
Mercury	15/ 17	1.1E-02	7.4E+00	5.3E-01	X	3.6E-02	Yes	Above background
Nickel	17/ 17	7.8E+00	4.8E+01	1.7E+01	L	2.1E+01	Yes	Above background
Potassium	17/ 17	3.6E+02	1.2E+03	6.5E+02	L	9.3E+02	No	Essential element
Selenium	5/ 17	4.8E-01	1.2E+00	1.1E+00	D	1.4E+00	No	Below background
Sodium	5/ 17	7.4E+01	1.8E+02	2.6E+02	D	1.2E+02	No	Essential element
Thallium	15/ 17	2.6E-01	1.2E+00	5.5E-01	L	0	Yes	Above background
Vanadium	17/ 17	5.5E+00	4.1E+01	1.4E+01	L	3.1E+01	Yes	Above background
Zinc	17/ 17	4.3E+01	7.5E+02	2.0E+02	L	6.2E+01	Yes	Above background
Organics-Total Organic Carbon (concentration units = mg/kg)								
Total Organic Carbon	1/ 1	1.4E+04	1.4E+04	1.4E+04	X	2.4E+04	No	Below background
Organics-Explosives (concentration units = mg/kg)								
Nitrocellulose	1/ 3	1.9E+01	1.9E+01	7.6E+00	D	0	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
PCB-1254	3/ 17	3.6E-01	4.8E+01	2.9E+00	D	0	Yes	Above background
PCB-1260	1/ 16	5.7E+00	5.7E+00	4.9E-01	D	0	Yes	Above background

Table 4-3. Summary Statistics and Determination of SRCs in Surface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Organics-Semivolatile (concentration units = mg/kg)								
Bis(2-ethylhexyl)phthalate	1/ 5	6.1E-02	6.1E-02	1.9E-01	D	0	Yes	Above background
Fluoranthene	1/ 5	7.0E-02	7.0E-02	1.9E-01	D	0	Yes	Above background
Phenanthrene	1/ 5	6.0E-02	6.0E-02	1.9E-01	D	0	Yes	Above background
Pyrene	1/ 5	6.9E-02	6.9E-02	1.9E-01	D	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
2-Butanone	1/ 5	1.3E-02	1.3E-02	1.0E-02	D	0	Yes	Above background
Acetone	2/ 4	1.2E-02	4.2E-02	1.9E-02	X	0	Yes	Above background
Toluene	3/ 5	6.6E-04	5.1E-03	2.5E-03	N	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
DDT = Dichlorodiphenyltrichloroethane.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
PCB = Polychlorinated biphenyl.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SRC = Site-related contaminant.

Table 4-4. Summary Statistics and Determination of SRCs in Subsurface Soil[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Explosives Handling Areas Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	4/ 4	1.1E+04	1.8E+04	1.3E+04	L	2.0E+04	No	Below background
Arsenic	4/ 4	4.3E+00	1.8E+01	1.0E+01	L	2.0E+01	No	Below background
Barium	4/ 4	5.1E+01	1.9E+02	1.1E+02	N	1.2E+02	Yes	Above background
Beryllium	2/ 4	1.5E+00	2.7E+00	1.2E+00	N	8.8E-01	Yes	Above background
Cadmium	3/ 4	2.9E-01	1.5E+00	8.7E-01	N	0	Yes	Above background
Calcium	4/ 4	3.8E+03	8.5E+04	3.5E+04	L	3.6E+04	No	Essential element
Chromium	4/ 4	1.3E+01	2.8E+01	1.7E+01	L	2.7E+01	Yes	Above background
Cobalt	4/ 4	3.5E+00	9.5E+00	6.6E+00	L	2.3E+01	No	Below background
Copper	4/ 4	1.5E+01	1.8E+01	1.7E+01	L	3.2E+01	No	Below background
Iron	4/ 4	1.4E+04	2.4E+04	1.9E+04	L	3.5E+04	No	Essential element
Lead	4/ 4	1.1E+01	1.4E+02	5.6E+01	L	1.9E+01	Yes	Above background
Magnesium	4/ 4	3.0E+03	1.4E+04	7.0E+03	L	8.8E+03	No	Essential element
Manganese	4/ 4	2.2E+02	1.6E+03	8.9E+02	N	3.0E+03	No	Below background
Mercury	3/ 4	1.3E-02	2.0E-01	6.7E-02	L	4.4E-02	Yes	Above background
Nickel	4/ 4	1.2E+01	2.4E+01	1.8E+01	L	6.1E+01	No	Below background
Potassium	4/ 4	6.9E+02	2.0E+03	1.3E+03	L	3.4E+03	No	Essential element
Selenium	1/ 4	8.6E-01	8.6E-01	1.1E+00	D	1.5E+00	No	Below background
Sodium	2/ 4	1.1E+02	2.5E+02	2.4E+02	N	1.5E+02	No	Essential element
Thallium	1/ 4	4.7E-01	4.7E-01	2.3E-01	D	9.1E-01	No	Below background
Vanadium	4/ 4	8.7E+00	1.7E+01	1.3E+01	N	3.8E+01	No	Below background
Zinc	4/ 4	5.7E+01	1.3E+02	9.0E+01	N	9.3E+01	Yes	Above background
Packaging and Shipping Areas Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	1/ 1	1.3E+04	1.3E+04	1.3E+04	X	2.0E+04	No	Below background
Arsenic	1/ 1	7.7E+00	7.7E+00	7.7E+00	X	2.0E+01	No	Below background
Barium	1/ 1	1.3E+02	1.3E+02	1.3E+02	X	1.2E+02	Yes	Above background
Beryllium	1/ 1	1.1E+00	1.1E+00	1.1E+00	X	8.8E-01	Yes	Above background
Cadmium	1/ 1	3.2E+00	3.2E+00	3.2E+00	X	0	Yes	Above background
Calcium	1/ 1	2.4E+04	2.4E+04	2.4E+04	X	3.6E+04	No	Essential element
Chromium	1/ 1	1.4E+01	1.4E+01	1.4E+01	X	2.7E+01	No	Below background
Cobalt	1/ 1	6.8E+00	6.8E+00	6.8E+00	X	2.3E+01	No	Below background
Copper	1/ 1	1.8E+01	1.8E+01	1.8E+01	X	3.2E+01	No	Below background

Table 4-4. Summary Statistics and Determination of SRCs in Subsurface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Iron	1/ 1	2.0E+04	2.0E+04	2.0E+04	X	3.5E+04	No	Essential element
Lead	1/ 1	4.8E+01	4.8E+01	4.8E+01	X	1.9E+01	Yes	Above background
Magnesium	1/ 1	5.5E+03	5.5E+03	5.5E+03	X	8.8E+03	No	Essential element
Manganese	1/ 1	7.3E+02	7.3E+02	7.3E+02	X	3.0E+03	No	Below background
Mercury	1/ 1	1.3E-02	1.3E-02	1.3E-02	X	4.4E-02	No	Below background
Nickel	1/ 1	1.9E+01	1.9E+01	1.9E+01	X	6.1E+01	No	Below background
Potassium	1/ 1	1.2E+03	1.2E+03	1.2E+03	X	3.4E+03	No	Essential element
Sodium	1/ 1	8.2E+01	8.2E+01	8.2E+01	X	1.5E+02	No	Essential element
Thallium	1/ 1	6.6E-01	6.6E-01	6.6E-01	X	9.1E-01	No	Below background
Vanadium	1/ 1	1.5E+01	1.5E+01	1.5E+01	X	3.8E+01	No	Below Background
Zinc	1/ 1	1.0E+02	1.0E+02	1.0E+02	X	9.3E+01	Yes	Above background
Perimeter Area Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	3/ 3	1.4E+04	1.5E+04	1.5E+04	N	2.0E+04	No	Below background
Arsenic	3/ 3	1.1E+01	1.4E+01	1.2E+01	L	2.0E+01	No	Below background
Barium	3/ 3	4.7E+01	7.1E+01	6.1E+01	N	1.2E+02	No	Below background
Calcium	3/ 3	2.2E+02	9.2E+02	6.2E+02	N	3.6E+04	No	Essential element
Chromium	3/ 3	1.5E+01	1.7E+01	1.7E+01	N	2.7E+01	No	Below background
Cobalt	3/ 3	7.3E+00	9.6E+00	8.2E+00	L	2.3E+01	No	Below background
Copper	3/ 3	1.6E+01	1.7E+01	1.7E+01	N	3.2E+01	No	Below background
Iron	3/ 3	2.3E+04	2.5E+04	2.4E+04	L	3.5E+04	No	Essential element
Lead	3/ 3	3.2E+01	4.6E+01	3.9E+01	N	1.9E+01	Yes	Above background
Magnesium	3/ 3	2.5E+03	2.9E+03	2.8E+03	N	8.8E+03	No	Essential element
Manganese	3/ 3	1.1E+02	1.9E+02	1.5E+02	N	3.0E+03	No	Below background
Mercury	3/ 3	2.1E-02	4.3E-02	3.4E-02	N	4.4E-02	No	Below background
Nickel	3/ 3	1.9E+01	2.1E+01	2.0E+01	N	6.1E+01	No	Below background
Potassium	3/ 3	7.9E+02	9.5E+02	8.8E+02	N	3.4E+03	No	Essential element
Thallium	3/ 3	4.4E-01	5.5E-01	5.1E-01	N	9.1E-01	No	Below background
Vanadium	3/ 3	2.0E+01	2.4E+01	2.2E+01	N	3.8E+01	No	Below background
Zinc	3/ 3	5.4E+01	6.1E+01	5.8E+01	N	9.3E+01	No	Below background
Preparation and Receiving Areas Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	3/ 3	1.1E+04	3.7E+04	2.0E+04	L	2.0E+04	Yes	Above background
Arsenic	3/ 3	2.7E+00	8.8E+00	5.8E+00	N	2.0E+01	No	Below background

Table 4-4. Summary Statistics and Determination of SRCs in Subsurface Soil[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Barium	3/ 3	3.2E+01	4.0E+02	2.1E+02	N	1.2E+02	Yes	Above background
Beryllium	2/ 3	1.1E+00	5.0E+00	2.1E+00	L	8.8E-01	Yes	Above background
Cadmium	2/ 3	2.6E-01	4.2E-01	3.3E-01	L	0	Yes	Above background
Calcium	3/ 3	1.9E+03	1.7E+05	6.8E+04	L	3.6E+04	No	Essential element
Chromium	3/ 3	8.9E+00	1.2E+01	1.1E+01	N	2.7E+01	No	Below background
Cobalt	3/ 3	1.9E+00	7.0E+00	3.9E+00	L	2.3E+01	No	Below background
Copper	3/ 3	5.5E+00	1.5E+01	8.9E+00	L	3.2E+01	No	Below background
Iron	3/ 3	9.3E+03	1.8E+04	1.4E+04	N	3.5E+04	No	Essential element
Lead	3/ 3	1.4E+01	8.5E+01	4.7E+01	N	1.9E+01	Yes	Above background
Magnesium	3/ 3	1.1E+03	1.7E+04	7.8E+03	L	8.8E+03	No	Essential element
Manganese	3/ 3	8.5E+01	4.7E+03	2.1E+03	N	3.0E+03	Yes	Above background
Nickel	3/ 3	4.3E+00	1.7E+01	9.4E+00	L	6.1E+01	No	Below background
Potassium	3/ 3	3.7E+02	2.5E+03	1.3E+03	L	3.4E+03	No	Essential element
Selenium	3/ 3	4.2E-01	2.8E+00	1.3E+00	L	1.5E+00	Yes	Above background
Sodium	2/ 3	1.0E+02	6.4E+02	3.5E+02	N	1.5E+02	No	Essential element
Vanadium	3/ 3	8.0E+00	1.5E+01	1.2E+01	N	3.8E+01	No	Below background
Zinc	3/ 3	3.6E+01	1.1E+02	6.5E+01	L	9.3E+01	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
SRC = Site-related contaminant.

Table 4-5. Summary Statistics and Determination of SRCs in Stream and Pond Sediment[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Exit Drainage								
Metals (concentration units = mg/kg)								
Aluminum	2/ 2	3.4E+03	4.6E+03	4.0E+03	N	1.4E+04	No	Below background
Arsenic	2/ 2	5.8E+00	5.9E+00	5.9E+00	N	2.0E+01	No	Below background
Barium	2/ 2	1.2E+01	3.0E+01	2.1E+01	N	1.2E+02	No	Below background
Beryllium	1/ 2	3.0E-01	3.0E-01	2.1E-01	N	3.8E-01	No	Below background
Cadmium	1/ 2	3.6E-01	3.6E-01	3.4E-01	N	0	Yes	Above background
Calcium	2/ 2	1.5E+03	2.9E+03	2.2E+03	N	5.5E+03	No	Essential element
Chromium	2/ 2	5.1E+00	6.9E+00	6.0E+00	N	1.8E+01	No	Below background
Chromium, hexavalent	1/ 2	1.4E+00	1.4E+00	1.0E+00	N	0	Yes	Above background
Cobalt	2/ 2	4.4E+00	6.3E+00	5.4E+00	N	9.1E+00	No	Below background
Copper	2/ 2	1.2E+01	1.3E+01	1.2E+01	N	2.8E+01	No	Below background
Iron	2/ 2	1.2E+04	1.2E+04	1.2E+04	N	2.8E+04	No	Essential element
Lead	2/ 2	6.4E+00	1.3E+01	9.5E+00	N	2.7E+01	No	Below background
Magnesium	2/ 2	1.6E+03	1.9E+03	1.7E+03	N	2.8E+03	No	Essential element
Manganese	2/ 2	2.1E+02	3.2E+02	2.6E+02	N	2.0E+03	No	Below background
Nickel	2/ 2	9.8E+00	1.1E+01	1.0E+01	N	1.8E+01	No	Below background
Potassium	2/ 2	3.1E+02	4.6E+02	3.8E+02	N	2.0E+03	No	Essential element
Thallium	2/ 2	1.8E-01	4.7E-01	3.3E-01	N	8.9E-01	No	Below background
Vanadium	2/ 2	5.9E+00	8.1E+00	7.0E+00	N	2.6E+01	No	Below background
Zinc	2/ 2	8.2E+01	1.2E+02	1.0E+02	N	5.3E+02	No	Below Background
Organics-Total Organic Carbon (concentration units = mg/kg)								
Total Organic Carbon	2/ 2	1.9E+03	8.2E+03	5.1E+03	N	0	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
PCB-1248	1/ 2	9.0E-02	9.0E-02	5.7E-02	N	0	Yes	Above background
Main Stream Segment Upstream of Perimeter Road								
Metals (concentration units = mg/kg)								
Aluminum	3/ 3	6.0E+03	9.7E+03	7.9E+03	N	1.4E+04	No	Below background
Arsenic	3/ 3	4.8E+00	1.0E+01	7.0E+00	L	2.0E+01	No	Below background
Barium	3/ 3	5.4E+01	8.1E+01	6.4E+01	L	1.2E+02	No	Below background
Beryllium	1/ 2	5.6E-01	5.6E-01	4.0E-01	N	3.8E-01	Yes	Above background
Cadmium	2/ 3	2.0E-01	2.5E-01	1.8E-01	N	0	Yes	Above background
Calcium	2/ 2	8.3E+03	1.4E+04	1.1E+04	N	5.5E+03	No	Essential element

Table 4-5. Summary Statistics and Determination of SRCs in Stream and Pond Sediment[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Chromium	3/ 3	8.0E+00	1.2E+01	1.0E+01	N	1.8E+01	No	Below background
Cobalt	2/ 2	6.3E+00	7.7E+00	7.0E+00	N	9.1E+00	No	Below background
Copper	2/ 2	1.1E+01	1.7E+01	1.4E+01	N	2.8E+01	No	Below background
Iron	2/ 2	1.2E+04	1.9E+04	1.5E+04	N	2.8E+04	No	Essential element
Lead	3/ 3	1.1E+01	1.4E+01	1.3E+01	N	2.7E+01	No	Below background
Magnesium	2/ 2	1.5E+03	4.2E+03	2.8E+03	N	2.8E+03	No	Essential element
Manganese	3/ 3	3.1E+02	5.2E+02	4.3E+02	N	2.0E+03	No	Below background
Mercury	1/ 3	2.9E-02	2.9E-02	4.8E-02	D	5.9E-02	No	Below background
Nickel	2/ 2	1.3E+01	1.6E+01	1.4E+01	N	1.8E+01	No	Below background
Potassium	2/ 2	5.6E+02	8.4E+02	7.0E+02	N	2.0E+03	No	Essential element
Selenium	1/ 3	5.7E-01	5.7E-01	1.3E+00	D	1.7E+00	No	Below background
Thallium	1/ 2	4.0E-01	4.0E-01	3.9E-01	N	8.9E-01	No	Below Background
Vanadium	2/ 2	1.0E+01	1.2E+01	1.1E+01	N	2.6E+01	No	Below background
Zinc	3/ 3	6.4E+01	9.1E+01	7.8E+01	N	5.3E+02	No	Below background
Organics-Total Organic Carbon (concentration units = mg/kg)								
Total Organic Carbon	2/ 2	1.1E+04	1.9E+04	1.5E+04	N	0	Yes	Above background
Organics-Explosives (concentration units = mg/kg)								
2,4,6-Trinitrotoluene	1/ 2	3.4E-01	3.4E-01	2.3E-01	N	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
2-Butanone	1/ 1	1.1E-02	1.1E-02	1.1E-02	X	0	Yes	Above background
Acetone	1/ 1	3.9E-02	3.9E-02	3.9E-02	X	0	Yes	Above background
Toluene	1/ 1	3.8E-03	3.8E-03	3.8E-03	X	0	Yes	Above background
Main Stream Segment and Settling Pond								
Metals (concentration units = mg/kg)								
Aluminum	6/ 6	6.3E+03	1.7E+04	1.3E+04	N	1.4E+04	Yes	Above background
Arsenic	6/ 6	2.0E+00	1.6E+01	1.1E+01	N	2.0E+01	No	Below background
Barium	6/ 6	4.5E+01	1.6E+02	1.1E+02	N	1.2E+02	Yes	Above background
Cadmium	5/ 6	2.8E-01	1.0E+00	6.9E-01	N	0	Yes	Above background
Calcium	5/ 5	9.8E+02	6.7E+03	3.8E+03	N	5.5E+03	No	Essential element
Chromium	6/ 6	9.2E+00	2.2E+01	1.6E+01	X	1.8E+01	Yes	Above background
Cobalt	5/ 5	5.6E+00	1.7E+01	1.4E+01	X	9.1E+00	Yes	Above background
Copper	5/ 5	7.5E+00	3.1E+01	2.4E+01	X	2.8E+01	Yes	Above background
Iron	5/ 5	9.4E+03	3.9E+04	3.1E+04	X	2.8E+04	No	Essential element
Lead	6/ 6	1.2E+01	2.8E+01	2.1E+01	N	2.7E+01	Yes	Above background

Table 4-5. Summary Statistics and Determination of SRCs in Stream and Pond Sediment[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Magnesium	5/ 5	1.5E+03	4.2E+03	3.3E+03	X	2.8E+03	No	Essential element
Manganese	6/ 6	7.8E+01	7.9E+02	5.4E+02	X	2.0E+03	No	Below background
Mercury	5/ 6	3.2E-02	1.3E-01	5.8E-02	L	5.9E-02	Yes	Above background
Nickel	5/ 5	1.1E+01	3.3E+01	2.6E+01	N	1.8E+01	Yes	Above background
Potassium	5/ 5	6.0E+02	1.6E+03	1.3E+03	N	2.0E+03	No	Essential element
Selenium	2/ 6	1.3E+00	1.6E+00	3.1E+00	D	1.7E+00	No	Below background
Thallium	5/ 5	7.1E-01	2.7E+00	1.6E+00	L	8.9E-01	Yes	Above background
Vanadium	5/ 5	1.1E+01	2.7E+01	2.2E+01	X	2.6E+01	Yes	Above background
Zinc	6/ 6	4.8E+01	3.1E+02	2.0E+02	N	5.3E+02	No	Below background
Organics-Total Organic Carbon (concentration units = mg/kg)								
Total Organic Carbon	2/ 2	1.6E+04	6.1E+04	3.8E+04	N	0	Yes	Above background
Organics-Explosives (concentration units = mg/kg)								
2,4,6-Trinitrotoluene	1/ 5	4.2E-01	4.2E-01	1.8E-01	D	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
2-Butanone	1/ 1	1.1E-01	1.1E-01	1.1E-01	X	0	Yes	Above background
Acetone	1/ 1	4.1E-01	4.1E-01	4.1E-01	X	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
PCB = Polychlorinated biphenyl.
SRC = Site-related contaminant.

Table 4-6. Summary Statistics and Determination of SRCs in Stream and Pond Surface Water[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Exit Drainage								
Metals (concentration units = mg/L)								
Antimony	1/ 2	2.5E-03	2.5E-03	3.8E-03	N	0	Yes	Above background
Barium	2/ 2	2.1E-02	4.2E-02	3.2E-02	N	4.8E-02	No	Below background
Calcium	2/ 2	4.9E+01	5.3E+01	5.1E+01	N	4.1E+01	No	Essential element
Iron	2/ 2	2.2E-01	1.5E+00	8.6E-01	N	2.6E+00	No	Essential element
Magnesium	2/ 2	7.3E+00	1.2E+01	9.8E+00	N	1.1E+01	No	Essential element
Manganese	2/ 2	9.5E-02	3.4E-01	2.2E-01	N	3.9E-01	No	Below background
Potassium	2/ 2	1.9E+00	2.8E+00	2.4E+00	N	3.2E+00	No	Essential element
Sodium	2/ 2	2.2E+00	4.6E+00	3.4E+00	N	2.1E+01	No	Essential element
Vanadium	1/ 2	1.4E-03	1.4E-03	2.5E-03	N	0	Yes	Above background
Zinc	2/ 2	1.3E-02	1.3E-02	1.3E-02	X	4.2E-02	No	Below background
Organics-Volatile (concentration units = mg/L)								
Acetone	1/ 1	1.2E-03	1.2E-03	1.2E-03	X	0	Yes	Above background
Main Stream Segment Upstream of Perimeter Road								
Metals (concentration units = mg/L)								
Aluminum	1/ 2	4.5E-01	4.5E-01	3.0E-01	N	3.4E+00	No	Below background
Arsenic	2/ 2	7.0E-03	7.1E-03	7.1E-03	N	3.2E-03	Yes	Above background
Barium	2/ 2	5.2E-02	5.9E-02	5.6E-02	N	4.8E-02	Yes	Above background
Cadmium	1/ 2	3.0E-04	3.0E-04	1.4E-03	N	0	Yes	Above background
Calcium	2/ 2	3.5E+01	6.2E+01	4.8E+01	N	4.1E+01	No	Essential element
Iron	2/ 2	1.2E+00	4.6E+00	2.9E+00	N	2.6E+00	No	Essential element
Magnesium	2/ 2	9.0E+00	1.7E+01	1.3E+01	N	1.1E+01	No	Essential element
Manganese	2/ 2	3.2E+00	3.6E+00	3.4E+00	N	3.9E-01	Yes	Above background
Mercury	1/ 2	7.8E-05	7.8E-05	8.9E-05	N	0	Yes	Above background
Potassium	2/ 2	3.1E+00	3.3E+00	3.2E+00	N	3.2E+00	No	Essential element
Sodium	2/ 2	5.1E+00	6.8E+00	6.0E+00	N	2.1E+01	No	Essential element
Vanadium	1/ 2	9.9E-04	9.9E-04	2.2E-03	N	0	Yes	Above background
Zinc	1/ 2	2.0E-02	2.0E-02	2.0E-02	X	4.2E-02	No	Below background
Main Stream Segment and Settling Pond								
Metals (concentration units = mg/L)								
Aluminum	1/ 5	1.1E+00	1.1E+00	2.9E-01	D	3.4E+00	No	Below background
Barium	5/ 5	2.5E-02	3.5E-02	3.1E-02	N	4.8E-02	No	Below background
Calcium	5/ 5	2.0E+01	2.3E+01	2.2E+01	X	4.1E+01	No	Essential element

Table 4-6. Summary Statistics and Determination of SRCs in Stream and Pond Surface Water[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Iron	5/ 5	7.2E-01	1.7E+00	1.1E+00	L	2.6E+00	No	Essential element
Magnesium	5/ 5	6.9E+00	8.2E+00	7.9E+00	X	1.1E+01	No	Essential element
Manganese	5/ 5	8.1E-02	5.1E-01	3.2E-01	N	3.9E-01	Yes	Above background
Mercury	1/ 5	9.2E-05	9.2E-05	9.8E-05	D	0	Yes	Above background
Potassium	4/ 5	8.7E-01	9.2E-01	7.7E-01	X	3.2E+00	No	Essential element
Sodium	5/ 5	3.6E+00	4.9E+00	3.9E+00	X	2.1E+01	No	Essential element
Vanadium	1/ 5	1.8E-03	1.8E-03	3.2E-03	D	0	Yes	Above background
Zinc	2/ 5	1.6E-02	2.6E-02	2.0E-02	D	4.2E-02	No	Below background
Organics-Pesticide/PCB (concentration units = mg/L)								
4,4'-DDT	1/ 1	3.1E-04	3.1E-04	3.1E-04	X	0	Yes	Above background
Organics-Volatile (concentration units = mg/L)								
Acetone	1/ 1	3.1E-03	3.1E-03	3.1E-03	X	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
DDT = Dichlorodiphenyltrichloroethane.
PCB = Polychlorinated biphenyl.
SRC = Site-related contaminant.

Table 4-7. Summary Statistics and Determination of SRCs in Miscellaneous Surface Water[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Miscellaneous Water Samples Aggregate								
Metals (concentration units = mg/L)								
Aluminum	1/ 1	5.1E-01	5.1E-01	5.1E-01	X	3.4E+00	No	Below background
Barium	1/ 1	4.9E-02	4.9E-02	4.9E-02	X	4.8E-02	Yes	Above background
Calcium	1/ 1	5.0E+01	5.0E+01	5.0E+01	X	4.1E+01	No	Essential element
Iron	1/ 1	1.7E+00	1.7E+00	1.7E+00	X	2.6E+00	No	Essential element
Magnesium	1/ 1	8.2E+00	8.2E+00	8.2E+00	X	1.1E+01	No	Essential element
Manganese	1/ 1	4.3E-01	4.3E-01	4.3E-01	X	3.9E-01	Yes	Above background
Potassium	1/ 1	2.3E+00	2.3E+00	2.3E+00	X	3.2E+00	No	Essential element
Sodium	1/ 1	2.7E+00	2.7E+00	2.7E+00	X	2.1E+01	No	Essential element
Vanadium	1/ 1	1.3E-03	1.3E-03	1.3E-03	X	0	Yes	Above background
Zinc	1/ 1	9.0E-02	9.0E-02	9.0E-02	X	4.2E-02	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
SRC = Site-related contaminant.

Table 4-8. Summary Statistics and Determination of SRCs in Groundwater[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Metals (concentration units =mg/L)								
Arsenic	2/ 8	6.5E-03	1.3E-02	8.1E-03	D	1.2E-02	Yes	Above background
Barium	8/ 8	1.7E-02	1.1E-01	4.8E-02	L	8.2E-02	Yes	Above background
Calcium	8/ 8	3.2E+01	2.5E+02	1.2E+02	L	1.2E+02	No	Essential element
Iron	5/ 8	3.1E-01	1.2E+01	1.9E+00	X	2.8E-01	No	Essential element
Magnesium	8/ 8	1.4E+01	6.8E+01	3.1E+01	L	4.3E+01	No	Essential element
Manganese	8/ 8	2.3E-01	2.7E+00	9.8E-01	L	1.0E+00	Yes	Above background
Nickel	5/ 8	2.8E-03	1.6E-02	8.6E-03	L	0	Yes	Above background
Potassium	8/ 8	9.3E-01	2.6E+00	1.6E+00	L	2.9E+00	No	Essential element
Sodium	8/ 8	2.3E+00	1.6E+01	7.8E+00	L	4.6E+01	No	Essential element
Zinc	1/ 8	1.6E-02	1.6E-02	2.0E-02	D	6.1E-02	No	Below background
Organics-Semivolatile (concentration units =mg/L)								
Bis(2-ethylhexyl)phthalate	1/ 8	4.4E-03	4.4E-03	4.9E-03	D	0	Yes	Above background
Organics-Volatile (concentration units =mg/L)								
Carbon Disulfide	1/ 8	2.0E-04	2.0E-04	4.6E-04	D	0	Yes	Above background
Chloromethane	1/ 8	1.3E-04	1.3E-04	4.5E-04	D	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
SRC = Site-related contaminant.

Table 4-9. Summary Statistics and Determination of SRCs in Storm and Sanitary Sewer Sediment[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Storm/Sanitary Sewers Sediment Samples Aggregate								
Metals (concentration units = mg/kg)								
Aluminum	9/ 9	1.2E+03	9.9E+03	4.8E+03	L	1.4E+04	No	Below background
Arsenic	9/ 9	2.4E+00	1.6E+02	2.7E+01	L	2.0E+01	Yes	Above background
Barium	9/ 9	1.5E+01	6.0E+02	1.3E+02	L	1.2E+02	Yes	Above background
Beryllium	7/ 9	1.1E-01	2.5E+00	5.4E-01	L	3.8E-01	Yes	Above background
Cadmium	8/ 9	1.8E-01	3.1E+00	2.2E+00	L	0	Yes	Above background
Calcium	9/ 9	6.0E+02	1.3E+05	2.3E+04	L	5.5E+03	No	Essential element
Chromium	8/ 9	3.7E+00	1.3E+01	8.3E+00	N	1.8E+01	No	Below background
Cobalt	9/ 9	2.4E+00	4.6E+01	1.0E+01	L	9.1E+00	Yes	Above background
Copper	9/ 9	4.0E+00	6.2E+01	2.7E+01	L	2.8E+01	Yes	Above background
Iron	9/ 9	7.2E+03	2.0E+05	5.4E+04	L	2.8E+04	No	Essential element
Lead	9/ 9	1.1E+01	2.5E+02	5.0E+01	X	2.7E+01	Yes	Above background
Magnesium	9/ 9	4.1E+02	3.8E+03	1.6E+03	L	2.8E+03	No	Essential element
Manganese	9/ 9	1.6E+02	3.1E+04	4.2E+03	L	2.0E+03	Yes	Above background
Mercury	7/ 9	1.4E-02	2.8E-01	1.1E-01	L	5.9E-02	Yes	Above background
Nickel	9/ 9	3.9E+00	6.4E+01	1.9E+01	L	1.8E+01	Yes	Above background
Potassium	9/ 9	1.6E+02	1.1E+03	4.8E+02	L	2.0E+03	No	Essential element
Selenium	2/ 9	4.4E-01	2.5E+00	6.7E+00	D	1.7E+00	Yes	Above background
Thallium	9/ 9	2.5E-01	3.6E+00	1.2E+00	L	8.9E-01	Yes	Above background
Vanadium	9/ 9	2.9E+00	2.9E+01	1.2E+01	L	2.6E+01	Yes	Above background
Zinc	9/ 9	4.4E+01	6.6E+02	2.1E+02	L	5.3E+02	Yes	Above background
Organics-Pesticide/PCB (concentration units = mg/kg)								
4,4'-DDE	1/ 3	1.0E-02	1.0E-02	7.4E-03	D	0	Yes	Above background
Dieldrin	1/ 3	8.1E-03	8.1E-03	6.7E-03	D	0	Yes	Above background
Endrin Aldehyde	1/ 3	1.2E-02	1.2E-02	8.0E-03	D	0	Yes	Above background
PCB-1254	1/ 9	6.7E-01	6.7E-01	1.2E-01	D	0	Yes	Above background
PCB-1260	2/ 6	4.8E-02	1.4E-01	5.0E-02	D	0	Yes	Above background
beta-BHC	1/ 3	4.4E-02	4.4E-02	1.6E-02	D	0	Yes	Above background
gamma-Chlordane	1/ 3	6.1E-03	6.1E-03	6.1E-03	D	0	Yes	Above background
Organics-Semivolatile (concentration units = mg/kg)								
Acenaphthene	1/ 3	1.6E-01	1.6E-01	4.7E-01	D	0	Yes	Above background
Anthracene	2/ 3	3.4E-01	8.4E-01	4.6E-01	L	0	Yes	Above background
Benz(*a*)anthracene	2/ 3	1.8E+00	3.2E+00	1.7E+00	N	0	Yes	Above background

Table 4-9. Summary Statistics and Determination of SRCs in Storm and Sanitary Sewer Sediment[a] (continued)

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Benzo(*a*)pyrene	2/ 3	1.3E+00	3.5E+00	1.7E+00	L	0	Yes	Above background
Benzo(*b*)fluoranthene	2/ 3	1.7E+00	5.5E+00	2.5E+00	L	0	Yes	Above background
Benzo(*g,h,i*)perylene	2/ 3	5.2E-01	1.8E+00	8.4E-01	L	0	Yes	Above background
Benzo(*k*)fluoranthene	2/ 3	6.7E-01	1.7E+00	8.6E-01	L	0	Yes	Above background
Chrysene	2/ 3	1.7E+00	4.0E+00	2.0E+00	N	0	Yes	Above background
Dibenz(*a,h*)anthracene	2/ 3	1.5E-01	5.1E-01	2.9E-01	L	0	Yes	Above background
Fluoranthene	2/ 3	4.4E+00	4.4E+00	3.0E+00	X	0	Yes	Above background
Fluorene	1/ 3	3.9E-01	3.9E-01	5.5E-01	D	0	Yes	Above background
Indeno(1,2,3-*cd*)pyrene	2/ 3	5.1E-01	1.8E+00	8.4E-01	L	0	Yes	Above background
Phenanthrene	2/ 3	1.5E+00	3.0E+00	1.6E+00	N	0	Yes	Above background
Pyrene	2/ 3	4.2E+00	4.9E+00	3.1E+00	N	0	Yes	Above background
Organics-Volatile (concentration units = mg/kg)								
2-Butanone	1/ 3	5.4E-02	5.4E-02	2.7E-02	D	0	Yes	Above background
Acetone	1/ 3	2.3E-01	2.3E-01	8.5E-02	D	0	Yes	Above background
Toluene	1/ 3	6.4E-03	6.4E-03	4.3E-03	D	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
BHC = Benzene hexachloride.
DDE = Dichlorodiphenyldichloroethylene.
PCB = Polychlorinated biphenyl.
SRC = Site-related contaminant.

Table 4-10. Summary Statistics and Determination of SRCs in Storm and Sanitary Sewer Water[a]

Contaminant	Freq. of Det.	Min. Det.	Max. Det.	Mean Conc.	Dist. [b]	Background Conc.	SRC?	Justification[c]
Storm/Sanitary Sewers Water Samples Aggregate								
Metals (concentration units = mg/L)								
Aluminum	3/ 7	8.9E-02	6.2E-01	1.5E-01	D	3.4E+00	No	Below background
Barium	7/ 7	1.4E-02	4.2E-02	2.6E-02	L	4.8E-02	No	Below background
Cadmium	2/ 7	2.9E-04	3.1E-04	1.9E-03	D	0	Yes	Above background
Calcium	7/ 7	2.1E+01	1.1E+02	4.4E+01	L	4.1E+01	No	Essential element
Copper	2/ 7	7.3E-03	9.2E-03	7.7E-03	D	7.9E-03	Yes	Above background
Iron	7/ 7	1.4E-01	2.5E+00	6.3E-01	L	2.6E+00	No	Essential element
Lead	2/ 7	6.4E-03	9.4E-03	5.8E-03	D	0	Yes	Above background
Magnesium	7/ 7	1.2E+00	1.6E+01	6.2E+00	L	1.1E+01	No	Essential element
Manganese	7/ 7	8.6E-03	3.7E-01	9.7E-02	L	3.9E-01	No	Below background
Potassium	6/ 7	9.0E-01	3.6E+00	1.7E+00	N	3.2E+00	No	Essential element
Sodium	7/ 7	7.7E-01	3.7E+00	2.1E+00	N	2.1E+01	No	Essential element
Vanadium	2/ 7	9.2E-04	1.5E-03	2.5E-03	D	0	Yes	Above background
Zinc	4/ 7	1.4E-02	2.2E-01	6.3E-02	L	4.2E-02	Yes	Above background
Organics-Explosives (concentration units = mg/L)								
2-Amino-4,6-Dinitrotoluene	2/ 7	1.3E-04	3.0E-04	1.3E-04	D	0	Yes	Above background
4-Amino-2,6-Dinitrotoluene	2/ 7	3.0E-04	3.4E-04	1.6E-04	D	0	Yes	Above background
RDX	1/ 7	4.6E-04	4.6E-04	2.8E-04	D	0	Yes	Above background
Organics-Volatile (concentration units = mg/L)								
Acetone	2/ 2	9.0E-04	1.1E-03	1.0E-03	N	0	Yes	Above background

[a] One-half of the method detection limit was used as a surrogate for non-detect results in the calculation of summary statistics.
[b] Distribution: D = Fewer than 50% detected - distribution not determined; L = Lognormal distribution; N = Normal distribution; X = Neither normal nor lognormal.
[c] The essential nutrient screen was not applied for the Screening Ecological Risk Assessment.
RDX = Hexahydro-1,3,5,-trinitro-1,3,5-triazine.
SRC = Site-related contaminant.

detected constituents were carried forward to the facility-wide background and essential human nutrient screening steps, as applicable.

All detected explosives and propellants were considered to be SRCs regardless of the frequency of detection and; thus, were subjected to the risk evaluation (Chapters 6.0 and 7.0). However, the text clearly points out those explosives and propellants having a frequency of detection less than 5%.

4.1.3.3 Facility-wide background screen

For each inorganic constituent passing the frequency of detection screen, concentrations were compared against facility-wide background values developed as part of the Phase II RI for WBG (USACE 1999). For inorganic constituents, if the maximum detected concentration (MDC) of an analyte exceeded its respective background criterion, it was considered to be an SRC. In the event a constituent was not detected in the background data set, the background value was set to zero, and any detected result for that constituent was considered above background. This conservative process ensured that detected constituents were not eliminated as SRCs simply because they were not detected in the background data set. All detected organic compounds were considered to be above background because these classes of compounds do not occur naturally.

4.1.3.4 Essential nutrients screen

Chemicals that are considered to be essential nutrients (calcium, chloride, iodine, iron, magnesium, potassium, phosphorus, and sodium) are an integral part of the food supply and are often added to foods as supplements. Thus, these constituents are not generally addressed as SRCs in the contaminant nature and extent evaluation and the baseline human health risk assessment (BHHRA) (EPA 1989a and 1996b) unless they are grossly elevated relative to background values. The essential nutrient screen is not applied for the ERA. For the Load Line 4 Phase II RI, analyses were conducted for calcium, iron, magnesium, potassium, and sodium. These five constituents were eliminated as SRCs in all environmental media based on comparison to background values.

4.1.4 Data Presentation

Data summary statistics and screening results for SRCs in each data aggregate are presented in Tables 4-3 through 4-10. In the sections addressing the nature and extent of contamination for each media, analytical results for selected SRCs are presented on maps to depict spatial distribution. Inorganic chemicals depicted on figures were selected based on process knowledge and highest frequency of detection and/or magnitude above background. The relative concentrations above background were bracketed by non-detects and the MDC, and they were arbitrarily subdivided between the highs and lows. This is intended to give the reader a sense of the relative concentrations. Analytical results for classes of SRCs (e.g., explosive compounds, inorganics, or VOCs) are presented in data summary tables for each media and spatial aggregate whenever a sufficient number of detected values occurred to merit such tables. Where few detected values for a class of SRCs occurred, the values are addressed in the text of the chapter. Complete analytical results, including all non-detected results, are contained in Appendix I. Each table in Appendix I presents the results for each sampling station for a specific medium aggregate (e.g., surface soil, subsurface soil, sediment) and class of analytes. Complete results for the samples taken during the Phase I RI are listed in the report addressing that investigation (USACE 1998). Results for field laboratory analyses of TNT and RDX are contained in Appendix J.

4.1.5 Use of Phase I Remedial Investigation Data

Load Line 4 has remained relatively undisturbed between the Phase I and Phase II RIs. No demolition of structures or extensive disturbance of soil has occurred. Accordingly, soil data obtained during the Phase I RI in 1996 were deemed to still represent current conditions at the AOC. Phase I RI soil data are incorporated into the appropriate data aggregates and evaluated in conjunction with Phase II data in the contaminant nature and extent evaluation. The Phase I soil data are also included in quantitative analyses (e.g., summary statistics and risk evaluations). Surface soil samples collected during the Phase I RI were collected from the 0 to 0.6-m (0 to 2-ft) bgs interval; these were assigned as surface soil aggregate samples in the evaluation of nature and extent and risk evaluations.

Sediment data collected from streams and ponds during the Phase I RI represents a transient media. Where a Phase I station was re-sampled during the Phase II RI, the latter data were used as the most representative of current conditions in assessment of contaminant nature and extent and risk evaluations. In locations where only Phase I RI data existed, they were used by necessity to provide an overall evaluation of contamination and risk. Phase I RI dry sediment samples from ditch lines (nonviable habitat), were addressed as soil as discussed in Section 4.1.2.

Phase I data are appropriately qualified in the nature and extent and risk evaluations with respect to uncertainties resulting from their age, changes in analytical methods and detection limits, and limited target analyte lists for many samples. However, the Phase I RI data for soil and sediment provide valuable information regarding extent of contamination related to source areas and within exit conveyances from the source areas.

4.2 SURFACE SOIL

4.2.1 Summary of Phase I Remedial Investigation Data

Samples were collected at 47 Phase I RI surface soil locations for analysis of explosives and 11 process-related inorganic analytes. Eleven of the samples were also analyzed for TAL metals, cyanide, VOCs, SVOCs, pesticides, and PCBs. The interpretation of the chemical data acquired during the Phase I RI is summarized as follows.

- 2,4,6-Trinitrotoluene (2,4,6-TNT) was present in 9 of the 47 samples. These samples are associated with Buildings G-8, the washout facility south of Building G-8, and Buildings G-12, G-12A, and G-13. RDX was detected only in a sample collected near the southwest corner of Building G-8. HMX was also detected once, in a sample collected northeast of Building G-12.

- Inorganic analytes were present in all samples and were present at the highest concentrations around Buildings G-8, G-12, G-12A, G-13, and G-17.

- Beryllium, cadmium, cobalt, lead, nickel, and zinc were the most abundant and concentrated of the metals detected in surface soil.

- PAH and pesticide/PCB compounds were the dominant organic constituents. The greatest concentrations of these analytes were found southeast and east of Building G-8, the southeast corner of Building G-12, immediately east of Building G-17, and at vacuum pump exhaust outlets at the ammunition cooling building northeast of Building G-12.

4.2.2 Geotechnical Results

Four disturbed soil samples were collected from selected surface soil sample locations during the Phase II RI and submitted for geotechnical analyses including moisture content, Atterberg Limits, grain size distribution, pH, specific gravity, and USCS classification. In addition, 17 grab samples of surface soil were collected and submitted for measurement of pH and moisture content. The data are summarized in Table 4-11.

Table 4-11. Geotechnical Data for Load Line 4 Surface Soil Samples

Station ID	Depth (ft)	Moisture Content (%)	Atterberg Limits Units			Grain Size				pH	Specific Gravity	USCS
			LL	PL	PI	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			
LL4-071	0 to 1	20.9	—	—	—	—	—	—	—	6.92	—	—
LL4-072	0 to 1	25.4	—	—	—	—	—	—	—	6.68	—	—
LL4-073	0 to 1	15.7	—	—	—	—	—	—	—	6.60	—	—
LL4-074	0 to 1	23.2	41	27	14	0.0	16.1	43.5	40.4	6.81	2.635	Silt with sand (ML)
LL4-075	0 to 1	14.6	—	—	—	—	—	—	—	7.56	—	—
LL4-077	0 to 1	16.6	—	—	—	—	—	—	—	7.26	—	—
LL4-078	0 to 1	21.8	—	—	—	—	—	—	—	6.86	—	—
LL4-080	0 to 1	15.3	—	—	—	—	—	—	—	7.32	—	—
LL4-081	0 to 1	19.7	—	—	—	—	—	—	—	7.13	—	—
LL4-082	0 to 1	17.7	—	—	—	—	—	—	—	7.43	—	—
LL4-083	0 to 1	23.1	36	25	11	0.0	33.7	35.9	30.4	4.71	2.641	Sandy silt (ML)
LL4-105	0 to 1	18.1	—	—	—	—	—	—	—	6.44	—	—
LL4-106	0 to 1	18.3	—	—	—	—	—	—	—	5.01	—	—
LL4-107	0 to 1	13.1	—	—	—	—	—	—	—	4.70	—	—
LL4-110	0 to 1	42.0	28	22	6	0.0	33.2	32.8	34.0	5.84	2.670	Sandy silt clay (CL-ML)
LL4-111	0 to 1	15.8	—	—	—	—	—	—	—	7.01	—	—
LL4-117	0 to 1	20.3	—	—	—	—	—	—	—	5.86	—	—
LL4-118	0 to 1	10.3	31	17	14	0.0	53.9	15.1	31.0	6.91	2.667	Clayey sand (SC)
LL4-121	0 to 1	16.2	—	—	—	—	—	—	—	4.98	—	—
LL4-122	0 to 1	16.2	—	—	—	—	—	—	—	6.22	—	—
LL4-142	0 to 1	12.9	—	—	—	—	—	—	—	6.85	—	—

ID = Identification.
LL = Liquid limit.
PI = Plasticity index.
PL = Plasticity limit.
USCS = Unified Soil Classification System.

Sieve analyses and USCS classification identified the undisturbed samples as ranging from clayey sand (SC) to silt with sand (ML). Moisture content of these four samples ranged from 10.3% (LL4-118) to 42.0% (LL4-110) and all four samples were identified as having some degree of plasticity.

4.2.3 Explosives and Propellants

Ninety-three surface soil samples were collected and submitted for results of field explosives across Load Line 4. Twenty samples had results greater than 1 mg/kg and were submitted for fixed-base laboratory confirmation. Of the remaining 73 samples with field explosives < 1 mg/kg, 19 (26%) were submitted for fixed-base laboratory confirmation.

The distribution of detected explosives in surface soil at each of the Load Line 4 soil aggregates is described below. Figures 4-2 and 4-3 illustrate the distribution of detected explosives in surface soil across Load Line 4.

4.2.3.1 Explosives Handling Areas Aggregate

Three explosives compounds were identified as SRCs in surface soil samples collected from the Explosives Handling Areas Aggregate (Table 4-3). Table 4-12 presents a summary of all detected explosives compounds by sampling station. Of the explosives compounds detected, (2,4,6-TNT) was the most widespread, occurring in nearly 20% (10 of 52) of the surface soil samples analyzed for explosives. The remaining explosives compounds detected were HMX (2 of 52 samples) and RDX (2 of 52 samples).

- **2,4,6-TNT.** The two highest concentrations of this explosive were detected in samples collected adjacent to Building G-12A; the sample collected at station LL4ss-031 on the north side of the building exhibited a concentration of 1.8 mg/kg and the sample collected at station LL4ss-032 on the south side of the building exhibited a concentration of 2.2 mg/kg. The next highest concentrations were seen in samples collected east of Building G-8 (0.69 mg/kg at station LL4ss-023), at the southeast corner of Building G-12A (0.61 mg/kg at station LL4ss-033), south of Building G-12 (0.55 mg/kg at station LL4ss-028), and at the northeast corner of Building G-8 (0.41 mg/kg at station LL4ss-003). The remaining detected results occur at actual or estimated concentrations of 0.27 mg/kg or less.

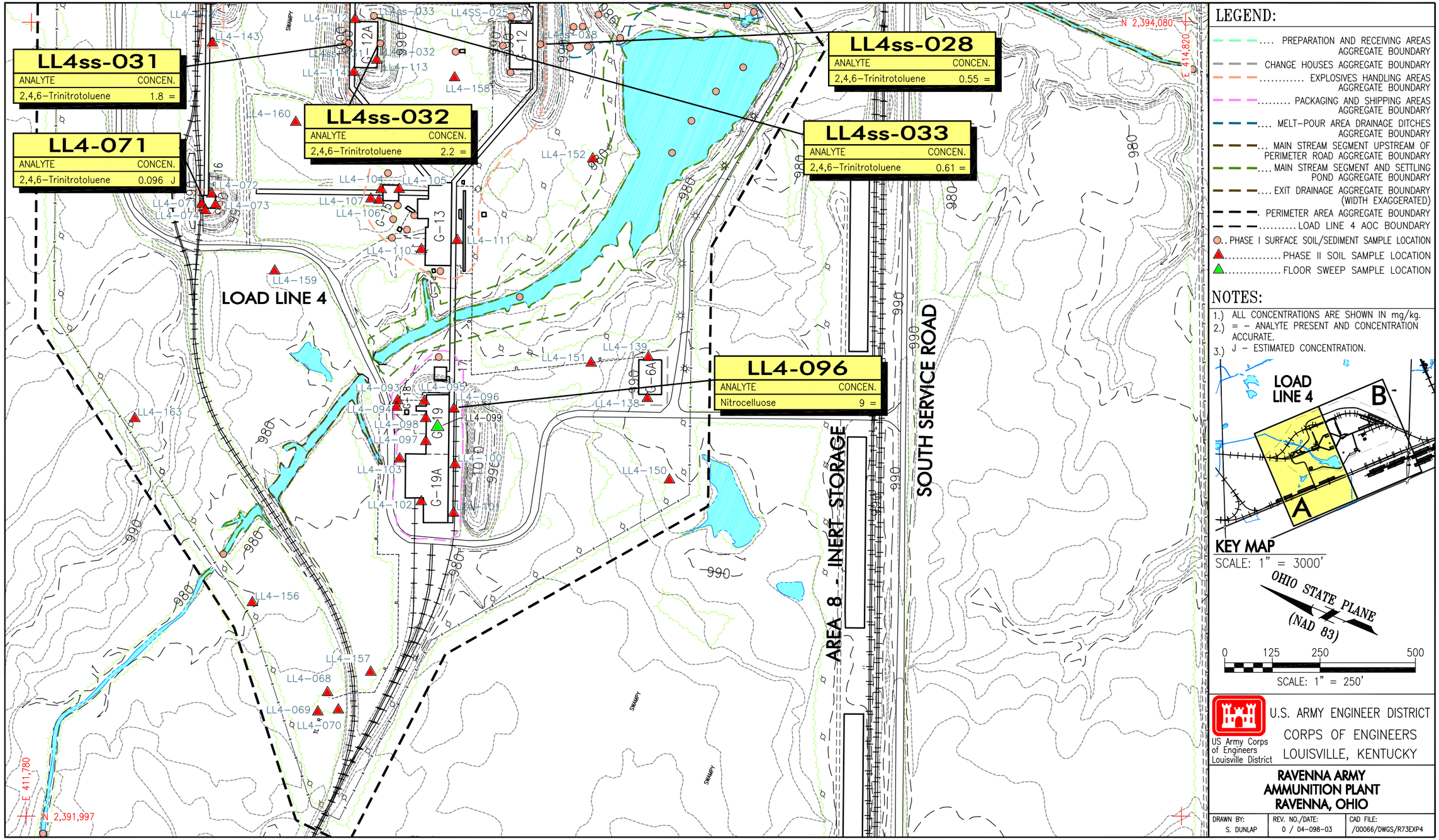
  Field analytical results indicated the presence of 2,4,6-TNT in surface soil near buildings G-9, G-11, and G-16; however, this compound was detected in subsequent laboratory analysis only in the sample collected on the north side of Building G-16 (LL4-071, at a comparatively low estimated concentration of 0.096 mg/kg).

- **HMX.** HMX was detected at two stations. In the sample from station LL4-142, near Building G-8, HMX was detected at a concentration of 3.6 mg/kg. In the sample from station LL4ss-067, east of G-12, this explosive was detected at an estimated concentration of 1 mg/kg.

- **RDX.** RDX was also detected in the sample from station LL4-142, near Building G-8, as was HMX (see above). RDX was detected at a concentration of 19 mg/kg. The field analysis for this sample indicated the presence of RDX at a concentration of 11.46 mg/kg. In the sample from station LL4ss-007, collected at the southwest corner of Building G-8, RDX was detected at an estimated concentration of 0.27 mg/kg.

4.2.3.2 Preparation and Receiving Areas Aggregate

Based on field analyses for TNT and RDX, three surface soil samples from the Preparation and Receiving Areas Aggregate were submitted for laboratory analysis of explosives and propellants (Table 4-3). Field analyses of the sample collected from station LL4-088, adjacent to Building G-1A, detected 2,4,6-TNT at a concentration of 10.3 mg/kg. This explosive compound was not detected during subsequent laboratory analyses of the sample; however, nitrocellulose was detected at a concentration of 18.8 mg/kg (Figures 4-2 and 4-3, and Table 4-13) and is considered to be an SRC for this aggregate. Field analysis of the surface soil samples collected from stations LL4-084, adjacent to Building G-1, and LL4-127, adjacent to Building G-3, detected 2,4,6-TNT at a concentration of 5.3 mg/kg and 1.4 mg/kg, respectively; however, no explosives compounds were detected during subsequent laboratory analyses of these samples.



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY
- LOAD LINE 4 AOC BOUNDARY
- PHASE I SURFACE SOIL/SEDIMENT SAMPLE LOCATION
- PHASE II SOIL SAMPLE LOCATION
- FLOOR SWEEP SAMPLE LOCATION

NOTES:

1.) ALL CONCENTRATIONS ARE SHOWN IN mg/kg.
2.) = - ANALYTE PRESENT AND CONCENTRATION ACCURATE.
J - ESTIMATED CONCENTRATION.
3.)

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

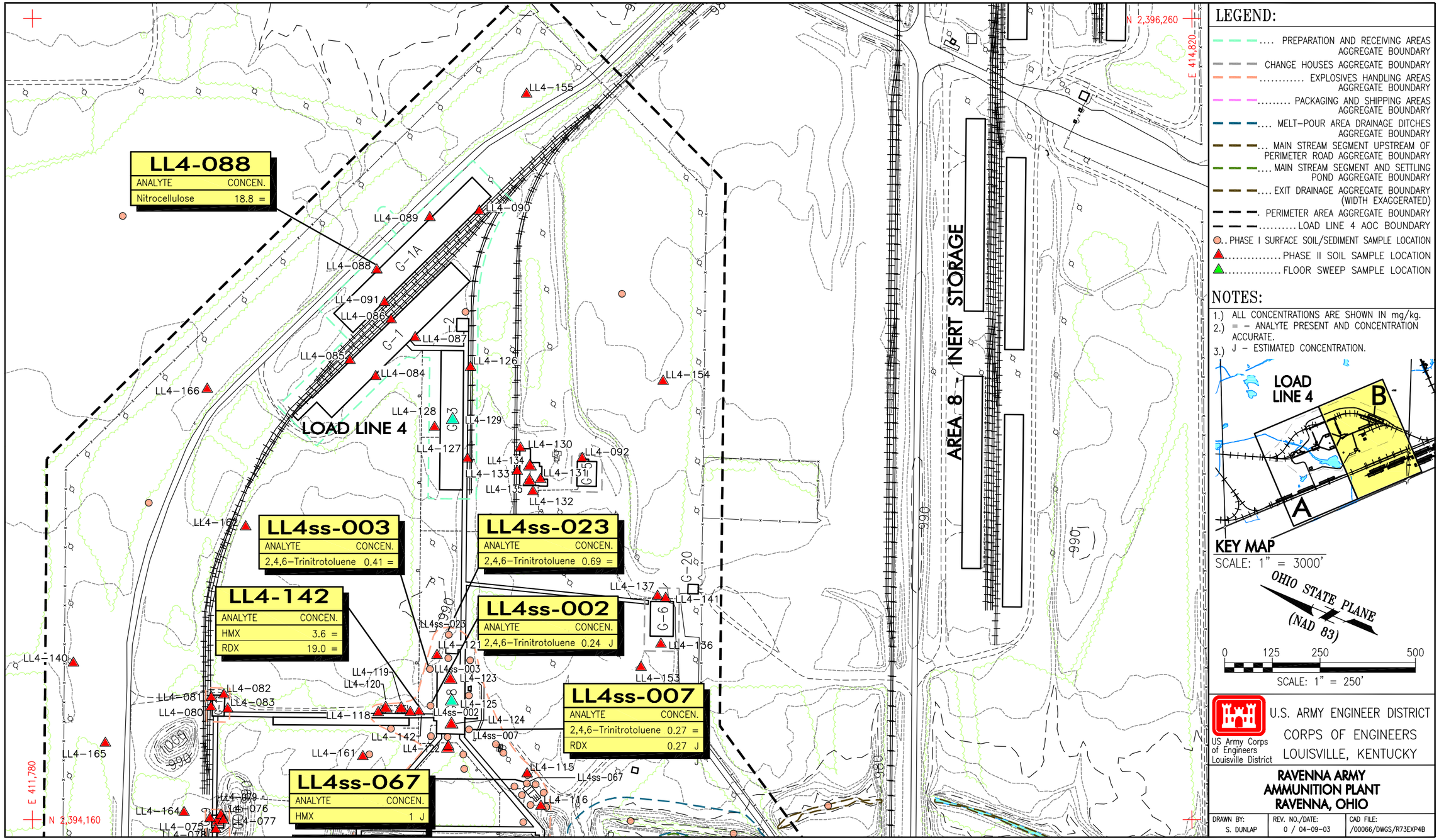
US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
S. DUNLAP	0 / 04-098-03	/00066/DWGS/R73EXP4

Figure 4-2. Explosives and Propellants Detected in Surface Soil at Load Line 4 - Western Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY
- LOAD LINE 4 AOC BOUNDARY
- PHASE I SURFACE SOIL/SEDIMENT SAMPLE LOCATION
- PHASE II SOIL SAMPLE LOCATION
- FLOOR SWEEP SAMPLE LOCATION

NOTES:

1.) ALL CONCENTRATIONS ARE SHOWN IN mg/kg.
2.) = – ANALYTE PRESENT AND CONCENTRATION ACCURATE.
3.) J – ESTIMATED CONCENTRATION.

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

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**RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO**

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Figure 4-3. Explosives and Propellants Detected in Surface Soil at Load Line 4 - Eastern Section

Table 4-12. Summary Data for Explosives and Propellants Detected in Explosives Handling Areas Aggregate Surface Soil[a]

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-071**	**LL4-073**	**LL4-075**	**LL4-076**	**LL4-076**	**LL4-077**	**LL4-080**
Sample ID		**LL40689**	**LL40695**	**LL40701**	**LL40704**	**LL41138**	**LL40707**	**LL40714**
Date		**08/21/2001**	**08/21/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**
Analyte	**Units**							
Explosives								
2,4,6-Trinitrotoluene	mg/kg	0.096 J	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RDX	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-081**	**LL4-105**	**LL4-113**	**LL4-114**	**LL4-116**	**LL4-116**	**LL4-142**
Sample ID		**LL40717**	**LL40787**	**LL40807**	**LL40810**	**LL40816**	**LL41141**	**LL40878**
Date		**08/22/2001**	**08/13/2001**	**08/21/2001**	**08/21/2001**	**08/14/2001**	**08/14/2001**	**08/24/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**							
Explosives								
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.6 =
RDX	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	19 =

Table 4-12. Summary Data for Explosives and Propellants Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-001**	**LL4ss-002**	**LL4ss-003**	**LL4ss-005**	**LL4ss-006**	**LL4ss-007**
Sample ID		**LL4SS-001-0231-SO**	**LL4SS-002-0232-SO**	**LL4SS-003-0233-SO**	**LL4SS-005-0235-SO**	**LL4SS-006-0236-SO**	**LL4SS-007-0237-SO**
Date		**07/26/1996**	**07/27/1996**	**07/27/1996**	**07/27/1996**	**07/26/1996**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 2**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.24 J	0.41 =	0.25 U	0.25 U	0.27 =
HMX	mg/kg	2 U	2 U	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U	1 U	0.27 J

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-008**	**LL4ss-009**	**LL4ss-010**	**LL4ss-011**	**LL4ss-012**	**LL4ss-014**
Sample ID		**LL4SS-008-0238-SO**	**LL4SS-009-0239-SO**	**LL4SS-010-0240-SO**	**LL4SS-011-0241-SO**	**LL4SS-012-0242-SO**	**LL4SS-014-0244-SO**
Date		**07/27/1996**	**07/27/1996**	**07/31/1996**	**07/26/1996**	**07/26/1996**	**07/24/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 2**	**0 - 1**	**0 - 2**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	mg/kg	2 U	2 U	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U	1 U	1 U

Table 4-12. Summary Data for Explosives and Propellants Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-015**	**LL4ss-016**	**LL4ss-017**	**LL4ss-018**	**LL4ss-019**	**LL4ss-020**
Sample ID		**LL4SS-015-0245-SO**	**LL4SS-016-0246-SO**	**LL4SS-017-0247-SO**	**LL4SS-018-0248-SO**	**LL4SS-019-0249-SO**	**LL4SS-020-0250-SO**
Date		**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/24/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.25 UJ	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U
HMX	mg/kg	2 UJ	2 UJ	2 U	2 U	2 U	2 U
RDX	mg/kg	1 UJ	1 UJ	1 U	1 U	1 U	1 U

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-023**	**LL4ss-024**	**LL4ss-025**	**LL4ss-025**	**LL4ss-027**	**LL4ss-028**
Sample ID		**LL4SS-023-0253-SO**	**LL4SS-024-0254-SO**	**LL4SS-025-0255-SO**	**LL4SS-025-0256-FD**	**LL4SS-027-0258-SO**	**LL4SS-028-0259-SO**
Date		**07/27/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**	**07/25/1996**	**07/23/1996**
Depth (ft)		**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.69 =	0.25 U	0.25 U	0.25 U	0.25 U	0.55 =
HMX	mg/kg	2 U	2 U	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U	1 U	1 U

Table 4-12. Summary Data for Explosives and Propellants Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-029**	**LL4ss-030**	**LL4ss-031**	**LL4ss-032**	**LL4ss-032**	**LL4ss-033**
Sample ID		**LL4SS-029-0260-SO**	**LL4SS-030-0261-SO**	**LL4SS-031-0262-SO**	**LL4SS-032-0263-SO**	**LL4SS-033-0264-FD**	**LL4SS-033-0266-SO**
Date		**07/25/1996**	**07/31/1996**	**07/25/1996**	**07/25/1996**	**07/25/1996**	**07/25/1996**
Depth (ft)		**0 - 1**	**0 - 0**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	1.8 =	2.2 =	0.32 =	0.61 =
HMX	mg/kg	2 U	2 U	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U	1 U	1 U

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-034**	**LL4ss-035**	**LL4ss-036**	**LL4ss-036**	**LL4ss-037**	**LL4ss-038**
Sample ID		**LL4SS-034-0267-SO**	**LL4SS-035-0268-SO**	**LL4SS-036-0269-SO**	**LL4SS-036-0270-FD**	**LL4SS-037-0271-SO**	**LL4SS-038-0272-SO**
Date		**07/26/1996**	**07/26/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**
Depth (ft)		**0 - 2**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Explosives							
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	mg/kg	2 U	2 U	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U	1 U	1 U

Table 4-12. Summary Data for Explosives and Propellants Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-039**	**LL4ss-040**	**LL4ss-045**	**LL4ss-062**
Sample ID		**LL4SS-039-0273-SO**	**LL4SS-040-0274-SO**	**LL4SS-045-0280-SO**	**LL4SS-062-0595-SO**
Date		**07/28/1996**	**07/28/1996**	**07/31/1996**	**08/12/1996**
Depth (ft)		**0 - 2**	**0 - 2**	**0 - 1**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab**
Analyte	**Units**				
Explosives					
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.32 J
HMX	mg/kg	2 U	2 U	2 U	2 U
RDX	mg/kg	1 U	1 U	1 U	1 U

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-063**	**LL4ss-066**	**LL4ss-067**
Sample ID		**LL4SS-063-0208-SO**	**LL4SS-066-0679-SO**	**LL4SS-067-0679-SO**
Date		**08/12/1996**	**08/14/1996**	**08/20/1996**
Depth (ft)		**0 - 2**	**0 - 0**	**0 - 1**
Sample Type		**Grab Composite**	**Grab**	**Grab Composite**
Analyte	**Units**			
Explosives				
2,4,6-Trinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U
HMX	mg/kg	2 U	2 U	1 J
RDX	mg/kg	1 U	1 U	1 UJ

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID = Identification.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
= - Detected result.
J - Estimated result.
U - Not detected.

Table 4-13. Summary Data for Site-Related Explosives and Propellants Detected in Preparation and Receiving Areas Aggregate Surface Soil

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-084**	**LL4-088**	**LL4-127**
Sample ID		**LL40726**	**LL40738**	**LL40839**
Date		**08/24/2001**	**08/22/2001**	**08/20/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**
Analyte	**Units**			
Propellants				
Nitrocellulose	mg/kg	4 U	18.8 =	3.8 U

ID = Identification.
= - Detected result.
U - Not detected.

4.2.3.3 Packaging and Shipping Areas Aggregate

Field analyses of the three samples collected along the north side of Building G-19 (stations LL4-095, LL4-097, and LL4-098) indicated the presence of 2,4,6-TNT at a concentration of 7.04, 1.02, and 7.81 mg/kg, respectively. The sample collected on the south side of the building (station LL4-096) also indicated the presence of 2,4,6-TNT at a concentration of 9.5 mg/kg. This sample was submitted for laboratory analyses of explosives compounds. Nitrocellulose was detected in this sample at a concentration of 9.0 mg/kg (Figures 4-2 and 4-3 and Table 4-14).

Table 4-14. Summary Data for Site-Related Explosives and Propellants Detected in Packaging and Shipping Areas Aggregate Surface Soil

Functional Area		Packaging and Shipping Areas Aggregate
Station ID		**LL4-096**
Sample ID		**LL40762**
Date		**08/22/2001**
Depth (ft)		**0 - 1**
Sample Type		**Grab**
Analyte	**Units**	
Propellants		
Nitrocellulose	mg/kg	9 =

ID = Identification.
= - Detected result.

4.2.3.4 Change Houses Aggregate

No explosives compounds were detected above the detection limit of 1.0 mg/kg during field analyses of six samples collected from the Change Houses Aggregate; therefore, no samples from this aggregate were submitted for laboratory analyses of explosives compounds.

4.2.3.5 Perimeter Area Aggregate

Field analyses of three samples collected near the WW-23 Water Tower (stations LL4-068, LL4-069, and LL4-070) detected 2,4,6-TNT at a concentration of 1.8, 1.5, and 2.8 mg/kg, respectively. No explosives

compounds were detected above the detection limit of 1.0 mg/kg during field analyses of 16 other samples collected from the Perimeter Area Aggregate. No samples from this aggregate were submitted for laboratory analyses of explosives compounds. Samples from the water tower area were not included for laboratory analysis of explosives in the SAP Addendum scoping and preparation effort.

4.2.3.6 Melt-Pour Area Drainage Ditches Aggregate

No explosives compounds were detected above the detection limit of 1.0 mg/kg or greater during field analyses of samples collected from the Melt-Pour Area Drainage Ditches Aggregate; therefore, no samples from this aggregate were submitted for laboratory analyses of explosives compounds.

4.2.4 Inorganic Constituents

The distribution of detected inorganics in surface soil at each of the Load Line 4 soil aggregates is described below. The distribution of selected inorganics in surface soil at Load Line 4 is depicted in Figures 4-4 through 4-13. The inorganics selected for depiction on the figures were based on process knowledge and those with the highest frequency of detection and/or magnitude above background. The relative concentrations above background were bracketed by non-detects and the MDC, and they were arbitrarily subdivided between the highs and lows.

4.2.4.1 Explosives Handling Areas Aggregate

A total of 24 inorganics were detected at least once in surface soil, 17 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Seven of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium), the MDC was below the corresponding background criterion (vanadium), or the frequency of detection was less than 5% (antimony). The MDCs for aluminum, arsenic, barium, beryllium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, and zinc exceeded their respective background criteria and were retained as SRCs. Hexavalent chromium, cyanide, cadmium, and thallium were also retained as SRCs because the background criteria for each of these constituents was set to zero.

Table 4-15 provides a summary by station of results for inorganic SRCs in surface soil for the Explosives Handling Areas Aggregate. For metals with established background concentrations and retained as SRCs in surface soils, aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, and zinc were detected in every sample for which those analyses were performed. Beryllium, mercury, selenium, and thallium are also considered pervasive in the Explosives Handling Areas Aggregate because they were detected in at least 47% (nearly half) of the samples for which they were analyzed. The extent and relative concentrations of beryllium, copper, lead, manganese, and mercury in surface soil at Load Line 4 are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Explosives Handling Areas Aggregate.

- Aluminum was detected in all 70 samples collected from the Explosives Handling Areas Aggregate. The background criterion (17,700 mg/kg) was exceeded in only four samples, three of which were collected in the vicinity of Building G-11. The maximum reported concentration was 22,700 mg/kg at station LL4ss-003, at the northeast corner of Building G-8.

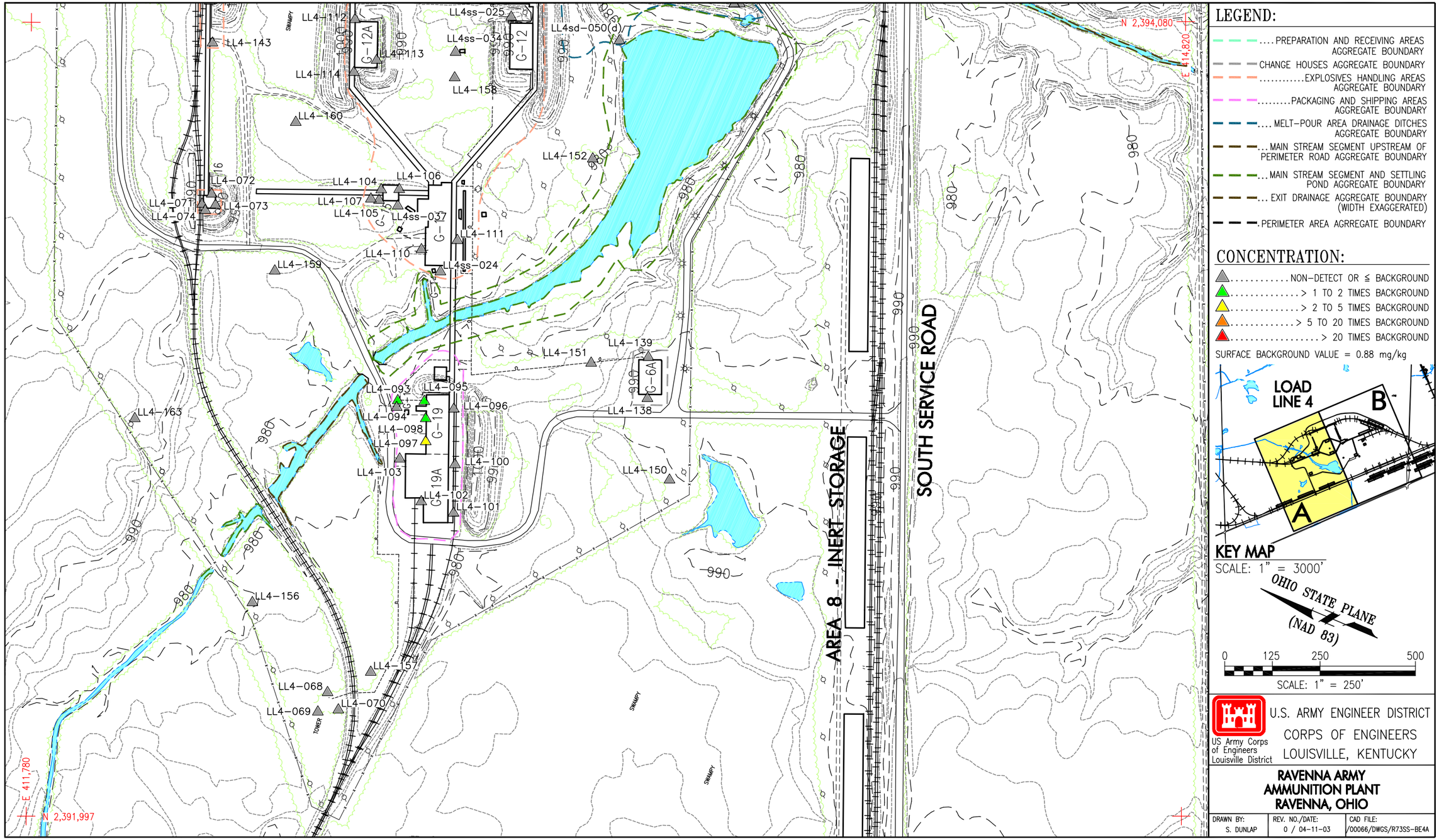
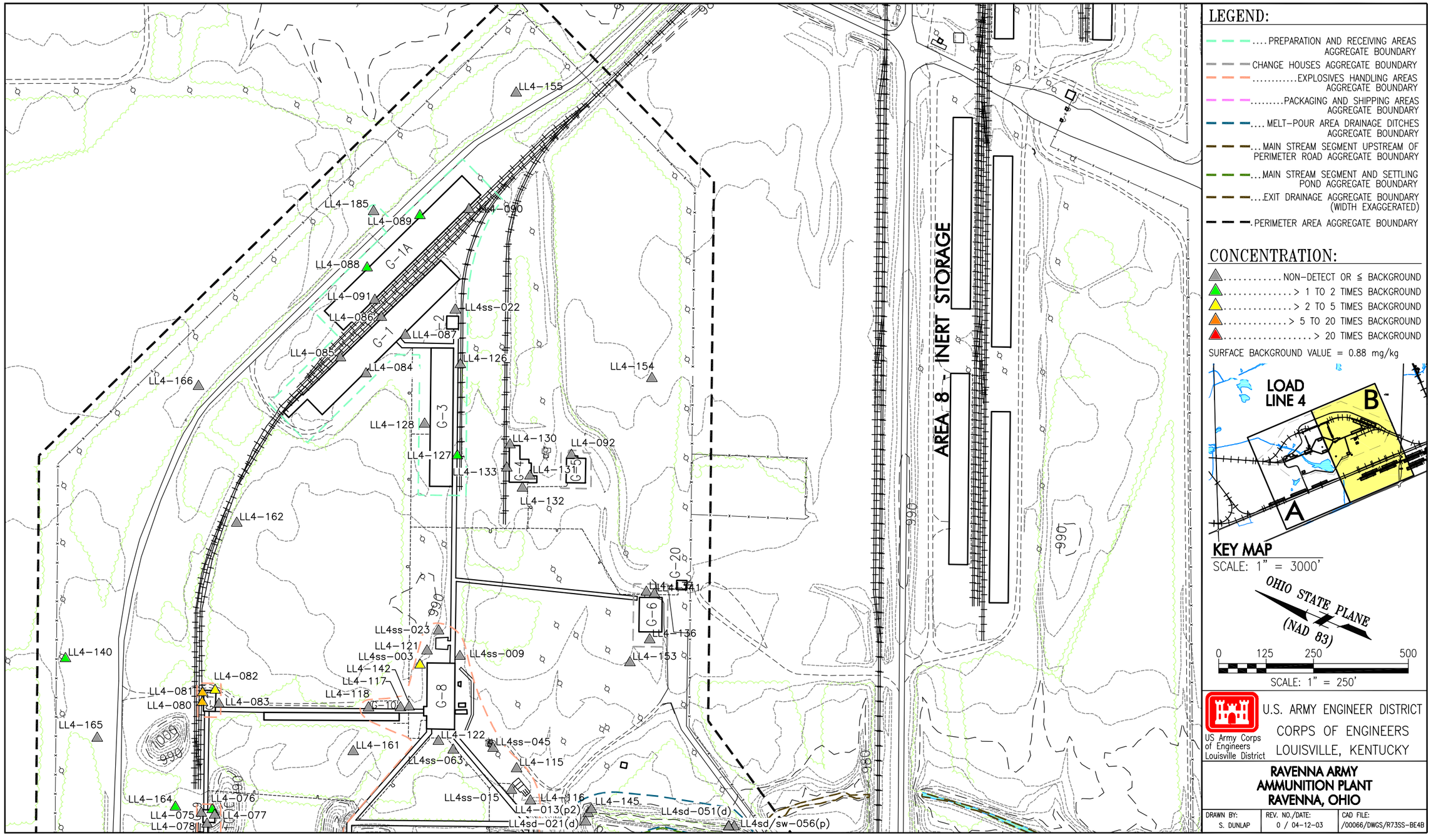


Figure 4-4. Distribution of Beryllium in Surface Soil at Load Line 4 - Western Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≦ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 0.88 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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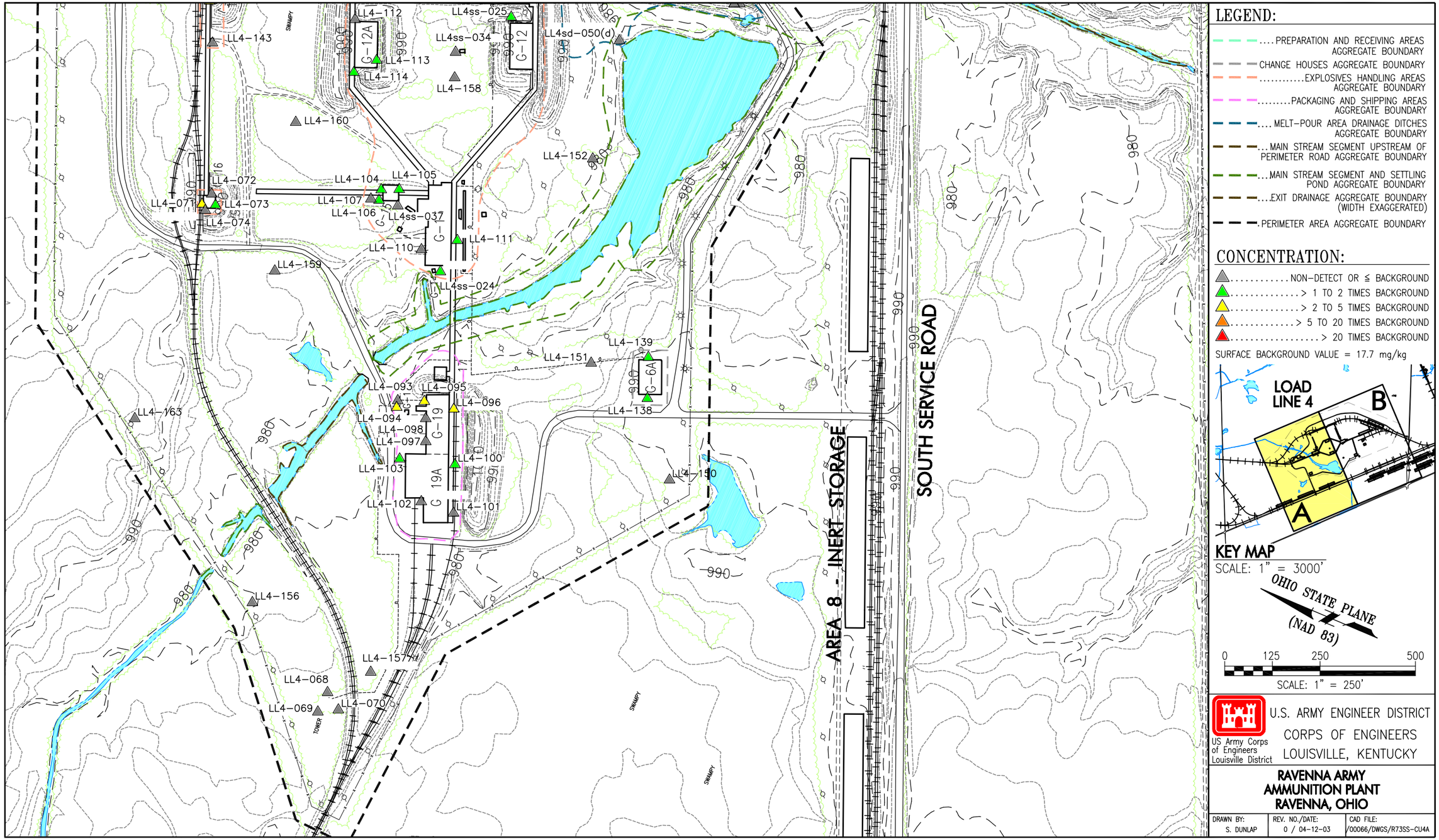
Figure 4-5. Distribution of Beryllium in Surface Soil at Load Line 4 - Eastern Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
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- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≤ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 17.7 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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Figure 4-6. Distribution of Copper in Surface Soil at Load Line 4 - Western Section

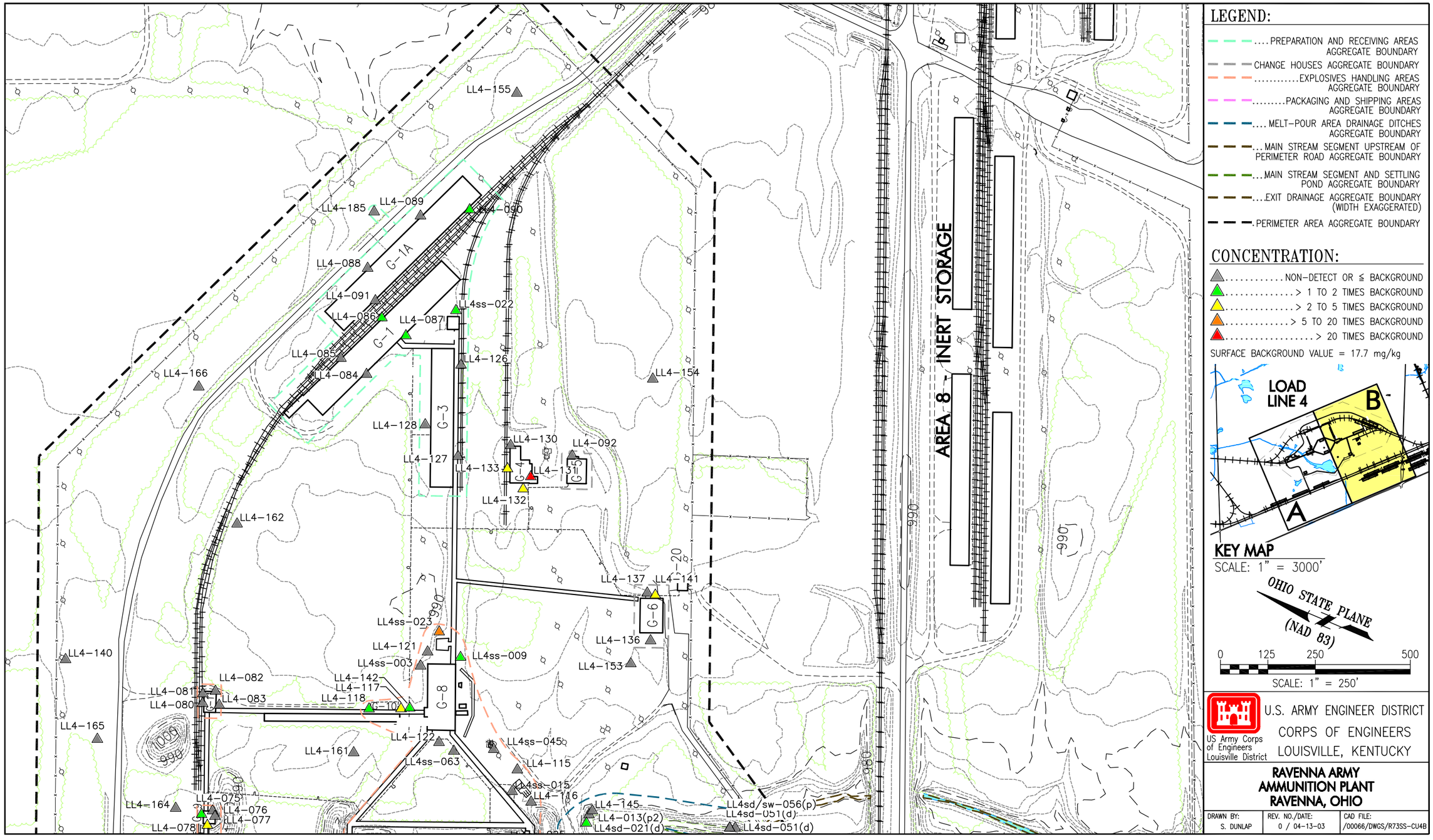
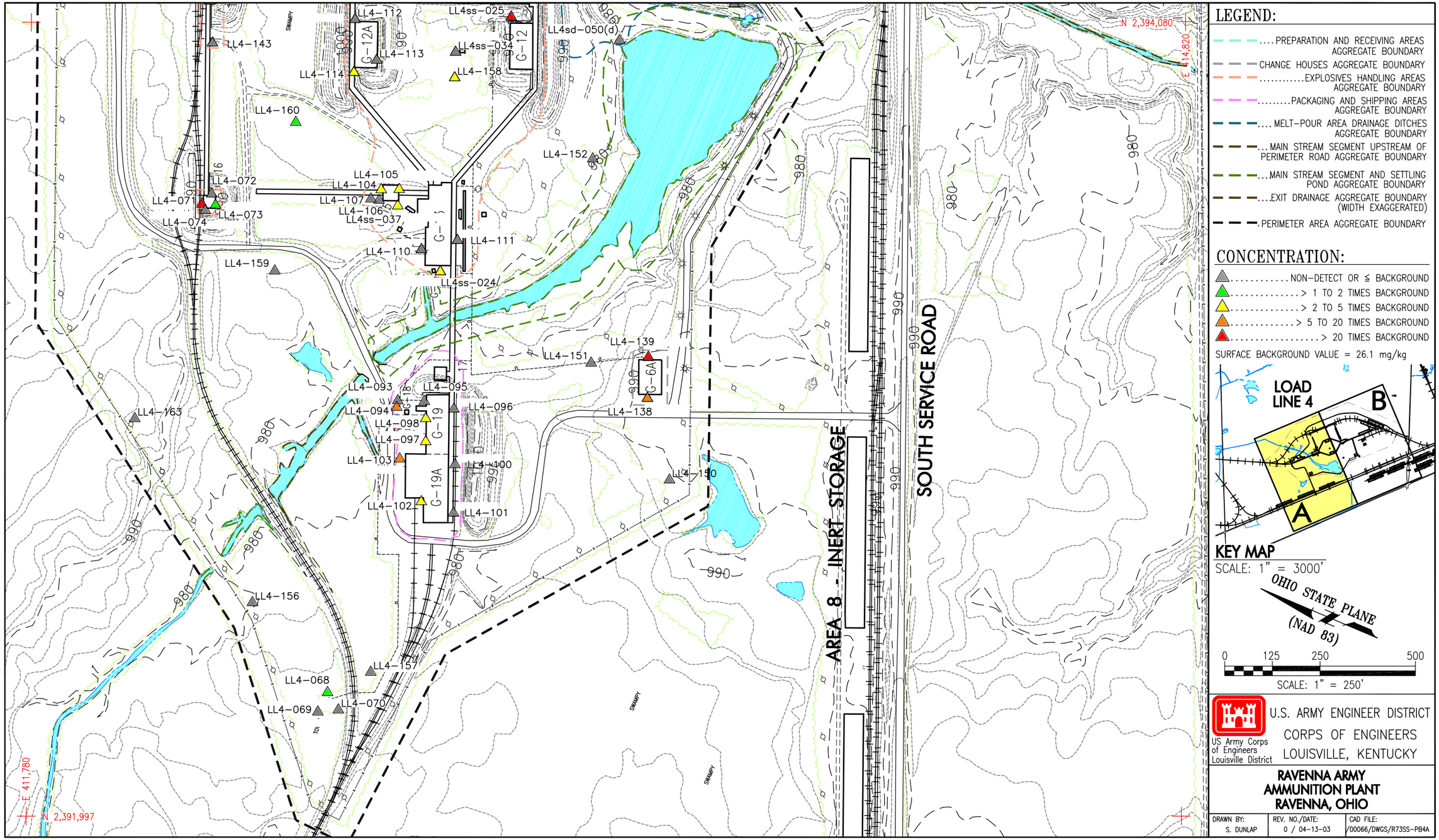


Figure 4-7. Distribution of Copper in Surface Soil at Load Line 4 - Eastern Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≤ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 26.1 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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Figure 4-8. Distribution of Lead in Surface Soil at Load Line 4 - Western Section

LL4–155
LL4–185
LL4–089
LL4–090
LL4–088
G–1A
LL4–091
LL4–086
LL4ss–022
G–1
LL4–087
LL4–085
LL4–126
LL4–084
LL4–166
LL4–154
LL4–128
G–3
LL4–130
LL4–092
LL4–127
LL4–133
LL4–131
G–5
LL4–132
LL4–162
AREA 8 - INERT STORAGE
990
LL4–137
LL4–141
G–6
LL4ss–023
LL4–121
LL4ss–003
LL4ss–009
LL4–153
LL4–136
LL4–140
LL4–142
LL4–117
LL4–118
G–8
LL4–165
LL4–161
LL4–122
LL4ss–045
LL4ss–063
LL4–115
LL4ss–015
LL4–116
LL4–164
LL4–076
LL4–077
LL4–075
LL4–078
LL4–145
LL4sd–051(d)
LL4–013(p2)
LL4sd–021(d)
LL4sd/sw–056(p)

LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
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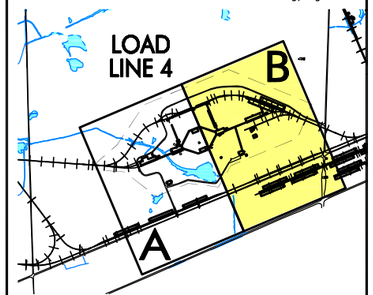
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON–DETECT OR ≦ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 26.1 mg/kg



KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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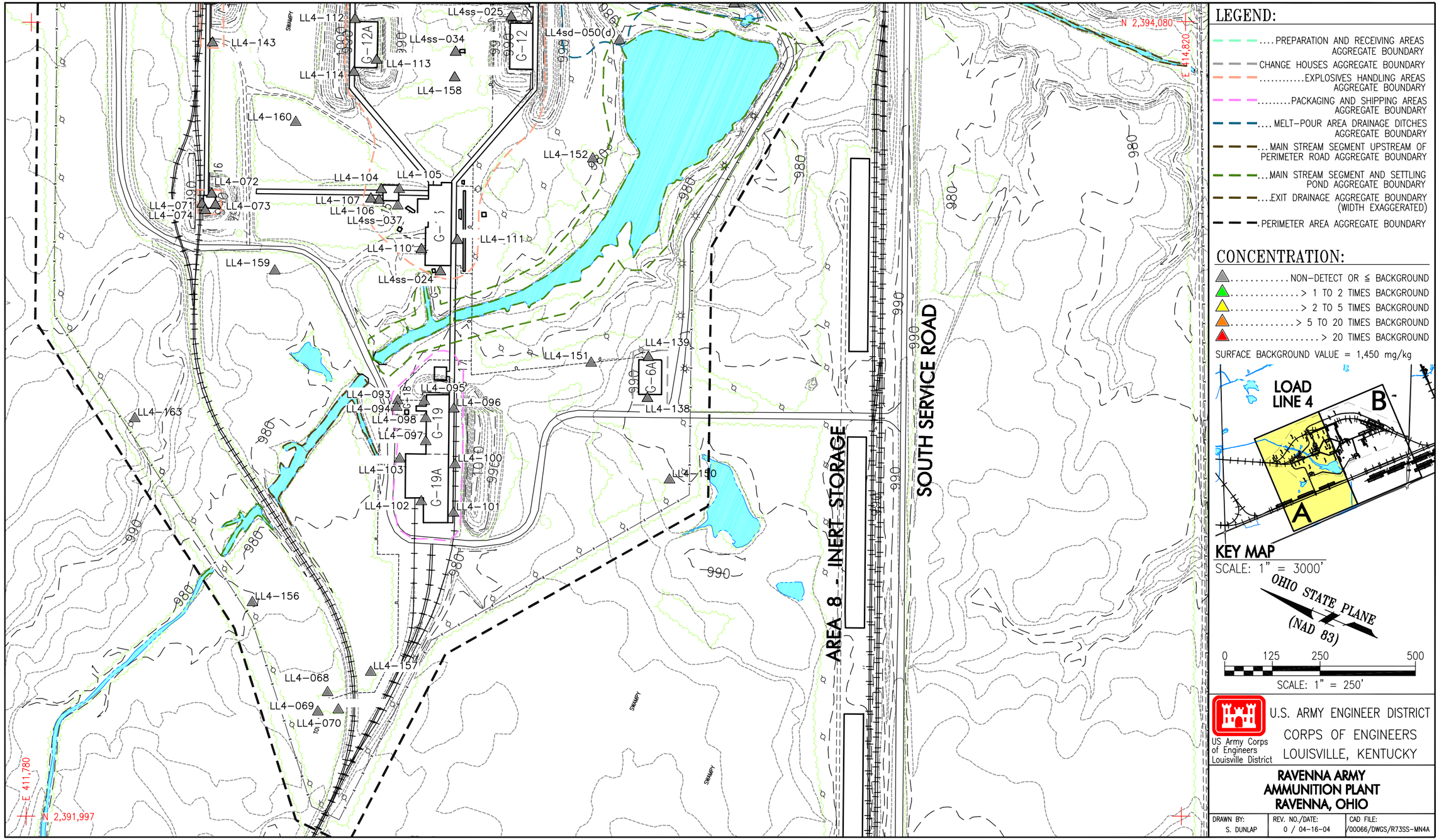
Figure 4-9. Distribution of Lead in Surface Soil at Lead Line 4 - Eastern Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
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- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≤ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 1,450 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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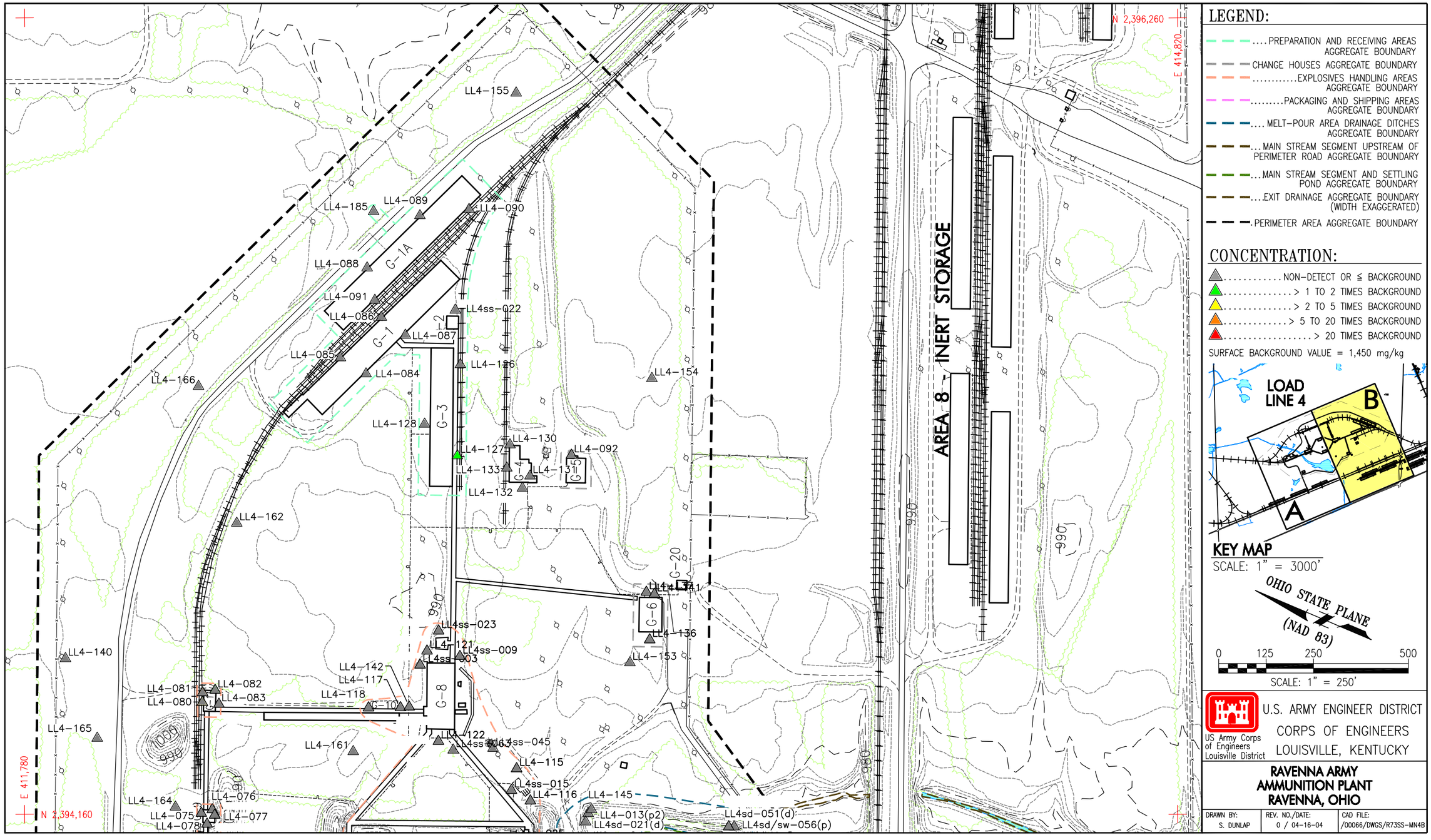
Figure 4-10. Distribution of Manganese in Surface Soil at Load Line 4 - Western Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≦ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 1,450 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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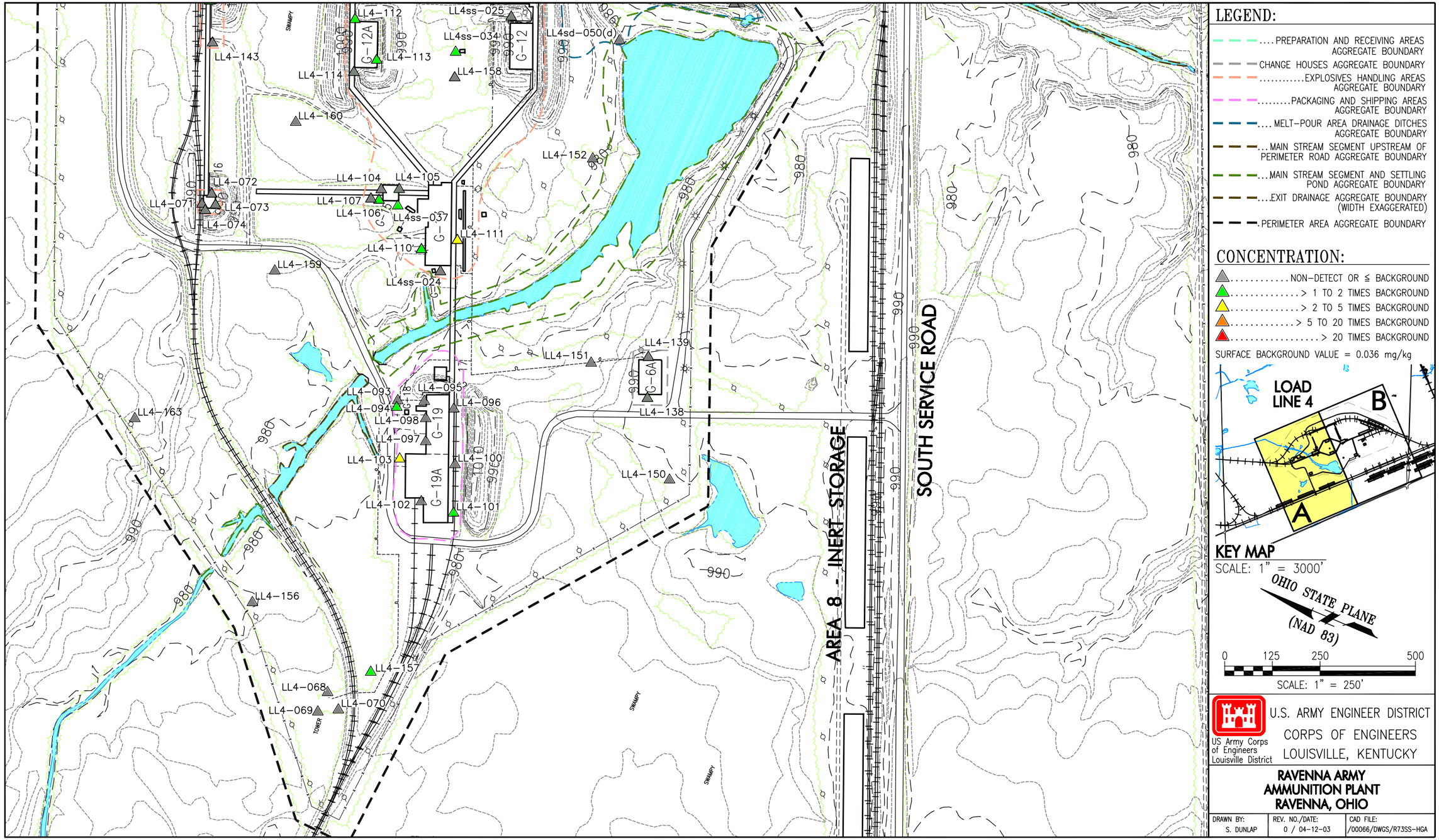
Figure 4-11. Distribution of Manganese in Surface Soil at Line 4 - Eastern Section



LEGEND:

- ....PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- .....EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- .....PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
- .... MELT-POUR AREA DRAINAGE DITCHES AGGREGATE BOUNDARY
- ...MAIN STREAM SEGMENT UPSTREAM OF PERIMETER ROAD AGGREGATE BOUNDARY
- ...MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- ....EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- .PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- .....NON-DETECT OR ≤ BACKGROUND
- .....> 1 TO 2 TIMES BACKGROUND
- .....> 2 TO 5 TIMES BACKGROUND
- .....> 5 TO 20 TIMES BACKGROUND
- .....> 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 0.036 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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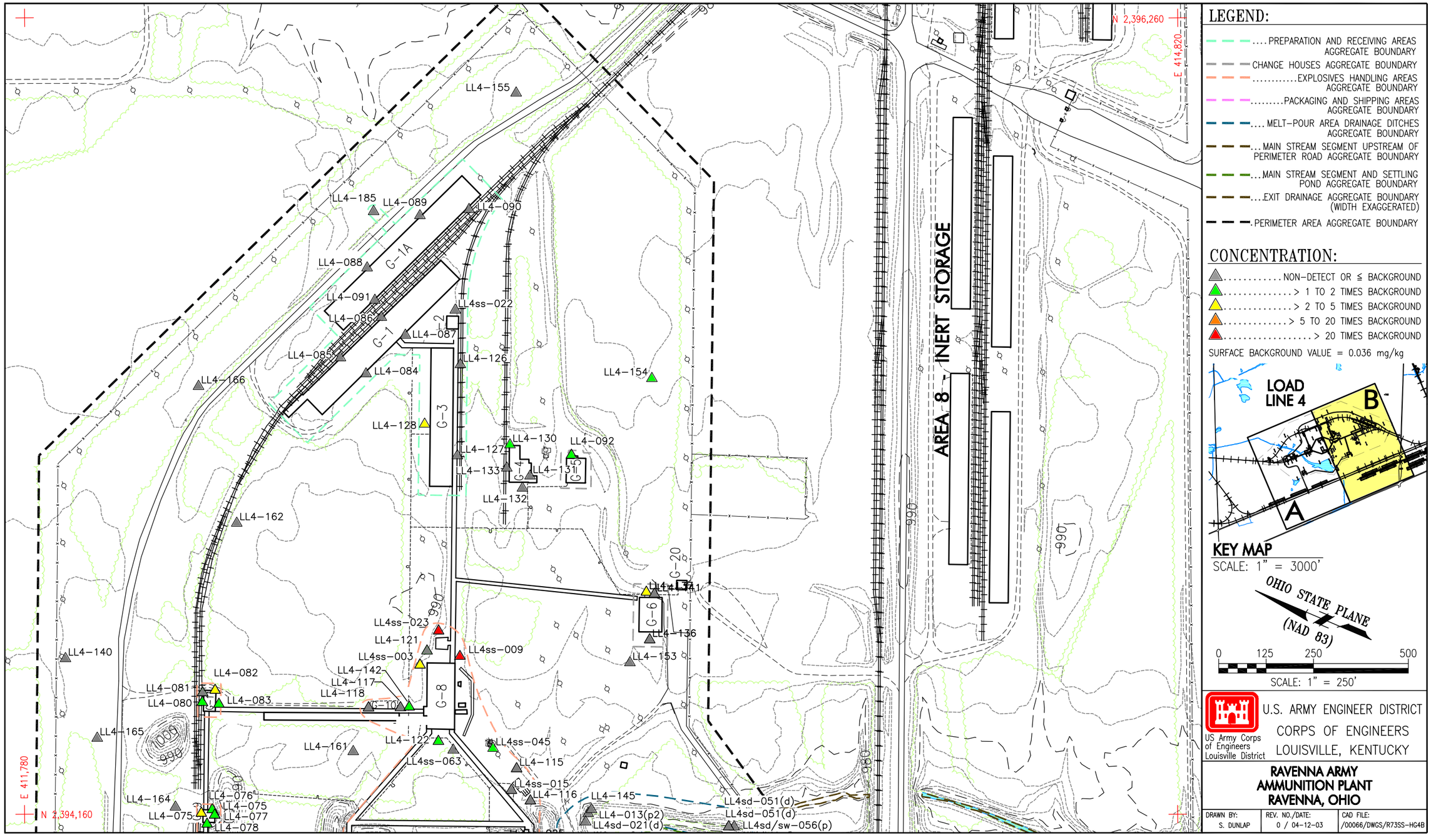
Figure 4-12. Distribution of Mercury in Surface Soil at Load Line 4 - Western Section



LEGEND:

- PREPARATION AND RECEIVING AREAS AGGREGATE BOUNDARY
- CHANGE HOUSES AGGREGATE BOUNDARY
- EXPLOSIVES HANDLING AREAS AGGREGATE BOUNDARY
- PACKAGING AND SHIPPING AREAS AGGREGATE BOUNDARY
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- MAIN STREAM SEGMENT AND SETTLING POND AGGREGATE BOUNDARY
- EXIT DRAINAGE AGGREGATE BOUNDARY (WIDTH EXAGGERATED)
- PERIMETER AREA AGGREGATE BOUNDARY

CONCENTRATION:

- NON-DETECT OR ≦ BACKGROUND
- > 1 TO 2 TIMES BACKGROUND
- > 2 TO 5 TIMES BACKGROUND
- > 5 TO 20 TIMES BACKGROUND
- > 20 TIMES BACKGROUND

SURFACE BACKGROUND VALUE = 0.036 mg/kg

KEY MAP

SCALE: 1" = 3000'

OHIO STATE PLANE (NAD 83)

0 125 250 500

SCALE: 1" = 250'

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Figure 4-13. Distribution of Mercury in Surface Soil at Load Line 4 - Eastern Section

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a]

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-071**	**LL4-072**	**LL4-073**	**LL4-074**	**LL4-074**	**LL4-075**
Sample ID		**LL40689**	**LL40692**	**LL40695**	**LL40698**	**LL41148**	**LL40701**
Date		**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	0.67 U	NA	NA	NA
Aluminum	mg/kg	6,110 =	13,700 =	13,000 =	10,800 =	10,400 =	5,690 =
Arsenic	mg/kg	6.4 =	8.1 =	9.7 =	7.4 =	5.3 =	6.4 =
Barium	mg/kg	377 J *	73.8 =	72 =	75.4 =	67.4 =	141 J *
Beryllium	mg/kg	0.87 =	0.72 U	0.69 =	0.54 U	0.45 U	0.73 U
Cadmium	mg/kg	13.2 = *	0.16 J *	0.079 J *	0.23 J *	0.18 J *	2.3 = *
Chromium	mg/kg	26.1 J *	15.1 =	16.7 =	13.7 =	12.8 =	20.8 J *
Cobalt	mg/kg	4.3 J	6.8 =	8.8 =	7.2 =	5.8 =	6.2 J
Copper	mg/kg	42.4 = *	16.5 =	25.9 = *	14.3 =	11.3 =	23.1 = *
Lead	mg/kg	618 = *	15.2 =	35.5 J *	23.9 J	18.2 J	209 = *
Manganese	mg/kg	1,270 J	266 J	242 =	346 =	323 =	691 J
Mercury	mg/kg	0.088 J *	0.021 U	0.047 J *	0.039 J *	0.041 J *	0.36 = *
Nickel	mg/kg	21.6 J *	16.6 J	22.1 J *	16.9 J	14 J	16 J
Selenium	mg/kg	2.3 U	0.96 J	2.7 U	2.5 U	2.5 U	2.3 U
Thallium	mg/kg	0.37 UJ	0.42 = *	0.9 = *	0.68 J *	0.68 J *	0.33 UJ
Zinc	mg/kg	402 = *	56.3 =	91.5 = *	76.4 = *	66.3 = *	200 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-076**	**LL4-076**	**LL4-077**	**LL4-078**	**LL4-080**	**LL4-081**
Sample ID		**LL40704**	**LL41138**	**LL40707**	**LL40710**	**LL40714**	**LL40717**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	0.55 U	0.55 U	NA	NA	NA	NA
Aluminum	mg/kg	10,800 =	10,200 =	6,940 =	10,800 =	37,400 = *	38,800 = *
Arsenic	mg/kg	7.2 =	8.6 =	7.8 =	10.8 =	2.8 =	3 J
Barium	mg/kg	100 J *	87.2 J	44 J	81.5 J	416 J *	752 J *
Beryllium	mg/kg	1.2 = *	0.95 = *	0.47 U	0.62 U	4.5 = *	5.9 = *
Cadmium	mg/kg	0.092 U	0.082 U	0.052 U	0.27 J *	1.6 = *	0.53 J *
Chromium	mg/kg	9.7 J	10.9 J	11.2 J	14.5 J	25.5 J *	19.5 J *
Cobalt	mg/kg	5.4 J	7 J	6.3 J	9.2 J	1.8 J	2.9 J
Copper	mg/kg	11.3 =	15.2 =	15.3 =	38.8 = *	12.6 =	9.1 =
Lead	mg/kg	21.3 =	24 =	18.6 =	33.2 = *	107 = *	67.2 = *
Manganese	mg/kg	622 J	680 J	280 J	554 J	6,730 J *	7,320 J *
Mercury	mg/kg	0.042 J *	0.042 J *	0.11 U	0.063 J *	0.038 J *	0.045 J *
Nickel	mg/kg	10.6 J	13.3 J	15.9 J	14.9 J	3.6 J	3 J
Selenium	mg/kg	2.2 U	2.2 U	2.2 U	1.1 J	1.9 J *	11.3 U
Thallium	mg/kg	0.41 UJ	0.4 UJ	0.41 UJ	0.49 UJ	0.26 UJ	0.32 UJ
Zinc	mg/kg	53.7 =	62.7 = *	54.2 =	79.3 = *	129 = *	97.5 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-082**	**LL4-083**	**LL4-104**	**LL4-105**	**LL4-106**	**LL4-106**
Sample ID		**LL40720**	**LL40723**	**LL40784**	**LL40787**	**LL40790**	**LL41147**
Date		**08/22/2001**	**08/22/2001**	**08/14/2001**	**08/13/2001**	**08/14/2001**	**08/14/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	NA
Aluminum	mg/kg	22,200 = *	10,500 J	9,320 =	9,680 =	11,900 =	11,800 =
Arsenic	mg/kg	4.8 =	9 J	14.7 =	8 =	7.3 =	7.5 =
Barium	mg/kg	252 J *	45.1 J	80.8 =	87.9 =	53.6 =	53.8 =
Beryllium	mg/kg	3.9 = *	0.49 UJ	0.7 =	0.52 =	0.86 =	0.89 = *
Cadmium	mg/kg	0.11 U	0.082 J *	1.6 = *	1.2 = *	0.16 J *	0.19 J *
Chromium	mg/kg	15.7 J	10.7 J	19.7 = *	16.7 J	15 =	15.2 =
Cobalt	mg/kg	1.9 J	4.7 J	9.3 =	9.8 =	11.7 = *	14 = *
Copper	mg/kg	5.9 =	14.4 J	24.8 = *	29.8 = *	25.5 = *	26.5 = *
Lead	mg/kg	7.2 =	16.9 J	111 = *	56.4 = *	15.7 =	17 =
Manganese	mg/kg	2,150 J *	203 J	337 =	287 =	228 =	294 =
Mercury	mg/kg	0.12 U	0.044 J *	0.03 J	0.04 J *	0.022 J	0.021 J
Nickel	mg/kg	4.7 J	11.8 J	20.9 =	24.1 = *	24.7 = *	25.4 = *
Selenium	mg/kg	0.6 J	0.51 J	2.5 U	2.4 U	2.5 U	2.4 U
Thallium	mg/kg	0.28 UJ	0.47 J *	0.62 = *	0.3 = *	0.61 = *	0.69 = *
Zinc	mg/kg	19.5 =	55.1 J	108 = *	100 = *	67.5 = *	71.2 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-107**	**LL4-110**	**LL4-111**	**LL4-112**	**LL4-113**	**LL4-114**
Sample ID		**LL40793**	**LL40798**	**LL40801**	**LL40804**	**LL40807**	**LL40810**
Date		**08/12/2001**	**08/12/2001**	**08/12/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	0.74 U	NA	NA	0.59 U	NA
Aluminum	mg/kg	7,590 =	8,690 =	10,500 =	8,620 =	10,400 =	8,160 =
Arsenic	mg/kg	3.9 =	6 =	6.5 =	12.1 =	16.2 = *	10.1 =
Barium	mg/kg	27.4 =	63.9 =	59.2 =	200 J *	98.6 J *	50.8 J
Beryllium	mg/kg	0.32 J	0.53 J	0.55 J	0.86 U	0.76 U	0.5 U
Cadmium	mg/kg	0.12 J *	6.7 = *	0.23 J *	0.2 J *	1.5 = *	0.18 J *
Chromium	mg/kg	9.2 =	11.9 =	13.1 =	12.5 J	15.2 J	11.3 J
Cobalt	mg/kg	5.4 =	10.3 =	8.9 =	78.3 J *	7.6 J	7.1 J
Copper	mg/kg	13.2 =	16.1 =	17.9 = *	16.6 =	25.1 = *	20 = *
Lead	mg/kg	9.6 =	35.4 = *	14.1 =	39.2 = *	63.6 = *	31.4 = *
Manganese	mg/kg	94 =	709 =	291 =	4,560 J *	616 J	408 J
Mercury	mg/kg	0.11 U	0.018 J	0.025 J	0.11 J *	0.02 J	0.045 J *
Nickel	mg/kg	13.3 =	16.4 =	19.2 =	15.8 J	19.7 =	19.7 J
Selenium	mg/kg	2.2 U	2.9 U	2.5 U	4.8 U	2.4 U	2.3 U
Thallium	mg/kg	0.45 = *	0.66 = *	0.6 J *	0.45 UJ	0.47 UJ	0.35 J *
Zinc	mg/kg	39.4 =	3,680 = *	91.1 = *	90.8 = *	157 = *	86.4 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-115**	**LL4-116**	**LL4-116**	**LL4-117**	**LL4-118**	**LL4-121**
Sample ID		**LL40813**	**LL40816**	**LL41141**	**LL40819**	**LL40822**	**LL40827**
Date		**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	0.62 U	0.58 U	0.57 U
Aluminum	mg/kg	4,970 =	5,470 =	5,510 =	12,100 =	9,960 =	10,800 =
Arsenic	mg/kg	9.9 J	7.5 J	9.6 J	13.4 =	13.1 =	9.4 =
Barium	mg/kg	44.6 J	34.4 J	35.7 J	94.8 = *	77.5 =	55.6 =
Beryllium	mg/kg	0.42 J	0.36 J	0.35 J	0.61 J	0.5 J	0.53 J
Cadmium	mg/kg	0.18 J *	0.29 J *	0.34 J *	0.93 = *	0.85 = *	0.079 U
Chromium	mg/kg	7.6 J	67.7 J *	8.6 J	16.9 =	14.8 =	12.4 =
Cobalt	mg/kg	4.4 =	5.3 =	5.1 =	10.3 =	7.1 =	11.6 = *
Copper	mg/kg	11.9 =	10 =	10.6 =	71.8 = *	28.1 = *	8.5 =
Lead	mg/kg	20 J	418 J *	17.4 J	73.9 J *	5,790 J *	19.4 J
Manganese	mg/kg	369 J	448 J	374 J	439 =	398 =	1,290 =
Mercury	mg/kg	0.024 J	0.023 J	0.017 J	0.011 J	0.021 J	0.053 J *
Nickel	mg/kg	9.2 J	9.2 J	10.1 J	24.4 J *	17.6 J	12.5 J
Selenium	mg/kg	2.2 U	2.3 U	2.2 U	2.5 U	2.3 U	0.45 J
Thallium	mg/kg	0.67 = *	0.35 = *	0.7 = *	0.82 J *	0.81 = *	0.81 = *
Zinc	mg/kg	54.3 =	72.2 = *	50 =	133 = *	158 = *	46.9 =

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-122**	**LL4-142**	**LL4-142**	**LL4-143**	**LL4-158**	**LL4ss-001**
Sample ID		**LL40830**	**LL40878**	**LL41142**	**LL40881**	**LL40910**	**LL4SS-001-0231-SO**
Date		**08/21/2001**	**08/24/2001**	**08/24/2001**	**08/24/2001**	**08/24/2001**	**07/26/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	1.9 J	1.2 UJ	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	NA
Aluminum	mg/kg	4,420 =	9,780 J	9510 J	14,200 =	7,800 =	6,050 J
Arsenic	mg/kg	8 =	11.7 J	11.6 J	10.8 =	4.9 =	10.4 =
Barium	mg/kg	24 J	71.6 J	68.2 J	68.8 =	31.1 =	72.9 =
Beryllium	mg/kg	0.38 U	0.73 UJ	0.71 UJ	0.73 J	0.32 U	NA
Cadmium	mg/kg	0.55 U	0.48 J *	0.48 J *	0.061 U	0.11 U	0.49 J *
Chromium	mg/kg	8.6 J	17.7 J *	22.5 J *	15.4 =	8.9 =	11.8 =
Cobalt	mg/kg	7.2 J	9.4 J	9.5 J	9.3 =	3.7 =	NA
Copper	mg/kg	8.9 =	23.5 J *	22.5 J *	16.3 =	8.9 =	NA
Lead	mg/kg	16.8 =	117 J *	161 J *	17 =	15 =	78 = *
Manganese	mg/kg	424 J	356 J	313 J	308 =	97.4 =	331 =
Mercury	mg/kg	0.11 U	0.058 J *	0.056 J *	0.021 U	0.029 U	0.03 U
Nickel	mg/kg	14.1 J	22.8 J *	23 J *	20.3 =	8.5 =	NA
Selenium	mg/kg	2.2 U	2.3 UJ	2.3 UJ	0.62 J	0.68 J	1.1 =
Thallium	mg/kg	0.32 J *	0.61 J *	0.67 J *	0.23 U	0.28 U	NA
Zinc	mg/kg	61.5 =	170 J *	175 J *	61.5 =	44.9 =	109 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-002**	**LL4ss-003**	**LL4ss-005**	**LL4ss-006**	**LL4ss-007**	**LL4ss-008**
Sample ID		**LL4SS-002-0232-SO**	**LL4SS-003-0233-SO**	**LL4SS-005-0235-SO**	**LL4SS-006-0236-SO**	**LL4SS-007-0237-SO**	**LL4SS-008-0238-SO**
Date		**07/27/1996**	**07/27/1996**	**07/27/1996**	**07/26/1996**	**07/27/1996**	**07/27/1996**
Depth (ft)		**0 - 2**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	0.51 J *	NA	NA	NA	NA
Aluminum	mg/kg	9,430 =	22,700 = *	9,160 =	6,780 J	5,680 =	7,750 =
Arsenic	mg/kg	17.8 J *	8.6 J	12.7 J	10.1 =	8.5 J	10 J
Barium	mg/kg	62.4 =	238 = *	76.9 =	41.7 =	50.9 =	65.9 =
Beryllium	mg/kg	NA	3.6 = *	NA	NA	NA	NA
Cadmium	mg/kg	0.12 J *	0.27 J *	0.93 = *	0.21 J *	0.5 J *	0.2 J *
Chromium	mg/kg	14.3 =	15.7 =	14 =	10.5 =	11.5 =	9.8 =
Cobalt	mg/kg	NA	3.9 =	NA	NA	NA	NA
Copper	mg/kg	NA	13.3 =	NA	NA	NA	NA
Lead	mg/kg	23.7 =	22.1 =	36 = *	25.3 =	48.3 = *	28.1 = *
Manganese	mg/kg	178 J	54.6 J	309 J	367 =	380 J	673 J
Mercury	mg/kg	0.04 U	0.03 U	0.04 U	0.04 U	0.04 = *	0.04 = *
Nickel	mg/kg	NA	8.9 =	NA	NA	NA	NA
Selenium	mg/kg	0.95 J	2.3 J *	1.1 J	1.3 =	0.86 J	1.1 J
Thallium	mg/kg	NA	13.3 J *	NA	NA	NA	NA
Zinc	mg/kg	64.2 = *	41.5 =	82.2 = *	70.6 = *	88 = *	68 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-009**	**LL4ss-010**	**LL4ss-011**	**LL4ss-012**	**LL4ss-014**	**LL4ss-015**
Sample ID		**LL4SS-009-0239-SO**	**LL4SS-010-0240-SO**	**LL4SS-011-0241-SO**	**LL4SS-012-0242-SO**	**LL4SS-014-0244-SO**	**LL4SS-015-0245-SO**
Date		**07/27/1996**	**07/31/1996**	**07/26/1996**	**07/26/1996**	**07/24/1996**	**07/24/1996**
Depth (ft)		**0 - 1**	**0 - 2**	**0 - 1**	**0 - 2**	**0 - 1**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	0.2 J *	NA	NA	NA	NA	0.1 U
Aluminum	mg/kg	6,780 =	7,370 =	8,310 =	6,810 =	15,400 =	5,460 =
Arsenic	mg/kg	10.6 J	9.3 =	9 J	8 J	4.8 =	10.8 =
Barium	mg/kg	58.1 =	49.8 =	44.8 =	36.6 =	172 = *	39.5 =
Beryllium	mg/kg	0.46 =	NA	NA	NA	NA	0.39 =
Cadmium	mg/kg	0.66 = *	0.16 J *	0.09 J *	0.26 J *	0.13 J *	0.15 J *
Chromium	mg/kg	13.3 =	10.5 =	9.9 J	9.2 J	8 =	6.8 =
Cobalt	mg/kg	7.7 =	NA	NA	NA	NA	5.6 =
Copper	mg/kg	21.5 = *	NA	NA	NA	NA	15.1 =
Lead	mg/kg	64.3 = *	13 =	15 J	14.1 J	8.9 =	14.5 =
Manganese	mg/kg	358 J	269 J	232 =	249 =	2,830 = *	381 =
Mercury	mg/kg	0.06 = *	0.04 = *	0.03 U	0.04 U	0.03 U	0.03 U
Nickel	mg/kg	17.7 =	NA	NA	NA	NA	10 =
Selenium	mg/kg	1.2 J	0.49 J	0.68 =	0.69 =	0.51 =	0.34 J
Thallium	mg/kg	1.5 J *	NA	NA	NA	NA	1.1 = *
Zinc	mg/kg	120 = *	64.6 = *	58.9 J	62.5 J *	25.4 =	47.6 =

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-016**	**LL4ss-017**	**LL4ss-018**	**LL4ss-019**	**LL4ss-020**	**LL4ss-023**
Sample ID		**LL4SS-016-0246-SO**	**LL4SS-017-0247-SO**	**LL4SS-018-0248-SO**	**LL4SS-019-0249-SO**	**LL4SS-020-0250-SO**	**LL4SS-023-0253-SO**
Date		**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/24/1996**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	0.21 J *
Aluminum	mg/kg	5,300 =	6,230 =	4,650 =	6,110 =	5,810 =	11,000 =
Arsenic	mg/kg	9 =	8.5 =	7.6 =	6.5 =	5.7 =	16.6 J *
Barium	mg/kg	41.2 =	53.8 =	40.1 =	49.7 =	61.5 =	82.8 =
Beryllium	mg/kg	NA	NA	NA	NA	NA	0.73 =
Cadmium	mg/kg	0.15 J *	0.34 J *	0.4 J *	0.19 J *	0.16 J *	4.4 = *
Chromium	mg/kg	7.2 =	6.4 =	6 =	7.8 =	5.2 =	18.1 = *
Cobalt	mg/kg	NA	NA	NA	NA	NA	10.4 =
Copper	mg/kg	NA	NA	NA	NA	NA	106 = *
Lead	mg/kg	15.3 =	14.2 =	13.7 =	13.3 =	10.3 =	220 = *
Manganese	mg/kg	309 =	673 =	574 =	373 =	781 =	330 J
Mercury	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 = *
Nickel	mg/kg	NA	NA	NA	NA	NA	32.1 = *
Selenium	mg/kg	0.33 J	0.5 J	0.31 U	0.61 =	0.6 =	1.2 J
Thallium	mg/kg	NA	NA	NA	NA	NA	1.9 J *
Zinc	mg/kg	47.9 =	173 = *	84.9 = *	82.5 = *	45.8 =	292 = *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-024**	**LL4ss-025**	**LL4ss-025**	**LL4ss-027**	**LL4ss-028**	**LL4ss-029**
Sample ID		**LL4SS-024-0254-SO**	**LL4SS-025-0255-SO**	**LL4SS-025-0256-FD**	**LL4SS-027-0258-SO**	**LL4SS-028-0259-SO**	**LL4SS-029-0260-SO**
Date		**07/28/1996**	**07/28/1996**	**07/28/1996**	**07/25/1996**	**07/23/1996**	**07/25/1996**
Depth (ft)		**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 1**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	0.16 U	0.11 U	0.13 U	NA	NA	NA
Aluminum	mg/kg	11,900 =	12,400 =	10,200 =	8,950 =	10,800 =	6,270 =
Arsenic	mg/kg	13.5 =	15.7 = *	10.1 =	10 J	8.9 =	8.6 =
Barium	mg/kg	44.1 =	48.8 =	47.3 =	88.2 =	79.9 =	36.6 =
Beryllium	mg/kg	0.65 =	0.57 =	0.48 =	NA	NA	NA
Cadmium	mg/kg	0.06 J *	0.2 J *	0.24 J *	3.6 = *	0.75 = *	0.2 J *
Chromium	mg/kg	14.8 =	15.4 =	12.4 =	17.6 J *	13 =	9.6 =
Cobalt	mg/kg	9.8 =	9.1 =	8 =	NA	NA	NA
Copper	mg/kg	21.5 = *	18.2 = *	14.5 =	NA	NA	NA
Lead	mg/kg	13 =	17.4 =	15.8 =	78.9 J *	60.6 = *	16.4 =
Manganese	mg/kg	230 =	167 =	142 =	596 =	1,140 =	265 =
Mercury	mg/kg	0.04 U	0.04 U	0.04 U	0.03 U	0.03 U	0.03 U
Nickel	mg/kg	22.7 = *	21.4 = *	17.4 =	NA	NA	NA
Selenium	mg/kg	0.37 J	0.61 =	0.48 J	0.95 =	0.68 =	0.32 J
Thallium	mg/kg	0.8 = *	1.5 = *	1 = *	NA	NA	NA
Zinc	mg/kg	58.4 =	63.9 = *	52.6 =	236 J *	81.5 = *	50.8 =

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-030**	**LL4ss-031**	**LL4ss-032**	**LL4ss-032**	**LL4ss-033**	**LL4ss-034**
Sample ID		**LL4SS-030-0261-SO**	**LL4SS-031-0262-SO**	**LL4SS-032-0263-SO**	**LL4SS-033-0264-FD**	**LL4SS-033-0266-SO**	**LL4SS-034-0267-SO**
Date		**07/31/1996**	**07/25/1996**	**07/25/1996**	**07/25/1996**	**07/25/1996**	**07/26/1996**
Depth (ft)		**0 - 0**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	0.34 J *
Aluminum	mg/kg	5,420 =	9,280 =	9,100 =	4,790 =	8,190 =	8,060 J
Arsenic	mg/kg	8.1 =	11.7 =	6.2 =	8.1 =	7.5 =	4.2 =
Barium	mg/kg	53.2 =	116 = *	102 = *	36.5 =	62.4 =	68.5 J
Beryllium	mg/kg	NA	NA	NA	NA	NA	0.54 =
Cadmium	mg/kg	0.2 J *	2.1 = *	5.2 = *	0.48 J *	0.57 = *	0.52 = *
Chromium	mg/kg	7.4 =	15.5 =	30.1 = *	7.2 =	9.2 =	9.4 =
Cobalt	mg/kg	NA	NA	NA	NA	NA	4.9 =
Copper	mg/kg	NA	NA	NA	NA	NA	14.3 J
Lead	mg/kg	22 =	69.2 = *	384 = *	43.9 = *	47.6 = *	25.6 =
Manganese	mg/kg	297 J	436 =	567 =	421 =	902 =	293 =
Mercury	mg/kg	0.04 = *	0.04 U	0.16 = *	0.04 U	0.04 U	0.04 =
Nickel	mg/kg	NA	NA	NA	NA	NA	7.8 =
Selenium	mg/kg	0.45 J	0.71 =	3.2 = *	0.55 =	0.55 =	0.76 =
Thallium	mg/kg	NA	NA	NA	NA	NA	1.2 = *
Zinc	mg/kg	67.8 = *	212 = *	1,850 = *	86.5 = *	96 = *	81.3 J *

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-035**	**LL4ss-036**	**LL4ss-036**	**LL4ss-037**	**LL4ss-038**	**LL4ss-039**
Sample ID		**LL4SS-035-0268-SO**	**LL4SS-036-0269-SO**	**LL4SS-036-0270-FD**	**LL4SS-037-0271-SO**	**LL4SS-038-0272-SO**	**LL4SS-039-0273-SO**
Date		**07/26/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**
Depth (ft)		**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	NA	NA	0.26 U	NA	NA
Aluminum	mg/kg	4,210 J	7,980 =	8,560 =	7,400 =	8,510 =	8,860 =
Arsenic	mg/kg	11.3 =	12.9 =	12.7 =	2.4 =	7.2 =	2 =
Barium	mg/kg	17.3 =	60.9 J	72.6 J	22.7 =	41.5 J	24.1 J
Beryllium	mg/kg	NA	NA	NA	0.27 =	NA	NA
Cadmium	mg/kg	0.05 J *	0.16 J *	0.13 J *	0.04 J *	0.04 U	0.07 J *
Chromium	mg/kg	6.3 =	11.2 J	11.9 J	7.4 =	11.1 J	8.9 J
Cobalt	mg/kg	NA	NA	NA	3.6 =	NA	NA
Copper	mg/kg	NA	NA	NA	9.8 =	NA	NA
Lead	mg/kg	17.6 =	11.9 =	12.5 =	8.6 =	17.6 =	8.1 =
Manganese	mg/kg	339 =	248 =	340 =	74.1 =	190 =	43.5 =
Mercury	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Nickel	mg/kg	NA	NA	NA	10.5 =	NA	NA
Selenium	mg/kg	1 =	1 J	0.94 J	0.31 U	0.39 J	0.33 J
Thallium	mg/kg	NA	NA	NA	0.46 J *	NA	NA
Zinc	mg/kg	67.3 = *	53.4 =	54.6 =	35.1 =	57.4 =	32.8 =

Table 4-15. Summary Data for Site-Related Inorganics in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-040**	**LL4ss-045**	**LL4ss-062**	**LL4ss-063**	**LL4ss-066**	**LL4ss-067**
Sample ID		**LL4SS-040-0274-SO**	**LL4SS-045-0280-SO**	**LL4SS-062-0595-SO**	**LL4SS-063-0208-SO**	**LL4SS-066-0679-SO**	**LL4SS-067-0679-SO**
Date		**07/28/1996**	**07/31/1996**	**08/12/1996**	**08/12/1996**	**08/14/1996**	**08/20/1996**
Depth (ft)		**0 - 2**	**0 - 1**	**0 - 1**	**0 - 2**	**0 - 0**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab**	**Grab Composite**	**Grab**	**Grab Composite**
Analyte	**Units**						
General Chemistry							
Chromium, hexavalent	mg/kg	NA	NA	NA	NA	NA	NA
Inorganics							
Cyanide	mg/kg	NA	0.23 J *	NA	0.1 U	NA	NA
Aluminum	mg/kg	7,860 =	7,260 =	4,700 =	8,250 =	13,300 =	8,170 =
Arsenic	mg/kg	2.4 =	10.4 =	9.1 =	3.4 =	4.3 J	13.6 =
Barium	mg/kg	25.2 J	57.9 =	41.1 =	26 =	41.3 =	69.4 =
Beryllium	mg/kg	NA	0.51 =	NA	0.27 =	NA	NA
Cadmium	mg/kg	0.04 U	0.21 J *	0.33 J *	0.1 J *	0.15 J *	0.45 J *
Chromium	mg/kg	7.7 J	10.8 =	6.6 =	7.9 =	14.1 =	10.7 =
Cobalt	mg/kg	NA	7.3 =	NA	3 =	NA	NA
Copper	mg/kg	NA	15.9 =	NA	7.7 =	NA	NA
Lead	mg/kg	9.5 =	27 = *	18.2 =	9.1 =	15.1 J	19.8 =
Manganese	mg/kg	51 =	303 =	286 =	79.2 =	181 J	474 =
Mercury	mg/kg	0.03 U	0.04 = *	0.04 U	0.03 J	0.04 = *	0.04 U
Nickel	mg/kg	NA	17.9 J	NA	8.3 =	NA	NA
Selenium	mg/kg	0.37 J	0.64 =	0.33 U	0.31 U	0.35 U	0.32 U
Thallium	mg/kg	NA	0.97 J *	NA	0.96 J *	NA	NA
Zinc	mg/kg	32.5 =	82.6 = *	59.6 =	34.4 =	55.2 =	68.5 = *

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
*-Exceeds RVAAP background criteria
NA = Not analyzed.
= - Detected result.
J - Estimated result.
U - Not detected.

- Arsenic was also detected in all 70 samples from the Explosives Handling Aggregate. The background criterion (15.4 mg/kg) was exceeded in four samples, two of which were collected in the vicinity of Building G-8. The maximum reported concentration was 17.8 mg/kg (estimated) on the north side of Building G-8. Arsenic was also detected above background criterion in samples collected near Building G-12A (station LL4-113) and Building G-19 (station LL4ss-025).

- Barium was another inorganic detected in all 70 samples. Barium was detected above background criterion (88.4 mg/kg) in 13 samples. The maximum reported concentration was 752 mg/kg (estimated), 8.5 times above background, in the sample collected at station LL4-081 near Building G-11. The next highest reported concentration was 377 mg/kg (estimated) in the sample collected at station LL4-071 near Building G-16.

- Beryllium was detected in 28 of 40 samples from the Explosives Handling Areas Aggregate and was present at concentrations above background (0.88 mg/kg) in 6 of the 28 samples. Three of the six samples with concentrations reported above background were collected near Building G-11. These were also the three highest reported concentrations for this inorganic. The highest detected concentration, 5.9 mg/kg in the sample collected at station LL4-081, exceeded background criterion by a factor of 6.7 (Figures 4-4 and 4-5).

- Cadmium was detected in 61 of 70 surface soil samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.04 to 13.2 mg/kg, with the maximum concentration detected at station LL4-071 north of Building G-16.

- Chromium was detected in all 70 samples and was present at concentrations above background (17.4 mg/kg) in 10 samples. Slight exceedances of the background criterion were seen in one or more samples collected near almost every building associated with this aggregate. The highest concentration (67.7 mg/kg, estimated) was reported in the sample collected at station LL4-116. The next highest concentration (30.1 mg/kg at station LL4ss-032 near Building G-12A) was less than 2 times the background criterion.

- Cobalt was detected in 40 of 40 samples, but occurred above background in only 3 samples. The highest detected concentration of this inorganic (78.3 mg/kg, estimated) occurred in the sample collected at station LL4-112 near Building G-12A. Two other detections (11.6 mg/kg at station LL4-121 and 11.7 mg/kg at station LL4-106) also exceeded the established background criterion (10.4 mg/kg) for cobalt.

- Copper was also detected in 40 of 40 samples. The background criterion of 17.7 mg/kg was exceeded in 17 samples; however, detected concentrations were more than 2 times background in only three of these samples. The highest detected concentration (106.0 mg/kg) occurred in the sample collected at station LL4ss-023 near Building G-8 (Figures 4-6 and 4-7).

- Lead was detected in 70 of 70 samples and was present at concentrations above the established background criterion (26.1 mg/kg) in 40% of the samples. Lead concentrations above background are widely distributed throughout the Explosives Handling Areas Aggregate. Detected lead concentrations ranged from 7.2 mg/kg at station LL4-082 near Building G-11 to 5,790 mg/kg (estimated) at station LL4-118 near Building G-10. The next highest detection of lead (618 mg/kg) occurred in the sample collected at station LL4-071 near Building G-16 (Figures 4-8 and 4-9).

- Manganese was detected in all samples and was present at concentrations above the established background criterion of 1,450 mg/kg in 5 samples. Three of the samples with detected concentration

above background were collected adjacent to Building G-11. The detected concentrations in these samples ranged from 2,150 mg/kg (estimated) in the sample from station LL4-082 to 7,320 mg/kg (estimated) in the sample from station LL4-081. The MDC of manganese was observed in the sample from station LL4-081. Additional locations with detected concentrations above background were station LL4-112 near Building G-12A [4,560 mg/kg (estimated)] and station LL4ss-014 east of Building G-12 [2,8340 mg/kg (estimated)] (Figures 4-10 and 4-11).

- Mercury was detected in 47% of the samples for the Explosives Handling Areas Aggregate and was present at concentrations above background in 23 of the 33 samples in which it was detected. Mercury concentrations above background are widely distributed throughout the Explosives Handling Areas Aggregate, primarily around buildings G-8, G-9, G-11, G-12A, and G-16. Nine of the detections above background occurred in the area around Building G-8. Detected mercury concentrations ranged from 0.011 mg/kg (station LL4-117 near Building G-10) to 0.36 mg/kg (station LL4-075 near Building G-9). The average concentration of mercury was 0.038 mg/kg only, slightly above the established background criterion of 0.036 mg/kg (Figures 4-12 and 4-13).

- Nickel was detected in 40 of 40 samples. The background criterion of 21.1 mg/kg was exceeded in 9 samples, most of which were collected at stations associated with Building G-8, G-15, and G-16. The MDC of nickel was present in the sample collected near Building G-8 (32.1 mg/kg at station LL4ss-023). The next highest detected concentration (24.7 mg/kg) was detected in the sample collected at station LL4-106 near Building G-15.

- Selenium was detected in 42 of 70 samples, but was present at concentrations above background (1.4 mg/kg) in only 3 samples. The maximum reported concentration was 3.2 mg/kg in the sample collected at station LL4ss-032 near Building G-12A.

- Thallium was detected in 28 of 40 surface soil samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Thallium concentrations ranged from 0.30 to 13.3 mg/kg (estimated), with the maximum concentration detected at station LL4ss-003 at the northeast corner of Building G-8. The average concentration of thallium was 0.92 mg/kg.

- Zinc was detected in 70 of 70 samples and was present at concentrations above background (61.8 mg/kg) in 43 samples. Most of the detections above background occurred in the vicinity of Building G-8 (11 detections above background), Building G-12 (8 detections above background), and Building G-12A (7 detections above background). The average concentration of zinc among all samples was 160 mg/kg, over 2.5 times the background concentration of 62 mg/kg. The MDC (3,680 mg/kg) was observed in the sample collected at station LL4-110 near Building G-13. The next highest detected concentration (1,850 mg/kg) was observed in the sample collected near Building G-12A.

4.2.4.2 Preparation and Receiving Areas Aggregate

A total of 22 inorganic compounds were detected at least once in surface soil, 15 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Seven of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium) or the MDC was below the corresponding background criterion (aluminum and selenium). The MDCs for arsenic, barium, beryllium, chromium, cobalt, copper, lead, manganese, mercury, nickel, vanadium, and zinc exceeded their respective background criteria and were retained as SRCs. Cadmium, cyanide, and thallium were also retained as SRCs because the background criteria for each of these constituents was set to zero.

Table 4-16 provides a summary by station of results for inorganic SRCs in surface soil for the Preparation and Receiving Areas Aggregate. For metals with established background concentrations and retained as SRCs in surface soil, arsenic, barium, chromium, cobalt, copper, cyanide, lead, manganese, nickel, vanadium, and zinc were detected in every sample for which those analyses were performed. Beryllium, cadmium, mercury, and thallium are also considered pervasive in the Preparation and Receiving Areas Aggregate because they were detected in more than 50% of the samples analyzed. The MDC of almost all of the SRCs in surface soil in this aggregate occurred in the sample collected at station LL4-131 on the south side of Building G-4. The extent and relative concentrations of beryllium, copper, lead, manganese, and mercury in surface soil at Load Line 4 are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Preparation and Receiving Areas Aggregate.

- Arsenic was detected in 17 of 17 samples. The maximum concentration was 27.3 mg/kg, detected in the sample collected at station LL4-131 near Building G-4. The average concentration of arsenic in all samples was 10.0 mg/kg, about 67% of the background criterion (15.4 mg/kg).

- Barium was detected in all 17 samples and was present at concentrations above background in 6 of the samples. Three of the detections above background were in samples collected on the north side of Buildings G-1 and G-1A, although the maximum concentration (198 mg/kg) was detected in the sample collected at station LL4-131 south of Building G-4. The average concentration of all samples was 86 mg/kg, slightly below the established background concentration of 88.4 mg/kg for this inorganic.

- Beryllium was detected in 53% of the samples and was present at concentrations above background (0.88 mg/kg) in 3 of the 9 samples in which it was detected. Two of the detections above background exceeded the background criterion by less than 40%. The MDC of 1.6 mg/kg was observed in the sample collected at station LL4-127 on the south side of Building G-3 (Figures 4-4 and 4-5).

- Cadmium was detected in 14 of 17 samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.12 to 4.6 mg/kg, with the maximum concentration detected at station LL4-127 on the south side of Building G-3.

- Chromium was detected in all 17 samples. The only detection above background (17.4 mg/kg) occurred in the sample collected at station LL4-131 near Building G-4. Chromium was detected in this sample at a concentration of 158 mg/kg.

- Cobalt was also detected in 17 of 17 samples. Two of the detections were above background (10.4 mg/kg), but the MDC (13.5 mg/kg at station LL4-131) was only moderately elevated above background.

- Copper was detected in all 17 samples and was present at concentrations above background (17.7 mg/kg) in 7 samples. The MDC of copper in these samples was 512 mg/kg, observed in the sample collected at station LL4-131 near Building G-4. The next highest concentration was 81.6 mg/kg, detected in the sample collected at station LL4-132, also near Building G-4 (Figures 4-6 and 4-7).

Table 4-16. Summary Data for Site-Related Inorganics in Preparation and Receiving Areas Aggregate Surface Soil[a]

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-084**	**LL4-085**	**LL4-086**	**LL4-087**	**LL4-088**	**LL4-089**
Sample ID		**LL40726**	**LL40729**	**LL40732**	**LL40735**	**LL40738**	**LL40741**
Date		**08/24/2001**	**08/23/2001**	**08/23/2001**	**08/24/2001**	**08/22/2001**	**08/23/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	NA
Arsenic	mg/kg	4.4 J	10.9 J	12.6 J	13 J	3.5 J	4.8 =
Barium	mg/kg	82.2 J	105 J *	41 J	38.9 J	141 J *	126 = *
Beryllium	mg/kg	0.39 UJ	1 UJ	0.58 UJ	0.53 UJ	1.2 J *	1.1 J *
Cadmium	mg/kg	0.73 J *	0.12 J *	0.62 UJ	0.42 J *	1.2 J *	0.82 = *
Chromium	mg/kg	7 J	14.4 J	14.3 J	10.1 J	11.1 J	6.9 =
Cobalt	mg/kg	3.6 J	13.6 J *	4.8 J	7.8 J	3.1 J	2.7 =
Copper	mg/kg	9.5 J	16.6 J	17.8 J *	20.3 J *	9.4 J	12.6 =
Lead	mg/kg	92.8 J *	11.2 J	13.2 J	79.5 J *	136 J *	59.7 = *
Manganese	mg/kg	341 J	401 J	102 J	383 J	1,100 J	1,240 J
Mercury	mg/kg	0.059 J *	0.011 J	0.033 J	0.023 J	0.031 J	0.016 J
Nickel	mg/kg	14.2 J	26 J *	12.9 J	16.7 J	12.4 J	11.2 J
Thallium	mg/kg	0.41 J *	0.69 J *	0.8 J *	0.54 J *	0.48 J *	0.26 J *
Vanadium	mg/kg	6.5 J	15.4 J	21.2 J	12.8 J	5.6 J	5.5 =
Zinc	mg/kg	183 J *	85.1 J *	45.7 J	189 J *	242 J *	131 = *

Table 4-16. Summary Data for Site-Related Inorganics in Preparation and Receiving Areas Aggregate Surface Soil[a] (continued)

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-090**	**LL4-090**	**LL4-091**	**LL4-126**	**LL4-127**	**LL4-128**
Sample ID		**LL40744**	**LL41139**	**LL40747**	**LL40836**	**LL40839**	**LL40842**
Date		**08/23/2001**	**08/23/2001**	**08/23/2001**	**08/22/2001**	**08/20/2001**	**08/20/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Inorganics							
Cyanide	mg/kg	NA	NA	NA	NA	NA	NA
Arsenic	mg/kg	13.9 =	15.1 =	9 =	11.9 J	4.1 =	8.7 =
Barium	mg/kg	29.6 =	51.3 =	55.8 =	87.9 J	188 = *	62.6 =
Beryllium	mg/kg	0.36 U	0.37 U	0.46 U	0.62 UJ	1.6 = *	0.4 U
Cadmium	mg/kg	0.55 U	0.77 = *	0.63 U	0.13 J *	4.6 = *	0.14 J *
Chromium	mg/kg	8 =	8.6 =	14.2 =	14.8 J	12.5 =	8.4 =
Cobalt	mg/kg	7 =	8.4 =	4.4 =	3 J	4 =	4.5 =
Copper	mg/kg	21.6 = *	32.7 = *	9.3 =	8 J	13.6 =	13.2 =
Lead	mg/kg	16.7 =	19.4 =	13.9 =	21.8 J	105 J *	47.9 J *
Manganese	mg/kg	392 =	1,220 J	92.1 J	177 J	1,830 = *	340 =
Mercury	mg/kg	0.022 J	0.019 J	0.058 J *	0.053 J *	0.016 J	0.019 J
Nickel	mg/kg	16 =	32.1 J *	10 J	7.8 J	9 J	11.4 J
Thallium	mg/kg	0.4 U	0.29 J *	0.44 J *	0.6 J *	0.47 U	0.64 = *
Vanadium	mg/kg	9.6 =	11.3 =	27.4 =	18.1 J	7.9 =	11 =
Zinc	mg/kg	76.3 = *	131 = *	43.2 =	53.3 J	263 = *	70.6 = *

Table 4-16. Summary Data for Site-Related Inorganics in Preparation and Receiving Areas Aggregate Surface Soil[a] (continued)

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-130**	**LL4-131**	**LL4-131**	**LL4-132**	**LL4-133**	**LL4-185**	**LL4ss-022**
Sample ID		**LL40846**	**LL40849**	**LL41143**	**LL40852**	**LL40855**	**LL40990**	**LL4SS-022-0252-SO**
Date		**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/11/2001**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**							
Inorganics								
Cyanide	mg/kg	NA	NA	NA	NA	NA	NA	0.11 J *
Arsenic	mg/kg	9.5 J	27.3 = *	14.5 =	12.6 J	9.1 J	8.6 =	13.2 J
Barium	mg/kg	50.2 J	198 = *	92.3 = *	52.9 J	74.6 J	109 = *	24.5 =
Beryllium	mg/kg	0.39 J	0.71 =	0.46 J	0.52 J	0.37 J	0.53 J	0.25 =
Cadmium	mg/kg	0.3 J *	3.4 = *	1.3 = *	0.53 J *	0.83 J *	2.6 = *	0.16 J *
Chromium	mg/kg	11.7 J	158 = *	23.9 = *	15.2 J	13.4 J	17.1 =	6.2 =
Cobalt	mg/kg	5.8 =	13.5 = *	7 =	9.1 =	5.1 =	6.5 =	4.7 =
Copper	mg/kg	13 =	512 = *	317 = *	81.6 = *	41.6 = *	16.6 =	19.1 = *
Lead	mg/kg	24.4 J	987 = *	209 = *	51.5 J *	105 J *	563 = *	14.8 =
Manganese	mg/kg	407 J	921 =	377 =	305 J	684 J	170 =	256 J
Mercury	mg/kg	0.088 J *	1.1 = *	0.83 = *	0.011 J	7.4 = *	0.17 U	0.04 U
Nickel	mg/kg	12.4 J	47.8 = *	27.7 = *	21.3 J *	12.3 J	28.5 = *	11.8 =
Thallium	mg/kg	0.66 = *	0.66 = *	0.6 = *	0.58 J *	0.26 = *	0.68 = *	1.2 J *
Vanadium	mg/kg	16.2 J	40.5 = *	21.6 =	17.5 J	9.7 J	11.6 =	8.9 =
Zinc	mg/kg	64.2 = *	749 = *	349 = *	398 = *	101 = *	560 = *	65.1 = *

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
NA = Not analyzed.
* - Exceeds Ravenna Army Ammunition Plant background criteria.
= - Detected result.
J - Estimated result.
U - Not detected.

- Cyanide was detected at an estimated concentration of 0.11 mg/kg in the only sample for which this inorganic was analyzed (LL4ss-022). No site background has been established for this metal, thus all detected results are considered to exceed background.

- Lead was detected in 17 of 17 samples and was present at concentrations above background (26.1 mg/kg) in 10 of the samples. Detected concentrations of lead ranged from 11.2 mg/kg (estimated) at station LL4-085 near Building G-1 to 987 mg/kg at station LL4-131 near Building G-4 (Figures 4-8 and 4-9).

- Manganese was also detected in 17 of 17 samples. The highest concentrations were detected in the samples collected near Building G-1A [1,100 mg/kg (estimated) at station LL4-088 and 1,240 mg/kg (estimated) at station LL4-089] and Building G-4 (1,830 mg/kg at station LL4-127) (Figures 4-10 and 4-11). Only one detected concentration exceeded the background criteria of 1,450 mg/kg.

- Mercury was detected in 15 of 17 samples and was present at concentrations above background in 6 of the samples. The average concentration of mercury in the samples from the Preparation and Receiving Areas Aggregate was almost 15 times the established background criterion (0.036 mg/kg). The MDC was 7.4 mg/kg in the sample collected at station LL4-133 near Building G-4 (Figures 4-12 and 4-13).

- Nickel was detected in all 17 samples. Four of the detected concentrations exceeded background (21.1 mg/kg), although the MDC (47.8 mg/kg at station LL4-131) exceeded the background criterion by a factor of slightly less than 2.8.

- Thallium was detected in 15 of 17 samples. Detected concentrations ranged from 0.26 mg/kg to 1.2 mg/kg (estimated). No site background has been established for this metal, thus all detected results are considered to exceed background.

- Vanadium was detected in 17 of 17 samples but was present at a concentration above background (31.1 mg/kg) in only one sample. The MDC of this inorganic (40.5 mg/kg) was observed in the sample collected at station LL4-131.

- Zinc was detected in 17 of 17 samples and was present at concentrations above background (61.8 mg/kg) in 14 samples. Detected concentrations ranged from 43.2 mg/kg at station LL4-091 on the south side of Building G-1A to 749 mg/kg at station LL4-131 south of Building G-4.

4.2.4.3 Packaging and Shipping Areas Aggregate

A total of 22 inorganic compounds were detected at least once in surface soil, 12 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Ten of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium) or the MDC was below the corresponding background criterion (aluminum, arsenic, cobalt, selenium, and vanadium). The MDCs for antimony, barium, beryllium, chromium, copper, lead, manganese, mercury, nickel, and zinc exceeded their respective background criteria and were retained as SRCs. Cadmium and thallium were also retained as SRCs because the background criteria for each of these constituents was set to zero.

Table 4-17 provides a summary by station of results for inorganic SRCs in surface soil for the Packaging and Shipping Areas Aggregate. For metals with established background concentrations and retained as SRCs in surface soil, barium, chromium, copper, lead, manganese, nickel, and zinc were detected in every sample for which those analyses were performed. Cadmium, mercury, and thallium are also considered pervasive in the Packaging and Shipping Areas Aggregate because they were detected in more than 50% of the samples analyzed. Antimony and beryllium were detected less frequently and at concentrations only slightly above established background criteria. The extent and relative concentration of beryllium, copper, lead, manganese, and mercury are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Packaging and Shipping Areas Aggregate.

- Barium was detected in 11 of 11 samples and was present at concentrations above background (88.4 mg/kg) in 6 samples. Detections above background occurred in samples collected adjacent to Building G-19; however, barium was not detected in any samples collected near Building G-19A.

- Cadmium was detected in 7 of the 11 samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.19 (estimated) to 9.1 mg/kg, with the maximum concentration detected at station LL4-095 on the north side of Building G-19. The maximum concentration of almost all of the inorganics detected in surface soil from the Packaging and Shipping Areas Aggregate were observed in the sample collected at station LL4-095.

- Chromium was detected in all samples (11 detections in 11 samples), but was present above background in only the sample from station LL4-095 where it was detected at a concentration of 30.2 mg/kg. Background for chromium is 17.4 mg/kg.

- Copper was detected in 10 of 10 samples and was present at concentrations above background (17.7 mg/kg) in 50% of the samples. Samples collected adjacent to Building G-19 exhibited the highest concentrations of copper. The MDC was 55.8 mg/kg at station LL4-095. Two of four samples collected adjacent to Building G-19A showed only slightly elevated concentrations (the other two detections were below background) (Figures 4-6 and 4-7).

- Lead was detected in 11 of 11 samples. The established background criterion (26 mg/kg) was exceeded in 5 of the samples. The MDC of 501 mg/kg was observed in the sample collected at station LL4-095 near Building G-19. The next highest concentration (284 mg/kg) was detected in the sample from station LL4-096 on the south side of the building (Figures 4-8 and 4-9).

- Manganese was detected in 11 of 11 samples and was present at a concentration above background in one of the samples (LL4-095). The detected concentration at this location was 1,870 mg/kg (estimated), approximately 1.25 times the established background criterion of 1,450 mg/kg. Detected concentrations ranged from 154 to 1,870 mg/kg. Elevated concentrations of this constituent, as with most of the inorganics, were observed in the samples collected adjacent to Building G-19 (Figures 4-10 and 4-11).

- Mercury was detected in 55% of the samples analyzed and was present at concentrations above background in 3 samples. The MDC above background were only slightly elevated (Figures 4-12 and 4-13).

Table 4-17. Summary Data for Site-Related Inorganics in Packaging and Shipping Areas Aggregate Surface Soil[a]

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-093**	**LL4-094**	**LL4-094**	**LL4-095**	**LL4-096**	**LL4-097**
Sample ID		**LL40753**	**LL40756**	**LL41146**	**LL40759**	**LL40762**	**LL40765**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Inorganics							
Antimony	mg/kg	1.3 R	1.5 R	1.4 R	0.86 J	1.5 J *	0.68 J
Barium	mg/kg	97.3 = *	111 = *	79 =	269 = *	163 = *	198 = *
Beryllium	mg/kg	1.7 J *	0.77 U	0.56 U	1.5 J *	0.6 U	2.1 J *
Cadmium	mg/kg	0.33 J *	0.74 U	0.68 U	9.1 = *	5.5 = *	3.8 = *
Chromium	mg/kg	8.4 =	15.6 =	13.7 =	30.2 = *	15 =	11.5 =
Copper	mg/kg	11.8 =	38.8 = *	20.9 = *	55.8 = *	36.7 = *	14.1 =
Lead	mg/kg	19.2 =	38 = *	32.9 = *	501 = *	284 = *	99 = *
Manganese	mg/kg	852 J	625 J	109 J	1870 J *	564 =	1,130 J
Mercury	mg/kg	0.031 U	0.02 U	0.027 U	0.078 J *	0.039 J *	0.019 U
Nickel	mg/kg	10.7 J	20.9 J	12.4 J	25.6 J *	17.6 =	9.9 J
Thallium	mg/kg	0.29 = *	0.58 = *	0.54 = *	0.29 = *	0.34 U	0.46 = *
Zinc	mg/kg	130 = *	99.8 = *	87.7 = *	508 = *	336 = *	232 = *

Table 4-17. Summary Data for Site-Related Inorganics in Packaging and Shipping Areas Aggregate Surface Soil[a] (continued)

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-098**	**LL4-100**	**LL4-101**	**LL4-102**	**LL4-103**	**LL4ss-026**
Sample ID		**LL40768**	**LL40772**	**LL40775**	**LL40778**	**LL40781**	**LL4SS-026-0257-SO**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**07/25/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**						
Inorganics							
Antimony	mg/kg	1.1 R	1.2 UJ	1.2 UJ	1.2 UJ	1.4 UJ	NA
Barium	mg/kg	84.9 =	30.6 =	25.3 =	45.1 =	66.7 =	90.1 = *
Beryllium	mg/kg	1.4 J *	0.37 U	0.3 U	0.48 U	0.64 U	NA
Cadmium	mg/kg	0.21 J *	0.29 J *	0.61 U	0.62 U	0.11 U	0.19 J *
Chromium	mg/kg	7.1 =	7.4 =	4.5 =	11.7 =	15.1 =	9.9 =
Copper	mg/kg	10.4 =	25.9 = *	13.1 =	15.7 =	23.1 = *	NA
Lead	mg/kg	17.2 =	31.3 = *	13.8 =	21.6 =	20.2 =	14.5 =
Manganese	mg/kg	752 J	168 =	237 =	154 =	300 =	648 =
Mercury	mg/kg	0.024 U	0.027 J	0.012 J	0.03 J	0.043 J *	0.04 U
Nickel	mg/kg	10.2 J	10.9 =	7.4 =	13.6 =	12.8 =	NA
Thallium	mg/kg	0.32 J *	0.41 U	0.34 U	0.41 U	0.52 U	NA
Zinc	mg/kg	116 = *	843 = *	48.9 =	66.2 = *	92.5 = *	51.2 =

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
NA = Not analyzed.
* - Exceeds Ravenna Army Ammunition Plant background criteria.
= - Detected result.
J - Estimated result.
U - Not detected.

- Nickel was detected in 10 of 10 samples, but was present at a concentration above background in only one sample. The MDC of 25.6 mg/kg (estimated) exceeded background (21.1 mg/kg) by less than 20%.

- Thallium was detected in 5 of 10 samples. Detected concentrations ranged from 0.29 mg/kg (at stations LL4-093 and LL4-095) to 0.58 mg/kg at station LL4-094. No site background has been established for this metal, thus all detected results are considered to exceed background.

- Zinc was detected in 11 of 11 samples and was present at concentrations above background in 9 samples. Detected concentrations ranged from 48.9 to 843 mg/kg. The background criterion for zinc is 61.8 mg/kg. The MDC of this metal was observed in the sample collected at station LL4-100 on the south side of Building G-19A.

4.2.4.4 Change Houses Aggregate

A total of 21 inorganic compounds were detected at least once in surface soil, 8 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Thirteen of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium) or the MDC was below the corresponding background criterion (aluminum, arsenic, beryllium, cobalt, manganese, nickel, selenium, and vanadium). The MDCs for barium, chromium, copper, lead, mercury, and zinc exceeded their respective background criteria and were retained as SRCs. Cadmium and thallium were also retained as SRCs because the background criteria for each of these constituents was set to zero.

Table 4-18 provides a summary by station of results for inorganic SRCs in surface soil for the Change Houses Aggregate. For metals with established background concentrations and retained as SRCs in surface soil, barium, cadmium, chromium, copper, lead, and zinc were detected in every sampled analyzed. Mercury was detected in five of the samples and thallium was detected in four. The extent and relative concentrations of beryllium, copper, lead, manganese, and mercury are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Change Houses Aggregate.

- Barium was detected in six of six samples, but was present above the established background criterion (88.4 mg/kg) only in the sample collected at station LL4-092 near Building G-5 where it was detected at a concentration of 133 mg/kg. The next highest concentration was 77.3 mg/kg (station LL4-141 near Building G-6), which is below the background value.

- Cadmium was detected in six of six samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.18 mg/kg (estimated) to 1.1 mg/kg, with the maximum concentration detected at station LL4-092 near Building G-5.

- Chromium was also detected in six of six samples. The sample collected at station LL4-139 was the only sample where chromium was detected at a concentration above background. The concentration at this location was 25.9 mg/kg, slightly exceeding the established background (17.4 mg/kg).

Table 4-18. Summary Data for Site-Related Inorganics in Change Houses Aggregate Surface Soil

Functional Area		Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate
Station ID		**LL4-092**	**LL4-136**	**LL4-137**	**LL4-138**	**LL4-139**	**LL4-141**
Sample ID		**LL40750**	**LL40860**	**LL40863**	**LL40866**	**LL40869**	**LL40875**
Date		**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/21/2001**	**08/21/2001**	**08/14/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Inorganics							
Barium	mg/kg	133 = *	49.2 =	51.4 =	45.6 =	45.6 =	77.3 =
Cadmium	mg/kg	1.1 = *	0.18 J *	0.23 J *	0.36 J *	0.87 = *	0.85 = *
Chromium	mg/kg	5.9 =	13.5 =	11.6 =	12 =	25.9 = *	12 =
Copper	mg/kg	13.5 =	15.6 =	17.2 =	20.1 = *	24 = *	35.6 = *
Lead	mg/kg	84.6 = *	26.6 = *	19.6 =	22.3 J	397 J *	279 = *
Mercury	mg/kg	0.05 J *	0.026 J	0.029 J	0.041 J *	0.015 U	0.026 J
Thallium	mg/kg	0.35 UJ	0.49 = *	0.59 = *	0.77 = *	0.85 J *	0.36 U
Zinc	mg/kg	139 = *	53.7 =	65.9 = *	69.1 = *	113 = *	194 = *

ID = Identification.
* - Exceeds Ravenna Army Ammunition Plant background criteria.
= - Detected result.
J - Estimated result.
U - Not detected.

- Copper was detected in six of six samples. Copper was present at concentrations above the established background criterion (17.7 mg/kg) in 3 samples, but exceedances ranged from very slight to only moderate. The MDC was 35.6 mg/kg in the sample from station LL4-141 near Building G-6.

- Lead was detected in all samples and was present at concentrations above background (26.1 mg/kg) in four of the samples. Two samples in this aggregate exhibited comparatively high concentrations; lead was detected in the sample collected at station LL4-139 at an estimated concentration of 397 mg/kg (15 times background) and in the sample collected at station LL4-141 at a concentration of 279 mg/kg (almost 11 times background).

- Mercury was detected in five of six samples and was present at concentrations above background in two samples. Detections above background were very slight (less than 40% above the established background criterion of 0.036 mg/kg).

- Thallium was detected in four of six samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Detected concentrations of thallium ranged from 0.49 to 0.85 mg/kg (estimated), with the maximum concentration detected at station LL4-139 near Building G-6A.

- Zinc was detected in all samples and was present at concentrations above background (61.8 mg/kg) in five samples. The MDC was observed in the sample collected at station LL4-141 (194 mg/kg, slightly more than 3 times background).

4.2.4.5 Perimeter Area Aggregate

A total of 21 inorganic compounds were detected at least once in surface soil, 10 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Eleven of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium) or the MDC was below the corresponding background criterion (aluminum, arsenic, copper, nickel, selenium, and vanadium). The MDCs for barium, beryllium, chromium, cobalt, lead, manganese, mercury, and zinc exceeded their respective background criteria and were retained as SRCs. Cadmium and thallium were also retained as SRCs because the background criteria for each of these constituents was set to zero.

Table 4-19 provides a summary by station of results for inorganic SRCs in surface soil for the Perimeter Area Aggregate. For metals with established background concentrations and retained as SRCs in surface soil, barium, chromium, lead, manganese, and zinc were detected in every sampled analyzed. Cobalt was detected in every sample for which that constituent was analyzed (20 detections in 20 samples). Cadmium was detected in 50% of the samples analyzed (12 detections in 24 samples). Thallium was detected in all but 2 of the 20 samples analyzed for that constituent. Beryllium was detected in only 3 of 20 samples collected from the Perimeter Area Aggregate. The extent and relative concentrations of beryllium, copper, lead, manganese, and mercury are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Perimeter Area Aggregate.

- Barium was detected in 24 of 24 samples but was present above the established background criterion (88.4 mg/kg) in only 2 samples. LL4-140 in the northern portion of the AOC (EU 17) and LL4-164 (EU 15).

Table 4-19. Summary Data for Site-Related Inorganics in Perimeter Area Aggregate Surface Soil[a]

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-068**	**LL4-069**	**LL4-070**	**LL4-140**	**LL4-150**	**LL4-150**	**LL4-151**
Sample ID		**LL40680**	**LL40683**	**LL40686**	**LL40872**	**LL40902**	**LL41149**	**LL40903**
Date		**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/26/2001**	**08/23/2001**	**08/23/2001**	**08/23/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**							
Inorganics								
Barium	mg/kg	52.3 =	54.7 =	57.4 =	89 = *	45.7 J	44.3 =	56 J
Beryllium	mg/kg	0.51 U	0.49 U	0.45 U	0.9 J *	0.64 UJ	0.6 U	0.52 UJ
Cadmium	mg/kg	0.22 J *	0.27 J *	0.28 J *	0.31 J *	0.61 UJ	0.6 U	0.12 J *
Chromium	mg/kg	35.2 = *	51.6 = *	120 = *	10.3 =	17.6 J *	16.6 =	8.5 J
Cobalt	mg/kg	8.4 =	7.8 =	8.6 =	5.7 =	7.5 J	9.1 =	6.6 J
Lead	mg/kg	599 = *	414 = *	1,340 = *	22.8 =	17 J	17.3 =	16.8 J
Manganese	mg/kg	242 J	222 J	433 J	862 =	188 J	258 J	656 J
Mercury	mg/kg	0.094 J *	0.046 U	0.066 U	0.026 U	0.012 J	0.019 J	0.016 J
Thallium	mg/kg	0.38 = *	0.3 = *	0.38 = *	0.17 UJ	0.56 J *	0.64 J *	0.33 J *
Zinc	mg/kg	120 = *	86.4 = *	116 = *	70.3 = *	59.3 J	58.3 =	42.6 J

Table 4-19. Summary Data for Site-Related Inorganics in Perimeter Area Aggregate Surface Soil[a] (continued)

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-152**	**LL4-153**	**LL4-154**	**LL4-155**	**LL4-156**	**LL4-157**	**LL4-159**
Sample ID		**LL40904**	**LL40905**	**LL40906**	**LL40907**	**LL40908**	**LL40909**	**LL40911**
Date		**08/23/2001**	**08/23/2001**	**08/23/2001**	**08/23/2001**	**08/24/2001**	**08/24/2001**	**08/23/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**							
Inorganics								
Barium	mg/kg	20.6 J	48.2 =	53.7 =	39.3 =	64.4 J	66.9 J	29.3 =
Beryllium	mg/kg	0.36 UJ	0.56 U	0.42 U	0.52 U	0.76 UJ	0.74 UJ	0.31 U
Cadmium	mg/kg	0.083 J *	0.57 U	0.57 U	0.61 U	0.13 J *	0.084 J *	0.57 U
Chromium	mg/kg	6.2 J	12.5 =	9.3 =	10.3 =	12.6 J	20.1 J *	6.5 =
Cobalt	mg/kg	2.6 J	6.9 =	2.2 =	3 =	14.8 J *	6.8 J	2.8 =
Lead	mg/kg	12 J	19.7 =	16.6 =	64.4 = *	21.9 J	212 J *	19 =
Manganese	mg/kg	84.7 J	325 J	97.3 J	112 J	617 J	419 J	204 J
Mercury	mg/kg	0.12 R	0.03 J	0.036 J	0.087 J *	0.037 J *	0.041 J *	0.058 J *
Thallium	mg/kg	0.5 J *	0.61 J *	0.49 J *	0.34 J *	0.47 J *	0.61 J *	0.48 J *
Zinc	mg/kg	31.5 J	54 =	33.8 =	46.5 =	60.8 J	56.7 J	28.1 =

Table 4-19. Summary Data for Site-Related Inorganics in Perimeter Area Aggregate Surface Soil[a] (continued)

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-160**	**LL4-161**	**LL4-161**	**LL4-162**	**LL4-163**	**LL4-164**
Sample ID		**LL40912**	**LL40913**	**LL41150**	**LL40914**	**LL40915**	**LL40916**
Date		**08/23/2001**	**08/24/2001**	**08/24/2001**	**08/23/2001**	**08/24/2001**	**08/23/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Inorganics							
Barium	mg/kg	58.9 =	58.8 =	57.7 =	80.5 =	49.2 J	112 = *
Beryllium	mg/kg	0.69 U	0.53 J	0.5 U	0.66 U	0.64 UJ	1.5 J *
Cadmium	mg/kg	0.6 U	0.38 J *	0.34 J *	0.6 U	0.6 UJ	0.055 J *
Chromium	mg/kg	15.2 =	13.2 =	12.9 =	12.9 =	12.5 J	10.1 =
Cobalt	mg/kg	6.2 =	12.2 = *	11 = *	8.1 =	9.7 J	3.5 =
Lead	mg/kg	22.1 =	26.9 = *	23.5 =	18.6 =	13.3 J	13.4 =
Manganese	mg/kg	150 J	930 =	868 =	598 J	501 J	1,780 J *
Mercury	mg/kg	0.062 J *	0.049 U	0.044 U	0.078 J *	0.045 J *	0.019 J
Thallium	mg/kg	0.43 J *	0.25 U	0.3 U	0.67 J *	0.59 J *	0.4 J *
Zinc	mg/kg	74 = *	68.5 = *	70.2 = *	54.2 =	41.4 J	34 =

Table 4-19. Summary Data for Site-Related Inorganics in Perimeter Area Aggregate Surface Soil[a] (continued)

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-165**	**LL4-166**	**LL4ss-004**	**LL4ss-041(b)**	**LL4ss-042(b)**	**LL4ss-043(b)**
Sample ID		**LL40917**	**LL40918**	**LL4SS-004-0234-SO**	**LL4SS-041(B)-0275-SO**	**LL4SS-042(B)-0276-SO**	**LL4SS-043(B)-0277-SO**
Date		**08/23/2001**	**08/23/2001**	**07/27/1996**	**07/30/1996**	**07/30/1996**	**07/31/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab**	**Grab**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Inorganics							
Barium	mg/kg	69.1 J	48 =	52.5 =	53.2 =	59.2 =	38.3 =
Beryllium	mg/kg	0.67 UJ	0.39 U	NA	NA	NA	NA
Cadmium	mg/kg	0.17 J *	0.6 U	0.54 J *	0.05 UJ	0.05 UJ	0.05 UJ
Chromium	mg/kg	11.6 J	10 =	10.7 =	9.2 =	13.8 =	14 =
Cobalt	mg/kg	7.5 J	4.6 =	NA	NA	NA	NA
Lead	mg/kg	20.1 J	12.8 =	23.4 =	7.8 =	15.5 =	13.5 =
Manganese	mg/kg	387 J	327 J	777 J	110 J	157 J	163 J
Mercury	mg/kg	0.031 J	0.051 J *	0.04 U	0.06 = *	0.08 = *	0.05 = *
Thallium	mg/kg	0.54 J *	0.36 J *	NA	NA	NA	NA
Zinc	mg/kg	55.9 J	32.2 =	88.4 = *	27.2 =	43.9 =	49.4 =

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
NA = Not analyzed.
* - Exceeds Ravenna Army Ammunition Plant background criteria.
= - Detected result.
J - Estimated result.
U - Not detected.

- Cadmium was detected in 12 of 24 samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.055 (estimated) to 0.54 mg/kg (estimated), with the maximum concentration detected at station LL4ss-004 (EU 12).

- Chromium was detected in 24 of 24 samples. Detected concentrations ranged from 6.2 to 120 mg/kg. Chromium was detected at concentrations above background (17.4 mg/kg) in five samples.

- Cobalt was detected in 20 of 20 samples. The detected concentration of cobalt exceeded background (10.4 mg/kg) at only two locations; LL4-156 in the western portion of the AOC and station LL4-161 in the north-central portion of the AOC. The maximum concentration was 14.8 mg/kg, only slightly exceeding the background value.

- Lead was detected in 24 of 24 samples and was present at concentrations above background (26.1 mg/kg) in 6 samples. The highest concentrations of lead occurred in the 3 samples collected near the WW-23 Water Tower (599 mg/kg at station LL4-068; 414 mg/kg at station LL4-069; and 1,340 mg/kg at station LL4-070).

- Manganese was detected in every sample analyzed; however, it only exceeded the established background criterion of 1,450 mg/kg in the sample collected at station LL4-164 (1,780 mg/kg) in the north-central portion of the AOC (EU 15).

- Thallium was detected in 18 of 20 samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Detected concentrations of thallium ranged from 0.30 to 0.67 mg/kg (estimated), with the maximum concentration detected at station LL4-162.

- Zinc was detected in 24 of 24 samples and was present at concentrations above background in 7 samples. The two highest detected concentrations were observed in samples collected near the WW 23 Water Tower (LL4-068 and LL4-070) were slightly less than 2 times the established background criterion (61.8 mg/kg).

Overall, the samples collected in the vicinity of the WW-23 Water Tower [stations LL4-068, LL4-069, and LL4-070 (EU 7)] showed the highest concentrations of most of the metals SRCs, although beryllium was not detected in any of the three samples and mercury was detected in only one of the samples in this group (station LL4-068). Background criteria were most frequently exceeded (and to a greater degree) in these three samples and the maximum concentration for four of the metals SRCs (mercury, zinc, chromium, and lead) in the Perimeter Areas Aggregate occur in two of the samples collected near the water tower (LL4-068 and LL4-070).

4.2.4.6 Melt-Pour Area Drainage Ditches Aggregate

A total of 23 inorganic compounds were detected at least once in surface soil, 8 of which were identified as SRCs (Table 4-3) and carried forward to the risk screening process (Chapters 6.0 and 7.0). Fifteen of the detected constituents were eliminated as surface soil SRCs because they were considered either essential nutrients (calcium, iron, magnesium, potassium, and sodium) or the MDC was below the corresponding background criterion (aluminum, barium, beryllium, chromium, cobalt, manganese, mercury, nickel, selenium, and vanadium). The MDCs for antimony, arsenic, copper, lead, and zinc exceeded their respective background criteria and were retained as SRCs. Cadmium, cyanide, and thallium were also retained as SRCs because the background criteria for each of these constituents were set to zero.

Table 4-20 provides a summary by station of results for inorganic SRCs in surface soil for the Melt-Pour Drainage Ditches Aggregate. For metals with established background concentrations and retained as SRCs in surface soil, arsenic, lead, and zinc were detected in every sampled analyzed. Cadmium was the next most frequently detected metal (12 detections in 15 samples). Copper was detected in the seven samples for which that analysis was performed. Antimony was detected in one of seven samples. The extent and relative concentrations of beryllium, copper, lead, manganese, and mercury in surface soil at Load Line 4 are shown on Figures 4-4 through 4-13.

The discussion below is a brief summary of the nature and extent for inorganic SRCs identified as pervasive in the Melt-Pour Area Drainage Ditches Aggregate.

- Arsenic was detected in 15 of 15 samples, but was present at a concentration above background (15.4 mg/kg) in only the sample collected at station LL4ss-047. The detected concentration at this station was 16.6 mg/kg.

- Cadmium was detected in 12 of 15 samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cadmium concentrations ranged from 0.04 (estimated) to 0.32 mg/kg (estimated), with the maximum concentration detected at station LL4sd-051(d).

- Copper was detected in seven of seven samples, but was present at a concentration above background in only one sample. The detected concentration in the sample collected at station LL4-021(d) was 19.5 mg/kg, only slightly above the background criterion of 17.7 mg/kg.

- Cyanide was detected in one of two samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Cyanide was detected at an estimated concentration of 0.16 mg/kg in the sample collected at station LL4sd-051(d).

- Lead was detected in all samples but was present at a concentration above background in only one sample. The detected concentration in the sample collected at station LL4-013(p2) was 27.2 mg/kg, slightly above the background criterion of 26.1 mg/kg.

- Thallium was detected in six of seven samples. No site background has been established for this metal, thus all detected results are considered to exceed background. Detected concentrations of thallium ranged from 0.28 (estimated) to 0.73 mg/kg. The MDC was observed in the sample collected at station LL4-013(p2).

- Zinc was detected in 15 of 15 samples and was present at concentrations above background in 11 samples; however, the MDC of this metal was above the background criterion (61.8 mg/kg) by a factor of less than 2. The maximum concentration was observed in the sample collected at station LL4-013(p2).

4.2.5 SVOCs, VOC, and Pesticides/PCBs

The distribution of detected SVOCs, VOCs, pesticides, and PCBs in surface soil at each of the Load Line 4 soil aggregates is discussed below.

Table 4-20. Summary Data for Site-Related Inorganics in Melt-Pour Area Drainage Ditches Aggregate Surface Soil[a]

Functional Area		Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate
Station ID		**LL4-013(p2)**	**LL4-145**	**LL4-145**	**LL4sd-013(d)**	**LL4sd-021(d)**	**LL4sd-021(d)**
Sample ID		**LL40953**	**LL40887**	**LL41137**	**LL4SD-013(D)-0243-SD**	**LL40954**	**LL4SD-021(D)-0251-SD**
Date		**08/11/2001**	**08/13/2001**	**08/13/2001**	**07/29/1996**	**08/11/2001**	**07/29/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab Composite**	**Grab**	**Grab Composite**
Analyte	**Units**						
Inorganics							
Cyanide	mg/kg		0.66 U	0.65 U	NA	NA	NA
Antimony	mg/kg	2 J *	1.3 UJ	1.3 UJ	NA	1.2 UJ	NA
Arsenic	mg/kg	7.1 =	8.4 =	7.6 =	7.5 =	13.7 =	9.5 =
Cadmium	mg/kg	0.22 J *	0.13 = *	0.17 = *	0.05 U	0.14 J *	0.1 J *
Copper	mg/kg	15.5 =	14.9 =	17.8 = *	NA	19.5 = *	NA
Lead	mg/kg	27.2 = *	11 =	12.2 =	10 =	12.1 =	14.3 =
Thallium	mg/kg	0.73 = *	0.44 = *	0.41 = *	NA	0.66 = *	NA
Zinc	mg/kg	111 = *	66.2 = *	64.8 = *	61.1 =	71.8 = *	84.4 = *

Table 4-20. Summary Data for Site-Related Inorganics in Melt-Pour Area Drainage Ditches Aggregate Surface Soil[a] (continued)

Functional Area		Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate
Station ID		**LL4sd-050(d)**	**LL4sd-050(d)**	**LL4sd-051(d)**	**LL4sd-051(d)**	**LL4sd/sw-056(p)**
Sample ID		**LL40961**	**LL4SD-050(D)-0287-SD**	**LL40962**	**LL4SD-051(D)-0288-SD**	**LL40971**
Date		**08/12/2001**	**07/29/1996**	**08/13/2001**	**07/30/1996**	**08/13/2001**
Depth (ft)		**0 - 1**	**0 - 2**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab Composite**	**Grab**	**Grab Composite**	**Grab**
Analyte	**Units**					
Inorganics						
Cyanide	mg/kg	NA	NA	NA	0.16 J *	NA
Antimony	mg/kg	1.3 UJ	NA	1.6 UJ	0.37 U	1.4 UJ
Arsenic	mg/kg	13.6 =	11.8 =	3.2 =	4.6 =	6.3 =
Cadmium	mg/kg	0.23 J *	0.05 U	0.18 = *	0.32 J *	0.26 = *
Copper	mg/kg	15.1 =	NA	7.5 =	10.4 =	15.1 =
Lead	mg/kg	13.6 =	7.8 =	8.6 =	11.1 =	18.3 =
Thallium	mg/kg	0.61 = *	NA	0.28 J *	0.42 U	0.31 = *
Zinc	mg/kg	69.3 = *	40.7 =	55.2 =	78.6 = *	77.9 = *

Table 4-20. Summary Data for Site-Related Inorganics in Melt-Pour Area Drainage Ditches Aggregate Surface Soil[a] (continued)

Functional Area		Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate
Station ID		**LL4sd/sw-056(p)**	**LL4ss-046**	**LL4ss-047**	**LL4ss-064**	**LL4ss-065**
Sample ID		**LL4SD-056(D)-0295-SD**	**LL4SS-046-0281-SO**	**LL4SS-047-0282-SO**	**LL4SS-064-0677-SO**	**LL4SS-065-0678-SO**
Date		**07/30/1996**	**07/29/1996**	**07/29/1996**	**08/14/1996**	**08/14/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 0**	**0 - 2**	**0 - 1**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**					
Inorganics						
Cyanide	mg/kg	NA	NA	NA	NA	NA
Antimony	mg/kg	NA	NA	NA	NA	NA
Arsenic	mg/kg	5.9 J	10.9 =	15.6 = *	7.3 J	11.6 J
Cadmium	mg/kg	0.07 J *	0.04 J *	0.05 U	0.24 J *	0.29 J *
Copper	mg/kg	NA	NA	NA	NA	NA
Lead	mg/kg	8.9 =	18.8 =	16.7 =	15.9 J	19.8 J
Thallium	mg/kg	NA	NA	NA	NA	NA
Zinc	mg/kg	39.1 J	94.6 = *	70.6 = *	79 = *	75.4 = *

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
NA = Not analyzed.
* - Exceeds Ravenna Army Ammunition Plant background criteria.
= - Detected result.
J - Estimated result.
U - Not detected.

4.2.5.1 Explosives Handling Areas Aggregate

SVOCs

Eighteen SVOCs were detected at least once in the surface soil samples collected in the Explosives Handling Areas Aggregate. All of these SVOCs were detected at a frequency of greater than 5% and are considered to be SRCs (Table 4-3). Table 4-21 lists the concentrations of the detected SVOCs by station in surface soil in the Explosives Handling Areas Aggregate.

Figures 4-14 and 4-15 show the distribution of SVOCs in surface soil at Load Line 4. The maximum concentration of all but 4 of the 18 detected SVOCs occurred in the sample collected at station LL4ss-009, located at the southeast corner of Building G-8. Concentrations of certain SVOCs are also relatively high (greater than 1 mg/kg) in the samples collected from station LL4ss-045, located along the walkway between Building G-8 and Building G-12, and station LL4-158, located between Building G-12 and Building G-12A, in the central portion of the AOC.

VOCs

Three VOCs were detected at least once in the surface soil samples collected in the Explosives Handling Areas Aggregate. These VOCs were detected at a frequency of greater than 5%, and are considered to SRCs (Table 4-3). Toluene was detected in 3 of 19 samples. The MDC of toluene was 0.012 mg/kg in the sample collected at station LL4ss-034, located between Buildings G-12 and G-12A in the central portion of the AOC. Table 4-22 lists the concentration of detected VOCs by station in surface soil in the Explosives Handling Areas Aggregate.

Pesticides/PCBs

Fourteen pesticides and two PCB compounds were detected in the surface soil samples collected in the Explosives Handling Areas Aggregate (Table 4-23). Gamma-chlordane and 4,4'-dichlorodiphenyltrichloroethane (DDT) were the most commonly reported pesticides. These pesticides were reported in 5 of 17 and 4 of 17 samples, respectively. 4,4'-DDE, alpha-chlordane, dieldrin, endrin, and endrin aldehyde were each detected in 3 of 17 samples.

The PCB compounds detected in the surface soil samples collected from the Explosives Handling Areas Aggregate included PCB-1254 (6 detections in 39 samples) and PCB-1260 (13 detections in 36 samples). Figures 4-16 and 4-17 shows the distribution of detected pesticides and PCBs in surface soil across Load Line 4.

4.2.5.2 Preparation and Receiving Areas Aggregate

SVOCs

Four SVOCs were detected one time each in five surface soil samples collected in the Preparation and Receiving Areas Aggregate (Table 4-24). The detections of fluoranthene, phenanthrene, and pyrene occurred in the sample collected at station LL4-130, located near Building G-4. The results for these three compounds are estimated concentrations ranging between 0.06 and 0.07 mg/kg. Bis(2-ethylhexyl)phthalate was detected at an estimated concentration of 0.061 mg/kg in the sample collected at station LL4ss-022, adjacent to Building G-2. The distribution of SVOCs in surface soil at Load Line 4 is shown on Figures 4-14 and 4-15.

Table 4-21. Summary Data for Site-Related SVOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a]

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-071**	**LL4-073**	**LL4-075**	**LL4-076**	**LL4-076**	**LL4-080**
Sample ID		**LL40689**	**LL40695**	**LL40701**	**LL40704**	**LL41138**	**LL40714**
Date		**08/21/2001**	**08/21/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**						
Semivolatile Organics							
Acenaphthylene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Anthracene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Benz(*a*)anthracene	mg/kg	0.15 J	0.44 UJ	0.12 J	0.078 J	0.089 J	0.083 J
Benzo(*a*)pyrene	mg/kg	0.21 J	0.44 UJ	0.15 J	0.19 J	0.21 J	0.12 J
Benzo(*b*)fluoranthene	mg/kg	0.54 J	0.44 UJ	0.32 J	0.3 J	0.35 J	0.18 J
Benzo(*g,h,i*)perylene	mg/kg	0.17 J	0.44 UJ	0.097 J	0.23 J	0.26 J	0.076 J
Benzo(*k*)fluoranthene	mg/kg	0.21 J	0.44 UJ	0.15 J	0.16 J	0.17 J	0.1 J
Bis(2-ethylhexyl)phthalate	mg/kg	0.37 UJ	0.15 J	0.13 J	0.2 J	0.14 J	0.38 UJ
Carbazole	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Chrysene	mg/kg	0.32 J	0.44 UJ	0.21 J	0.17 J	0.18 J	0.14 J
Di-n-butyl phthalate	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Dibenz(*a,h*)anthracene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.065 J	0.38 UJ
Fluoranthene	mg/kg	0.29 J	0.44 UJ	0.22 J	0.13 J	0.14 J	0.18 J
Fluorene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.15 J	0.44 UJ	0.098 J	0.19 J	0.22 J	0.082 J
Naphthalene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Phenanthrene	mg/kg	0.37 UJ	0.44 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.38 UJ
Pyrene	mg/kg	0.27 J	0.44 UJ	0.2 J	0.08 J	0.086 J	0.12 J

Table 4-21. Summary Data for Site-Related SVOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-110**	**LL4-113**	**LL4-117**	**LL4-158**	**LL4ss-003**	**LL4ss-009**
Sample ID		**LL40798**	**LL40807**	**LL40819**	**LL40910**	**LL4SS-003-0233-SO**	**LL4SS-009-0239-SO**
Date		**08/12/2001**	**08/21/2001**	**08/21/2001**	**08/24/2001**	**07/27/1996**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Semivolatile Organics							
Acenaphthylene	mg/kg	0.49 UJ	0.39 UJ	0.41 UJ	0.38 UJ	0.34 U	0.56 J
Anthracene	mg/kg	0.49 UJ	0.39 UJ	0.41 UJ	0.15 J	0.34 U	1.2 =
Benz(*a*)anthracene	mg/kg	0.49 UJ	0.26 J	0.41 UJ	0.99 J	0.34 U	1.6 =
Benzo(*a*)pyrene	mg/kg	0.49 UJ	0.77 J	0.41 UJ	1.9 UJ	0.34 U	2.7 =
Benzo(*b*)fluoranthene	mg/kg	0.49 UJ	1.3 J	0.41 UJ	5.4 J	0.04 J	7.2 =
Benzo(*g,h,i*)perylene	mg/kg	0.49 UJ	2 J	0.41 UJ	2.9 UJ	0.34 U	3.8 =
Benzo(*k*)fluoranthene	mg/kg	0.49 UJ	0.68 J	0.41 UJ	1.3 UJ	0.34 U	5 =
Bis(2-ethylhexyl)phthalate	mg/kg	0.14 J	0.39 UJ	0.093 J	0.38 UJ	0.043 J	0.08 J
Carbazole	mg/kg	0.49 UJ	0.39 UJ	0.41 UJ	0.38 UJ	0.34 U	1.4 =
Chrysene	mg/kg	0.49 UJ	0.84 J	0.41 UJ	3 J	0.047 J	6.4 =
Di-n-butyl phthalate	mg/kg	0.49 UJ	0.39 UJ	0.41 UJ	0.38 UJ	0.34 U	0.77 U
Dibenz(*a,h*)anthracene	mg/kg	0.49 UJ	0.38 J	0.41 UJ	0.75 UJ	0.34 U	1.2 =
Fluoranthene	mg/kg	0.49 UJ	0.29 J	0.13 J	0.74 J	0.062 J	8.1 =
Fluorene	mg/kg	0.49 UJ	0.39 UJ	0.41 UJ	0.38 UJ	0.34 U	0.12 J
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.49 UJ	1.4 J	0.41 UJ	2.7 UJ	0.34 U	3.7 =
Naphthalene	mg/kg	0.49 UJ	0.058 J	0.41 UJ	0.38 UJ	0.34 U	0.77 U
Phenanthrene	mg/kg	0.49 UJ	0.32 J	0.41 UJ	0.38 UJ	0.34 U	2.3 =
Pyrene	mg/kg	0.49 UJ	0.34 J	0.41 UJ	1.3 J	0.046 J	5.4 =

Table 4-21. Summary Data for Site-Related SVOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-015**	**LL4ss-023**	**LL4ss-024**	**LL4ss-025**	**LL4ss-025**
Sample ID		**LL4SS-015-0245-SO**	**LL4SS-023-0253-SO**	**LL4SS-024-0254-SO**	**LL4SS-025-0255-SO**	**LL4SS-025-0256-FD**
Date		**07/24/1996**	**07/27/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**
Analyte	**Units**					
Semivolatile Organics						
Acenaphthylene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Anthracene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Benz(*a*)anthracene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Benzo(*a*)pyrene	mg/kg	0.34 U	0.04 J	0.78 U	0.74 U	0.73 U
Benzo(*b*)fluoranthene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Benzo(*g,h,i*)perylene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Benzo(*k*)fluoranthene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Bis(2-ethylhexyl)phthalate	mg/kg	0.34 U	0.083 J	0.78 U	0.74 U	0.73 U
Carbazole	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Chrysene	mg/kg	0.34 U	0.038 J	0.78 U	0.74 U	0.73 U
Di-n-butyl phthalate	mg/kg	0.34 U	0.92 =	0.78 U	0.74 U	0.73 U
Dibenz(*a,h*)anthracene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Fluoranthene	mg/kg	0.047 J	0.038 J	0.78 U	0.74 U	0.73 U
Fluorene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Naphthalene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Phenanthrene	mg/kg	0.34 U	0.35 U	0.78 U	0.74 U	0.73 U
Pyrene	mg/kg	0.035 J	0.35 U	0.78 U	0.74 U	0.73 U

Table 4-21. Summary Data for Site-Related SVOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-034**	**LL4ss-037**	**LL4ss-045**	**LL4ss-063**
Sample ID		**LL4SS-034-0267-SO**	**LL4SS-037-0271-SO**	**LL4SS-045-0280-SO**	**LL4SS-063-0208-SO**
Date		**07/26/1996**	**07/28/1996**	**07/31/1996**	**08/12/1996**
Depth (ft)		**0 - 2**	**0 - 2**	**0 - 1**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**				
Semivolatile Organics					
Acenaphthylene	mg/kg	0.41 J	0.69 U	0.27 J	0.67 U
Anthracene	mg/kg	0.19 J	0.69 U	0.75 =	0.67 U
Benz(*a*)anthracene	mg/kg	0.45 =	0.69 U	2.1 =	0.67 U
Benzo(*a*)pyrene	mg/kg	0.45 =	0.69 U	2.1 =	0.67 U
Benzo(*b*)fluoranthene	mg/kg	0.44 =	0.69 U	2.7 =	0.67 U
Benzo(*g,h,i*)perylene	mg/kg	0.24 J	0.69 U	1.2 =	0.67 U
Benzo(*k*)fluoranthene	mg/kg	0.33 J	0.69 U	3.1 =	0.67 U
Bis(2-ethylhexyl)phthalate	mg/kg	0.41 U	0.69 U	0.17 J	0.67 U
Carbazole	mg/kg	0.13 J	0.69 U	0.12 J	0.67 U
Chrysene	mg/kg	0.48 =	0.69 U	2.6 =	0.67 U
Di-n-butyl phthalate	mg/kg	0.41 U	0.69 U	0.68 U	0.67 U
Dibenz(*a,h*)anthracene	mg/kg	0.14 J	0.69 U	0.59 J	0.67 U
Fluoranthene	mg/kg	1.1 =	0.075 J	2 =	0.67 U
Fluorene	mg/kg	0.064 J	0.69 U	0.68 U	0.67 U
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.23 J	0.69 U	1.5 =	0.67 U
Naphthalene	mg/kg	0.41 U	0.69 U	0.68 U	0.67 U
Phenanthrene	mg/kg	0.7 =	0.69 U	0.14 J	0.67 U
Pyrene	mg/kg	0.82 =	0.69 U	2.5 =	0.67 U

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
SVOC = Semivolatile organic compound.
= - Detected result.
J - Estimated result.
U - Not detected.

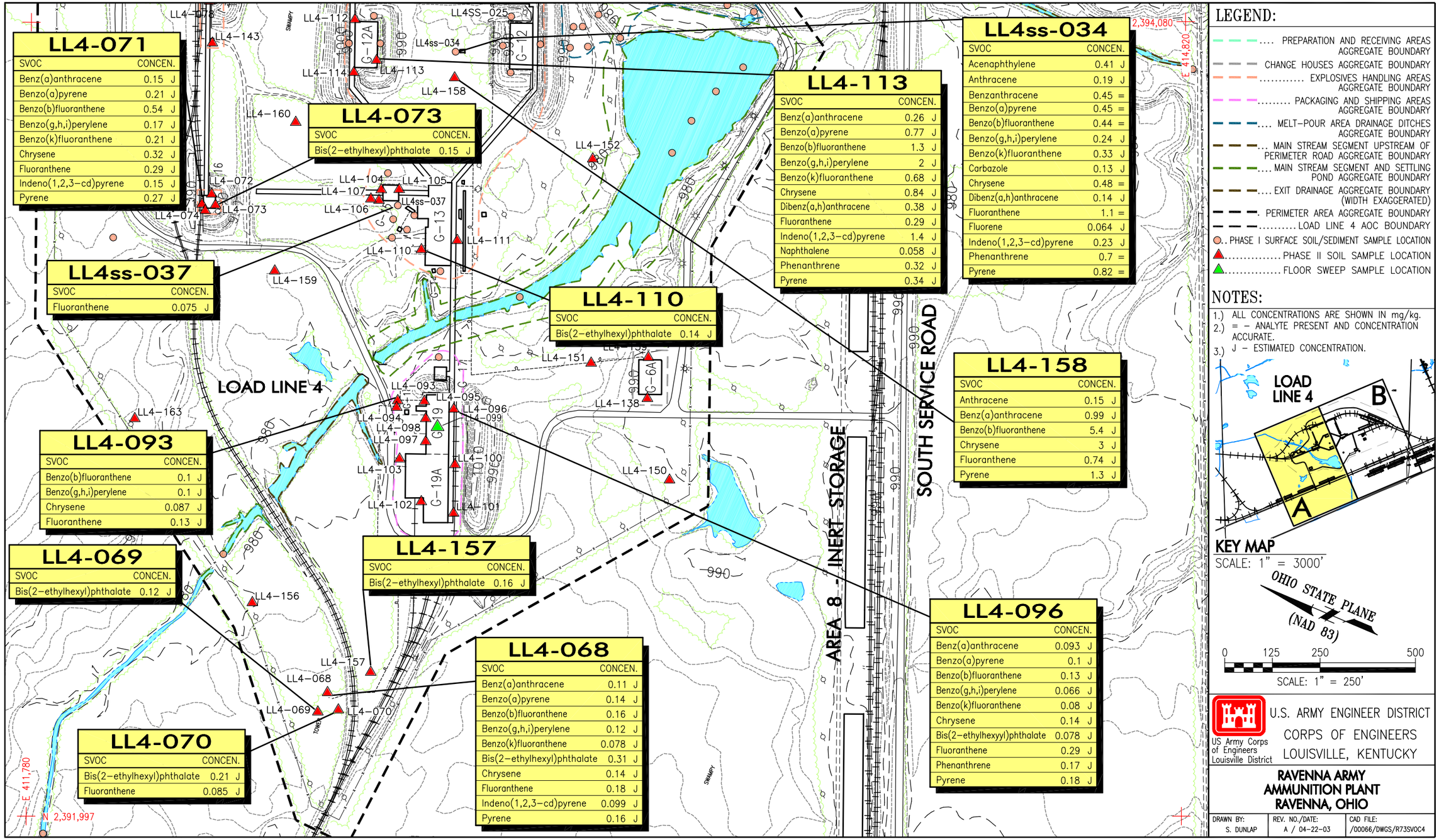

Figure 4-14. Selected SVOCs Detected in Surface Soil at Load Line 4 - Western Section

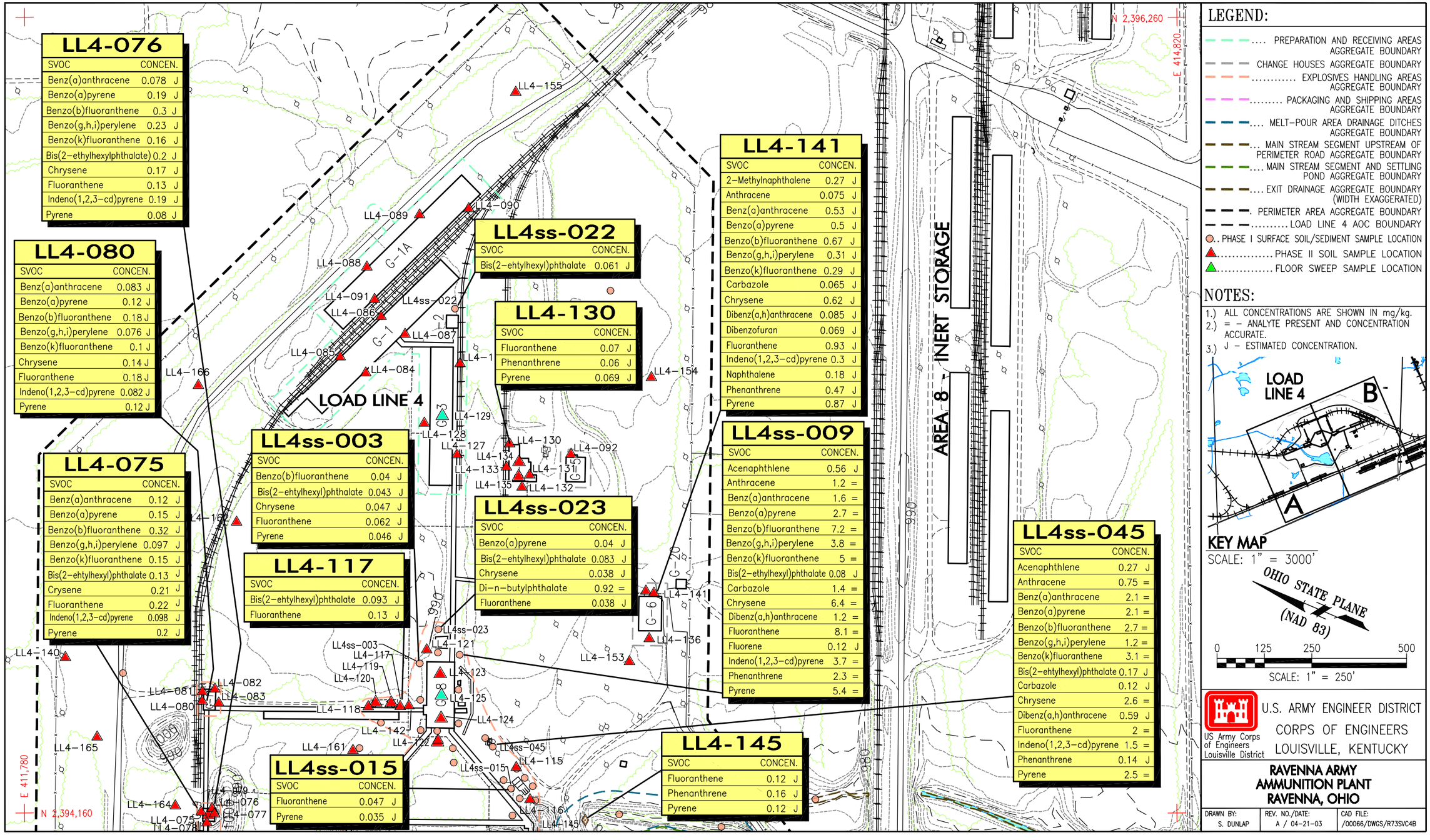

Figure 4-15. Selected SVOCs Detected in Surface Soil at Load Line 4 - Eastern Section

Table 4-22. Summary Data for Site-Related VOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a]

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-071**	**LL4-073**	**LL4-075**	**LL4-076**	**LL4-076**	**LL4-080**
Sample ID		**LL40689**	**LL40695**	**LL40701**	**LL40704**	**LL41138**	**LL40714**
Date		**08/21/2001**	**08/21/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**						
Volatile Organics							
Acetone	mg/kg	0.023 UJ	0.027 UJ	0.023 UJ	0.022 UJ	0.022 UJ	0.023 UJ
Chloroform	mg/kg	0.0057 U	0.0067 U	0.0058 U	0.0055 U	0.0055 U	0.0058 U
Toluene	mg/kg	0.0057 U	0.0067 U	0.0058 U	0.00086 J	0.0055 U	0.0058 U

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-110**	**LL4-113**	**LL4-117**	**LL4-158**	**LL4ss-003**	**LL4ss-009**
Sample ID		**LL40798**	**LL40807**	**LL40819**	**LL40910**	**LL4SS-003-0233-SO**	**LL4SS-009-0239-SO**
Date		**08/12/2001**	**08/21/2001**	**08/21/2001**	**08/24/2001**	**07/27/1996**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab Composite**	**Grab Composite**
Analyte	**Units**						
Volatile Organics							
Acetone	mg/kg	0.029 UJ	0.024 UJ	0.025 UJ	0.023 U	0.05 J	0.006 UJ
Chloroform	mg/kg	0.0074 U	0.0059 U	0.0062 U	0.0058 U	0.005 UJ	0.006 UJ
Toluene	mg/kg	0.0074 U	0.0059 U	0.0062 U	0.0058 U	0.005 UJ	0.006 UJ

Table 4-22. Summary Data for Site-Related VOCs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-015**	**LL4ss-023**	**LL4ss-024**	**LL4ss-025**	**LL4ss-025**
Sample ID		**LL4SS-015-0245-SO**	**LL4SS-023-0253-SO**	**LL4SS-024-0254-SO**	**LL4SS-025-0255-SO**	**LL4SS-025-0256-FD**
Date		**07/24/1996**	**07/27/1996**	**07/28/1996**	**07/28/1996**	**07/28/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Field Duplicate**
Analyte	**Units**					
Volatile Organics						
Acetone	mg/kg	0.005 UJ	0.005 UJ	0.006 R	0.006 UJ	0.006 UJ
Chloroform	mg/kg	0.005 UJ	0.005 UJ	0.006 U	0.006 UJ	0.006 UJ
Toluene	mg/kg	0.005 UJ	0.005 UJ	0.006 U	0.006 UJ	0.006 UJ

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-034**	**LL4ss-037**	**LL4ss-045**	**LL4ss-063**
Sample ID		**LL4SS-034-0267-SO**	**LL4SS-037-0271-SO**	**LL4SS-045-0280-SO**	**LL4SS-063-0208-SO**
Date		**07/26/1996**	**07/28/1996**	**07/31/1996**	**08/12/1996**
Depth (ft)		**0 - 2**	**0 - 2**	**0 - 1**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**				
Volatile Organics					
Acetone	mg/kg	0.006 UJ	0.005 R	0.005 R	0.005 UJ
Chloroform	mg/kg	0.006 U	0.005 U	0.005 UJ	0.002 J
Toluene	mg/kg	0.012 J	0.005 U	0.005 UJ	0.005 J

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
VOC = Volatile organic compound.
= - Detected result.
J - Estimated result.
U - Not detected.

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a]

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-071**	**LL4-073**	**LL4-074**	**LL4-074**	**LL4-075**	**LL4-076**
Sample ID		**LL40689**	**LL40695**	**LL40698**	**LL41148**	**LL40701**	**LL40704**
Date		**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDD	mg/kg	0.1 J	0.0045 U	NA	NA	NA	0.019 U
4,4'-DDE	mg/kg	0.039 U	0.0045 U	NA	NA	NA	0.019 U
4,4'-DDT	mg/kg	0.29 J	0.0045 U	NA	NA	NA	0.019 U
Aldrin	mg/kg	0.039 U	0.0045 U	NA	NA	NA	0.019 U
Dieldrin	mg/kg	0.07 J	0.0045 U	NA	NA	NA	0.019 U
Endrin	mg/kg	0.039 U	0.0045 UJ	NA	NA	NA	0.019 U
Endrin Aldehyde	mg/kg	0.84 J	0.0045 U	NA	NA	NA	0.019 U
Endrin Ketone	mg/kg	0.039 U	0.0045 U	NA	NA	NA	0.019 U
Heptachlor	mg/kg	0.67 =	0.0045 U	NA	NA	NA	0.019 U
Heptachlor Epoxide	mg/kg	0.052 J	0.0045 U	NA	NA	NA	0.019 U
Methoxychlor	mg/kg	0.21 J	0.0088 U	NA	NA	NA	0.036 U
PCB-1254	mg/kg	3.7 U	0.044 U	0.083 U	0.083 U	0.77 U	0.036 U
PCB-1260	mg/kg	28 J	0.044 R	0.31 J	0.53 J	4.5 J	0.18 J
alpha-Chlordane	mg/kg	0.039 U	0.0045 U	NA	NA	NA	0.019 U
gamma-Chlordane	mg/kg	0.083 J	0.0045 U	NA	NA	NA	0.019 U

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-076**	**LL4-077**	**LL4-078**	**LL4-080**	**LL4-081**	**LL4-082**
Sample ID		**LL41138**	**LL40707**	**LL40710**	**LL40714**	**LL40717**	**LL40720**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDD	mg/kg	0.019 U	NA	NA	NA	NA	NA
4,4'-DDE	mg/kg	0.019 U	NA	NA	NA	NA	NA
4,4'-DDT	mg/kg	0.019 U	NA	NA	NA	NA	NA
Aldrin	mg/kg	0.019 U	NA	NA	NA	NA	NA
Dieldrin	mg/kg	0.019 U	NA	NA	NA	NA	NA
Endrin	mg/kg	0.019 U	NA	NA	NA	NA	NA
Endrin Aldehyde	mg/kg	0.019 U	NA	NA	NA	NA	NA
Endrin Ketone	mg/kg	0.019 U	NA	NA	NA	NA	NA
Heptachlor	mg/kg	0.019 U	NA	NA	NA	NA	NA
Heptachlor Epoxide	mg/kg	0.019 U	NA	NA	NA	NA	NA
Methoxychlor	mg/kg	0.036 U	NA	NA	NA	NA	NA
PCB-1254	mg/kg	0.072 U	0.37 U	0.41 U	0.76 U	2.1 =	0.04 U
PCB-1260	mg/kg	0.2 J	1.5 J	2.6 J	5.1 J	0.37 UJ	0.04 UJ
alpha-Chlordane	mg/kg	0.019 U	NA	NA	NA	NA	NA
gamma-Chlordane	mg/kg	0.019 U	NA	NA	NA	NA	NA

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-083**	**LL4-104**	**LL4-105**	**LL4-106**	**LL4-106**	**LL4-107**
Sample ID		**LL40723**	**LL40784**	**LL40787**	**LL40790**	**LL41147**	**LL40793**
Date		**08/22/2001**	**08/14/2001**	**08/13/2001**	**08/14/2001**	**08/14/2001**	**08/12/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDD	mg/kg	NA	NA	NA	NA	NA	NA
4,4'-DDE	mg/kg	NA	NA	NA	NA	NA	NA
4,4'-DDT	mg/kg	NA	NA	NA	NA	NA	NA
Aldrin	mg/kg	NA	NA	NA	NA	NA	NA
Dieldrin	mg/kg	NA	NA	NA	NA	NA	NA
Endrin	mg/kg	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	mg/kg	NA	NA	NA	NA	NA	NA
Endrin Ketone	mg/kg	NA	NA	NA	NA	NA	NA
Heptachlor	mg/kg	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	mg/kg	NA	NA	NA	NA	NA	NA
Methoxychlor	mg/kg	NA	NA	NA	NA	NA	NA
PCB-1254	mg/kg	0.04 U	0.41 U	0.4 U	0.04 U	0.04 U	0.036 U
PCB-1260	mg/kg	0.04 U	2.1 =	1.7 =	0.04 U	0.04 U	0.036 U
alpha-Chlordane	mg/kg	NA	NA	NA	NA	NA	NA
gamma-Chlordane	mg/kg	NA	NA	NA	NA	NA	NA

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-110**	**LL4-111**	**LL4-112**	**LL4-113**	**LL4-114**	**LL4-115**
Sample ID		**LL40798**	**LL40801**	**LL40804**	**LL40807**	**LL40810**	**LL40813**
Date		**08/12/2001**	**08/12/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/14/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDD	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
4,4'-DDE	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
4,4'-DDT	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Aldrin	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Dieldrin	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Endrin	mg/kg	0.005 UJ	NA	NA	0.004 UJ	NA	NA
Endrin Aldehyde	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Endrin Ketone	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Heptachlor	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Heptachlor Epoxide	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
Methoxychlor	mg/kg	0.0097 U	NA	NA	0.0078 U	NA	NA
PCB-1254	mg/kg	0.049 U	0.041 U	0.039 U	0.039 U	0.038 U	0.056 J
PCB-1260	mg/kg	0.049 U	0.041 U	0.039 UJ	0.039 UJ	0.19 J	0.037 U
alpha-Chlordane	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA
gamma-Chlordane	mg/kg	0.005 U	NA	NA	0.004 U	NA	NA

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-116**	**LL4-116**	**LL4-117**	**LL4-118**	**LL4-121**	**LL4-122**
Sample ID		**LL40816**	**LL41141**	**LL40819**	**LL40822**	**LL40827**	**LL40830**
Date		**08/14/2001**	**08/14/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/21/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDD	mg/kg	NA	NA	0.0042 U	NA	NA	NA
4,4'-DDE	mg/kg	NA	NA	0.049 J	NA	NA	NA
4,4'-DDT	mg/kg	NA	NA	0.0042 U	NA	NA	NA
Aldrin	mg/kg	NA	NA	0.0042 U	NA	NA	NA
Dieldrin	mg/kg	NA	NA	0.025 J	NA	NA	NA
Endrin	mg/kg	NA	NA	0.0042 UJ	NA	NA	NA
Endrin Aldehyde	mg/kg	NA	NA	0.053 =	NA	NA	NA
Endrin Ketone	mg/kg	NA	NA	0.0042 U	NA	NA	NA
Heptachlor	mg/kg	NA	NA	0.0071 J	NA	NA	NA
Heptachlor Epoxide	mg/kg	NA	NA	0.0042 U	NA	NA	NA
Methoxychlor	mg/kg	NA	NA	0.018 =	NA	NA	NA
PCB-1254	mg/kg	0.037 U	0.037 U	2.9 =	0.38 U	0.038 U	0.036 U
PCB-1260	mg/kg	0.037 U	0.037 U	0.41 R	2.3 J	0.038 R	0.036 UJ
alpha-Chlordane	mg/kg	NA	NA	0.0042 U	NA	NA	NA
gamma-Chlordane	mg/kg	NA	NA	0.017 J	NA	NA	NA

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4-142**	**LL4-142**	**LL4-143**	**LL4-158**	**LL4ss-003**
Sample ID		**LL40878**	**LL41142**	**LL40881**	**LL40910**	**LL4SS-003-0233-SO**
Date		**08/24/2001**	**08/24/2001**	**08/24/2001**	**08/24/2001**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**					
Pesticides and PCBs						
4,4'-DDD	mg/kg	NA	NA	NA	0.0098 U	0.0026 UJ
4,4'-DDE	mg/kg	NA	NA	NA	0.0098 U	0.0026 U
4,4'-DDT	mg/kg	NA	NA	NA	0.0098 U	0.0026 UJ
Aldrin	mg/kg	NA	NA	NA	0.0098 U	0.0014 U
Dieldrin	mg/kg	NA	NA	NA	0.0098 U	0.0026 U
Endrin	mg/kg	NA	NA	NA	0.0098 U	0.0026 UJ
Endrin Aldehyde	mg/kg	NA	NA	NA	0.0098 U	0.0026 UJ
Endrin Ketone	mg/kg	NA	NA	NA	0.011 J	0.0026 UJ
Heptachlor	mg/kg	NA	NA	NA	0.0098 U	0.0014 UJ
Heptachlor Epoxide	mg/kg	NA	NA	NA	0.0098 U	0.0014 U
Methoxychlor	mg/kg	NA	NA	NA	0.019 U	0.014 UJ
PCB-1254	mg/kg	0.19 U	0.38 U	0.038 U	0.038 U	0.07 U
PCB-1260	mg/kg	0.48 =	0.38 U	0.038 U	0.038 U	0.07 U
alpha-Chlordane	mg/kg	NA	NA	NA	0.0098 U	0.0014 U
gamma-Chlordane	mg/kg	NA	NA	NA	0.0098 U	0.0016 =

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-009**	**LL4ss-015**	**LL4ss-023**	**LL4ss-024**	**LL4ss-025**
Sample ID		**LL4SS-009-0239-SO**	**LL4SS-015-0245-SO**	**LL4SS-023-0253-SO**	**LL4SS-024-0254-SO**	**LL4SS-025-0255-SO**
Date		**07/27/1996**	**07/24/1996**	**07/27/1996**	**07/28/1996**	**07/28/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**	**0 - 2**
Sample Type		**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**					
Pesticides and PCBs						
4,4'-DDD	mg/kg	0.0029 UJ	0.0026 U	0.0027 UJ	0.0029 U	0.0098 J
4,4'-DDE	mg/kg	0.018 J	0.0026 U	0.0027 U	0.0029 U	0.019 J
4,4'-DDT	mg/kg	0.068 J	0.0026 U	0.23 =	0.0029 U	0.0028 U
Aldrin	mg/kg	0.017 =	0.0013 U	0.043 J	0.0015 U	0.0015 U
Dieldrin	mg/kg	0.0029 U	0.0026 U	0.0027 U	0.0029 U	0.0028 U
Endrin	mg/kg	0.0029 UJ	0.0075 J	0.0027 UJ	0.0029 U	0.0084 J
Endrin Aldehyde	mg/kg	0.0029 UJ	0.0026 U	0.0027 UJ	0.0029 U	0.0028 U
Endrin Ketone	mg/kg	0.0029 UJ	0.0026 U	0.0027 UJ	0.0029 U	0.0028 U
Heptachlor	mg/kg	0.0015 UJ	0.0013 U	0.0014 UJ	0.0015 U	0.0015 U
Heptachlor Epoxide	mg/kg	0.0015 U	0.0013 U	0.0014 U	0.0015 U	0.0015 U
Methoxychlor	mg/kg	0.015 UJ	0.013 U	0.014 UJ	0.015 U	0.015 U
PCB-1254	mg/kg	0.46 J	0.069 U	3.2 =	0.079 U	0.11 J
PCB-1260	mg/kg	0.078 U	0.069 U	4.5 =	0.079 U	0.075 U
alpha-Chlordane	mg/kg	0.034 J	0.0013 U	0.025 J	0.0015 U	0.0056 J
gamma-Chlordane	mg/kg	0.019 J	0.0013 U	0.011 J	0.0015 U	0.0015 U

Table 4-23. Summary Data for Site-Related Pesticides and PCBs Detected in Explosives Handling Areas Aggregate Surface Soil[a] (continued)

Functional Area		Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate	Explosives Handling Areas Aggregate
Station ID		**LL4ss-025**	**LL4ss-034**	**LL4ss-037**	**LL4ss-045**	**LL4ss-063**
Sample ID		**LL4SS-025-0256-FD**	**LL4SS-034-0267-SO**	**LL4SS-037-0271-SO**	**LL4SS-045-0280-SO**	**LL4SS-063-0208-SO**
Date		**07/28/1996**	**07/26/1996**	**07/28/1996**	**07/31/1996**	**08/12/1996**
Depth (ft)		**0 - 2**	**0 - 2**	**0 - 2**	**0 - 1**	**0 - 2**
Sample Type		**Field Duplicate**	**Grab Composite**	**Grab Composite**	**Grab Composite**	**Grab Composite**
Analyte	**Units**					
Pesticides and PCBs						
4,4'-DDD	mg/kg	0.09 J	0.0031 J	0.0026 UJ	0.0026 U	0.0026 U
4,4'-DDE	mg/kg	0.057 J	0.0031 U	0.0026 U	0.0026 U	0.0026 U
4,4'-DDT	mg/kg	0.0028 U	0.0087 J	0.0026 U	0.0026 U	0.0026 UJ
Aldrin	mg/kg	0.0014 U	0.0016 U	0.0014 U	0.0013 U	0.0013 U
Dieldrin	mg/kg	0.0028 U	0.0031 U	0.0026 U	0.0048 J	0.0026 U
Endrin	mg/kg	0.035 J	0.0031 UJ	0.0026 U	0.018 J	0.0026 UJ
Endrin Aldehyde	mg/kg	0.0028 U	0.0045 J	0.0026 U	0.0026 U	0.0026 UJ
Endrin Ketone	mg/kg	0.0028 U	0.0031 UJ	0.0026 U	0.0026 U	0.0026 UJ
Heptachlor	mg/kg	0.0014 U	0.0016 U	0.0014 U	0.0013 U	0.0013 UJ
Heptachlor Epoxide	mg/kg	0.0014 U	0.0016 UJ	0.0014 U	0.0013 U	0.0013 U
Methoxychlor	mg/kg	0.014 U	0.016 UJ	0.014 U	0.013 U	0.013 UJ
PCB-1254	mg/kg	0.31 J	0.084 U	0.07 U	0.069 U	0.068 U
PCB-1260	mg/kg	0.074 U	0.084 U	0.07 U	0.069 U	0.068 U
alpha-Chlordane	mg/kg	0.019 J	0.0016 UJ	0.0014 U	0.0013 U	0.0013 UJ
gamma-Chlordane	mg/kg	0.0014 U	0.0016 UJ	0.0014 U	0.0013 U	0.0013 UJ

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
DDT = Dichlorodiphenyltrichloroethane.
ID = Identification.
NA = Not analyzed.
PCB = Polychlorinated biphenyl.
= - Detected result.
J - Estimated result.
U - Not detected.

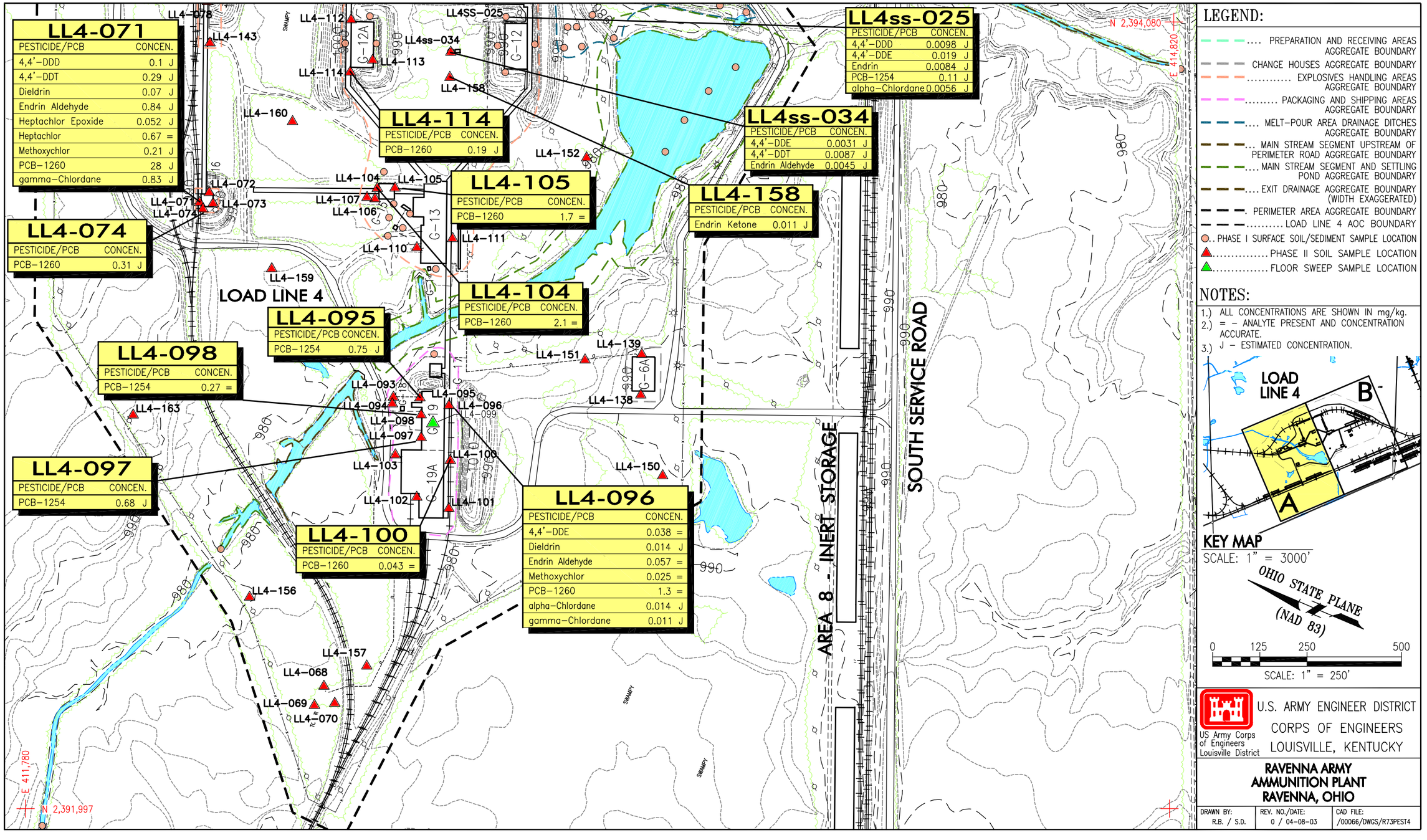

Figure 4-16. Pesticides and PCBs Detected in Surface Soil at Load Line 4 - Western Section

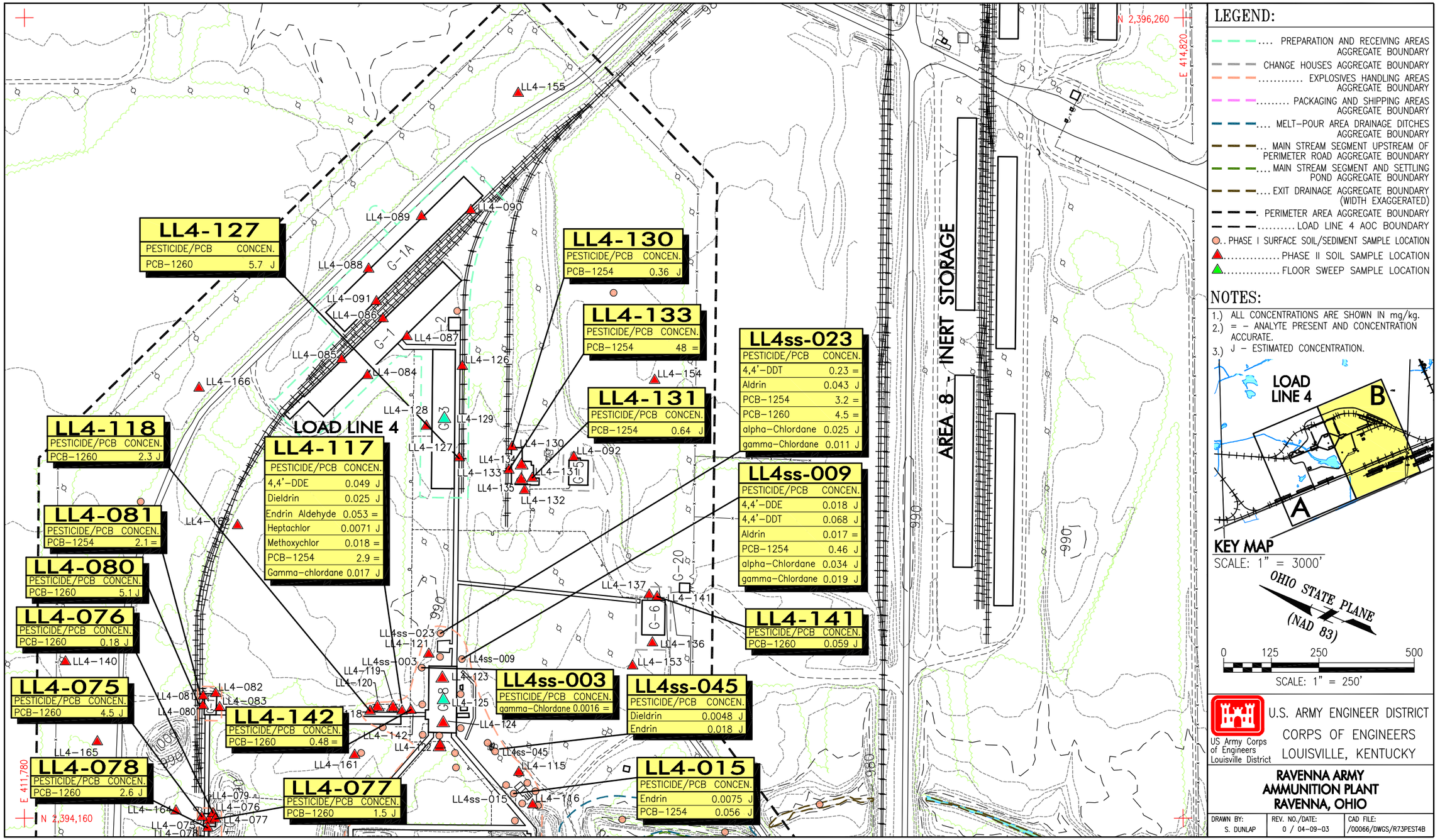

Figure 4-17. Pesticides and PCBs Detected in Surface Soil at Load Line 4 - Eastern Section

Table 4-24. Summary Data for Site-Related SVOCs Detected in Preparation and Receiving Areas Aggregate Surface Soil[a]

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-090**	**LL4-090**	**LL4-126**	**LL4-130**	**LL4-185**	**LL4ss-022**
Sample ID		**LL40744**	**LL41139**	**LL40836**	**LL40846**	**LL40990**	**LL4SS-022-0252-SO**
Date		**08/23/2001**	**08/23/2001**	**08/22/2001**	**08/14/2001**	**08/11/2001**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**						
Semivolatile Organics							
Bis(2-ethylhexyl)phthalate	mg/kg	0.36 UJ	0.36 UJ	0.45 UJ	0.38 UJ	0.57 UJ	0.061 J
Fluoranthene	mg/kg	0.36 UJ	0.36 UJ	0.45 UJ	0.07 J	0.57 UJ	0.35 U
Phenanthrene	mg/kg	0.36 UJ	0.36 UJ	0.45 UJ	0.06 J	0.57 UJ	0.35 U
Pyrene	mg/kg	0.36 UJ	0.36 UJ	0.45 UJ	0.069 J	0.57 UJ	0.35 U

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
SVOC = Semivolatile organic compound.
= - Detected result.
J - Estimated result.
U - Not detected.

VOCs

Three VOCs were detected at least once in surface soil samples collected in the Preparation and Receiving Areas Aggregate (Table 4-3). Acetone was detected in two of four samples, toluene was detected in three of five samples, and 2-butanone was detected in one of five samples. The maximum concentration of all of the VOCs detected in these samples occurred in the sample collected at station LL4-185. Table 4-25 lists the concentration of detected VOCs by station in surface soil in the Preparation and Receiving Areas Aggregate.

Pesticides/PCBs

Two PCB compounds were detected in the surface soil samples collected from the Preparation and Receiving Areas Aggregate (Table 4-3). PCB-1254 was detected in 3 of 17 samples and PCB-1260 was detected in 1 of 16 samples. PCB-1254 was detected at a maximum concentration of 48 mg/kg in the sample collected at station LL4-133, located on the north side of Building G-4. The other two detected concentrations of this PCB also occurred in samples collected near Building G-4. An estimated concentration of 0.36 mg/kg was seen in the sample collected at station LL4-130, located south of the building, and the sample collected at station LL4-131 contained PCB-1254 at an estimated concentration of 0.64 mg/kg. Table 4-26 lists the concentration of detected VOCs in surface soil in the Preparation and Receiving Areas Aggregate. Figures 4-16 and 4-17 shows the distribution of detected pesticides and PCBs in surface soil across Load Line 4. No pesticides were detected in the surface soil samples collected in the Preparation and Receiving Areas Aggregate.

4.2.5.3 Packaging and Shipping Areas Aggregate

SVOCs

Ten SVOCs were detected at least once in two surface soil samples collected in the Packaging and Shipping Areas Aggregate (Table 4-3). The maximum concentration of all but one of the detected SVOCs [benzo(*g,h,i*)perylene] occurred in the sample collected at station LL4-096, located south of Building G-19 (Table 4-27). Figures 4-14 and 4-15 show the distribution of detected SVOCs in surface soil at Load Line 4.

VOCs

Toluene was the only VOC detected in surface soil samples collected in the Packaging and Shipping Areas Aggregate (Table 4-3). This compound was detected in 1 of 3 samples (station LL4-096, located south of Building G-19) at an estimated concentration of 0.0016 mg/kg. Table 4-28 lists the concentration of detected VOCs in surface soil in the Packaging and Receiving Areas Aggregate.

Pesticides/PCBs

Six pesticides and two PCB compounds were detected in the surface soil samples collected in the Packaging and Shipping Areas Aggregate (Table 4-3). One sample was submitted for analyses of pesticides. The pesticides detected in this sample (LL4-096, located south of Building G-19) were 4,4'-DDE, dieldrin, endrin aldehyde, methoxychlor, alpha-chlordane, and gamma-chlordane. This sample also contained the MDC of PCB-1260 (1.3 mg/kg) seen in the 10 samples analyzed for PCBs from this aggregate (2 detections in 10 samples) (Table 4-29). PCB-1254 was detected in 3 of the 10 samples analyzed for PCBs. The MDC for this PCB was 0.75 mg/kg (estimated) and occurred in the sample collected at station LL4-095, near the northeast corner of Building G-19. Figures 4-16 and 4-17 show the distribution of detected pesticides and PCBs in surface soil across Load Line 4.

Table 4-25. Summary Data For Site-Related VOCs Detected in Preparation and Receiving Areas Aggregate Surface Soil[a]

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-090**	**LL4-090**	**LL4-126**	**LL4-130**	**LL4-185**	**LL4ss-022**
Sample ID		**LL40744**	**LL41139**	**LL40836**	**LL40846**	**LL40990**	**LL4SS-022-0252-SO**
Date		**08/23/2001**	**08/23/2001**	**08/22/2001**	**08/14/2001**	**08/11/2001**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**						
Volatile Organics							
2-Butanone	mg/kg	0.022 U	0.022 U	0.027 U	0.023 U	0.013 J	0.005 UJ
Acetone	mg/kg	0.022 U	0.022 U	0.012 J	0.023 UJ	0.042 J	0.005 R
Toluene	mg/kg	0.00066 J	0.0054 U	0.0068 U	0.00087 J	0.0051 J	0.005 U

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
VOC = Volatile organic compound.
= - Detected result.
J - Estimated result.
U - Not detected.

Table 4-26. Summary Data for Site-Related Pesticides and PCBs Detected in Preparation and Receiving Areas Aggregate Surface Soil[a]

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-084**	**LL4-085**	**LL4-086**	**LL4-087**	**LL4-088**	**LL4-089**	**LL4-090**
Sample ID		**LL40726**	**LL40729**	**LL40732**	**LL40735**	**LL40738**	**LL40741**	**LL40744**
Date		**08/24/2001**	**08/23/2001**	**08/23/2001**	**08/24/2001**	**08/22/2001**	**08/23/2001**	**08/23/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**							
Pesticides and PCBs								
PCB-1254	mg/kg	0.035 U	0.039 U	0.041 U	0.038 U	0.039 U	0.039 U	0.036 U
PCB-1260	mg/kg	0.035 U	0.039 U	0.041 U	0.038 U	0.039 U	0.039 U	0.036 U

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-090**	**LL4-091**	**LL4-126**	**LL4-127**	**LL4-128**	**LL4-130**
Sample ID		**LL41139**	**LL40747**	**LL40836**	**LL40839**	**LL40842**	**LL40846**
Date		**08/23/2001**	**08/23/2001**	**08/22/2001**	**08/20/2001**	**08/20/2001**	**08/14/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
PCB-1254	mg/kg	0.036 U	0.042 U	0.045 U	0.72 U	0.041 U	0.36 J
PCB-1260	mg/kg	0.036 U	0.042 U	0.045 U	5.7 J	0.041 R	0.038 U

Table 4-26. Summary Data for Site-Related Pesticides and PCBs Detected in Preparation and Receiving Areas Aggregate Surface Soil[a] (continued)

Functional Area		Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate	Preparation and Receiving Areas Aggregate
Station ID		**LL4-131**	**LL4-131**	**LL4-132**	**LL4-133**	**LL4-185**	**LL4ss-022**
Sample ID		**LL40849**	**LL41143**	**LL40852**	**LL40855**	**LL40990**	**LL4SS-022-0252-SO**
Date		**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/11/2001**	**07/27/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 2**
Sample Type		**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**	**Grab Composite**
Analyte	**Units**						
Pesticides and PCBs							
PCB-1254	mg/kg	0.64 J	0.67 =	0.041 U	48 =	0.057 U	0.071 U
PCB-1260	mg/kg	0.077 U	0.077 U	0.041 U	3.7 U	0.057 U	0.071 U

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
PCB = Polychlorinated biphenyl.
= - Detected result.
J - Estimated result.
U - Not detected.

Table 4-27. Summary Data for Site-Related SVOCs Detected in Packaging and Shipping Areas Aggregate Surface Soil

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-093**	**LL4-096**
Sample ID		**LL40753**	**LL40762**
Date		**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**
Analyte	**Units**		
Semivolatile Organics			
Benz(a)anthracene	mg/kg	0.41 UJ	0.093 J
Benzo(a)pyrene	mg/kg	0.41 UJ	0.1 J
Benzo(b)fluoranthene	mg/kg	0.1 J	0.13 J
Benzo(g,h,i)perylene	mg/kg	0.1 J	0.066 J
Benzo(k)fluoranthene	mg/kg	0.41 UJ	0.08 J
Bis(2-ethylhexyl)phthalate	mg/kg	0.41 UJ	0.078 J
Chrysene	mg/kg	0.087 J	0.14 J
Fluoranthene	mg/kg	0.13 J	0.29 J
Phenanthrene	mg/kg	0.41 UJ	0.17 J
Pyrene	mg/kg	0.41 UJ	0.18 J

ID = Identification.
SVOC = Semivolatile organic compound.
J - Estimated result.
U - Not detected.

Table 4-28. Summary Data for Site-Related VOCs Detected in Packaging and Shipping Areas Aggregate Surface Soil

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-093**	**LL4-096**	**LL4-098**
Sample ID		**LL40753**	**LL40762**	**LL40768**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**
Analyte	**Units**			
Volatile Organics				
Toluene	mg/kg	0.0063 U	0.0016 J	0.0056 U

ID = Identification.
VOC = Volatile organic compound.
J - Estimated result.
U - Not detected.

Table 4-29. Summary Data for Site-Related Pesticides and PCBs Detected in Packaging and Shipping Areas Aggregate Surface Soil

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-093**	**LL4-094**	**LL4-094**	**LL4-095**	**LL4-096**	**LL4-097**
Sample ID		**LL40753**	**LL40756**	**LL41146**	**LL40759**	**LL40762**	**LL40765**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab**	**Grab**	**Grab**
Analyte	**Units**						
Pesticides and PCBs							
4,4'-DDE	mg/kg	NA	NA	NA	NA	0.038 =	NA
Dieldrin	mg/kg	NA	NA	NA	NA	0.014 J	NA
Endrin Aldehyde	mg/kg	NA	NA	NA	NA	0.057 =	NA
Methoxychlor	mg/kg	NA	NA	NA	NA	0.025 =	NA
PCB-1254	mg/kg	0.041 U	0.049 U	0.045 U	0.75 J	0.36 U	0.68 J
PCB-1260	mg/kg	0.041 U	0.049 U	0.045 U	0.08 UJ	1.3 =	0.073 U
alpha-Chlordane	mg/kg	NA	NA	NA	NA	0.014 J	NA
gamma-Chlordane	mg/kg	NA	NA	NA	NA	0.011 J	NA

Table 4-29. Summary Data for Site-Related Pesticides and PCBs Detected in Packaging and Shipping Areas Aggregate Surface Soil (continued)

Functional Area		Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate	Packaging and Shipping Areas Aggregate
Station ID		**LL4-098**	**LL4-100**	**LL4-101**	**LL4-102**	**LL4-103**
Sample ID		**LL40768**	**LL40772**	**LL40775**	**LL40778**	**LL40781**
Date		**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**	**08/22/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**					
Pesticides and PCBs						
4,4'-DDE	mg/kg	NA	NA	NA	NA	NA
Dieldrin	mg/kg	NA	NA	NA	NA	NA
Endrin Aldehyde	mg/kg	NA	NA	NA	NA	NA
Methoxychlor	mg/kg	NA	NA	NA	NA	NA
PCB-1254	mg/kg	0.27 =	0.041 U	0.04 U	0.041 U	0.045 U
PCB-1260	mg/kg	0.074 U	0.043 =	0.04 U	0.041 U	0.045 U
alpha-Chlordane	mg/kg	NA	NA	NA	NA	NA
gamma-Chlordane	mg/kg	NA	NA	NA	NA	NA

DDE = Dichlorodiphenyldichloroethylene.
ID = Identification.
NA = Not analyzed.
PCB = Polychlorinated biphenyl.
= - Detected result.
J - Estimated result.
U - Not detected.

4.2.5.4 Change Houses Aggregate

SVOCs

One surface soil sample collected from the Change Houses Aggregate was submitted for analyses of SVOCs. The sample was collected at station LL4-141, located on the east side of Building G-6. Sixteen SVOCs were detected in this sample (Table 4-30). Figures 4-14 and 4-15 show the distribution of SVOCs in surface soil at Load Line 4.

Table 4-30. Summary Data for Site-Related SVOCs Detected in Change Houses Aggregate Surface Soil

Functional Area		**Change Houses Aggregate**
Station ID		**LL4-141**
Sample ID		**LL40875**
Date		**08/14/2001**
Depth (ft)		**0 - 1**
Sample Type		**Grab**
Analyte	**Units**	
Semivolatile Organics		
2-Methylnaphthalene	mg/kg	0.27 J
Anthracene	mg/kg	0.075 J
Benz(*a*)anthracene	mg/kg	0.53 J
Benzo(*a*)pyrene	mg/kg	0.5 J
Benzo(*b*)fluoranthene	mg/kg	0.67 J
Benzo(*g,h,i*)perylene	mg/kg	0.31 J
Benzo(*k*)fluoranthene	mg/kg	0.29 J
Carbazole	mg/kg	0.065 J
Chrysene	mg/kg	0.62 J
Dibenz(*a,h*)anthracene	mg/kg	0.085 J
Dibenzofuran	mg/kg	0.069 J
Fluoranthene	mg/kg	0.93 J
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.3 J
Naphthalene	mg/kg	0.18 J
Phenanthrene	mg/kg	0.47 J
Pyrene	mg/kg	0.87 J

ID = Identification.
SVOC = Semivolatile organic compound.
J - Estimated result.

VOCs

The surface soil sample collected at station LL4-141 was also analyzed for VOCs. Three VOCs were detected in the sample. Benzene was detected at an estimated concentration of 0.0026 mg/kg, dimethylbenzene was detected at an estimated concentration of 0.003 mg/kg, and toluene was detected at an estimated concentration of 0.0056 mg/kg (Table 4-31).

Table 4-31. Summary Data for Site-Related VOCs Detected in Change Houses Aggregate Surface Soil

Functional Area		Change Houses Aggregate
Station ID		**LL4-141**
Sample ID		**LL40875**
Date		**08/14/2001**
Depth (ft)		**0 - 1**
Sample Type		**Grab**
Analyte	**Units**	
Volatile Organics		
Benzene	mg/kg	0.0026 J
Dimethylbenzene	mg/kg	0.003 J
Toluene	mg/kg	0.0056 J

ID = Identification.
VOC = Volatile organic compound.
J - Estimated result.

Pesticides/PCBs

One PCB compound was detected in one of four samples submitted for analyses of pesticides and PCBs. PCB-1260 was detected at an estimated concentration of 0.059 mg/kg in the sample collected at station LL4-141 (Table 4-32). This compound was not detected in the samples collected at stations LL4 092, LL4-136, or LL4-137. No other PCB compounds were detected in any of the samples collected from this aggregate. Also, no pesticides were detected in any of the samples from this aggregate. Figures 4-16 and 4-17 show the distribution of detected pesticides and PCBs in surface soil across Load Line 4.

Table 4-32. Summary Data for Site-Related Pesticides and PCBs Detected in Change Houses Aggregate Surface Soil

Functional Area		Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate	Change Houses Aggregate
Station ID		**LL4-092**	**LL4-136**	**LL4-137**	**LL4-141**
Sample ID		**LL40750**	**LL40860**	**LL40863**	**LL40875**
Date		**08/14/2001**	**08/14/2001**	**08/14/2001**	**08/14/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**				
Pesticides and PCBs					
PCB-1260	mg/kg	0.037 U	0.038 U	0.038 U	0.059 J

ID = Identification.
PCB = Polychlorinated biphenyl.
J - Estimated result.
U - Not detected.

4.2.5.5 Perimeter Area Aggregate

SVOCs

Ten SVOCs were detected at least once in five surface soil samples collected in the Perimeter Area Aggregate (Table 4-3). Bis(2-ethylhexyl)phthalate was detected in four of the samples. The maximum MDC of this compound was 0.31 mg/kg (estimated) and occurred in the sample collected at station LL4-068, near the WW-23 Water Tower. All of the other SVOCs detected in the samples collected in the Perimeter Area

Aggregate were also present in the sample collected at station LL4-068. Bis(2-ethylhexyl)phthalate was also detected at an estimated concentration of 0.12 mg/kg in the sample collected at station LL4-069 and an estimated concentration of 0.21 mg/kg in the sample collected at station LL4-070. These two stations are also located near the old water tower. Table 4-33 lists the concentrations of the detected SVOCs by station in surface soil in the Perimeter Area Aggregate. Figures 4-14 and 4-15 show the distribution of SVOCs in surface soil across Load Line 4.

Table 4-33. Summary Data for Site-Related SVOCs Detected in Perimeter Area Aggregate Surface Soil Site-Related Contaminants

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-068**	**LL4-069**	**LL4-070**	**LL4-140**	**LL4-157**
Sample ID		**LL40680**	**LL40683**	**LL40686**	**LL40872**	**LL40909**
Date		**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/26/2001**	**08/24/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**					
Semivolatile Organics						
Benz(*a*)anthracene	mg/kg	0.11 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Benzo(*a*)pyrene	mg/kg	0.14 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Benzo(*b*)fluoranthene	mg/kg	0.16 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Benzo(*g,h,i*)perylene	mg/kg	0.12 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Benzo(*k*)fluoranthene	mg/kg	0.078 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Bis(2-ethylhexyl)phthalate	mg/kg	0.31 J	0.12 J	0.21 J	0.38 UJ	0.16 J
Chrysene	mg/kg	0.14 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Fluoranthene	mg/kg	0.18 J	0.38 UJ	0.085 J	0.38 UJ	0.44 UJ
Indeno(1,2,3-*cd*)pyrene	mg/kg	0.099 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ
Pyrene	mg/kg	0.16 J	0.38 UJ	0.38 UJ	0.38 UJ	0.44 UJ

ID = Identification.
SVOC = Semivolatile organic compound.
J - Estimated result.
U - Not detected.

VOCs

Toluene was the only VOC detected in surface soil samples collected in the Perimeter Area Aggregate (Table 4-3). This compound was detected in 1 of 5 samples (station LL4-068, located near the WW-23 Water Tower) at an estimated concentration of 0.00062 mg/kg. Table 4-34 lists the concentrations of detected VOCs by station in surface soil in the Perimeter Area Aggregate.

Pesticides/PCBs

No samples collected in the Perimeter Area Aggregate were analyzed for pesticides or PCB compounds.

4.2.5.6 Melt-Pour Area Drainage Ditches Aggregate

SVOCs

Three samples from the Melt-Pour Area Drainage Ditches Aggregate were analyzed for SVOCs (Table 4-3). No SVOCs were detected in two of the samples [(LL4-013(p) and LL4sd-051(d)]. Three compounds were detected in the sample collected at station LL4-145. Fluoranthene was detected at an estimated

Table 4-34. Summary Data For Site-Related VOCs Detected in Perimeter Area Aggregate Surface Soil

Functional Area		Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate	Perimeter Area Aggregate
Station ID		**LL4-068**	**LL4-069**	**LL4-070**	**LL4-140**	**LL4-157**
Sample ID		**LL40680**	**LL40683**	**LL40686**	**LL40872**	**LL40909**
Date		**08/21/2001**	**08/21/2001**	**08/21/2001**	**08/26/2001**	**08/24/2001**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Analyte	**Units**					
Volatile Organics						
Toluene	mg/kg	0.00062 J	0.0057 U	0.0058 U	0.0057 U	0.0066 U

ID = Identification.
VOC = Volatile organic compound.
J - Estimated result.
U - Not detected.

concentration of 0.12 mg/kg, phenanthrene was detected at an estimated concentration of 0.16 mg/kg, and pyrene was detected at an estimated concentration of 0.12 mg/kg. Table 4-35 lists the concentration of detected SVOCs by station in surface soil in the Melt-Pour Area Drainage Ditches Aggregate. The distribution of SVOCs in surface soil at Load Line 4 is shown on Figures 4-14 and 4-15.

Table 4-35. Summary Data for Site-Related SVOCs Detected in Melt-Pour Area Drainage Aggregate Surface Soil[a]

Functional Area		Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate	Melt-Pour Area Drainage Ditches Aggregate
Station ID		**LL4-013(p2)**	**LL4-145**	**LL4-145**	**LL4sd-051(d)**
Sample ID		**LL40953**	**LL40887**	**LL41137**	**LL4SD-051(D)-0288-SD**
Date		**08/11/2001**	**08/13/2001**	**08/13/2001**	**07/30/1996**
Depth (ft)		**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Sample Type		**Grab**	**Grab**	**Field Duplicate**	**Grab Composite**
Analyte	**Units**				
Semivolatile Organics					
Fluoranthene	mg/kg	0.45 UJ	0.12 J	0.43 UJ	0.82 U
Phenanthrene	mg/kg	0.45 UJ	0.16 J	0.43 UJ	0.82 U
Pyrene	mg/kg	0.45 UJ	0.12 J	0.43 UJ	0.82 U

[a] Table presents results for samples collected during the Phase I RI (1996) and the Phase II RI (2001).
ID = Identification.
SVOC = Semivolatile organic compound.
J - Estimated result.
U - Not detected.

VOCs

Acetone was the only VOC detected in the surface soil samples collected in the Melt-Pour Area Drainage Ditches Aggregate (Table 4-3). This compound was detected in 1 sample (LL4-145) at an estimated concentration of 0.0063 mg/kg. Table 4-36 lists the concentration of detected VOCs by station in surface soil in the Melt-Pour Area Drainage Ditches Aggregate.

Pesticides/PCBs

No samples collected in the Melt-Pour Area Drainage Ditches Aggregate were analyzed for pesticides or PCB compounds.