Environmental Consultants

SCS ENGINEERS

ENVIRONMENTAL SITE INVESTIGATION
BUILDING SERIES 104 INTERIM REPORT

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SECTION 1

INTRODUCTION

At the request of the U.S. General Services Administration (GSA), SCS Engineers initiated a Preliminary Assessment (PA)/Site Investigation (SI) of the St. Louis Federal Center located at 4300 Goodfellow, St. Louis, Missouri (Property). This interim report summarizes the results of the SI conducted by SCS at Building Series 104 to date. Our findings based on these results can be relied upon by GSA as to the conditions that currently exist, but are not intended for use by others at a later date.

PRELIMINARY ASSESSMENT

In 2002, SCS Engineers initiated a PA of the facility, including a detailed inspection of Building 105. Recognized Environmental Concerns associated with possible future occupancy of Building 105 were emphasized. The PA process performed at the site identified the need for a facility SI. The PA determined, based on the site's former use, in combination with the future occupancy of the buildings by federal office workers, that an SI be performed starting with Building 105.

A separate PA Report has been prepared by SCS which documents the findings of the PA. The PA identified the need for a removal action associated with the shooting range in the basement of Building 105. Concerns regarding the presence of lead associated with the firing range and the potential for human exposure or a release to the environment necessitated the removal action. The Shooting Range Remediation project was completed by SCS and has been documented in a Removal Action Report.

Other suspect environmental concerns were identified during the PA and subsequent data review process. These suspect environmental concerns are associated with the former use of the Federal Center as a munitions manufacturing facility and include potential environmental impacts to the Property by hazardous chemicals. The PA/SI process, as designed by the Environmental Protection Agency (EPA), will address these potential concerns. This would include a detailed assessment of former and current activities at the Property and would include intrusive sampling of all identified concerns. During the performance of a PA/SI, potential environmental concerns are identified and assessed. The typical PA/SI Scope of Work would include conducting a file review, performance of a thorough site inspection, development of a sampling plan, execution of the data acquisition and analysis, and the interpretation and reporting of the results. The goals of the PA/SI process are to determine if a release of hazardous substances has occurred, if the hazardous substances are of sufficient toxicity and quantity to represent a risk to human health and the environment, and determine if human or environmental targets have the potential to be exposed to the hazardous substances at the site. The performance of a PA/SI at the Property would provide a thorough understanding of the environmental conditions at the Federal Center.

SITE INVESTIGATION PURPOSE

The purpose of this investigation was to screen the Property for potential environmental impacts from on-site activities, past Property use, and/or surrounding properties. The protocol for the investigation is based on the "Guidance For Performing Site Investigations Under CERCLA, EPA540-R-92-021, September 1992." A Site Investigation is intended to:

- Eliminate from consideration those sites that pose no threat to public health and environment.
- Determine the need for a removal action.
- Set priorities for future investigations.
- Gather existing or additional data to facilitate later components of the site assessment process.

A scope of work was developed to assist SCS in collecting defensible data to make informed decisions as to whether the site poses a threat to public health and environment. The scope of work performed by SCS included the collection of wipe samples of interior surfaces, collection of crawl space soil samples, collection of water samples from interior sumps, and the collection of subsurface soil samples using direct-push technology. Sample locations were selected as a part of a detailed sampling strategy designed to eliminate concern over occupation of the building by Federal office workers.

SITE DESCRIPTION AND HISTORICAL USE

The 4300 Goodfellow Federal Center is located on a portion of the former St. Louis Ordnance Plant in St. Louis, Missouri. In January, 1941, construction of the St. Louis Ordnance Plant began and was completed in May 1942. The Ordnance Plant was the largest small-arms ammunition installation in the world and embodied three operating divisions. The facility, a Government-Owned/Contractor Operated (GOCO) plant, produced small arms ammunition (.30 caliber and .50 caliber) and components for the 105-mm shells. Plant No. 1 was located on the east side of Goodfellow Boulevard. During World War II buildings 102, 103, 104, and 105 of Plant No. 1 were operated for the production of small arms ammunition. Buildings 102 and 103 housed the production of .30 caliber ammunition, while Buildings 104 and 105 housed the production of .50 caliber ammunition.

During small arms ammunition manufacturing at Plant No. 1, Building 104 served as one of two .50 caliber production locations. The small arms ammunition production at Building 104 consisted of brass cartridge annealing and shaping, powder and primer packing, lead core insertion, and sorting, packaging, and shipping. Powder and primer were stored in a munitions bunker located south of Building 104. The bunker was removed and was replaced with a parking lot. Powder was moved from the bunker and brought into Building 104E for loading. Primer was brought into Building 104F for packing. Cartridge annealing and shaping took place in Building 104, as did sorting, packaging, and shipping of the completed cartridges. Cartridge manufacturing ended at Plant No. 1 at the close of World War II.

The Department of Defense converted the Property in the 1960's and 1970's to a Federal Office Complex under the management of GSA. The Department of Defense reportedly spent in excess of $50 million dollars in demolition, grading, disposal, and remodeling costs. The four primary munitions manufacturing buildings (102, 103, 104, and 105) were decommissioned and converted into office and warehouse space. The grounds surrounding the buildings were graded and converted into parking and greenspace. The Federal Center has been utilized for over 20 years as a Federal Office Center whose primary tenants have included GSA, USDA, and the Department of Defense (Army).

SECTION 2

WIPE SAMPLING

Main floor and crawl space wipe samples were collected from the basement and main floor levels of Building 104 (Areas A, B, C, & D), Building 104E, and Building 104F. A total of nine wipe samples was collected from 104, 104E, and 104F, from both the basement and main floor levels. Crawl space wipe sample locations were selected at random within each defined area. Locations were selected based on proximity to potential hazard exposure, proximity to process areas, and/or spatial considerations. Wipe sample locations are detailed on Figure 2A and 2B in Appendix B. Wipe samples were collected using American Society For Testing and Materials (ASTM), Occupational Safety and Health Administration (OSHA), and Housing and Urban Development (HUD) protocols. All wipe samples were collected from an area of 100 cm^2 using cut gauze pads containing appropriate solvent/preservatives (explosives-acetonitrile, polychlorinated biphenyls (PCBs)-hexane, metals-solvent).

LOGGING OF SAMPLE PARAMETERS

All sample locations were documented in the field log and pictures of the sample locations were taken.

WIPE SAMPLE COLLECTION

Each wipe sample was collected from a predetermined location on the main floor and basement levels. Basement level wipe samples were collected from the sides of concrete pillars or walls and were collected from a height of three (3) feet above ground surface. Explosives, PCBs, and metals wipe samples were collected from the same sample locations at the same elevation. Main floor wipe samples were collected from exposed walls, concrete floors, and from exposed steel ceiling girders depending on sample location. All wipe samples were collected by removing the pre-soaked gauze pad from the sample container and wiping an area of approximately 100 cm^2. Explosives, PCBs, and metals wipe samples were collected from the same sample locations, i.e. walls, floors, ceilings. Upon collection, wipe samples were immediately stored in the same laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars were placed on ice in a cooler and held until the end of the day. Samples were placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories (STL) in University Park, Illinois.

CHEMICAL ANALYSES

Building 104

Analysis of the four wipe samples collected from Sections A, B, C, and D within Building104 included PCBs by Method 8082, explosives by Method 8330, and metals by Method 6010B. Table 1-1 in Appendix D presents a summary of analytical results from the collected wipe

samples within Building 104. Only analytes with reported concentrations above laboratory quantitative limits are listed.

Aroclor 1260 was detected in two of the four wipe samples collected and analyzed for PCBs. Reported detections of Aroclor 1260 ranged from 2.6 µg/wipe to 27 µg/wipe. The Federal Toxic Substances Control Act (TSCA) defines PCB contamination of a non-porous surface as having a PCB surface concentration >10 mg/100 cm^2 but <100 mg/100 cm^2 as measured by a standard wipe test. Wipe samples collected as part of this investigation were standard wipe tests which covered surface areas 100 cm^2 each.

No other PCBs were detected above laboratory quantitative limits in any of the wipe samples.

No explosives were detected above laboratory quantitative limits in any of the wipe samples.

Mercury was detected above laboratory quantitative limits in all of the wipes samples, and the reported concentration in three of the four wipe samples (104CSWS1, 104CWS1, and 104DWS1). Currently, no State or Federal agency has established regulatory threshold values for mercury collected by the standard wipe method. Air monitoring for mercury was completed as part of this investigation and is detailed in Section 6.

Building 104E

The four wipe samples collected from Building 104E were analyzed for PCBs by Method 8082, explosives by Method 8330, mercury by Method 7471A, and metals by Method 6010B. Table 1-2 in Appendix D presents a summary of analytical results from the collected wipe samples within Building 104E. Only analytes with reported concentrations above laboratory quantitative limits are listed.

Aroclor 1260 was detected in two of the four wipe samples and analyzed for PCBs. Reported detections of Aroclor 1260 ranged from 0.57 µg/wipe to 1.3 µg/wipe. TSCA defines PCB contamination as a non-porous surface having a PCB surface concentration >10 mg/100 cm^2 but <100 mg/100 cm^2 as measured by a standard wipe test. Wipe samples collected as part of this investigation were standard wipe tests which covered surface areas 100 cm^2 each.

No other PCBs were detected above laboratory quantitative limits in any of the wipe samples.

No explosives were detected above laboratory quantitative limits in any of the wipe samples.

Mercury was detected above laboratory quantitative limits in all of the wipes samples collected. Detections of mercury ranged from 14 µg/wipe to 2,900 µg/wipe. Excluding the sample where the reported mercury concentration exceeded the screening level, detections of mercury ranged from 14 µg/wipe to 410 µg/wipe. Currently, no State or Federal agency has established regulatory threshold values for mercury collected by the standard wipe method. Air monitoring for mercury was completed as part of this investigation and is detailed in Section 6.

Lead was detected above laboratory quantitative limits in all of the wipe samples collected in Building 104E. Two of the samples were collected on the main floor of the building (within the child occupied day care facility) These samples contained concentrations of $1.21E^6$ $\mu g/ft^2$ (104EWS1) and $1.86E^4$ $\mu g/ft^2$ (104EWS2). HUD protocol states that lead dust levels within child occupied facilities should not exceed 40 $\mu g/ft^2$ on floors and/or 250 $\mu g/ft^2$ on interior window sills.

Building 104F

The one wipe sample collected from Building 104F was analyzed for PCBs by Method 8082, explosives by Method 8330, mercury by Method 7471A, and metals by Method 6010B. Table 1-3 in Appendix D presents a summary of analytical results from the collected wipe sample within Building 104F. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs or explosives were detected above laboratory quantitative limits in the wipe sample.

Mercury was detected above laboratory quantitative limits in the wipe sample at a concentration of 97 μg/wipe. Currently, no State or Federal agency has established regulatory threshold values for mercury collected by the standard wipe method. Air monitoring for mercury was completed as part of this investigation and is detailed in Section 6.

SECTION 3

SHALLOW SOIL AND SEDIMENT SAMPLING

Shallow soil and sediment samples were collected from the basement level of Building 104 (Areas A, B, C, & D), Building 104 E, and Building 104 F. A total of eight shallow soil and sediment samples were collected for laboratory analysis. Shallow soil and sediment sample locations were selected based upon proximity to potential hazard exposure, changes in surface color or texture, proximity to process areas, and/or spatial considerations. Soil samples were collected from an average depth of 4 - 6 inches bgs. Shallow soil and sediment sample locations are detailed on Figure 2A and 2B in Appendix B.

LOGGING OF SAMPLE PARAMETERS

The color, texture, and moisture content of materials sampled were classified in the field log for each sample location. The classification procedure included texture descriptions of soils according to the Unified Soil Classification System (USCS). Included in the descriptions are principal and minor soil constituents, moisture content, soil color, and other visible features. Color was defined using the Munsell Color System. No unusual odors or other indicators of potential contamination were observed during sampling.

ANALYTICAL SAMPLE COLLECTION

Each sample was collected from a predetermined depth by removing the cover material to expose the layer to be sampled. Crawl space soil samples were collected with a stainless steel sampling tool. VOC samples were collected using USEPA Method 5035. Three discreet 5 gram soil samples were collected in En Core sample containers using an En Core T-handle sampler. The 5035 Method requires the three sample containers to be placed in sealed bags and shipped overnight to the laboratory for preservation and analysis. Upon collection, crawl space soil samples for other analyses were immediately stored in clean, laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars were placed on ice in a cooler, and held until the end of the day. One soil sample from each sample location was submitted for laboratory analysis. Samples were placed on ice and submitted under a chain-of-custody to STL in University Park, Illinois.

CHEMICAL ANALYSES

Building 104

The analysis of the five shallow soil and sediment samples collected from Sections A, B, C, and D within Building 104 included PCBs by Method 8082; explosives by Method 8330; cyanide by Method 9014/9010B; phosphorous by Method 4500PE; mercury by Method 7471A; metals by Method 6010B; and SVOCs by Method 8270C. Table 2-1 in Appendix D presents a summary of analytical results from the collected shallow soil and sediment samples within Building 104. Only analytes with reported concentrations above laboratory quantitative limits are listed.

Aroclor 1260 was detected in two sediment samples below the CALM STARC Scenario A screening level of 600 µg/kg. Reported detections of Aroclor 1260 ranged from 21 µg/kg to 100 µg/kg.

No other PCBs were detected above laboratory quantitative limits in any of the shallow soil and sediment samples.

No explosives were detected above laboratory quantitative limits in any of the sediment samples collected and analyzed for explosives (104CSSS1, 104CSSS2, 104CSSS3, AND 104CSPIPE).

Cyanide was not detected above laboratory quantitative limits in any of sediment samples collected and analyzed for cyanide (104CSSS1, 104CSSS2, 104CSSS3, AND 104CSPIPE).

Phosphorous was detected above laboratory quantitative limits in the four sediment samples, and reported concentrations in these samples ranged between 51 mg/kg to 380 mg/kg. Currently, no CALM STARC Scenario A screening level has been established for this analyte.

Mercury was detected above laboratory quantitative limits in the shallow soil and sediment samples, and the reported concentration in one of the five samples (104CSSS2) exceeded the CALM STARC Scenario A screening level of 600 mg/kg. Detections of mercury ranged from 0.023 mg/kg to 0.68 mg/kg. Excluding the sample where the reported mercury concentration exceeded the screening level, detections of mercury ranged from 0.023 mg/kg to 0.53 mg/kg.

Beryllium was detected above laboratory quantitative limits in three shallow soil and sediment samples, and all three detections exceeded the CALM STARC Scenario A screening level of 0.05 mg/kg. Detections of beryllium ranged from 0.21 to 0.61 mg/kg. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

Copper was detected above laboratory quantitative limits in all of the shallow soil and sediment samples, and reported concentrations in the four sediment samples (104CSSS1, 104CSSS2, 104CSSS3, AND 104CSPIPE) exceeded the CALM STARC Scenario A screening level of 1,100 mg/kg. Detections of copper in the sediment samples ranged from 1,400 mg/kg to 29,000 mg/kg.

Lead was detected above laboratory quantitative limits in all of the shallow soil and sediment samples, and reported concentrations in two sediment samples exceeded the CALM STARC Scenario A screening level of 260 mg/kg. Detections of lead ranged from 16 mg/kg to 570 mg/kg. Excluding the two samples where reported lead concentrations exceeded the screening level, detections of lead ranged from 16 mg/kg to 44 mg/kg.

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the shallow soil and sediment samples.

All reported concentrations of SVOCs were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the shallow soil sample collected from the railroad track subgrade located adjacent to Building 104 (104RRTRACK SUBGRD).

Building 104E

The analysis of the two shallow soil samples collected from Buildings 104E included PCBs by Method 8082; explosives by Method 8330; cyanide by Method 9014/9010B; phosphorous by Method 4500PE; mercury by Method 7471A; and metals by Method 6010B. Table 2-2 in Appendix D presents a summary of analytical results from the collected shallow soil samples within Building 104E. Only analytes with reported concentrations above laboratory quantitative limits are listed.

Aroclor 1260 was detected in one shallow soil sample below the CALM STARC Scenario A screening level of 600 µg/kg. The reported concentration of Aroclor 1260 was 22 µg/kg.

No other PCBs were detected above laboratory quantitative limits in any of the shallow soil samples.

No explosives or cyanide were detected above laboratory quantitative limits in the shallow soil samples.

Phosphorous was detected above laboratory quantitative limits in the two shallow soil samples, and reported concentrations in these samples ranged from 99 mg/kg to 330 mg/kg. Currently, no CALM STARC Scenario A screening level has been established for this analyte.

Mercury was detected above laboratory quantitative limits in both shallow soil samples at concentrations below the CALM STARC Scenario A screening level of 0.6 mg/kg. Detections of mercury ranged from 0.011 mg/kg to 0.044 mg/kg.

Beryllium was detected above laboratory quantitative limits in both shallow soil samples, and both detections of beryllium exceeded the CALM STARC Scenario A screening level of 0.05 mg/kg. Detections of beryllium ranged from 0.45 mg/kg to 1.5 mg/kg. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the shallow soil samples.

Building 104F

The analysis of the shallow soil and sediment samples collected from Buildings 104F included PCBs by Method 8082; explosives by Method 8330; cyanide by Method 9014/9010B; phosphorous by Method 4500PE; mercury by Method 7471A; and metals by Method 6010B. Table 2-3 in Appendix D presents a summary of analytical results from the collected shallow soil and sediment samples within Building 104F. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs or explosives were detected above laboratory quantitative limits in the shallow soil and sediment samples.

Cyanide was detected above laboratory quantitative limits in the shallow soil and sediment samples, and reported concentrations in both samples were below the CALM STARC Scenario A screening level of 5,480 mg/kg. The reported concentrations of cyanide ranged from 0.28 mg/kg to 0.43 mg/kg.

Phosphorous was detected above laboratory quantitative limits in the shallow soil and sediment samples, and reported concentrations in these samples ranged from 40 mg/kg to 180 mg/kg. Currently, no CALM STARC Scenario A screening level has been established for this analyte.

Mercury was detected above laboratory quantitative limits in the shallow soil and sediment samples, and the reported concentrations in both samples were below the CALM STARC Scenario A screening level of 0.6 mg/kg. Detections of mercury ranged from 0.027 mg/kg to 0.046 mg/kg.

Beryllium was detected above laboratory quantitative limits in both shallow soil and sediment samples, and both detections of beryllium exceeded the CALM STARC Scenario A screening level of 0.05 mg/kg. Detections of beryllium ranged from 0.64 mg/kg to 0.98 mg/kg. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the shallow soil and sediment samples.

SECTION 4

SUBSURFACE SOIL SAMPLING

In September 2002 and December 2003, soil borings were advanced around Building 104, 104E, 104F, and former Buildings 104G, 104H, 104J, 104K and 104L. A total of ten soil borings were advanced at locations near Building Series 104. Soil boring locations are detailed on Figure 3 in Appendix C.

Subsurface soil samples were collected using direct-push soil probing technology. Direct-push borings were located around buildings and at former building locations across the Site. Probe locations included areas surrounding existing structures, such as main production buildings and electrical substations. Probe locations also included former powder canning and storage buildings and areas with former underground storage tanks (USTs).

Three of the ten borings (105-4, SB20, and SB38) were placed near Building 104 Sections A, B, C, and D. Boring 105-4 was placed near the southern corner of Building 104, SB20 was placed around the eastern corner, and SB38 was placed near the northern corner of Building 104. Boring SB105-4 was advanced to its target depth of twelve feet bgs, and Boring SB20 and SB38 were advanced to their target depths of twenty feet bgs. Boring SB28 was placed near the northwestern side of Building 104E and was advanced to its target depth of twenty feet bgs. Boring SB34 was placed near the northwestern side of Building 104F. Boring SB34 was advanced to its target depth of twenty feet bgs. Boring SB7, SB8, and SB9 were placed within the area of former Buildings 104G, 104H, 104J, 104K, and 104L. Boring SB8 and SB9 encountered probe refusal at depths of approximately three feet bgs. Boring SB7 was advanced to its target depth of twenty feet bgs.

Probing was performed by Detech, Inc. (Detech) of Lawrence, Kansas and Below Ground Service, Inc. (BGS) of Lawrence, Kansas. Detech and BGS performed direct-push soil sampling using a truck-mounted Geoprobe® unit equipped with a pneumatic hammer and hollow, two-inch diameter probe rods. At each location, continuous soil cores were collected using a continuous-barrel sampler two feet in length. Soil cores were removed from the sampler using disposable acetate liners. Subsurface soil cores were collected until the target depth (typically twenty feet bgs) or refusal.

When the acetate liners were removed from the continuous-barrel sampler, a handheld photoionization detector (PID) was used to screen vapors for VOCs in the headspace above the soil core. No groundwater samples were collected.

LOGGING OF SUBSURFACE MATERIALS

Building 104

In general, the material encountered at boring location 105-4 consisted of varying amounts of damp clay and silt to its target depth of twelve feet bgs. Field screening of soil cores from 105-4 registered readings below the detection limit of the PID

The material encountered at boring location SB20 generally consisted of varying amounts of clay, sand, and gravel to its target depth of twenty feet bgs. Field screening of soil cores collected from SB20 registered readings between 2.7 and 10.6 ppm on the PID, and odors were noted during boring advancement from a depth of approximately 7 feet bgs to the bottom of the boring.

The material encountered at boring location SB38 consisted of varying amounts of clay, sand, and gravel to its target depth of twenty feet bgs. Soil cores from SB38 registered readings below the detection limit of the PID. Notable increases in moisture content occurred at twelve feet bgs.

Static groundwater levels were not identified during the probing effort around Building 104.

Building 104E

In general, the materials encountered at boring SB28 consisted of varying amounts of clay, sand, and gravel to its target depth of twenty feet bgs. Soil cores from SB28 registered readings below the detection limit of the PID. Static groundwater level was not identified during the probing effort around Building 104E.

Building 104F

In general, the material encountered at boring location SB34 consisted of dry to moist clay to its target depth of twenty feet bgs. Field screening of soil cores collected from SB34 registered readings of approximately 1.2 ppm on the PID, and odors were noted during boring advancement from approximately one to three feet bgs. Static groundwater level was not identified during the probing effort around Building 104F.

Former Buildings 104G, 104H, and 104J

In general, the materials encountered at boring location SB7 consisted of dry to moist gravel, sand, and clay until its target depth of twenty feet bgs. Soil cores from SB7 registered readings below the detection limit of the PID.

The materials encountered at borings SB8 and SB9 generally consisted of gravel, sand, and debris until refusal at three feet bgs. Field screening of soil cores collected from SB8 and SB9 registered readings below the detection limit of the PID.

Static groundwater levels were not identified during the probing effort around former Buildings 104G, 104H, and 104J.

Former Buildings 104K and 104L

In general, the materials encountered at boring locations SB21 and SB22 consisted of a wet, gravelly fill. Borings SB21 and SB22 encountered probe refusal at a depth of ten feet bgs (believed to be concrete slab associated with former Building 104K and 104L). Soil cores from both probe locations registered readings below the detection limit of the PID. Static groundwater levels were not identified during the probing effort around former Buildings 104K and 104L.

ANALYTICAL SAMPLE COLLECTION

Discrete soil samples were extracted directly from the acetate liner and continuous-barrel sampler using a clean, decontaminated stainless steel utensil. Upon extraction from the acetate liners, soil samples were immediately stored in clean, laboratory-supplied jars for analysis. Once capped and sealed, sample containers were placed on ice in a cooler, and held until the end of the day of field investigation. At the end of the day of field investigation, the sample containers were shipped on ice under a proper chain-of-custody via overnight express delivery service to STL in University Park, Illinois

Samples analyzed for VOCs were collected using SW-846 Method 5035. At each sample location, three containers were filled with 5 grams of soil collected discreetly using an En Core™ sampler. Method 5035 requires that these three containers be placed in sealed bags and shipped overnight to the laboratory for preservation and analysis. Once capped and sealed, sample containers were placed on ice in a cooler, and held until the end of the day of field investigation. At the end of the day of field investigation, the sample containers were shipped on ice under a proper chain-of-custody via overnight express delivery service to STL in University Park, Illinois

CHEMICAL ANALYSES

Building 104

Pre-selected analyses for samples collected around Building 104 Sections A, B, C, and D included PCBs by Method 8082; explosives by Method 8330; TPH by Method 8015B MDRO; cyanide by Method 9014/9010B; phosphorous by Method 4500PE; mercury by Method 7471A; metals by Method 6010B; SVOCs by Method 8270C; and VOCs by Method 8260B. Table 3-1 in Appendix D presents a summary of analytical results from the subsurface soil samples collected around Building 104. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs or were detected above laboratory quantitative limits in the subsurface soil samples collected around Building 104.

No explosives were detected above laboratory quantitative limits in the subsurface soil sample collected near Building 104 and analyzed for explosives (105-4).

No cyanide was detected above laboratory quantitative limits in the subsurface soil sample collected near Building 104 and analyzed for cyanide (105-4).

TPH-DRO concentrations were detected below the CALM STARC screening level of 200 mg/kg in the subsurface soil sample collected and analyzed for TPH-DRO (SB38). The reported DRO concentration in the subsurface soil sample collected from boring SB38 was 4.8 mg/kg.

Phosphorous was detected above laboratory quantitative limits in the subsurface soil sample collected and analyzed for phosphorous (105-4). The reported phosphorous concentration in the subsurface soil sample collected from boring 105-4 was 520 mg/kg. Currently, no CALM STARC Scenario A screening level has been established for this analyte.

Mercury was detected above laboratory quantitative limits in the two subsurface soil samples collected and analyzed for mercury (105-4 and SB20). The reported concentrations for these samples were below the CALM STARC Scenario A screening level of 0.6 mg/kg. Detections of mercury ranged from 0.035 mg/kg to 0.073 mg/kg.

Beryllium was detected above the CALM STARC Scenario A screening level of 0.05 mg/kg in the two subsurface soil samples collected and analyzed for beryllium (105-4 and SB20). Reported concentrations ranged from 0.36 mg/kg to 0.97 mg/kg. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the subsurface soil samples collected and analyzed for metals (105-4 and SB20).

All reported concentrations of SVOCs were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the one subsurface soil sample collected and analyzed for SVOCs (105-4).

Acetone and 1,1,2,2-tetrachloroethane were detected below their respective CALM STARC Scenario A screening levels in the subsurface soil sample collected from SB20. Acetone also was detected below its CALM STARC Scenario A screening level in the subsurface soil sample collected from 105-4. No other VOCs were detected above laboratory quantitative limits in the subsurface soil samples collected and analyzed for VOCs (105-4 and SB20).

Building 104E

Pre-selected analyses for the sample collected near Building 104E included PCBs by Method 8082, explosives by Method 8330, mercury by Method 7471A, and metals by Method 6010B. Table 3-1 in Appendix D presents a summary of analytical results from the subsurface soil

sample collected near Building 104E. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs or explosives were detected above laboratory quantitative limits in the subsurface soil sample collected near Building 104E.

Mercury was detected above laboratory quantitative limits in the subsurface soil sample; however, the reported concentration for this sample was below the CALM STARC Scenario A screening level of 0.6 mg/kg. The reported mercury concentration in the subsurface soil sample collected from boring SB28 was 0.025 mg/kg.

Beryllium was detected above the CALM STARC Scenario A screening level of 0.05 mg/kg in the subsurface soil sample. The reported beryllium concentration in the subsurface soil sample collected from boring SB28 was 0.42 mg/kg. However, this reported beryllium concentration may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the subsurface soil sample collected from boring SB28.

Building 104F

Pre-selected analyses for the sample collected near Building 104F included PCBs by Method 8082, explosives by Method 8330, mercury by Method 7471A, metals by Method 6010B, and VOCs by Method 8260B. Table 3-1 in Appendix D presents a summary of analytical results from the subsurface soil sample collected near Building 104F. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs or explosives were detected above laboratory quantitative limits in the subsurface soil sample collected near Building 104F.

Mercury was detected above laboratory quantitative limits in the subsurface soil sample; however, the reported concentration for this sample was below the CALM STARC Scenario A screening level of 0.6 mg/kg. The reported mercury concentration in the subsurface soil sample collected from boring SB34 was 0.024 mg/kg.

Beryllium was detected above the CALM STARC Scenario A screening level of 0.05 mg/kg in the subsurface soil sample. The reported beryllium concentration in the subsurface soil sample collected from boring SB34 is 0.88 mg/kg. However, this reported beryllium concentration may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the subsurface soil sample collected from boring SB34.

Acetone was detected below its CALM STARC Scenario A screening level in the subsurface soil sample collected from boring SB34. No other VOCs were detected above laboratory quantitative limits in the subsurface soil sample collected near Building 104F.

Former Buildings 104G, 104H, and 104J

Direct-push soil sampling at boring locations SB8 and SB9 recovered insufficient quantities of material suitable for laboratory testing from each boring individually. Consequently, proportionate sample material from SB8 and SB9 was combined into a single composite sample. The soil sample recovered from boring SB7 was of sufficient volume that an individual sample was submitted for laboratory analysis.

Pre-selected analyses for samples collected around former Buildings 104G, 104H, and 104J included explosives by Method 8330, mercury by Method 7471A, and metals by Method 6010B. Table 3-1 in appendix D presents a summary of analytical results from the subsurface soil samples collected around former Buildings 104G, 104H, and 104J. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No explosives were detected above laboratory quantitative limits in the subsurface soil samples collected around former Buildings 104G, 104H, and 104J.

Mercury was detected above laboratory quantitative limits in the two subsurface soil samples; however, the reported concentrations for these samples were below the CALM STARC Scenario A screening level of 0.6 mg/kg. Detections of mercury ranged from 0.0089 mg/kg to 0.019 mg/kg.

Beryllium was detected above the CALM STARC Scenario A screening level of 0.05 mg/kg in the two subsurface soil samples. Reported concentrations ranged from 0.76 mg/kg to 1.2 mg/kg. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

All reported concentrations of the remaining metal analytes were below the CALM STARC Scenario A screening levels or below laboratory quantitative limits in the two subsurface soil samples collected around former Buildings 104G, 104H, and 104J.

Former Buildings 104K and 104L

Pre-selected analyses for samples collected around former Buildings 104K and 104L included PCBs by Method 8082, mercury by Method 7471A, and metals by Method 6010B. Table 3-1 in appendix D presents a summary of analytical results from the subsurface soil samples collected near former Buildings 104K and 104L. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No PCBs were detected above laboratory quantitative limits in the subsurface soil sample collected from boring SB21.

Beryllium was detected above the Cleanup Levels for Missouri (CALM) Soil Target Concentrations (STARC) Scenario A screening level of 0.05 milligrams per kilogram (mg/kg) in both soil samples. Reported concentrations in subsurface soil samples collected from boring SB21 and boring SB22 were 0.051 mg/kg and 0.69 mg/kg, respectively. However, these reported beryllium concentrations may be indicative of typical background concentrations for this area in the State of Missouri (see Section 8).

Mercury was detected above the CALM STARC Scenario A screening level of 0.6 mg/kg in the subsurface soil sample collected from boring SB22. The reported concentration of mercury was 560 mg/kg. Mercury was not identified above laboratory quantitative limits in the subsurface soil sample collected from boring SB21.

All reported concentrations of the remaining metal analytes were below the CALM STARC screening levels or below laboratory quantitative limits in the subsurface soil samples collected from boring SB21 and boring SB22.

SECTION 5

BASEMENT SUMP SAMPLING

In December 2003, a sump water sample was collected in the basement level of Building 104F. The sump water sample location was selected based upon proximity to potential hazard exposure, proximity to process areas, and/or spatial considerations. The basement sump sample location is detailed on Figure 2A and 2B in Appendix B.

ANALYTICAL SAMPLE COLLECTION

The sump water sample was collected using a stainless dipper. Upon collection from the sump, the water sample was immediately stored in clean, laboratory-supplied containers for analysis. Once capped and sealed with a Teflon-lined lid, sample containers were placed on ice in a cooler, and held until the end of the day of field investigation. The sample was placed on ice and submitted under a chain-of-custody to STL in University Park, Illinois.

CHEMICAL ANALYSES

Sample TW-2 was analyzed by STL for explosives by Method 8330, mercury by Method 7470A, and metals by Method 6010B. Table 4-1 in Appendix D presents the results of the sump water sample analysis. Only analytes with reported concentrations above laboratory quantitative limits are listed.

No explosives or mercury were detected above laboratory quantitative limits in the sump water sample collected within Building 104F.

Manganese was detected above the CALM GTARC screening level of 0.05 mg/l in the sump water sample. The reported manganese concentration in sample TW-2 was 0.095 mg/l.

All reported concentrations of the remaining metal analytes were below the CALM GTARC screening levels or below laboratory quantitative limits in the sump water sample.

SECTION 6

AIR MONITORING

On September 4, 2003, SCS Engineers utilized a HG253 portable mercury vapor analyzer manufactured by Genesis Laboratory Systems to collect and analyze ambient air within Building 104. A total of six ambient air samples were collected within Building 104. Four samples were collected on the main floor of the building within Sections A, B, C, and D and two samples were collected within the crawl space level. Mercury vapor concentrations ranged from below detectible levels to 0.0005 mg/m^3 at the areas sampled within Building 104. The OSHA Permissible Exposure Limit (PEL) for mercury is 0.001 mg/m^3.

In September 2003, four ambient air samples were collected at two locations in Building 104. A passive vapor ambient air sample and ambient air monitoring sample were collected from near the freight elevator of Buildings 104, and a passive vapor ambient air sample and ambient air monitoring sample were collected from second floor hallway near the exit at the southern end of Building 104.

Passive vapor ambient air samples and ambient air monitoring samples were analyzed by Assay Technology AT Labs for mercury vapor by OSHA Method 140 and OSHA Method 145 Table 5-1 in Appendix D presents the passive vapor ambient air monitoring and ambient air monitoring results.

Mercury vapor and particulate mercury were not detected above laboratory quantitative limits in the ambient air monitoring samples.

SECTION 7

SOLID SAMPLING

In July 2003, a paint chip sample was collected from Building 104E. Sample 104EPAINT was collected from a predetermined location with stainless steel sampling equipment. The sample was immediately stored in a clean, laboratory-supplied jar for analysis. Once capped and sealed, the sample container was placed on ice in a cooler, and held until the end of the day. At the end of the day of field investigation, the sample container was shipped on ice under a proper chain-of-custody via overnight express delivery service to STL in University Park, Illinois.

The sample 104EPAINT was analyzed by STL for lead by Method 6010B and mercury by Method 7471A. Table 6-1 in Appendix D presents the results of solid sample analysis.

Lead was detected at a reported concentration of 380 mg/kg in sample 104EPAINT. This concentration is below the HUD established threshold for lead-based paint determination of 5,000 mg/kg or 0.5 percent.

SECTION 8

MISSOURI RISK BASED CLEANUP STANDARDS (CALM)

The Missouri Department of Natural Resources CALM guidance document outlines a process for determining cleanup goals at sites with known or suspected hazardous substance contamination. The CALM document was developed to service the Missouri Voluntary Cleanup Program law (10CAR 25-15.010). According to the introductory section of the CALM document, "CALM may be used only for setting cleanup goals for sites undergoing cleanup in the department's Voluntary Cleanup Program." While it was not the goal of this investigation to establish an appropriate regulatory jurisdiction for the Property, CALM protocols provide a reasonable, widely-referenced initial standard upon which detected compounds can be assessed.

Appendix B of the CALM document contains a table of Soil and Groundwater Target Concentrations (STARC and GTARC) divided into three Exposure Scenarios. All analytical results were compared to an Exposure Scenario A. Exposure Scenario A applies to sites where no land-use restriction covenants are to be used and are the most restrictive in terms of cleanup goals.

As previously discussed, beryllium exceeded maximum concentrations set forth in CALM (Scenario A – 0.05mg/kg) in numerous shallow soil, sediment and subsurface soil samples analyzed. These Exposure Scenario's are inclusive of a "Direct Exposure" pathway (ingestion/dermal/inhalation). The "Leaching to Groundwater" maximum concentration of 130 mg/kg is far above the levels detected in the soils at the subject site.

Background concentrations of beryllium in the subsurface soils of Missouri have been identified at levels ranging from 0.1 mg/kg to 40 mg/kg (Tidball, 1984). USEPA has published a "Fact Sheet" on *Metal Concentrations in Natural Soils, USEPA, Office of Solid Waste and Emergency Response (April, 1983)* which has defined an average concentration of beryllium in soils at 6 mg/kg. The Tier 2 process within the CALM Guidance allows for a Tier 2 Background assessment to determine background levels of identified contaminates at sites in Missouri. A Tier 2 Background Assessment would establish a background level for beryllium at the subject site and would most likely "risk away" any concerns regarding beryllium levels at the subject site.

A Background Assessment was performed by SCS in December of 2003. Four surface/near surface samples were collected from undisturbed locations within a 2-mile radius of the Federal Facility. Samples were collected from St. Vincent Park, Sverdrup Army Reserve Center across Goodfellow from the Federal Facility, Schnucks Plaza at Natural Bridge and Union Street, and from a vacant lot at the intersection of Clara Street and Ashland Avenue. Average detected beryllium concentrations were approximately 0.27 mg/kg, or many orders of magnitude higher than the MDNR STARC for Scenario A of 0.05 mg/kg.

SECTION 9

CONCLUSIONS AND RECOMMENDATIONS

- Lead was detected above laboratory quantitative limits in all of the wipe samples collected in Building 104E. Two of the samples were collected on the main floor of the building (within the child occupied day care facility). These samples contained concentrations of $1.21E^{6}$ $\mu g/ft^2$ (104EWS1) and $1.86E^{4}$ $\mu g/ft^2$ (104EWS2). HUD protocol states that lead dust levels within child occupied facilities should not exceed 40 $\mu g/ft^2$ on floors and/or 250 $\mu g/ft^2$ on interior window sills. Based on analytical data obtained from the wipe samples, a dust-lead hazard may be present within the child occupied facility. A paint chip sample was also collected within Building 104E (104EPAINT) which contained lead at a concentration of 380 mg/kg. This concentration is below the HUD threshold of 5,000 mg/kg or 0.5 percent which is used to define lead-based paint. Based on the concentrations of lead identified in the wipe samples, it is recommended that interim controls or permanent abatement be performed to reduce the potential dust-lead hazard within the child occupied day care facility located within Building 104E.

- Mercury concentrations exceeded MDNR CALM STARC Scenario A screening levels in soil samples collected near former Building 104L. SCS recommends additional soil sampling around former Building 104L to better define the nature and extent of the mercury impact. Up to five additional Geoprobe® borings are recommended to better identify mercury concentrations both vertically and horizontally around former Building 104L. A maximum of two soil samples from each boring will be analyzed for mercury by Method 7471A. In addition, SCS recommends installing up to five temporary groundwater monitoring points after boring advancement using small diameter schedule 40 polyvinylchloride (PVC) riser and screen. The purpose for monitoring point installation is to determine the elevation, direction, and gradient of groundwater near former Building 104L and to evaluate the potential for mercury groundwater contamination. If the monitoring points yield appreciable amounts of groundwater, SCS recommends collecting a groundwater sample from one of the monitoring points. SCS has prepared and presented GSA with a scope of work and cost estimate detailing this additional recommended investigative action.

- With exception of a potential dust-lead hazard in Building 104E, analytical results of the limited sampling performed to date by SCS associated with Building 104, 104E, and 104F would indicate that there are no environmental concerns regarding the occupancy of the respective buildings.

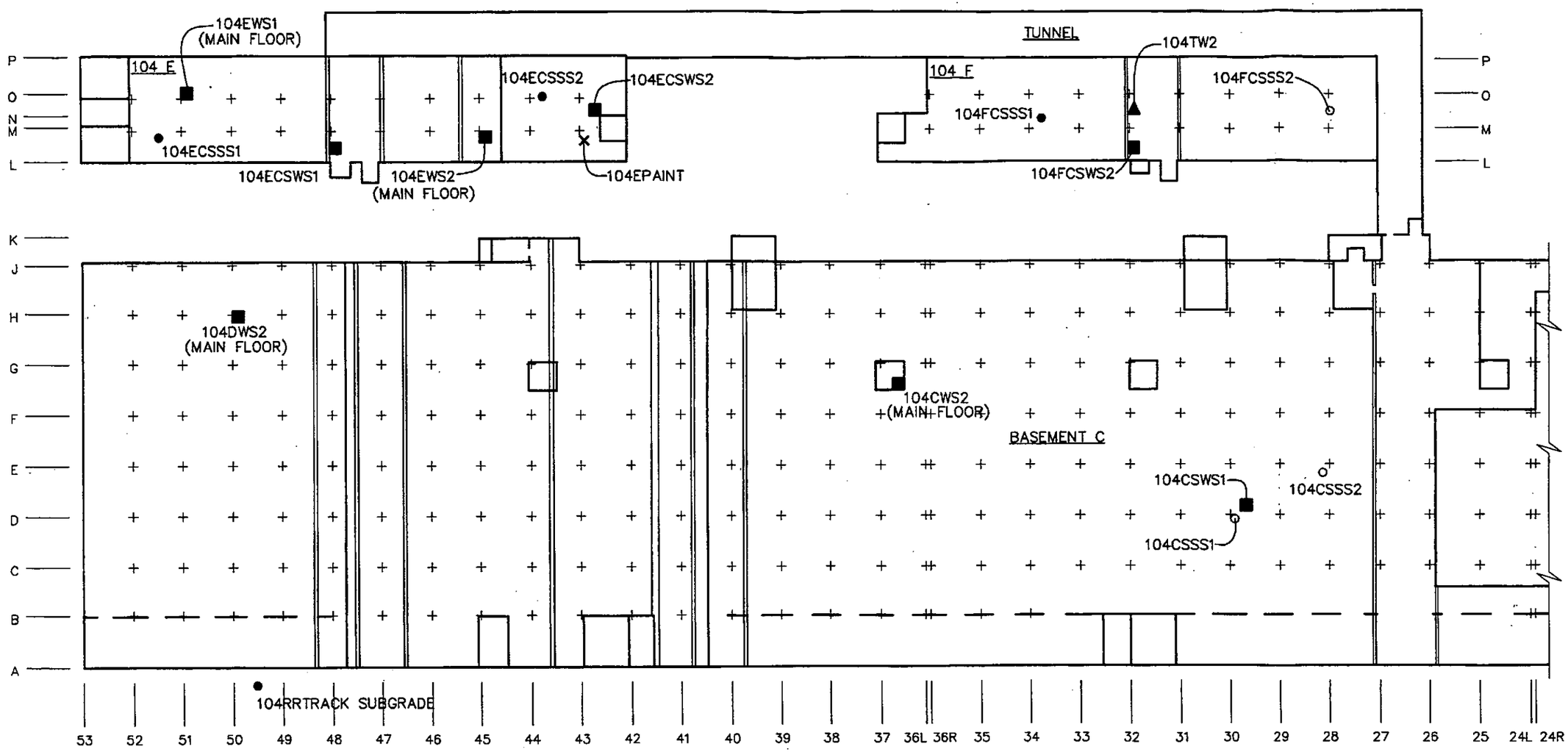
APPENDIX A

FIGURE 1: SITE MAP

APPENDIX B

SAMPLE LOCATION MAPS

Figure 2A: Sample Location Map (Building 104, 104E, and 104F)
Figure 2B: Sample Location Map (Building 104)



LEGEND

■ 104WS2	WIPE SAMPLE LOCATION
• 104SS1	SOIL SAMPLE LOCATION
○ 104WS1	SEDIMENT SAMPLE LOCATION
▲ 104TW2	WATER SAMPLE LOCATION
× 104EPAINT	SOLID SAMPLE LOCATION

NOT TO SCALE

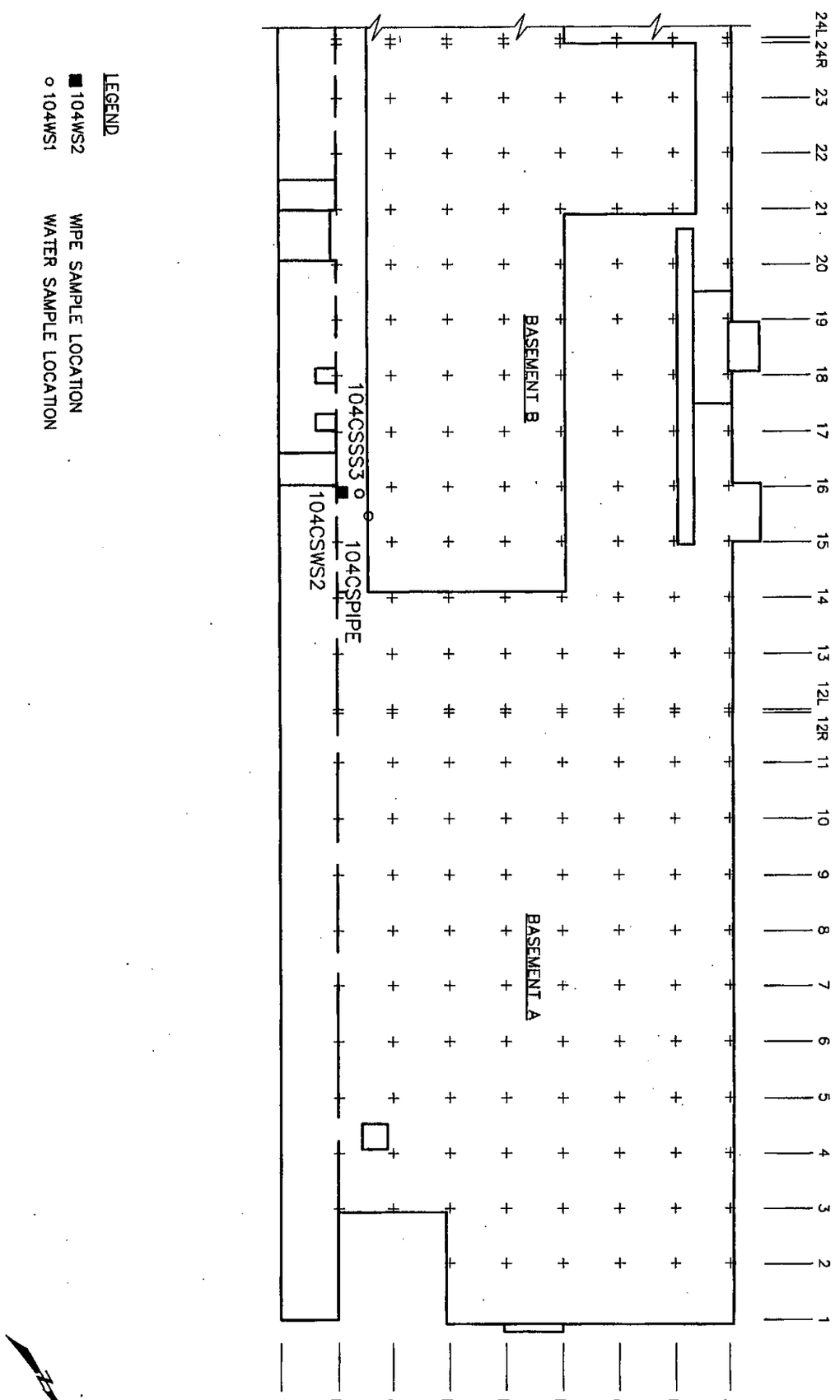
FIGURE 2A
SAMPLE LOCATION MAP

BUILDINGS 104, 104E, & 104F
FORMER ST. LOUIS ORDNANCE PLANT
4300 GOODFELLOW BLVD. ST. LOUIS, MISSOURI
PROJECT NO. 02200070.27 MARCH 2006

SCS ENGINEERS
DSN. BY J. DOMUNG CHK. BY D. BREWER
DWN. BY P. MORRIS REV.

D:\SCS\P2D-DWGS\HAZARDS\02\200070.27\200070.27-04.dwg 1=1 03-07-06

D:\SCS\P2D-DWGS\HAZARDS\02\200070.27\ 200070.27-03B.dwg 1=1 03-08-03



NOT TO SCALE

SCS ENGINEERS DSN. BY B. ENGARD CHK. BY D. BREWER DWN. BY P. MORRIS REV:	BASEMENT BUILDING 104, 104E, & 104F FORMER ST. LOUIS ORDNANCE PLANT 4300 GOODFELLOW BLVD. ST. LOUIS, MISSOURI PROJECT NO. 02200070.27 MARCH 2006	FIGURE 2B SAMPLE LOCATION MAP

APPENDIX C

FIGURE 3: SOIL BORING LOCATION MAP

FIGURE 3
BORING LOCATION MAP

BUILDINGS SERIES 104 AND 106
FORMER ST. LOUIS ORDNANCE PLANT
4300 GOODFELLOW BLVD. ST. LOUIS, MISSOURI
PROJECT NO. 02200070.27 MARCH 2008

SCS ENGINEERS
DSN. BY R. ENGARD CHK. BY D. BREMER
DWN. BY R. PHILLIPS REV:

D:\SCS\P2D-DWGS\HAZARDS\02\200070.27\ 200070.27-030.dwg 1=1 03-08-06

3RD ST
4TH ST
5TH ST
PATTON ST
INDUSTRIAL DRIVE

SB9
SB8
SB7
SB28
SB34
SB22
SB19
SB20
SB21
SB17
SB38
SB37
105-1
105-2
105-3
105-4
105-5

POWDER STORAGE
BLDGS 104G, 104H, 104J
BLDG 104E LOADING
BLDG 104F PRIMER
BLDG 104L
BLDG 104K
BLDG 115 GARAGE
UST
PUMP
104 ANNEX
BLDG 104 PRODUCTION
BLDG 108B SUBSTATION
POWDER STORAGE
BLDGS 105G, 105H, 105J
BLDG 105E LOADING
BLDG 105F PRIMER
BLDG 105L KITCHEN
"J" LOT
"K" LOT
BLDG 105 PRODUCTION
GUARD HOUSE
GATE 5
GATE 4
T C
D C B A

LEGEND

FENCE	
FIRE HYDRANT	FH
SMOKING SHELTER	
FORMER BUILDING LOCATION	
COMPLETED SOIL BORING LOCATION	SB38

APPENDIX D

SUMMARY OF LABORATORY ANALYTICAL RESULTS

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104 SECTIONS A, B, C, AND D
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 1-1 - RESULTS OF WIPE SAMPLE ANALYSIS

SAMPLE NUMBER:		104CSWS1	104CSWS2	104CWS1	104DWS1	SOIL TARGET CONCENTRATIONS SCENARIO A[1]
SAMPLE DATE:		7/23/2003	7/23/2003	7/24/2003	7/24/2003	
LAB ID NUMBER:		219204-15	219204-18	219240-33	219240-32	
PARAMETER (METHOD)	UNITS					
PCBs (8082)						
Aroclor 1260	µg/Wipe	ND	27	ND	2.6	600 µg/Kg
MERCURY (7471A)						
Mercury	µg/Wipe	7200	180	2000	1500	600 µg/Kg
METALS (6010B)						
Aluminum	mg/Wipe	2.7	1.9	11	2.9	NT
Antimony	mg/Wipe	0.0035	ND	0.017	0.004	85 mg/Kg
Arsenic	mg/Wipe	0.0073	0.0017	0.074	0.009	11 mg/Kg
Barium	mg/Wipe	0.33	0.047	0.56	3.3	14,000 mg/Kg
Beryllium	mg/Wipe	ND	ND	0.0004	ND	0.05 mg/Kg
Cadmium	mg/Wipe	0.0031	0.042	0.44	0.035	110 mg/Kg
Calcium	mg/Wipe	140	53	160	60	NT
Chromium	mg/Wipe	0.034	0.0051	0.57	0.062	2,100 mg/Kg
Cobalt	mg/Wipe	0.0039	0.0028	0.049	0.024	NT
Copper	mg/Wipe	92	0.084	2.3	0.41	1,100 mg/Kg
Iron	mg/Wipe	32	3	430	80	NT
Lead	mg/Wipe	2.5	0.07	100	2	260 mg/Kg
Magnesium	mg/Wipe	8.2	12	8.7	3	NT
Manganese	mg/Wipe	0.27	0.43	2.9	0.5	3,700 mg/Kg
Nickel	mg/Wipe	0.026	0.26	0.39	0.049	4,600 mg/Kg
Potassium	mg/Wipe	0.88	1	22	1.3	NT
Selenium	mg/Wipe	0.0029	ND	0.012	ND	300 mg/Kg
Silver	mg/Wipe	0.0043	ND	0.0044	0.0014	140 mg/Kg
Sodium	mg/Wipe	12	6.1	48	3.5	NT
Thallium	mg/Wipe	ND	ND	0.0085	ND	17 mg/Kg
Vanadium	mg/Wipe	0.011	0.0051	0.067	0.013	1,500 mg/Kg
Zinc	mg/Wipe	39	11	6.8	3.8	38,000 mg/Kg

µg/Wipe = micrograms per wipe
mg/Wipe = milligrams per wipe
NT = No Target Concentration
µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
ND = Not Detected above laboratory quantitative limits
[1]Target Concentration based on the CALM STARC Scenario A, as directed by personel in the Federal Facility Section of MDNR

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104E
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 1-2 - RESULTS OF WIPE SAMPLE ANALYSIS

SAMPLE NUMBER:		104ECSWS1	104ECSWS2	104EWS1	104EWS2	SOIL TARGET CONCENTRATIONS
SAMPLE DATE:		7/24/2003	7/24/2003	7/24/2003	7/24/2003	SCENARIO A[1]
LAB ID NUMBER:		219240-5	219240-7	219240-34	219240-35	
PARAMETER (METHOD)	UNITS					
PCBs (8082)						
Aroclor 1260	µg/Wipe	0.57	1.3	ND	ND	600 µg/Kg
MERCURY (7471A)						
Mercury	µg/Wipe	14	410	280	2900	600 µg/Kg
METALS (6010B)						
Aluminum	mg/Wipe	3.7	1.9	4.5	10	NT
Antimony	mg/Wipe	ND	ND	0.0057	0.0047	85 mg/Kg
Arsenic	mg/Wipe	0.0024	ND	0.056	0.0092	11 mg/Kg
Barium	mg/Wipe	0.045	0.028	0.65	2.2	140,00 mg/Kg
Cadmium	mg/Wipe	0.0012	0.0003	0.33	0.026	110 mg/Kg
Calcium	mg/Wipe	61	44	46	140	NT
Chromium	mg/Wipe	0.008	0.004	0.074	0.081	2,100 mg/Kg
Cobalt	mg/Wipe	0.0015	0.0008	0.02	0.065	NT
Copper	mg/Wipe	0.011	0.0043	0.12	0.63	1,100 mg/Kg
Iron	mg/Wipe	4.3	2.3	190	25	NT
Lead	mg/Wipe	0.15	0.11	130	2	260 mg/Kg
Magnesium	mg/Wipe	2.1	0.6	3.7	10	NT
Manganese	mg/Wipe	0.078	0.046	4.8	0.44	3,700 mg/Kg
Nickel	mg/Wipe	0.0056	0.0025	0.037	0.045	4,800 mg/Kg
Potassium	mg/Wipe	4.7	0.78	11	4.8	NT
Selenium	mg/Wipe	ND	ND	0.016	0.0027	300 mg/Kg
Silver	mg/Wipe	ND	ND	0.0021	0.016	140 mg/Kg
Sodium	mg/Wipe	2.2	0.65	12	6.9	NT
Thallium	mg/Wipe	ND	ND	0.0037	ND	17 mg/Kg
Vanadium	mg/Wipe	0.0058	0.0031	0.035	0.028	1,500 mg/Kg
Zinc	mg/Wipe	0.092	0.047	5.4	5.1	38,000 mg/Kg

µg/Wipe = micrograms per wipe
mg/Wipe = milligrams per wipe
NT = No Target Concentration
µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
ND = Not Detected above laboratory quantitative limits
[1]Target Concentration based on the CALM STARC Scenario A, as directed by personel in the Federal Facility Section of MDNR

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104F
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 1-3 - RESULTS OF WIPE SAMPLE ANALYSIS

SAMPLE NUMBER: SAMPLE DATE: LAB ID NUMBER:		104FCSWS 7/24/2003 219240-2	SOIL TARGET CONCENTRATIONS SCENARIO A[1]
PARAMETER (METHOD)	UNITS		
MERCURY (7471A)			
Mercury	µg/Wipe	97	600 µg/Kg
METALS (6010B)			
Aluminum	mg/Wipe	8.5	NT
Barium	mg/Wipe	0.087	14,000 mg/Kg
Calcium	mg/Wipe	300	NT
Chromium	mg/Wipe	0.02	2,100 mg/Kg
Cobalt	mg/Wipe	0.0035	NT
Copper	mg/Wipe	0.021	1,100 mg/Kg
Iron	mg/Wipe	12	NT
Lead	mg/Wipe	0.2	260 mg/Kg
Magnesium	mg/Wipe	4.8	NT
Manganese	mg/Wipe	0.22	3,700 mg/Kg
Nickel	mg/Wipe	0.011	4,800 mg/Kg
Potassium	mg/Wipe	11	NT
Sodium	mg/Wipe	5.7	NT
Vanadium	mg/Wipe	0.021	1,500 mg/Kg
Zinc	mg/Wipe	0.085	38,000 mg/Kg

µg/Wipe = micrograms per wipe
mg/Wipe = milligrams per wipe
µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
ND = Not Detected above laboratory quantitative limits
[1]Target Concentration based on the CALM STARC Scenario A, as directed by personel in the Federal Facility Section of MDNR

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104 SECTIONS A, B, C, AND D
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 2-1 - RESULTS OF SHALLOW SOIL & SEDIMENT SAMPLE ANALYSIS

SAMPLE NUMBER:		104CSSS1	104CSS52	104CSSS3	104CSPIPE	104RRTRACK SUBGRD	SOIL TARGET CONCENTRATIONS SCENARIO A
SAMPLE DATE:		7/23/2003	7/23/2003	7/23/2003	7/23/2003	12/19/2003	
LAB ID NUMBER:		219204-16	219204-17	219204-20	219204-18	223259-2	
SAMPLE DEPTH:		0" to 6"	0" to 6"	0" to 6"	(Pipe Sediment)	18" to 24"	
PARAMETER (METHOD)	UNITS						
PCBs (8082)							
Aroclor 1260	µg/Kg	ND	ND	21	100	ND	500 µg/Kg
PHOSPHOROUS (4500PE)							
Total Phosphorous	mg/Kg	380	69	180	51	NA	NT
MERCURY (7471A)							
Mercury	mg/Kg	0.53	0.68	0.28	0.023	0.029	0.6 mg/Kg
METALS (6010B)							
Aluminum	mg/Kg	11000	13000	1600	63	15000	NT
Arsenic	mg/Kg	6.3	7.2	1.4	2.5	8.3	11 mg/Kg
Barium	mg/Kg	130	160	30	18	140	14,000 mg/Kg
Beryllium	mg/Kg	0.36	0.61	ND	ND	0.21	0.05 mg/Kg
Cadmium	mg/Kg	0.59	2.6	1.5	0.8	ND	110 mg/Kg
Calcium	mg/Kg	30000	15000	220000	220000	2300	NT
Chromium	mg/Kg	17	35	11	3	19	2,100 mg/Kg
Cobalt	mg/Kg	11	11	1.3	0.29	11	NT
Copper	mg/Kg	1400	5300	14000	29000	15	1,100 mg/Kg
Iron	mg/Kg	17000	47000	4300	39000	20000	NT
Lead	mg/Kg	44	320	570	17	16	260 mg/Kg
Magnesium	mg/Kg	3100	5000	2500	1100	2900	NT
Manganese	mg/Kg	500	470	77	53	730	3,700 mg/Kg
Nickel	mg/Kg	16	37	8.8	4.8	17	4,800 mg/Kg
Potassium	mg/Kg	1100	800	1100	2500	1600	NT
Selenium	mg/Kg	ND	1.4	0.42	0.77	0.87	300 mg/Kg
Silver	mg/Kg	ND	1.5	0.53	0.86	ND	140 mg/Kg
Sodium	mg/Kg	660	1500	4000	7300	420	NT
Thallium	mg/Kg	0.78	1.4	ND	ND	ND	17 mg/Kg
Vanadium	mg/Kg	26	32	5.1	1.3	38	1,500 mg/Kg
Zinc	mg/Kg	570	2500	5200	12000	48	38,000 mg/Kg
SEMI-VOLATILE ORGANICS (8270C)							
Phenanthrene	µg/Kg	NA	NA	NA	NA	9	NT
Flouranthene	µg/Kg	NA	NA	NA	NA	15	1,600,000 µg/Kg
Pyrene	µg/Kg	NA	NA	NA	NA	15	2,100,000 µg/Kg
Benzo(a)anthracene	µg/Kg	NA	NA	NA	NA	9.1	1,000 µg/Kg
Chrysene	µg/Kg	NA	NA	NA	NA	12	36,000 µg/Kg
Bis(2-ethylhexyl) phthalate	µg/Kg	NA	NA	NA	NA	17	410,000 µg/Kg
Benzo(b)flouranthene	µg/Kg	NA	NA	NA	NA	13	900 µg/Kg
Benzo(k)flouranthene	µg/Kg	NA	NA	NA	NA	6.9	8,000 µg/Kg
Benzo(a)pyrene	µg/Kg	NA	NA	NA	NA	10	200 µg/Kg
Ideno(1,2,3-cd)pyrene	µg/Kg	NA	NA	NA	NA	26	3,000 µg/Kg
Dibenzo(a,h)anthracene	µg/Kg	NA	NA	NA	NA	33	200 µg/Kg
Benzo(ghi)perylene	µg/Kg	NA	NA	NA	NA	11	NT

µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
NA = Not Analyzed

Underlined Sample Numbers represent sediment samples.

ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104E
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 2-2 - RESULTS OF SHALLOW SOIL SAMPLE ANALYSIS

SAMPLE NUMBER: / SAMPLE DATE: / LAB ID NUMBER: / SAMPLE DEPTH:		104ECSSS1 7/24/2003 219240-4 0" to 6"	104ECSSS2 7/24/2003 219240-5 0" to 6"	SOIL TARGET CONCENTRATIONS SCENARIO A
PARAMETER (METHOD)	UNITS			
PCBs (8082)				
Aroclor 1260	µg/Kg	ND	22	600 µg/Kg
PHOSPHOROUS (4500PE)				
Total Phosphorous	mg/Kg	99	330	NT
MERCURY (7471A)				
Mercury	mg/Kg	0.011	0.044	0.6 mg/Kg
METALS (6010B)				
Aluminum	mg/Kg	9400	8800	NT
Arsenic	mg/Kg	7.3	3.7	11 mg/Kg
Barium	mg/Kg	89	91	14,000 mg/Kg
Beryllium	mg/Kg	1.5	0.45	0.05 mg/Kg
Calcium	mg/Kg	3600	2500	NT
Chromium	mg/Kg	13	16	2,100 mg/Kg
Cobalt	mg/Kg	11	6.9	NT
Copper	mg/Kg	11	11	1,100 mg/Kg
Iron	mg/Kg	16000	13000	NT
Lead	mg/Kg	13	12	260 mg/Kg
Magnesium	mg/Kg	2200	2500	NT
Manganese	mg/Kg	230	360	3,700 mg/Kg
Nickel	mg/Kg	21	11	4,800 mg/Kg
Potassium	mg/Kg	480	520	NT
Sodium	mg/Kg	690	1400	NT
Vanadium	mg/Kg	29	25	1,500 mg/Kg
Zinc	mg/Kg	23	31	38,000 mg/Kg

µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
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TABLE 2-3 - RESULTS OF SHALLOW SOIL & SEDIMENT SAMPLE ANALYSIS

SAMPLE NUMBER:		104FCSSS1	104FCSSS2	SOIL TARGET CONCENTRATIONS SCENARIO A
SAMPLE DATE:		7/24/2003	7/24/2003	
LAB ID NUMBER:		219240-1	219240-3	
SAMPLE DEPTH:		0" to 6"	0" to 6"	
PARAMETER (METHOD)	UNITS			
CYANIDE (9014/9010B)				
Total Cyanide	mg/Kg	0.43	0.28	5480 mg/Kg
PHOSPHOROUS (4500PE)				
Total Phosphorous	mg/Kg	180	40	NT
MERCURY (7471A)				
Mercury	mg/Kg	0.046	0.027	0.6 mg/Kg
METALS (6010B)				
Aluminum	mg/Kg	11000	12000	NT
Arsenic	mg/Kg	5	5	11 mg/Kg
Barium	mg/Kg	120	91	14,000 mg/Kg
Beryllium	mg/Kg	0.64	0.98	0.05 mg/Kg
Cadmium	mg/Kg	0.37	ND	110 mg/Kg
Calcium	mg/Kg	9400	9100	NT
Chromium	mg/Kg	18	17	2,100 mg/Kg
Cobalt	mg/Kg	8.5	7.8	NT
Copper	mg/Kg	33	15	1,100 mg/Kg
Iron	mg/Kg	15000	14000	NT
Lead	mg/Kg	35	60	260 mg/Kg
Magnesium	mg/Kg	3300	3400	NT
Manganese	mg/Kg	270	210	3,700 mg/Kg
Nickel	mg/Kg	12	17	4,800 mg/Kg
Potassium	mg/Kg	670	650	NT
Sodium	mg/Kg	450	580	NT
Vanadium	mg/Kg	33	25	1,500 mg/Kg
Zinc	mg/Kg	50	29	36,000 mg/Kg

µg/Kg = micrograms per kilogram
mg/Kg = miligrams per kilogram
NT = No Target Concentration

Underlined Sample Numbers represent sediment sample

ND = Not Detected above laboratory quantitative limits

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TABLE 3-1 - RESULTS OF SUBSURFACE SOIL SAMPLE ANALYSIS

SAMPLE NUMBER:		101-1	101-2	101-3	101-4	105-1	105-2	105-3	105-4	105-5	SB1-SB4	SB5	SB6	SB7	SB8-SB9	SB10	SOIL TARGET CONCENTRATIONS SCENARIO A
SAMPLE DATE:		9/10/2002	9/10/2002	9/10/2002	9/10/2002	9/10/2002	9/10/2002	9/10/2002	9/10/2002	9/10/2002	12/15/2003	12/15/2003	12/16/2003	12/16/2003	12/16/2003	12/16/2003	
LAB ID NUMBER:		211927-6	211927-7	211927-8	211927-9	211927-5	211927-2	211927-3	211927-4	211927-5	223146-1	223146-2	223146-3	223146-4	223146-5	223146-6	
PARAMETER (METHOD)	UNITS																
PCBs (8082)																	
Aroclor 1260	µg/Kg	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	600 µg/Kg
TPH (8015B MDRO)																	
Diesel Range Organics	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	NA	NA	NA	NA	NA	200 mg/Kg
THP (8015B MGRO)																	
Gasoline Range Organics	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 mg/Kg
PHOSPHOROUS (4500PE)																	
Total Phosphorous	mg/Kg	NA	NA	NA	NA	510	600	430	520	510	NA	NA	NA	NA	NA	NA	NT
MERCURY (7471A)																	
Mercury	mg/Kg	0.053	0.038	0.038	0.089	0.022	0.022	0.029	0.073	0.039	0.011	0.056	0.029	0.0089	0.019	0.024	0.6 mg/Kg
METALS (6010B)																	
Aluminum	mg/Kg	13000	13000	9900	12000	9900	9700	12000	11000	12000	770	9700	10000	12000	10000	11000	NT
Arsenic	mg/Kg	9.1	8.5	10	8.5	5.7	3.9	5.8	4.3	5.2	0.81	3.6	5	3	5	3.8	11 mg/Kg
Barium	mg/Kg	150	140	130	160	140	93	110	120	210	20	78	72	78	93	44	14,000 mg/Kg
Beryllium	mg/Kg	0.43	0.44	0.51	0.44	0.28	0.33	0.38	0.36	0.4	0.047	0.72	0.78	1.2	0.76	0.67	0.05 mg/Kg
Cadmium	mg/Kg	0.19	0.2	0.33	0.47	0.16	ND	0.071	ND	ND	0.24	ND	ND	ND	0.1	ND	110 mg/Kg
Calcium	mg/Kg	3200	4800	11000	4000	27000	3800	24000	4100	6900	370000	2100	3400	3400	23000	2200	NT
Chromium	mg/Kg	18	19	21	24	18	18	18	22	19	6.5	15	17	14	18	16	2,100 mg/Kg
Cobalt	mg/Kg	9.2	8.3	6.9	7.6	6.1	4.5	6.5	5.2	5.9	0.49	2.8	3.3	2.1	6.8	4.1	NT
Copper	mg/Kg	18	17	16	22	13	11	13	13	16	0.7	9.3	13	9.2	12	9.5	1,100 mg/Kg
Iron	mg/Kg	18000	18000	17000	18000	14000	14000	15000	15000	20000	1200	11000	15000	12000	15000	12000	NT
Lead	mg/Kg	31	25	25	66	19	15	14	13	22	ND	7.3	11	7	48	7	260 mg/Kg
Magnesium	mg/Kg	2600	2900	4200	2400	3300	2700	2700	2700	2700	5100	1800	2000	2100	6300	1700	NT
Manganese	mg/Kg	800	750	530	600	360	200	420	210	730	46	100	180	220	450	170	3,700 mg/Kg
Nickel	mg/Kg	19	19	15	18	14	13	15	14	20	4.2	9.7	10	13	12	9.3	4,800 mg/Kg
Potassium	mg/Kg	1400	1300	1100	1600	1200	660	1100	1100	950	490	400	470	400	840	390	NT
Selenium	mg/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1	ND	ND	ND	ND	ND	390 mg/Kg
Sodium	mg/Kg	230	840	630	200	760	380	760	360	320	310	ND	600	ND	1000	120	NT
Thallium	mg/Kg	ND	ND	ND	ND	ND	ND	ND	0.56	ND	0.93	ND	ND	ND	ND	ND	17 mg/Kg
Vanadium	mg/Kg	32	31	35	31	30	28	31	30	26	2.9	17	34	20	26	26	1,500 mg/Kg
Zinc	mg/Kg	64	56	54	87	56	38	42	43	47	9.1	22	34	17	35	24	38,000 mg/Kg
SEMI-VOLATILE ORGANICS (8270C)																	
Acenaphthene	µg/Kg	NA	NA	NA	NA	75	ND	870	ND	150	NA	NA	NA	NA	NA	NA	1,700,000 µg/Kg
Dibenzofuran	µg/Kg	NA	NA	NA	NA	ND	ND	390	ND	79	NA	NA	NA	NA	NA	NA	110,000 µg/Kg
Flourene	µg/Kg	NA	NA	NA	NA	ND	ND	1000	ND	200	NA	NA	NA	NA	NA	NA	1,100,000 µg/Kg
Phenanthrene	µg/Kg	NA	NA	NA	NA	1000	ND	11000	200	1700	NA	NA	NA	NA	NA	NA	NT
Anthracene	µg/Kg	NA	NA	NA	NA	160	ND	1800	ND	330	NA	NA	NA	NA	NA	NA	8,500,000 µg/Kg
Carbazole	µg/Kg	NA	NA	NA	NA	140	ND	990	ND	160	NA	NA	NA	NA	NA	NA	82,000 µg/Kg
Flouranthene	µg/Kg	NA	NA	NA	NA	1400	ND	14000	370	1900	NA	NA	NA	NA	NA	NA	1,600,000 µg/Kg
Pyrene	µg/Kg	NA	NA	NA	NA	1300	ND	11000	270	1700	NA	NA	NA	NA	NA	NA	2,100,000 µg/Kg
Benzo(a)anthracene	µg/Kg	NA	NA	NA	NA	530	ND	4400	130	770	NA	NA	NA	NA	NA	NA	1,000 µg/Kg
Chrysene	µg/Kg	NA	NA	NA	NA	700	ND	5300	180	900	NA	NA	NA	NA	NA	NA	36,000 µg/Kg
Bis(2-ethylhexyl) phthalate	µg/Kg	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	410,000 µg/Kg
Benzo(b)flouranthene	µg/Kg	NA	NA	NA	NA	580	ND	4800	150	710	NA	NA	NA	NA	NA	NA	900 µg/Kg
Benzo(k)flouranthene	µg/Kg	NA	NA	NA	NA	520	ND	3500	ND	640	NA	NA	NA	NA	NA	NA	8,000 µg/Kg
Benzo(a)pyrene	µg/Kg	NA	NA	NA	NA	520	ND	3700	130	670	NA	NA	NA	NA	NA	NA	200 µg/Kg
Indeno(1,2,3-cd)pyrene	µg/Kg	NA	NA	NA	NA	350	ND	2400	ND	470	NA	NA	NA	NA	NA	NA	3,000 µg/Kg
Dibenzo(a,h)anthracene	µg/Kg	NA	NA	NA	NA	160	ND	1100	ND	ND	NA	NA	NA	NA	NA	NA	200 µg/Kg
Benzo(ghi)perylene	µg/Kg	NA	NA	NA	NA	400	ND	2600	ND	530	NA	NA	NA	NA	NA	NA	NT
VOLATILE ORGANICS (8260B)																	
Acetone	µg/Kg	NA	NA	NA	NA	7.1	100	ND	6.8	13	NA	15	NA	NA	NA	NA	2,700,000 µg/Kg
2-Butanone	µg/Kg	NA	NA	NA	NA	ND	10	ND	ND	ND	NA	ND	NA	NA	NA	NA	NT
Toluene	µg/Kg	NA	NA	NA	NA	ND	9.1	ND	ND	ND	NA	ND	NA	NA	NA	NA	650,000 µg/Kg
1,1,2,2-Tetrachloroethane	µg/Kg	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	2,000 µg/Kg
1,2,4-Trimethylbenzene	µg/Kg	NA	NA	NA	NA	ND	3.4	ND	ND	ND	NA	ND	NA	NA	NA	NA	100,000 µg/Kg
p-Isopropyltoluene	µg/Kg	NA	NA	NA	NA	ND	46	ND	ND	ND	NA	ND	NA	NA	NA	NA	NT

µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
NA = Not Analyzed

ND = Not Detected above laboratory quantitative limits

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TABLE 3-1 (continued) - RESULTS OF SUBSURFACE SOIL SAMPLE ANALYSIS

SAMPLE NUMBER:		SB11	SB12	SB13-SB14	SB15-SB16	SB17	SB18	SB19	SB20	SB21	SB22	SB23	SB24	SB25	SB26	SB27	SOIL
SAMPLE DATE:		12/16/2003	12/16/2003	12/16/2003	12/16/2003	12/16/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	TARGET
LAB ID NUMBER:		223146-7	223146-8	223146-9	223146-10	223146-11	223218-1	223218-2	223218-3	223218-4	223218-5	223218-6	223218-7	223218-8	223218-9	223218-10	CONCENTRATIONS
PARAMETER (METHOD)	UNITS																SCENARIO A
PCBs (8082)																	
Aroclor 1260	µg/Kg	NA	ND	NA	NA	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	600 µg/Kg
TPH (8015B MDRO)																	
Diesel Range Organics	mg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	200 mg/Kg
THP (8015B MGRO)																	
Gasoline Range Organics	mg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 mg/Kg
PHOSPHOROUS (4500PE)																	
Total Phosphorous	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
MERCURY (7471A)																	
Mercury	mg/Kg	0.0047	0.021	0.025	0.026	NA	0.032	0.035	0.035	ND	580	0.065	0.046	0.061	0.0062	0.038	0.6 mg/Kg
METALS (6010B)																	
Aluminum	mg/Kg	6400	11000	10000	7800	NA	14000	15000	14000	610	11000	14000	12000	16000	9100	13000	NT
Arsenic	mg/Kg	3.7	5.4	5.5	5.4	NA	5.5	4.4	9.2	ND	7.6	4.7	7.1	5.2	3	3.2	11 mg/Kg
Barium	mg/Kg	59	100	87	64	NA	100	240	170	7.8	150	130	160	370	160	87	14,000 mg/Kg
Beryllium	mg/Kg	0.53	0.76	0.69	0.5	NA	0.86	0.71	0.97	0.051	0.69	0.98	0.99	2	1.7	0.69	0.05 mg/Kg
Cadmium	mg/Kg	ND	ND	ND	ND	NA	ND	ND	ND	0.17	0.32	ND	ND	ND	ND	ND	110 mg/Kg
Calcium	mg/Kg	23000	45000	3800	12000	NA	1800	2600	7900	360000	45000	5000	15000	3400	3200	2400	NT
Chromium	mg/Kg	16	16	16	12	NA	21	24	19	5.6	44	22	20	16	19	18	2,100 mg/Kg
Cobalt	mg/Kg	4	12	6	3.7	NA	5.1	7.4	8.5	0.48	5.5	7.0	9.2	44	5.5	5.1	NT
Copper	mg/Kg	8.4	12	10	6.6	NA	12	15	18	ND	54	11	21	9.2	6.4	8.7	1,100 mg/Kg
Iron	mg/Kg	9100	14000	14000	13000	NA	17000	18000	21000	1400	21000	16000	21000	21000	20000	13000	NT
Lead	mg/Kg	19	44	11	13	NA	7.3	8	13	ND	140	18	41	19	7.5	8.8	260 mg/Kg
Magnesium	mg/Kg	1700	2700	2100	2100	NA	2500	3100	3200	9300	9300	2300	2300	2400	1800	1700	NT
Manganese	mg/Kg	210	580	390	220	NA	260	1100	760	180	320	360	730	1700	260	140	3,700 mg/Kg
Nickel	mg/Kg	9.1	14	12	9.9	NA	14	21	23	3.2	14	16	20	34	27	9.1	4,800 mg/Kg
Potassium	mg/Kg	550	580	500	450	NA	800	1300	1200	380	1500	730	1400	720	460	480	NT
Selenium	mg/Kg	ND	ND	ND	ND	NA	ND	ND	0.48	ND	0.48	ND	ND	ND	ND	ND	300 mg/Kg
Sodium	mg/Kg	390	110	540	370	NA	220	430	690	270	1300	160	160	140	ND	290	NT
Thallium	mg/Kg	ND	ND	ND	ND	NA	ND	ND	ND	0.87	ND	ND	ND	ND	ND	ND	17 mg/Kg
Vanadium	mg/Kg	17	26	26	25	NA	32	27	37	3.1	26	30	33	32	25	24	1,500 mg/Kg
Zinc	mg/Kg	30	37	47	21	NA	34	52	54	5.8	110	40	46	28	18	20	38,000 mg/Kg
SEMI-VOLATILE ORGANICS (8270C)																	
Acenaphthene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,700,000 µg/Kg
Dibenzofuran	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	110,000 µg/Kg
Flourene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,100,000 µg/Kg
Phenanthrene	µg/Kg	NA	NA	NA	NA	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
Anthracene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,500,000 µg/Kg
Carbazole	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82,000 µg/Kg
Flouranthene	µg/Kg	NA	NA	NA	NA	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,600,000 µg/Kg
Pyrene	µg/Kg	NA	NA	NA	NA	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,100,000 µg/Kg
Benzo(a)anthracene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000 µg/Kg
Chrysene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	36,000 µg/Kg
Bis(2-ethylhexyl) phthalate	µg/Kg	NA	NA	NA	NA	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	410,000 µg/Kg
Benzo(b)flouranthene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	900 µg/Kg
Benzo(k)flouranthene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,000 µg/Kg
Benzo(a)pyrene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 µg/Kg
Indeno(1,2,3-cd)pyrene	µg/Kg	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,000 µg/Kg
Dibenzo(a,h)anthracene	µg/Kg	NA	NA	NA	NA	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 µg/Kg
Benzo(ghi)perylene	µg/Kg	NA	NA	NA	NA	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
VOLATILE ORGANICS (8260B)																	
Acetone	µg/Kg	NA	ND	NA	NA	9	NA	NA	130	NA	NA	NA	ND	NA	NA	NA	2,700,000 µg/Kg
2-Butanone	µg/Kg	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NT
Toluene	µg/Kg	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	650,000 µg/Kg
1,1,2,2-Tetrachloroethane	µg/Kg	NA	ND	NA	NA	ND	NA	NA	41	NA	NA	NA	ND	NA	NA	NA	2,000 µg/Kg
1,2,4-Trimethylbenzene	µg/Kg	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	100,000 µg/Kg
p-Isopropyltoluene	µg/Kg	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NT

µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
NA = Not Analyzed

ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - SOIL BORINGS
ST. LOUIS, MISSOURI
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TABLE 3-1 (continued) - RESULTS OF SUBSURFACE SOIL SAMPLE ANALYSIS

SAMPLE NUMBER:		SB28	SB29	SB30	SB31	SB32	SB33	SB34	SB35	SB36	SB37	SB38	SB39	SB40	SB41	SOIL TARGET CONCENTRATIONS SCENARIO A
SAMPLE DATE:		12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/17/2003	12/19/2003	
LAB ID NUMBER:		223218-11	223218-12	223218-13	223218-14	223218-15	223218-16	223218-17	223218-18	223218-19	223218-20	223218-21	223218-22	223218-23	223259-1	
PARAMETER (METHOD)	UNITS															
PCBs (8082)																
Aroclor 1260	µg/Kg	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	3900	1000	ND	600 µg/Kg
TPH (8015D MDRO)																
Diesel Range Organics	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	3.2	5.1	4.8	27	17	26	200 mg/Kg
THP (8015D MGRO)																
Gasoline Range Organics	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13	200 mg/Kg
PHOSPHORUS (4500PE)																
Total Phosphorous	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
MERCURY (7471A)																
Mercury	mg/Kg	0.025	0.038	0.029	0.033	0.0068	0.011	0.024	0.016	0.048	NA	NA	NA	NA	0.025	0.6 mg/Kg
METALS (6010B)																
Aluminum	mg/Kg	4800	19000	15000	12000	17000	14000	11000	16000	12000	NA	NA	NA	NA	11000	NT
Arsenic	mg/Kg	3.4	3.1	7.1	4.3	2.8	5.7	7.2	4.4	4.9	NA	NA	NA	NA	6.4	11 mg/Kg
Barium	mg/Kg	58	74	62	57	110	140	150	40	60	NA	NA	NA	NA	150	14,000 mg/Kg
Beryllium	mg/Kg	0.42	0.91	0.88	0.66	0.77	2	0.88	0.76	0.84	NA	NA	NA	NA	0.93	0.05 mg/Kg
Cadmium	mg/Kg	ND	ND	ND	ND	ND	0.23	0.18	ND	ND	NA	NA	NA	NA	ND	110 mg/Kg
Calcium	mg/Kg	17000	3300	2600	1600	2700	2400	8300	2400	1800	NA	NA	NA	NA	8000	NT
Chromium	mg/Kg	9.7	23	21	16	17	26	19	22	17	NA	NA	NA	NA	21	2,100 mg/Kg
Cobalt	mg/Kg	4.3	4	2.5	4.1	20	53	7.6	3.5	4.7	NA	NA	NA	NA	11	NT
Copper	mg/Kg	9.1	9.8	11	8.6	12	74	33	8.6	9.7	NA	NA	NA	NA	14	1,100 mg/Kg
Iron	mg/Kg	8700	15000	20000	15000	13000	65000	17000	17000	16000	NA	NA	NA	NA	20000	NT
Lead	mg/Kg	14	8.3	7.3	13	10	8.5	110	6.7	9.7	NA	NA	NA	NA	18	260 mg/Kg
Magnesium	mg/Kg	3800	2700	2200	1300	1900	4300	3400	1900	1600	NA	NA	NA	NA	2200	NT
Manganese	mg/Kg	240	61	57	100	650	330	900	86	170	NA	NA	NA	NA	610	3,700 mg/Kg
Nickel	mg/Kg	11	17	14	7.9	9.4	88	19	10	10	NA	NA	NA	NA	17	4,800 mg/Kg
Potassium	mg/Kg	510	700	560	470	700	1300	1200	540	480	NA	NA	NA	NA	590	NT
Selenium	mg/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	300 mg/Kg
Sodium	mg/Kg	260	150	180	150	230	ND	210	420	340	NA	NA	NA	NA	120	NT
Thallium	mg/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	17 mg/Kg
Vanadium	mg/Kg	13	24	34	34	26	48	32	29	31	NA	NA	NA	NA	39	1,500 mg/Kg
Zinc	mg/Kg	30	27	27	17	23	150	73	21	23	NA	NA	NA	NA	36	38,000 mg/Kg
SEMI-VOLATILE ORGANICS (8270C)																
Acenaphthene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,700,000 µg/Kg
Dibenzofuran	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	110,000 µg/Kg
Flourene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,100,000 µg/Kg
Phenanthrene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
Anthracene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,500,000 µg/Kg
Carbazole	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82,000 µg/Kg
Flouranthene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,600,000 µg/Kg
Pyrene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,100,000 µg/Kg
Benzo(a)anthracene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000 µg/Kg
Chrysene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	36,000 µg/Kg
Bis(2-ethylhexyl) phthalate	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	410,000 µg/Kg
Benzo(b)flouranthene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	900 µg/Kg
Benzo(k)flouranthene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,000 µg/Kg
Benzo(a)pyrene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 µg/Kg
Indeno(1,2,3-cd)pyrene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,000 µg/Kg
Dibenzo(a,h)anthracene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200 µg/Kg
Benzo(ghi)perylene	µg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NT
VOLATILE ORGANICS (8260B)																
Acetone	µg/Kg	NA	NA	NA	NA	NA	NA	9.8	10	NA	NA	NA	NA	NA	NA	2,700,000 µg/Kg
2-Butanone	µg/Kg	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NT
Toluene	µg/Kg	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	650,000 µg/Kg
1,1,2,2-Tetrachloroethane	µg/Kg	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	2,000 µg/Kg
1,2,4-Trimethylbenzene	µg/Kg	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	100,000 µg/Kg
p-Isopropyltoluene	µg/Kg	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NT

µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
NT = No Target Concentration
NA = Not Analyzed
ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDINGS 104F
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 4-1 - RESULTS OF SUMP WATER SAMPLE ANALYSIS

	SAMPLE NUMBER:	TW-2	GROUNDWATER
	SAMPLE DATE:	12/18/2003	TARGET
	LAB ID NUMBER:	223220-3	CONCENTRATIONS
PARAMETER (METHOD)	UNITS		
METALS (6010B)			
Aluminum	mg/L	0.044	NT
Barium	mg/L	0.31	2.0 mg/L
Cadmium	mg/L	0.00051	0.005 mg/L
Calcium	mg/L	190	NT
Copper	mg/L	0.0036	1.3 mg/L
Iron	mg/L	0.048	NT
Magnesium	mg/L	47	NT
Manganese	mg/L	0.085	0.05 mg/L
Nickel	mg/L	0.0022	0.1 mg/L
Potassium	mg/L	7.7	NT
Selenium	mg/L	0.0078	0.05 mg/L
Sodium	mg/L	380	NT
Zinc	mg/L	0.032	2 mg/L

mg/L = milligrams per liter
NT = No Target Concentration
ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - AIR MONITORING
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 5-1 - RESULTS OF AIR MONITORING

SAMPLE NUMBER	LAB ID NUMBER	SAMPLE DATE	SAMPLE DURATION (minutes)	SAMPLE VOLUME (liters)	QUANTITY DETECTED (µg)	EXPOSURE (mg/m^3)	OSHA PEL[1] (mg/m^3)
PARAMETER (METHOD)							
PARTICULATE MERCURY, ABIENT (OSHA METHOD 145)							
104D	2003028259	9/4/2003	400	800	ND	<0.00003	0.01
104C	2003028260	9/4/2003	394	788	ND	<0.00003	0.01
104T	2003028261	9/4/2003	130	234	ND	<0.00003	0.01
MERCURY (OSHA METHOD 140)							
104C	2003028253	9/4/2003	395	5.89	ND	<0.0017	0.05
104T	2003028255	9/4/2003	339	5.05	ND	<0.0020	0.05
104D	2003028256	9/4/2003	398	5.93	ND	<0.0017	0.05

[1]Occupational Safty and Health Administration (OSHA) Permissible Exposure Limits (PEL).
µg = micrograms
mg/m^3 = milligrams per cubic meter
ND = Not Detected above laboratory quantitative limits

FORMER SAINT LOUIS ORDNANCE PLANT
4300 GOODFELLOW - BUILDING 104E
ST. LOUIS, MISSOURI
U.S. GENERAL SERVICES ADMINISTRAITON

TABLE 5-1 - RESULTS OF SOLID SAMPLE ANALYSIS

SAMPLE NUMBER: SAMPLE DATE: LAB ID NUMBER:		104EPAINT 7/24/2003 219240-35	104EPAINT 7/24/200. 220008-1	SOIL TARGET CONCENTRATIONS SCENARIO A
PARAMETER (METHOD)	UNITS			
MERCURY (7471A) Mercury	mg/Kg	NA	2.3	0.6 mg/Kg
METALS (6010B) Lead	mg/Kg	380	NA	260 mg/Kg

mg/Kg = milligrams per kilogram
NA = Not Analyzed