ASSEMBLY E
VOLUNTARY CORRECTIVE ACTION WORK PLAN
RCRA FACILITY INVESTIGATION
NAVAL SUPPORT ACTIVITY MEMPHIS

DEMOLITION AND SOIL EXCAVATION
SWMU 59 — OLD PESTICIDE SHOP

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North Charleston, South Carolina

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The Contractor, EnSafe Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0318 is complete, accurate, and complies with all requirements of the contract.

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1.0 INTRODUCTION

As part of the U.S. Navy Installation Restoration Program, the following Voluntary Corrective Action Work Plan has been prepared by EnSafe/Allen & Hoshall (E/A&H) for the demolition of the Old Pesticide Shop, Building S-335 (Solid Waste Management Unit [SWMU] 59), and the excavation and disposal of surrounding pesticide-contaminated soil. SWMU 59 is on the Southside (Figure 1) of Naval Support Activity (NSA) Memphis, Millington, Tennessee, and is part of Assembly E, one of eight SWMU assemblies defined for the NSA Memphis Resource Conservation and Recovery Act (RCRA) Corrective Action Program. Assembly E comprises six SWMUs (2, 9, 14, 38, 59, and 65) requiring full RCRA Facility Investigation (RFI) characterization on the nonclosing portion of NSA Memphis.

The goals of the SWMU 59 building demolition are as follows:

- To eliminate risk to human health and the environment through the demolition, removal, and disposal of Building S-335 and its contents.

- To eliminate risk to human health and the environment through the removal, excavation, and disposal of the asphalt foundation associated with Building S-335.

- To reduce or eliminate risk to human health and the environment through the excavation and disposal of soil contaminated with pesticides surrounding Building S-335.

The demolition, removal, excavation, and disposal will be conducted in accordance with all applicable federal, state, and local laws and regulations. The primary reference for this building demolition work plan is the *Comprehensive RFI Work Plan* (E/A&H, 1994). According to the RCRA Facility Assessment (ERC/EDGe, 1990), the exact age of Building S-335 is unknown, but

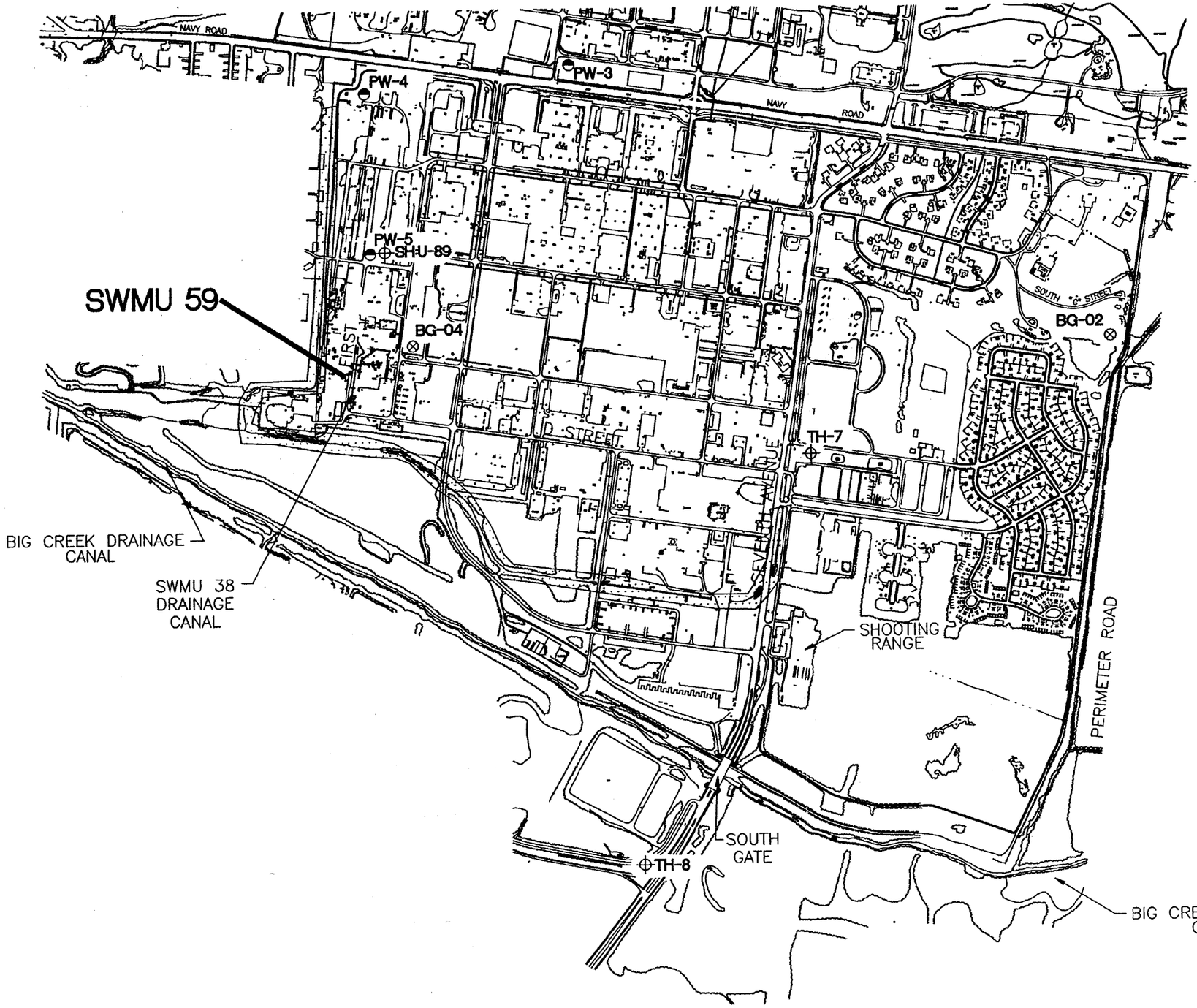
it is estimated to be at least 30 years old. The building stored pesticides and fertilizers used throughout NSA Memphis. Pesticides reportedly stored in the building included chlordane, dieldrin, DDT, and arsenic, which was formerly a common component of pesticide formulations. SWMU 59 was flooded in 1974 and again in 1987, as evidenced by watermarks on the interior walls approximately 2.5 feet above the floor.

According to the *Draft Final RCRA Facility Investigation Work Plan* (SOUTHDIV, 1990), an inspection of Building S-335 in 1990 indicated the building was locked and had not been cleaned up after the floods. The work plan also stated that the building was scheduled for demolition in 1990.

A 1990 Visual Site Inspection conducted by the Navy and the U.S. Geological Survey indicated a pesticide odor emanating from the building's window. A water line was leaking during the visit, resulting in clear water trickling from beneath the building and saturating the ground on its east side.

In 1990 an RFI was conducted at SWMU 59 because the Navy planned on demolishing Building S-335 and needed to generate data for project planning issues, including worker health and safety and demolition waste disposal. The Final Draft RFI Report (ERC/EnSafe, 1990) confirmed the presence of chlorinated pesticides and arsenic in shallow (0 to 2 feet below land surface [bls]) soil surrounding the building and on surfaces inside the building.

On June 8, 1995, E/A&H representatives inspected the site. The building had not been demolished, had not been cleaned, was still locked and a chlorinated pesticide odor was evident near the window and door. According to Navy personnel, employees associated with the SWMU 59 pesticide operation are no longer employed at NSA Memphis. Therefore, no definitive information is available regarding former operating procedures at SWMU 59.



LEGEND

TH-7 ⊕	STRATIGRAPHIC TEST HOLE
PW-4 ◓	PRODUCTION WELL
BG-02 ⊗	BACKGROUND WELL

1000 0 1000

SCALE FEET

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MILLINGTON, TENNESSEE

FIGURE 1
VICINITY MAP
SWMU 59

DWG DATE: 04/22/97 | DWG NAME: 106VCAVM

000006

00648F01Z

2.0 ENVIRONMENTAL SETTING

SWMU 59 consists of Building S-335, which is framed with wood and has a sheet metal exterior. On the north and southwest sides of the building are small unpaved areas, separating it from the adjacent asphalt lot, which borders it to the north, south, and west. An unpaved area on the east side of the building separates it from First Avenue (Figure 2).

2.1 Topography and Drainage

The area around SWMU 59 slopes gently to the east, with runoff flowing toward a storm drain in the grassy area east and northeast of Building S-335 (Figure 2). This storm drain conveys the water southeast under First Street, to an outfall in the SWMU 38 secondary drainage ditch along the east side of First Street. SWMU 38 then conveys runoff approximately 1,400 feet south to the Big Creek Drainage Canal (Figure 1). Any storm runoff that does not enter the drain northeast of the building would move across the parking lot as sheet flow to First Street, where it would travel south to the Big Creek Drainage Canal.

2.2 Hydrogeologic Information

A discussion of the general hydrogeology of the Memphis area and a conceptual model of the hydrogeology at NSA Memphis are presented in Sections 2.11 and 2.12 of the *Comprehensive RFI Work Plan*, respectively. Updated information is available in the *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee* (Kingsbury and Carmichael, 1995).

Site-specific hydrogeologic data for SWMU 59 were compiled from information collected during the 1996 Assembly E RFI (E/A&H, pending). One well screened in the upper part of the fluvial deposits and three wells screened in the loess were installed at SWMU 59 in March 1996. The loess, as described in logs compiled while advancing borings, consisted of clay, silty clay, clayey

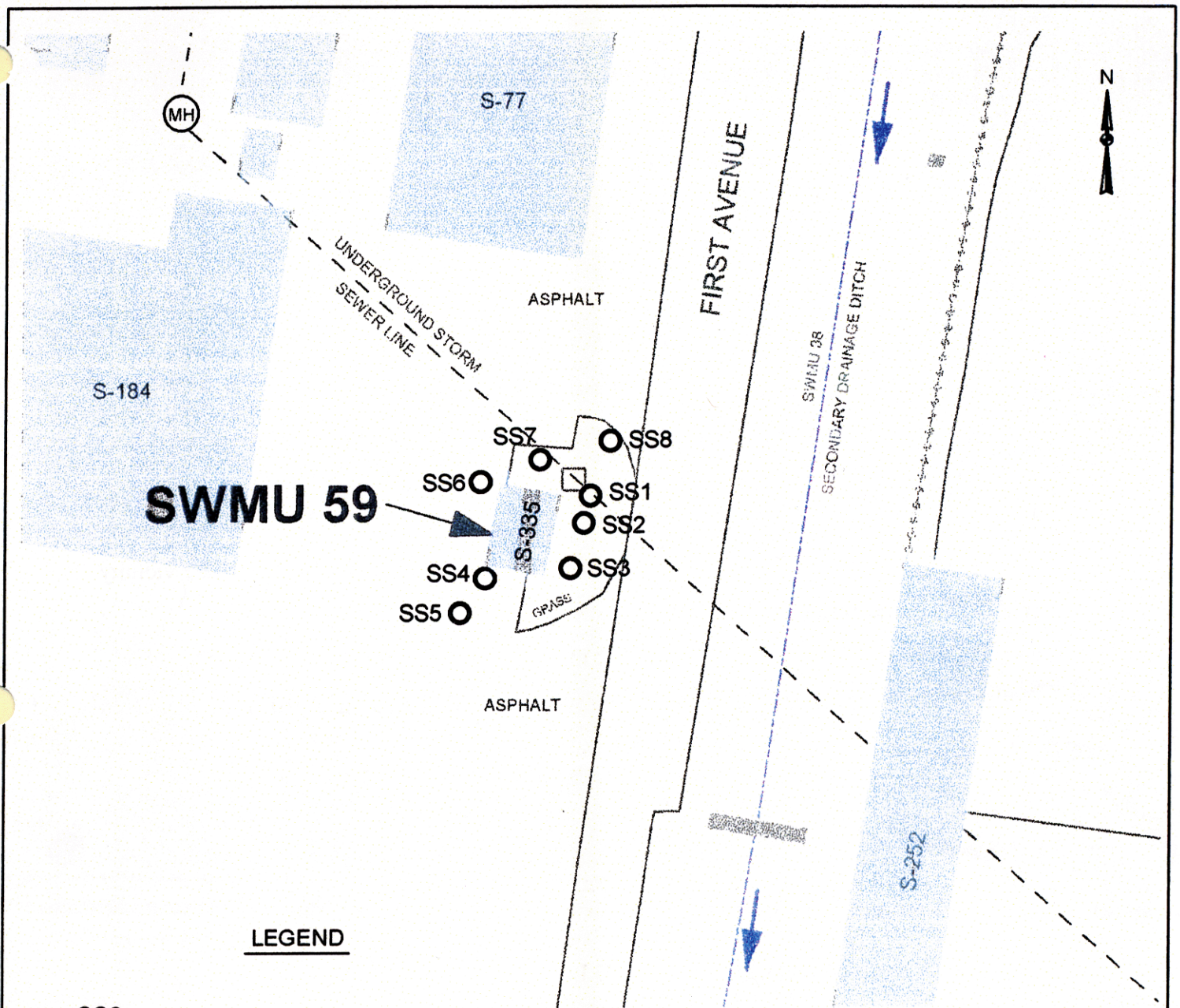
silt, and silt from land surface to depths ranging from 30 to 39 feet. In general, the clay fraction decreased and the silt fraction increased with depth. The deepest soil boring at SWMU 59 (059S03UF, terminated at 56 feet bls) did not encounter the base of the fluvial deposits. The upper 6- to 7-foot interval was typically dry. A moist to wet zone was encountered between 10 and 16 feet bls in most SWMU 59 soil borings, representing the uppermost water-bearing zone in the loess. The depth to groundwater in the three loess wells installed at SWMU 59, measured in April 1996, ranged from 7.71 feet bls (059G01LS) to 9.69 feet bls (059G03LS). Within the NSA Memphis Southside, groundwater in the loess typically moves primarily downward to recharge the fluvial deposits. In the immediate vicinity of SWMU 59, some water in the loess may move laterally and discharge to the SWMU 38 drainage ditch east of SWMU 59. Water levels measured in wells screened in the lower part of the fluvial deposits at select locations throughout NSA Memphis in April 1996 indicated groundwater in the fluvial deposits flows southwest in the vicinity of SWMU 59.

2.3 Climatological Data

Regional climatological data are provided in Section 2.8 of the *Comprehensive RFI Work Plan*.

3.0 PREVIOUS INVESTIGATIONS AND REMOVALS

To assess the risk associated with the contaminant concentrations identified at SWMU 59 during previous investigations, the analytical results were compared to concentrations in the U.S. Environmental Protection Agency (USEPA), Region III, Risk-Based Concentration (RBC) Table, January-June 1996 (USEPA, 1996a). Surface soil sample results were compared to residential and industrial RBC soil exposure/ingestion concentrations, as well as soil screening level (SSL) concentrations for the protection of groundwater. Soil sample results from the subsurface interval were compared to the SSL concentrations only, because RBCs do not apply to subsurface soil.



LEGEND

SS2 — 1990 RFI SOIL SAMPLE LOCATION AND DESIGNATION

UNDERGROUND STORM SEWER LINE

STORM DRAIN

MH — MANHOLE

SWMU 38 SECONDARY DRAINAGE DITCH, WITH ARROW INDICATING SURFACE WATER FLOW DIRECTION

50 0 50 Feet

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FIGURE 2
1990 RFI SOIL SAMPLE LOCATIONS
SWMU 59 - S-335 OLD PESTICIDE SHOP

NOTE: 1990 RFI SOIL SAMPLES WERE COLLECTED WITH A STAINLESS-STEEL HAND AUGER FROM THE FOLLOWING INTERVALS: 0 TO 1 FOOT AND 1 TO 2 FEET BELOW LAND SURFACE.

Groundwater sample results were compared to the tap water RBCs (USEPA, 1996a) and the maximum contaminant levels (MCLs) listed in *Drinking Water Regulations and Health Advisories* (USEPA, 1996b). Inorganics detected in either soil or groundwater were also compared to the reference concentrations (RCs) established in the August 1996 technical memorandum *Reference Concentrations* (E/A&H, 1996).

3.1 1990 RCRA Facility Investigation

The 1990 RFI (ERC/EnSafe, 1990) consisted of collecting shallow soil samples from eight locations surrounding Building S-335 and 30 wipe samples from the building's interior surfaces. Soil samples were collected from the 0 to 1-foot bls (upper) interval and the 1- to 2-foot bls (lower) interval at all eight boring locations. The samples were analyzed for chlordane, DDT and related isomers, dieldrin, and arsenic. Figure 2 shows the 1990 RFI soil sample locations and Table 1 summarizes the soil sample results. As shown in Table 1, contaminant concentrations generally decreased from the upper to the lower intervals.

The residential RBC for chlordane (490 micrograms per kilogram [μg/kg]) was exceeded in all upper interval samples, while the industrial RBC for chlordane (4,400 μg/kg) was exceeded in the upper interval samples from locations SS3, SS4, SS5, and SS7. The residential RBC for dieldrin (40 μg/kg) was exceeded in the upper interval soil samples from locations SS2 and SS3, while the industrial RBC for dieldrin (360 μg/kg) was not exceeded. The residential RBCs for DDT (1,900 μg/kg), DDD (2,700 μg/kg), and DDE (1,900 μg/kg) were not exceeded in any upper interval soil samples, nor were the corresponding industrial RBCs. Comparing both the surface soil RC for arsenic (14.58 milligrams per kilogram [mg/kg]) and the RBC values for arsenic as a carcinogen (residential RBC – 0.43 mg/kg, industrial RBC — 3.8 mg/kg) to the upper interval arsenic detections indicated the only exceedance was in the sample from location SS1, which exceeded both the RC and industrial RBC.

Table 1
Analytical Summary of 1990 RFI Soil Samples

Sample Location and Interval (feet bls)	Arsenic (mg/kg)	DDT (μg/kg)	DDD (μg/kg)	DDE (μg/kg)	Dieldrin (μg/kg)	Chlordane (μg/kg)
SS1 (0-1')	**33**	ND	ND	25	35.8	**2,602**
SS1 (1-2')	17.5	10	ND	4	4.7	267
SS2 (0-1')	8.5	ND	ND	41	**41.6**	**2,391**
SS2 (1-2')	6	9	ND	2	42.8	202
SS3 (0-1')	14.5	ND	312	230	**260**	**279,719**
SS3 (1-2')	7.25	ND	ND	ND	4.9	9,949
SS4 (0-1')	9	ND	ND	ND	ND	**22,180**
SS4 (1-2')	7	ND	ND	ND	ND	5,014
SS5 (0-1')	10.5	ND	ND	ND	23.7	**5,793**
SS5 (1-2')	13	ND	ND	ND	18	407
SS6 (0-1')	8.5	ND	ND	ND	ND	**1,231**
SS6 (1-2')	10.5	ND	ND	ND	ND	398
SS7 (0-1')	8.25	ND	ND	ND	20.1	**5,667**
SS7 (1-2')	6.5	ND	ND	ND	ND	1,323
SS8 (0-1')	7	ND	ND	13	26.2	**801**
SS8 (1-2')	7	ND	ND	5	7.8	20
RBC[a] — Residential	0.43	1,900	2,700	1,900	40	490
RBC[a] — Industrial	3.8	17,000	24,000	17,000	360	4,400
SSL[a]	15	1000	700	500	1	2,000

Notes:
a — RBCs and SSLs were obtained from the Risk-Based Concentration Table, January-June 1996 (USEPA, 1996a).
ND — None detected (analyte was below the method detection limit).
Surface soil sample pesticides detections which exceeded their residential RBC or residential and industrial RBCs are shown in **large bold print**, while arsenic surface soil detections which exceeded its surface soil RC (14.54 mg/kg) and residential and industrial RBCs are also shown in **large bold print**.

The SSLs for DDT (1,000 μg/kg), DDD (700 μg/kg), and DDE (500 μg/kg) were not exceeded in any upper or lower interval soil samples. The SSL for dieldrin (1 μg/kg) was exceeded in the upper interval sample from location SS7, and in the upper and lower interval samples from locations SS1, SS2, SS3, SS5, and SS8. The SSL for chlordane (2,000 μg/kg) was exceeded in the upper interval samples from locations SS1, SS2, SS5, and SS7, and in the upper and lower interval samples from locations SS3 and SS4. Both the SSL for arsenic (15 mg/kg) and the arsenic surface soil RC (14.58 mg/kg) were only exceeded at location SS1, while subsurface samples indicated no exceedances of both the arsenic SSL and arsenic subsurface RC (20.32 mg/kg).

During the 1990 RFI, wipe samples were collected from the floor, walls, and shelving within Building S-335. Ten of the wipe samples were submitted for analysis of DDT, DDE, DDD, and dieldrin, ten more were submitted for analysis of arsenic, and a third set of ten were submitted for analysis of chlordane. DDT was indicated in one wipe sample while DDE was indicated in seven of ten wipe samples. Arsenic was indicated in all ten wipe samples. Dieldrin was indicated in one wipe sample and chlordane was indicated in all ten of the wipe samples.

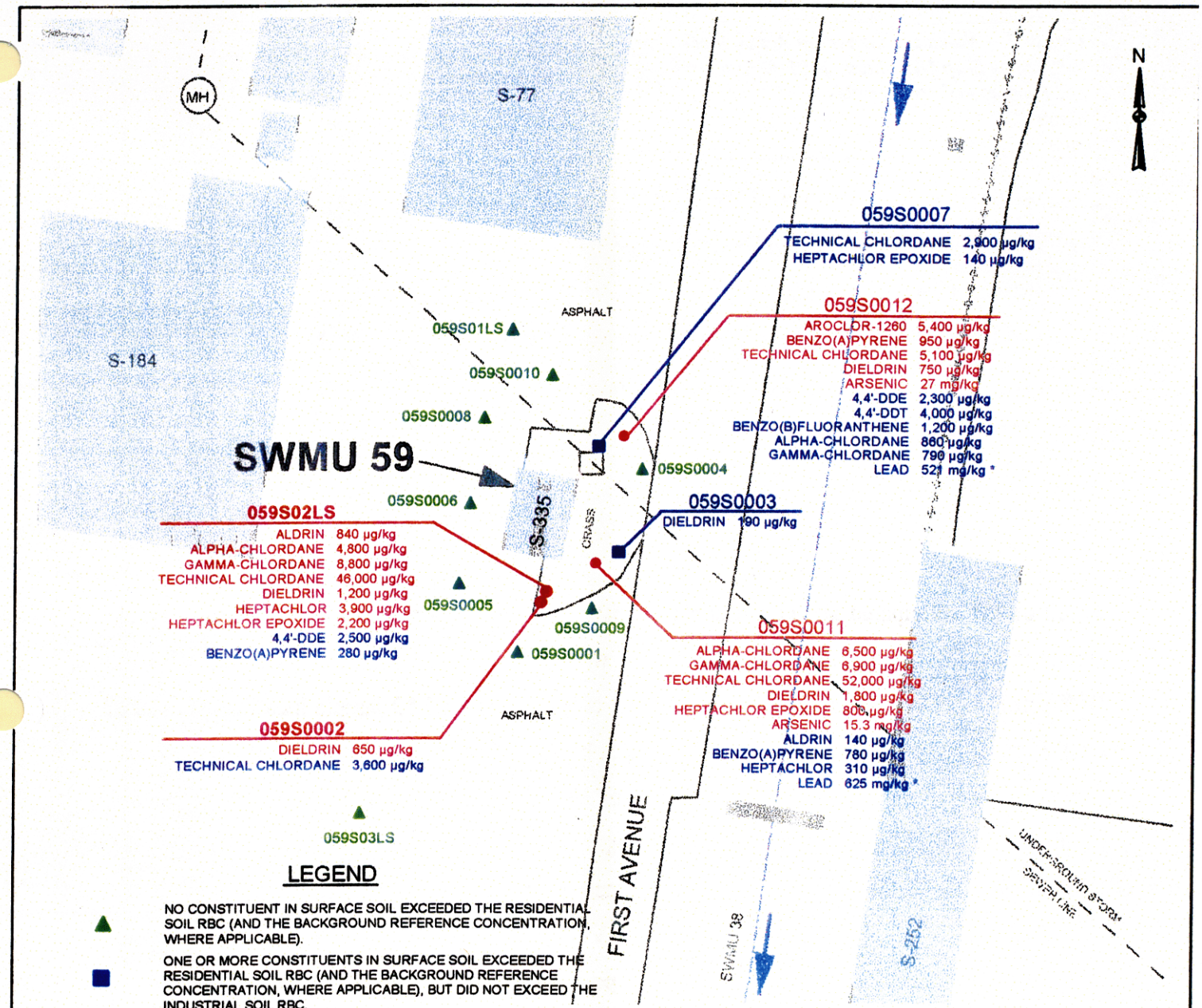
3.2 1996 RFI Characterization

A soil and groundwater screening investigation was conducted by E/A&H around Building S-335 using Direct Push Technology (DPT) Geoprobe equipment operated by ProTech Inc. of Baton Rouge, Louisiana. Ten DPT sample locations (059S0001 through 059S0010) were selected and soil samples were collected from three depth intervals at each location (Figure 3). Also, one groundwater sample was collected from location 059S0002. The NSA Memphis Base Realignment and Closure Cleanup Team (BCT) reviewed the DPT results to determine the optimal number, placement, and depth of the subsequent RFI soil borings and groundwater monitoring wells. Upon the BCT's recommendation, three soil borings, one north (059S01LS), one immediately south (059S02LS), and one southwest (059S03LS) of Building S-335 (Figure 3), were

advanced to approximately 20 feet bls by Alliance Environmental Inc. of Marietta, Ohio, using a rotasonic drill rig. Groundwater monitoring wells (059G01LS, 059G02LS, and 059G03LS) were installed through the open borehole at each soil boring location and screened from 10 to 20 feet bls in the loess, just above the fluvial deposits. Also, a well screened in the upper part of the fluvial deposits (059G03UF) was installed adjacent to loess well 059G03LS. Finally, E/A&H collected two surface soil samples (059S0011 and 059S0012) using a stainless-steel hand auger from 0 to 6 inches bls (Figure 3).

3.2.1 DPT Screening Investigation

Based on the anticipated site constituents — pesticides and carrier compounds, volatile organic compounds (VOCs) and chlorinated pesticides were chosen as the indicator parameters for the DPT screening investigation. Soil samples were collected from all 10 sample locations at each of the following intervals: 0 to 2 feet bls, 3 to 5 feet bls, and 9 to 11 feet bls. The soil samples were submitted to an offsite laboratory for analysis of VOCs (USEPA Method 8240) and chlorinated pesticides/PCBs (USEPA Method 8080). A single groundwater sample was collected during the DPT investigation from 39 to 40 feet bls at location 059S0002. The groundwater sample was submitted to an offsite laboratory for analysis of VOCs (USEPA Method 8240). Summary tables of the detected concentrations of VOCs and pesticides in DPT soil samples are included in Appendix A. Figure 3 shows the RBC exceedances for DPT surface soil samples, while Figure 4 shows the SSL exceedances for DPT surface and subsurface soil samples. For comparison to screening parameters, the soil samples collected from 0 to 2 feet bls were considered surface soil samples. Eight VOCs were detected among the DPT soil samples. Of the six VOCs detected in the 0 to 2-foot interval, none of them exceeded their respective residential RBC values. Acetone's SSL (8,000 μg/kg) was the only VOC SSL exceedance in the sample collected from 3 to 5 feet bls at location 059S0009 (8,600 μg/kg).



LEGEND

▲ NO CONSTITUENT IN SURFACE SOIL EXCEEDED THE RESIDENTIAL SOIL RBC (AND THE BACKGROUND REFERENCE CONCENTRATION, WHERE APPLICABLE).

■ ONE OR MORE CONSTITUENTS IN SURFACE SOIL EXCEEDED THE RESIDENTIAL SOIL RBC (AND THE BACKGROUND REFERENCE CONCENTRATION, WHERE APPLICABLE), BUT DID NOT EXCEED THE INDUSTRIAL SOIL RBC.

● ONE OR MORE CONSTITUENTS IN SURFACE SOIL EXCEEDED THE INDUSTRIAL SOIL RBC (AND THE BACKGROUND REFERENCE CONCENTRATION, WHERE APPLICABLE).

059S0002
DIELDRIN 650 µg/kg
TECHNICAL CHLORDANE 3,600 µg/kg

THE SURFACE SOIL SAMPLE FROM SAMPLING LOCATION 059S0002 CONTAINED THE FOLLOWING CONTAMINANTS THAT EXCEEDED SOIL RBCs: 650 µg/kg DIELDRIN, WHICH EXCEEDED ITS INDUSTRIAL SOIL RBC, AND 3,600 µg/kg TECHNICAL CHLORDANE, WHICH EXCEEDED ITS RESIDENTIAL SOIL RBC ONLY.

059S0002 GEOPROBE OR HAND AUGER SURFACE SOIL SAMPLE DESIGNATION

059S02LS SOIL BORING SURFACE SOIL SAMPLE DESIGNATION; SAMPLE COLLECTED WITH THE ROTASONIC DRILLING RIG DURING MONITORING WELL INSTALLATION

NOTES:

** NO RBC IS AVAILABLE FOR LEAD; THE USEPA RESIDENTIAL AND INDUSTRIAL LEAD CLEANUP GOALS OF 400 µg/kg AND 1,300 µg/kg WERE USED FOR COMPARISON (OSWER DIRECTIVE 9355.4-12).*

ALL SOIL BORING SAMPLES AND HAND AUGER SAMPLES 059S0011 AND 059S0012 WERE ANALYZED FOR VOCs, SVOCs, TPH-GRO, TPH-DRO, CHLORINATED PESTICIDES/PCBs, ORGANOPHOSPHORUS PESTICIDES, HERBICIDES, APPENDIX IX METALS, AND CYANIDE. DPT SOIL SAMPLES 059S0001 THROUGH 059S0010 WERE ANALYZED FOR VOCs AND CHLORINATED PESTICIDES/PCBs ONLY.

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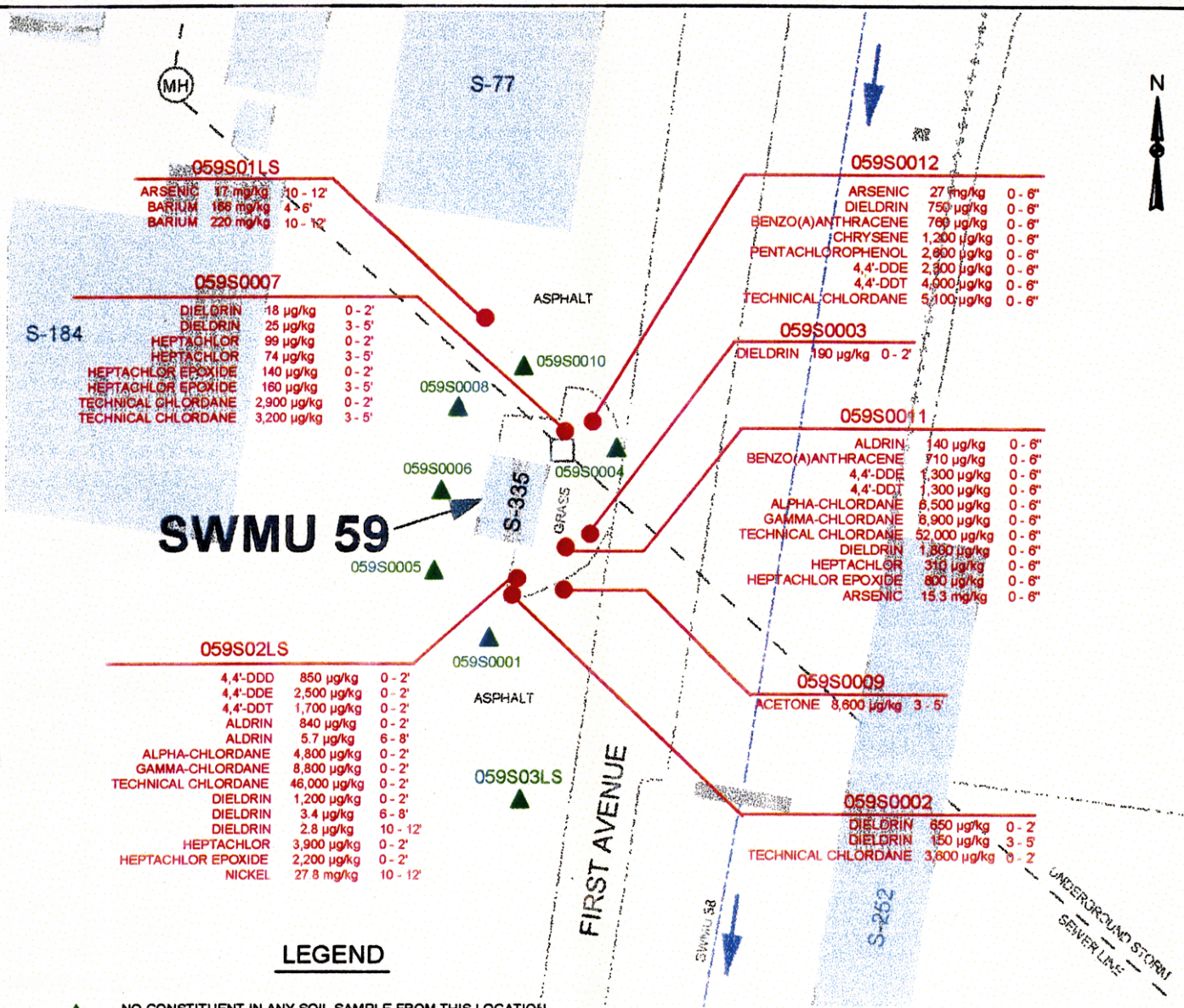
FIGURE 3
RBC EXCEEDANCES FOR ORGANICS, AND RC AND RBC EXCEEDANCES FOR INORGANICS IN SURFACE SOIL SAMPLES FROM DPT, HAND AUGER, AND SOIL BORING LOCATIONS SWMU 59 - S-335 OLD PESTICIDE SHOP



LEGEND

▲ NO CONSTITUENT IN ANY SOIL SAMPLE FROM THIS LOCATION EXCEEDED ITS SOIL-TO-GROUNDWATER SSL (AND BACKGROUND REFERENCE CONCENTRATION, WHERE APPLICABLE).

● ONE OR MORE CONSTITUENTS IN A SOIL SAMPLE FROM THIS LOCATION EXCEEDED ITS SOIL-TO-GROUNDWATER SSL (AND BACKGROUND REFERENCE CONCENTRATION, WHERE APPLICABLE).

059S0002
DIELDRIN 650 µg/kg 0 - 2'
DIELDRIN 150 µg/kg 3 - 5'
TECHNICAL CHLORDANE 3,600 µg/kg 0 - 2'

THE FOLLOWING CONSTITUENTS IN SOIL SAMPLES FROM LOCATION 059S0002 EXCEEDED THEIR RESPECTIVE SSLs (AND BACKGROUND REFERENCE CONCENTRATIONS, WHERE APPLICABLE): 650 µg/kg DIELDRIN IN THE 0- TO 2-FOOT INTERVAL SAMPLE, 150 µg/kg DIELDRIN IN THE 3 TO 5-FOOT INTERVAL SAMPLE, AND 3,600 µg/kg TECHNICAL CHLORDANE IN THE 0- TO 2-FOOT INTERVAL SAMPLE.

50 0 50 Feet

059S0002 GEOPROBE OR HAND AUGER SOIL SAMPLE DESIGNATION

059S02LS SOIL BORING SAMPLE DESIGNATION; SAMPLE COLLECTED WITH THE ROTASONIC DRILLING RIG DURING MONITORING WELL INSTALLATION

NOTE:

ALL SOIL BORING SAMPLES AND HAND AUGER SAMPLES 059S0011 AND 059S0012 WERE ANALYZED FOR VOCs, SVOCs, TPH-GRO, TPH-DRO, CHLORINATED PESTICIDES/PCBs, ORGANOPHOSPHORUS PESTICIDES, HERBICIDES, APPENDIX IX METALS, AND CYANIDE. DPT SOIL SAMPLES 059S0001 THROUGH 059S0010 WERE ANALYZED FOR VOCs AND CHLORINATED PESTICIDES/PCBs ONLY.

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FIGURE 4
SOIL-TO-GROUNDWATER SSL EXCEEDANCES
IN SOIL SAMPLES FROM DPT, HAND AUGER,
AND SOIL BORING LOCATIONS
SWMU 59 - S-335 OLD PESTICIDE SHOP

The pesticides detected at concentrations above RBCs or SSLs in DPT soil samples were dieldrin, heptachlor, heptachlor epoxide, and technical chlordane. The residential RBC for dieldrin (40 μg/kg) was exceeded at surface soil sample locations 059S0002 (650 μg/kg) and 059S0003 (190 μg/kg), while the sample from 059S0002 also exceeded its industrial RBC (360 μg/kg). The SSL for dieldrin (1 μg/kg) was exceeded in surface soil samples from locations 059S0002 (650 μg/kg), 059S0003 (190 μg/kg), and 059S0007 (18 μg/kg), and in the soil samples collected from 3 to 5 feet bls at locations 059S0002 (150 μg/kg) and 059S0007 (25 μg/kg).

Heptachlor was detected at concentrations which exceeded its SSL (60 μg/kg) in surface and subsurface (3-to 5-foot bls interval) soil at location 059S0007 (99 μg/kg and 74 μg/kg, respectively). Heptachlor epoxide's residential RBC (70 μg/kg) and SSL (30 μg/kg) were both exceeded in a surface soil sample from location 059S0007 (140 μg/kg). The SSL for heptachlor epoxide was also exceeded in the soil sample collected from 3 to 5 feet bls at location 059S0007 (160 μg/kg). Both the residential RBC and SSL for technical chlordane (490 μg/kg and 2,000 μg/kg, respectively) were exceeded in surface soil samples from locations 059S0002 (3,600 μg/kg) and 059S0007 (2,900 μg/kg), while in the soil samples collected from 3 to 5 feet bls, the SSL for technical chlordane was exceeded at sample location 059S0007 (3,200 μg/kg).

No VOCs were detected at concentrations above their tap water RBCs or MCLs in the groundwater sample from location 059S0002.

3.2.2 Soil Borings, Monitoring Wells, and Hand Auger Samples

Based on the DPT results, the NSA Memphis BCT selected two locations for collecting hand auger surface soil samples and three locations for advancing soil borings and installing groundwater

wells. E/A&H collected two surface soil samples (locations 059S0011 and 059S0012) using a stainless-steel hand auger from 0 to 6 inches bls. Both samples were submitted to an offsite laboratory for full scan analysis (FSA) which included VOCs (USEPA Method 8240), semivolatile organic compounds (SVOCs) (USEPA Method 8270), chlorinated pesticides/PCBs (USEPA Method 8080), organophosphorus pesticides (USEPA Method 8140), chlorinated herbicides (USEPA Method 8150), Appendix IX metals (USEPA Method 6010/7000 series), cyanide (USEPA Method 6010/9012), and total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) and diesel range organics (DRO) (modified USEPA Method 8015).

Soil samples from each of the three borings were collected at three intervals. Boring 059S01LS was sampled from 1 to 2 feet bls, 6 to 8 feet bls, and 10 to 12 feet bls; the 0 to 1-foot interval was not included because it consisted of asphalt, and the 6-to 8-foot interval, rather than the 4-to 6-foot interval, was sampled due to poor sample recovery in the 4- to 6-foot interval. Boring 059S02LS was sampled from 0 to 2 feet bls, 4 to 6 feet bls, and 10 to 12 feet bls. Boring 059S03LS was sampled from 1 to 2 feet bls, 4 to 6 feet bls, and 10 to 12 feet bls; the 0 to 1-foot interval was not included because it consisted of asphalt. All soil boring samples were submitted to an offsite laboratory for FSA. For comparison to screening parameters, the hand auger samples collected from 0 to 6 inches bls and the soil boring samples collected from 0 to 1 foot or 1 to 2 feet bls were considered surface soil.

Loess groundwater monitoring wells (059G01LS, 059G02LS, and 059G03LS) were installed through the open borehole at each soil boring location and screened from 10 to 20 feet bls. Every soil boring/monitoring well was advanced, continuously sampled, and installed with a rotasonic drilling rig operated by Alliance Environmental. Additionally, a monitoring well screened in the upper part of the fluvial deposits (059G03UF) was installed adjacent to loess well 059G03LS and

screened from 44 to 54 feet bls. No soil samples were submitted for laboratory analysis from well 059G03UF. Several weeks after monitoring well installation and development, the wells were purged and sampled. Samples were collected from all three loess monitoring wells and the well screened in the upper part of the fluvial deposits. The groundwater samples were submitted to an offsite laboratory for FSA excluding TPH-GRO. Groundwater samples were not tested for TPH-GRO because many of the lighter fraction hydrocarbons of interest would be identified during VOC analyses.

Summary tables of the detected concentrations of organics and inorganics in soil boring, monitoring well, and hand auger samples are included in Appendix B. Figure 3 shows the RBC exceedances for hand auger and soil boring surface soil samples, while Figure 4 shows the SSL exceedances for hand auger and soil boring surface soil samples and soil boring subsurface soil samples.

Soil Samples — Analytical Results

Any VOCs, chlorinated herbicides, or organophosphorus pesticides detected in hand auger or soil boring samples were detected at concentrations below their respective residential RBCs and SSLs.

Two SVOCs were detected in surface soil exceeding their respective RBCs. Benzo(a)pyrene was detected in samples from locations 059S02LS (280 μg/kg), 059S0011 (780 μg/kg), and 059S0012 (950 μg/kg) at concentrations exceeding its residential RBC (88 μg/kg), one of which also exceeded its industrial RBC (780 μg/kg). Benzo(b)fluoranthene was detected in a sample from location 059S0012 (1,200 μg/kg) at a concentration exceeding its residential RBC (880 μg/kg), but not its industrial RBC (7,800 μg/kg). SSL values for benzo(a)anthracene (700 μg/kg), chrysene (1,000 μg/kg), and pentachlorophenol (200 μg/kg) were exceeded at sample location 059S0012 by detected concentrations of 760 μg/kg, 1,200 μg/kg, and 2,600 μg/kg,

respectively. The SSL for benzo(a)anthracene (700 μg/kg) was also exceeded at sample location 059S0011 (710 μg/kg). TPH-GRO and TPH-DRO were detected in multiple soil samples collected during the RFI. The USEPA has not established an RBC or SSL for TPH. Therefore for evaluation, TPH-GRO and TPH-DRO concentrations were summed and compared with the Tennessee Department of Environment and Conservation (TDEC) soil cleanup levels for petroleum-contaminated sites (TDEC, 1996). TDEC's most conservative TPH concentration cleanup level is 100 mg/kg, which was not exceeded in any of the RFI soil samples.

Chlorinated pesticides/PCBs, which are the motivating factor behind this demolition and removal at SWMU 59, were identified at concentrations exceeding RBC and/or SSL values in soil samples from boring 059S02LS and hand auger samples from locations 059S0011 and 059S0012. Figure 3 shows the RBC exceedances, and Figure 4 shows the SSL exceedances for pesticides in hand auger and soil boring samples. The pesticide/PCB exceedances for soil boring and hand auger samples are as follows:

- 4,4'-DDD was detected in a surface soil sample from location 059S02LS (850 μg/kg) exceeding its SSL (700 μg/kg).

- 4,4'-DDE was detected in surface soil samples from locations 059S0011 (1,300 μg/kg), 059S0012 (2,300 μg/kg), and 059S02LS (2,500 μg/kg) at concentrations exceeding its SSL (500 μg/kg), while the samples from locations 059S0012 and 059S02LS also exceeded its residential RBC (1,900 μg/kg).

- 4,4'-DDT was detected in surface soil samples from locations 059S0011 (1,300 μg/kg), 059S0012 (4,000 μg/kg), and 059S02LS (1,700 μg/kg) at concentrations that exceeded the

SSL (1,000 μg/kg), while the sample from location 059S0012 also exceeded the residential RBC (1,900 μg/kg).

- Aldrin was detected in surface soil samples from location 059S0011 (140 μg/kg) and 059S02LS (840 μg/kg) at concentrations exceeding its residential RBC (38 μg/kg) and SSL (5 μg/kg), while the sample from location 059S02LS also exceeded the industrial RBC (340 μg/kg). The SSL for aldrin was also exceeded in the 4- to 8-foot interval sample from location 059S02LS (5.7 μg/kg).

- Aroclor-1260 was detected at sample location 059S0012 (5,400 μg/kg) exceeding both its residential RBC (320 μg/kg) and industrial RBC (2,850 μg/kg).

- Alpha-chlordane was detected in surface soil samples from locations 059S0011 (6,500 μg/kg), 059S0012 (860 μg/kg), and 059S02LS (4,800 μg/kg) at concentrations exceeding its residential RBC (490 μg/kg), while the samples from locations 059S0011 and 059S02LS also exceeded its industrial RBC (4,400 μg/kg) and SSL (2,000 μg/kg).

- Gamma-chlordane was detected in surface soil samples from locations 059S0011 (6,900 μg/kg), 059S0012 (790 μg/kg), and 059S02LS (8,800 μg/kg) at concentrations exceeding its residential RBC (490 μg/kg), while the samples from locations 059S0011 and 059S02LS also exceeded its industrial RBC (4,400 μg/kg) and SSL (2,000 μg/kg).

- Technical chlordane was detected in surface soil samples from locations 059S0011 (52,000 μg/kg), 059S0012 (5,100 μg/kg), and 059S02LS (46,000 μg/kg) at concentrations exceeding its residential RBC (490 μg/kg), industrial RBC (4,400 μg/kg), and SSL (2,000 μg/kg).

- Dieldrin was detected in surface soil samples from locations 059S0011 (1,800 μg/kg), 059S0012 (750 μg/kg), and 059S02LS (1,200 μg/kg) at concentrations which exceeded its residential RBC (40 μg/kg), industrial RBC (360 μg/kg), and SSL (1 μg/kg). The SSL for dieldrin was also exceeded at location 059S02LS in the 4- to 8-foot interval sample (3.4 μg/kg) and the 10- to 12-foot interval sample (2.8 μg/kg).

- Heptachlor was detected in surface soil samples from locations 059S0011 (310 μg/kg) and 059S02LS (3,900 μg/kg) at concentrations exceeding its residential RBC (140 μg/kg) and SSL (60 μg/kg), while the sample from location 059S02LS also exceeded its industrial RBC (1,300 μg/kg).

- Heptachlor epoxide was detected in surface soil samples from locations 059S0011 (800 μg/kg) and 059S02LS (2,200 μg/kg) at concentrations exceeding its residential RBC (70 μg/kg), industrial RBC (630 μg/kg), and SSL (30 μg/kg).

The only inorganics that exceeded both their RCs and RBCs or SSLs were arsenic and nickel (see Figure 3). Arsenic's residential RBC (0.43 mg/kg), industrial RBC (3.8 mg/kg), surface soil RC (14.58 mg/kg), and SSL (15 mg/kg) all were exceeded in surface soil samples from locations 059S0011 (15.3 mg/kg) and 059S0012 (27 mg/kg). Lead, which has no RBC or SSL, was compared to the USEPA residential soil cleanup goal of 400 mg/kg (USEPA, 1994) and the surface soil RC (26.03 mg/kg). Concentrations of lead in surface soil samples from locations 059S0011 (625 mg/kg) and 059S0012 (521 mg/kg) exceeded both the residential cleanup goal and RC. Nickel exceeded its subsurface RC (nondetect) and SSL (21 mg/kg) values in the 10- to 12-foot interval sample from location 059S02LS (27.8 mg/kg).

Groundwater Samples — Analytical Results

Analytical results for the groundwater samples collected from the four wells (three loess and one in the upper part of the fluvial deposits) installed during the RFI were compared to tap water RBCs, MCLs, and RCs, where applicable. Only one VOC, acetone, was detected, in one loess well sample, and the concentration was below the applicable tap water RBC (no MCL was available). Two SVOCs were detected, one each in two loess wells, but both SVOC concentrations were below the applicable tap water RBCs (no MCLs were available). Summary tables of the detected concentrations of organics and inorganics in groundwater samples are included in Appendix B.

As previously mentioned, loess groundwater samples were not tested for TPH-GRO because many of the lighter fraction hydrocarbons would be identified during VOC analyses. TPH-DRO was detected in loess monitoring well 059G02LS at a concentration of 160 micrograms per liter (μg/L).

No PCBs or herbicides were detected in groundwater samples, while pesticide compounds were indicated in only one groundwater sample from loess well 059G02LS. Six pesticides exceeding their tap water RBCs were detected in the sample from well 059G02LS. The pesticides and their corresponding tap water RBCs are as follows: alpha-chlordane (0.052 μg/L), gamma-chlordane (0.052 μg/L), technical chlordane (0.052 μg/L), dieldrin (0.0042 μg/L), heptachlor (0.0023 μg/L), and heptachlor epoxide (0.0012 μg/L). The concentrations of these pesticides detected in the sample from well 059G02LS are as follows: alpha-chlordane (0.085 μg/L); gamma-chlordane at (0.12 μg/L); technical chlordane at (1.1 μg/L); dieldrin at (0.052 μg/L); heptachlor at (0.069 μg/L); and heptachlor epoxide at (0.19 μg/L).

No inorganic was detected in groundwater that exceeded both its RC and tap water RBC or MCL for drinking water. However, lead, which does not have a tap water RBC or MCL, was screened by comparing concentrations to its RC (17.5 μg/L) and the USEPA treatment technique action level (TTAL) of 15 μg/L. Lead concentrations in groundwater samples from monitoring wells 059G01LS (18 μg/L) and 059G03LS (30.6 μg/L) exceeded the TTAL and RC.

3.3 Previous Removal Actions

No known previous removal actions have occurred at SWMU 59.

4.0 SOURCE CHARACTERIZATION

Chlordane, dieldrin, and DDT and its isomers belong to the organochlorine pesticide family. These compounds bioaccumulate and have been banned for home use due to their toxicity (they are all carcinogens) and their persistence in the environment (long half-lives and resistance to degradation). These pesticides have high retardation factors and tend to adhere to site soil rather than dissolve or migrate into the groundwater. Background concentrations of arsenic in surface and subsurface soil have been established for NSA Memphis, and their calculation is explained in detail in the RC technical memorandum. RCs, established for two soil intervals and four groundwater intervals, are equal to two times the average detected concentration of the compound in all background samples representative of the applicable medium and interval. The RC for arsenic in surface soil is 14.58 mg/kg and in subsurface soil it is 20.32 mg/kg. During the 1990 RFI, chlordane, dieldrin, and DDT and its isomers were detected in shallow (0 to 2 feet bls) soil samples in the immediate vicinity of Building S-335.

Arsenic, a naturally occurring element and carcinogen, was also present in the shallow soil samples collected during the 1990 RFI at SWMU 59. No subsurface soil samples (greater than 2 feet bls) were collected during the 1990 RFI.

During the 1996 RFI, chlorinated pesticides, as well as SVOCs, VOCs, and inorganics, were prevalent in shallow soil samples in the immediate vicinity of Building S-335. Pesticides, inorganics, and acetone concentrations exceeding their respective SSLs were detected at depths greater than 3 feet bls. Figure 4 shows sample locations and concentrations for soil samples collected during the 1996 RFI. Based on the RBC exceedances presented in Tables B-1 through B-4, the entire grassy area adjacent to Building S-335 would be considered contaminated with pesticides to a depth of at least 2 feet bls.

5.0 SOIL REMOVAL AND BUILDING DEMOLITION

The following sections outline the required actions before, during, and after the demolition of the building and the excavation of surrounding soil.

5.1 Electrical Cutoff and Pesticide Product Removal

Before any soil removal or building demolition occurs, NSA Memphis personnel will be responsible for turning off and disconnecting any electricity connected to Building S-335 and removing and disposing of any remaining pesticide products it contains. The building is presently locked and inaccessible for inspection.

5.2 Well Abandonment

Loess well 059G02LS is in the proposed area of excavation and will need to be properly abandoned prior to any excavation activities. The well will be abandoned in accordance with the Memphis and Shelby County Health Department's well regulations, which will consist of sanitizing and grouting it in place. The well will not be replaced due to the existence of both a down gradient loess and a down gradient fluvial deposits wells.

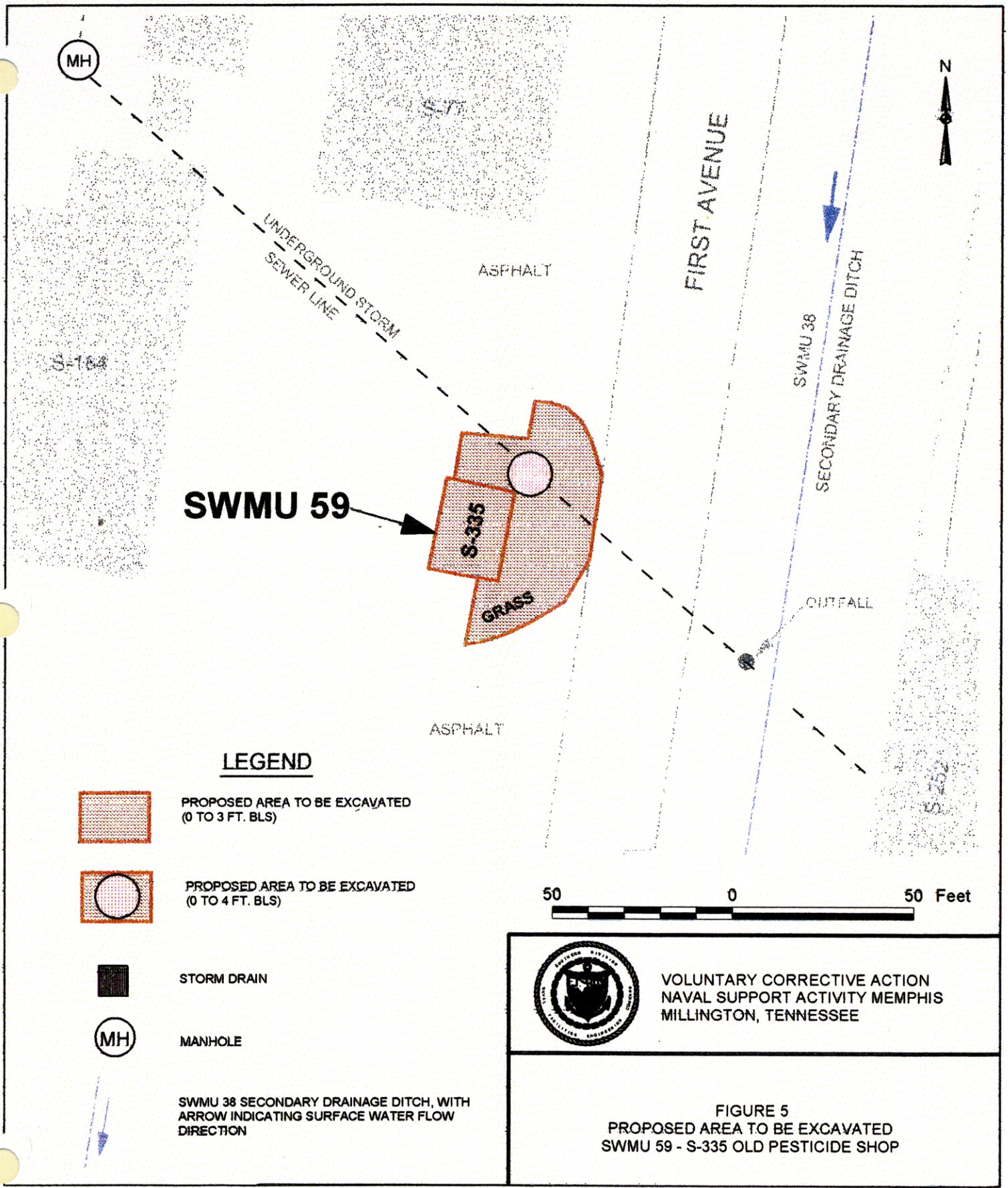
The most recent groundwater sampling results for loess well 059G02LS, the April/May 1997 event, are included in Appendix B. The pesticide analysis results for loess well 059G02LS indicated heptachlor epoxide at 0.084 μg/L and dieldrin at 0.027 μg/L. All other pesticides in loess well 059G02LS were below the method detection limit.

5.3 Building Demolition

The building will be draped with plastic sheeting prior to demolition to reduce airborne particulates, which will minimize potential exposure to pesticides. The building will be demolished by the removal contractor using heavy equipment. After the building has been razed, the debris will be placed in lined, covered, lockable, roll-off boxes provided by NSA Memphis.

5.4 Soil Excavation

Soil will be excavated from the grassy area adjacent to Building S-335 along with the asphalt foundation of the building. A storm sewer crosses the site within the proposed area of excavation and it will be identified prior to any ground penetration. The contaminated soil and asphalt will be excavated by the removal contractor and placed directly into lined, covered, lockable, roll-off boxes provided by NSA Memphis. The area of soil to be removed is approximately 40 feet wide by 65 feet long. Three feet of soil will be excavated, generating approximately 290 cubic yards of material. Also, immediately adjacent to the storm drain an additional foot of soil will be removed for a total depth of 4 feet. The additional excavation around the storm drain should produce less than 5 cubic yards of material. After confirmation samples (see Section 5.5) have been collected, the removal contractor will cover the excavated area with geotextile membrane and backfill with clean soil followed by compaction of the backfill. The geotextile membrane will delineate the backfill/native soil contact if the BCT decides additional excavation is necessary. Figure 5 shows the area of proposed soil excavation at SWMU 59.



LEGEND

PROPOSED AREA TO BE EXCAVATED (0 TO 3 FT. BLS)

PROPOSED AREA TO BE EXCAVATED (0 TO 4 FT. BLS)

STORM DRAIN

MH — MANHOLE

SWMU 38 SECONDARY DRAINAGE DITCH, WITH ARROW INDICATING SURFACE WATER FLOW DIRECTION

VOLUNTARY CORRECTIVE ACTION
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 5
PROPOSED AREA TO BE EXCAVATED
SWMU 59 - S-335 OLD PESTICIDE SHOP

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5.5 Confirmation Soil Sampling

After the excavation activities are completed, grab confirmation soil samples will be collected by EnSafe personnel based on a 20-foot by 20-foot grid system. One composite sample will be collected from the center of each cell. These samples will be analyzed for chlorinated pesticides using USEPA Method 8080. The confirmation samples will be collected from the surface of the excavated area to a depth of 6 inches into the native soil in accordance with the procedures described in Section 4.4.3 of the *Comprehensive RFI Work Plan.* The BCT will review the confirmation sample results and determine if any further action is necessary.

5.6 Backfilling Requirements

The excavated area will be backfilled with clean soil, which may be any commercially available, clean structural fill. At a minimum, the top 6 inches of soil will be a fertile, friable, natural surface soil capable of sustaining vigorous plant growth from a freely draining area and shall be free from roots, stumps, or other deleterious matter. The backfill will be compacted as necessary.

5.7 Disposal of Building and Contaminated Soil

Building

EnSafe will collect a representative sample from each 100 cubic yards of building debris that will include each distinct material within the roll-off boxes. There are no reported or documented spills of material at SWMU 59 and the pesticides present are reportedly from poor house-keeping practices during the time of its operation. The building material waste would not be a P-listed or a U-listed hazardous waste (i.e., spill residue of a commercial chemical product), because the comment in 40 CFR 261.33(d) refers to chemical substances which are manufactured or formulated for commercial or manufacturing use (i.e., commercially pure grade of the chemical, technical grade of the chemical, or formulations in which the chemical is the sole active ingredient), but does not refer to a substance such as a manufacturing process waste. However,

the building material waste would be a hazardous waste if it failed the toxicity characteristic leaching procedure (TCLP). The sample will be analyzed for TCLP pesticides and, if necessary, additional analyses will be performed to meet disposal facility requirements.

NSA Memphis personnel will complete any waste characterization forms required by the disposal facility. If analytical results indicate the building debris must be disposed of as a hazardous waste, NSA Memphis will label the roll-off boxes in accordance with applicable regulations and dispose of the material through the Defense Reutilization and Marketing Office.

Soil

EnSafe will collect a composite sample from each 100 cubic yards of excavated soil for disposal characterization. A sample will be collected from each roll-off box consisting of a homogenization of three equal volumes of soil collected from a depth of 2 feet into the soil mass within the box. One sample volume will be collected from each end, and one will be collected from the center of the roll-off box. Then the roll-off box samples will be composited so there is one representative sample for each 100 cubic yards of excavated soil. Just like the building material debris, the soil will be a hazardous waste only if it fails the TCLP method, since there is no documentation that the spilled material was from a commercial chemical product that was the commercially pure grade of the chemical, any technical grades of the chemical, or a formulation in which the chemical was the sole active ingredient. The disposal characterization soil samples will be analyzed for TCLP pesticides and, if necessary, additional analyses will be performed to meet disposal facility requirements.

NSA Memphis personnel will complete any waste characterization forms required by the disposal facility. If analytical results indicate the excavated soil must be disposed of as a hazardous waste, NSA Memphis will label the roll-off boxes in accordance with applicable regulations and dispose

of the material through the Defense Reutilization and Marketing Office. The area of the excavation will be considered a less-than-90-day storage area for temporarily storing the building debris and soil excavated from the site until analytical results are received.

5.8 Analytical Requirements

Analytical requirements for the samples collected for confirmation and disposal purposes are summarized in Table 2. Level III-equivalent Data Quality Objectives will be used for all confirmation sample analyses. Approximately seven confirmation soil samples will be collected and analyzed for chlorinated pesticides using USEPA Method 8080. The building disposal characterization sample and the soil disposal characterization samples collected from the roll-off boxes will be analyzed for TCLP pesticides using USEPA Method 1311/8080. If necessary, additional analyses will be performed to meet disposal facility requirements.

5.9 Sample Management

Samples will be managed in accordance with Sections 4.12 and 5 of the *Comprehensive RFI Work Plan.*

Table 2
Sample Summary and Analytical Requirements

Sample Type	Matrix	No.*	Composite/Grab	Analytical Parameters	Turnaround
Confirmation	Soil	7	Grab	Pesticides	7 days
Soil Disposal	Soil	2	Composite	TCLP-pesticides	7 days
Building Disposal	Building materials	1	Composite	TCLP-pesticides	7 days

Note:
* — The actual number of samples to be collected will be dictated by field conditions (e.g., the dimensions of the excavated area and the volume of soil for offsite disposal).

5.10 Sample Custody

Sample custody will be maintained in accordance with Section 4.12.5 of the *Comprehensive RFI Work Plan.*

6.0 QUALITY ASSURANCE PLAN

The Quality Assurance Plan presented in Section 4.14 of the *Comprehensive RFI Work Plan* will be followed for sampling activities.

7.0 DATA MANAGEMENT PLAN

The Data Management Plan presented in Section 5 of the *Comprehensive RFI Work Plan* will be followed for sampling activities.

8.0 HEALTH AND SAFETY PLAN

During confirmation sampling, EnSafe personnel will comply with the comprehensive health and safety plan (CHASP; Section 7 of the *Comprehensive RFI Work Plan*), included as Appendix C, and the Site-Specific Health and Safety Plan (SSHASP; included as Appendix D). The EnSafe CHASP and SSHASP establish minimum health and safety requirements to be fulfilled during fieldwork. If the removal contractor is an EnSafe subcontractor, it must submit a HASP meeting these minimum requirements or a letter adopting the EnSafe SSHASP as the official contractor HASP. If the U.S. Army Corps of Engineers, DynCorp, or the Charleston Naval Shipyard Detachment is the removal contractor, they will prepare their own HASPs and submit them to TDEC for review and approval.

9.0 REFERENCES

EnSafe. (Pending). *Draft Assembly E RFI Report*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall. (1996). Technical Memorandum: *Reference Concentrations*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall. (1994). *Comprehensive RCRA Facility Investigation Work Plan.* E/A&H: Memphis, Tennessee.

ERC/EDGe. (1990). *RCRA Facility Assessment*. ERC/EDGe: Nashville, Tennessee.

ERC/EnSafe. (1990). *RCRA Facility Investigation (RFI) Report, NAS Memphis Site No. 59, NAS Memphis, Millington, Tennessee*. E/A&H: Memphis, Tennessee.

Kingsbury, J.A., and J. Carmichael. (1995). *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station, Near Millington, Tennessee*. U.S. Department of the Interior, U.S. Geological Survey, Water-Resources Investigation Report 9504011.

SOUTHDIV. (1990). *Draft Final RCRA Facility Investigation Work Plan.*

TDEC, Division of Underground Storage Tanks. (1996). *Environmental Assessment Guidelines.*

U.S. Environmental Protection Agency. (1996a). *Risk-Based Concentration Table*. USEPA, Region III, January to June 1996.

U.S. Environmental Protection Agency. (1996b). *Drinking Water Regulations and Health Advisories*. USEPA, Office of Water.

U.S. Environmental Protection Agency. (1994). *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*. USEPA Office of Solid Waste and Emergency Response, Directive 9355.4-12, July 1994.

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Appendix A

Summary Tables and Analytical Results

DPT Screening Samples

Table A-1
Detected Concentrations of VOCs and Pesticides in DPT Soil Samples
SWMU 59 – Building S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
VOCs										
2-Butanone (MEK)	3 - 5	3/10	22 - 37	29	N/A	N/A	N/A	N/A	NA	NA
	9 - 11	4/10	7 - 1,100	284	N/A	N/A	N/A	N/A	NA	NA
4-Methyl-2-Pentanone (MIBK)	3 - 5	1/10	1	1	N/A	N/A	N/A	N/A	NA	NA
Acetone	0 - 2	5/10	700 - 7,200	3,292	7,800,000	0	200,000,000	0	8,000	No
	3 - 5	5/10	320 - 8,600	3,160	N/A	N/A	N/A	N/A	8,000	1 (059S0009)
	9 - 11	5/10	370 - 6,400	2,598	N/A	N/A	N/A	N/A	8,000	No
Carbon disulfide	0 - 2	1/10	2	2	7,800,000	0	200,000,000	0	14,000	No
Ethylbenzene	0 - 2	2/10	1 - 2	2	7,800,000	0	200,000,000	0	5,000	No
	3 - 5	1/10	1	1	N/A	N/A	N/A	N/A	5,000	No
Methylene chloride	0 - 2	1/10	3	3	85,000	0	760,000	0	10	No
	3 - 5	2/10	3 - 4	4	N/A	N/A	N/A	N/A	10	No
	9 - 11	2/10	1 - 2	2	N/A	N/A	N/A	N/A	10	No
Tetrachloroethene (PCE)	0 - 2	1/10	6 - 6	6	12,000	0	110,000	0	40	No
Xylene (total)	0 - 2	2/10	7 - 9	8	160,000,000	0	1,000,000,000	0	74,000	No
Pesticides/PCBs										
4,4'-DDD	0 - 2	2/10	92 - 160	126	2,700	0	24,000	0	700	No
	3 - 5	2/10	14 - 16	15	N/A	N/A	N/A	N/A	700	No
4,4'-DDE	0 - 2	5/10	39 - 340	163	1,900	0	17,000	0	500	No
	3 - 5	3/10	29 - 58	45	N/A	N/A	N/A	N/A	500	No
4,4'-DDT	0 - 2	4/10	25 - 180	109	1,900	0	17,000	0	1,000	No
	3 - 5	3/10	8.2 - 47	30	N/A	N/A	N/A	N/A	1,000	No
Aldrin	3 - 5	1/10	1.2	1.2	N/A	N/A	N/A	N/A	5	No
alpha-Chlordane	0 - 2	3/10	19 - 430	273	490	0	4,400	0	2,000	No
	3 - 5	2/10	93 - 410	252	N/A	N/A	N/A	N/A	2,000	No
	9 - 11	1/10	1.2	1.2	N/A	N/A	N/A	N/A	2,000	No
Aroclor-1260	0 - 2	1/10	210	210	320	0	2,850	0	NA	NA

Table A-1
Detected Concentrations of VOCs and Pesticides in DPT Soil Samples
SWMU 59 – Building S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC – Res. Exceedances	Industrial Soil RBC[e]	RBC – Ind. Exceedances	SSL[f]	SSL Exceedances
Dieldrin	0 - 2	3/10	18 - 650	286	40	2 (059S0002, 059S0003)	360	1 (059S0002)	1	3 (059S0002, 059S0003, 059S0007)
	3 - 5	2/10	25 - 150	88	N/A	N/A	N/A	N/A	1	2 (059S0002, 059S0007)
Endrin aldehyde	0 - 2	1/10	58	58	23,000	0	610,000	0	NA	NA
gamma-Chlordane	0 - 2	3/10	22 - 490	311	490	0	4,400	0	2,000	No
	3 - 5	2/10	90 - 480	285	N/A	N/A	N/A	N/A	2,000	No
	9 - 11	1/10	1.3	1.3	N/A	N/A	N/A	N/A	2,000	No
Heptachlor	0 - 2	1/10	99	99	140	0	1,300	0	60	1 (059S0007)
	3 - 5	1/10	74	74	N/A	N/A	N/A	N/A	60	1 (059S0007)
Heptachlor epoxide	0 - 2	1/10	140	140	70	1 (059S0007)	630	0	30	1 (059S0007)
	3 - 5	1/10	160	160	N/A	N/A	N/A	N/A	30	1 (059S0007)
Technical Chlordane	0 - 2	2/10	2,900 - 3,600	3,250	490	2 (059S0002, 059S0007)	4,400	0	2,000	2 (059S0002, 059S0007)
	3 - 5	2/10	730 - 3,200	1,965	N/A	N/A	N/A	N/A	2,000	1 (059S0007)

Notes:

a – Feet below land surface

b – Thirty samples were collected from 10 Geoprobe sampling locations. The following intervals were sampled: 0 to 2 feet, 3 to 5 feet, and 9 to 11 feet. Three of the samples from 0 to 2 feet were split as duplicates. All samples were submitted to the offsite laboratory for VOC and pesticide/PCB analyses.

c – Range lower limit is the lowest detected analyte concentration.

d – Mean based on detected analyte concentrations only.

e – Residential and industrial screening values (RBC-Res., RBC-Ind.) are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum). RBCs are only applicable for comparison to data from samples collected across the surface interval.

f – Soil Screening Levels (SSLs), considered protective of contaminant transfer from soil to groundwater, are from January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum).

N/A denotes RBC comparison is not applicable for this subsurface sample.

NA denotes risk-based data not available for this analyte; therefore, no comparison can be made.

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-PEST	SAMPLE ID ------>	059-S-0001-02 DL		059-S-0001-05		059-S-0001-11		059-S-0002-02		059-C-0002-02		059-S-0002-05	
	ORIGINAL ID ----->	059S000102		059S000105		059S000111		059S000202		059C000202		059S000205	
	LAB SAMPLE ID --->	137870		137871		137872		137867		137866		137868	
	ID FROM REPORT -->	059S000102		059S000105		059S000111		059S000202		059C000202		059S000205	
	SAMPLE DATE ----->	10/27/95		10/27/95		10/27/95		10/27/95		10/27/95		10/27/95	
	DATE EXTRACTED -->	11/08/95		11/08/95		11/08/95		11/08/95		11/08/95		11/08/95	
	DATE ANALYZED --->	11/22/95		11/22/95		11/22/95		11/18/95		11/18/95		11/18/95	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ---------->	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1591	VAL	1591	VAL	1591	VAL	1597	VAL	1597	VAL	1597	VAL
319-84-6	alpha-BHC	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
319-85-7	beta-BHC	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
319-86-8	delta-BHC	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
58-89-9	gamma-BHC (Lindane)	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
76-44-8	Heptachlor	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
309-00-2	Aldrin	9.7	U	2.1	U	2.2	U	21.	U	19.	JD	1.2	J
1024-57-3	Heptachlor epoxide	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
959-98-8	Endosulfan I	9.7	U	2.1	U	2.2	U	21.	U	21.	U	2.1	U
60-57-1	Dieldrin	19.	U	4.2	U	4.4	U	650.	D	610.	D	150.	D
72-55-9	4,4'-DDE	19.	U	4.2	U	4.4	U	260.	JD	590.	JD	47.	
72-20-8	Endrin	19.	U	4.2	U	4.4	U	42.	U	42.	U	4.3	U
33213-65-9	Endosulfan II	19.	U	4.2	U	4.4	U	42.	U	42.	U	4.3	U
72-54-8	4,4'-DDD	19.	U	4.2	U	4.4	U	92.	JD	120.	JD	16.	J
1031-07-8	Endosulfan sulfate	19.	U	4.2	U	4.4	U	42.	U	42.	U	4.3	U
50-29-3	4,4'-DDT	19.	U	4.2	U	4.4	U	180.	JD	390.	JD	35.	J
72-43-5	Methoxychlor	97.	U	21.	U	22.	U	210.	U	210.	U	21.	U
53494-70-5	Endrin ketone	19.	U	4.2	U	4.4	U	42.	U	42.	U	4.3	U
7421-93-4	Endrin aldehyde	19.	U	4.2	U	4.4	U	42.	U	42.	U	4.3	U
5103-71-9	alpha-Chlordane	19.	U	2.1	U	2.2	U	430.	DE	320.	D	93.	D
5103-74-2	gamma-Chlordane	19.	U	2.1	U	2.2	U	420.	D	330.	D	90.	D
8001-35-2	Toxaphene	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
12674-11-2	Aroclor-1016	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
11104-28-2	Aroclor-1221	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
11141-16-5	Aroclor-1232	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
53469-21-9	Aroclor-1242	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
12672-29-6	Aroclor-1248	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
11097-69-1	Aroclor-1254	190.	U	42.	U	44.	U	420.	U	420.	U	43.	U
11096-82-5	Aroclor-1260	190.	U	42.	U	44.	U	420.	U	590.	JD	43.	U
12789-03-6	Technical Chlordane	190.	U	42.	U	44.	U	3600.	D	3100.	JD	730.	J

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-PEST						
SAMPLE ID ------->	059-S-0002-11	059-S-0003-02 DL	059-C-0003-02 DL	059-S-0003-05	059-S-0003-11	059-S-0004-02
ORIGINAL ID ----->	059S000211	059S000302	059C000302	059S000305	059S000311	059S200402
LAB SAMPLE ID --->	137873	137874	137869	137875	137876	137981
ID FROM REPORT -->	059S000211	059S000302	059C000302	059S000305	059S000311	059S200402
SAMPLE DATE ----->	10/27/95	10/27/95	10/27/95	10/27/95	10/27/95	10/28/95
DATE EXTRACTED -->	11/08/95	11/08/95	11/08/95	11/08/95	11/08/95	11/04/95
DATE ANALYZED --->	11/22/95	11/22/95	11/22/95	11/22/95	11/22/95	11/24/95
MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
UNITS ----------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1591	VAL	1591	VAL	1591	VAL	1591	VAL	1591	VAL	1601	VAL
319-84-6	alpha-BHC	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
319-85-7	beta-BHC	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
319-86-8	delta-BHC	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
58-89-9	gamma-BHC (Lindane)	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
76-44-8	Heptachlor	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
309-00-2	Aldrin	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
1024-57-3	Heptachlor epoxide	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
959-98-8	Endosulfan I	2.2	U	38.	U	19.	U	2.1	U	2.1	U	20.	U
60-57-1	Dieldrin	4.3	U	190.	J	130.	D	4.2	U	4.2	U	40.	U
72-55-9	4,4'-DDE	4.3	U	39.	JD	64.	D	4.2	U	4.2	U	130.	D
72-20-8	Endrin	4.3	U	77.	U	38.	U	4.2	U	4.2	U	40.	U
33213-65-9	Endosulfan II	4.3	U	77.	U	38.	U	4.2	U	4.2	U	40.	U
72-54-8	4,4'-DDD	4.3	U	77.	U	38.	U	4.2	U	4.2	U	40.	U
1031-07-8	Endosulfan sulfate	4.3	U	77.	U	38.	U	4.2	U	4.2	U	40.	U
50-29-3	4,4'-DDT	4.3	U	77.	U	26.	JD	4.2	U	4.2	U	110.	D
72-43-5	Methoxychlor	22.	U	380.	U	190.	U	21.	U	21.	U	200.	U
53494-70-5	Endrin ketone	4.3	U	77.	U	35.	JD	4.2	U	4.2	U	40.	U
7421-93-4	Endrin aldehyde	4.3	U	58.	JD	35.	JD	4.2	U	4.2	U	40.	U
5103-71-9	alpha-Chlordane	2.2	U	38.	U	19.	U	2.1	U	2.1	U	19.	JD
5103-74-2	gamma-Chlordane	2.2	U	38.	U	19.	U	2.1	U	2.1	U	22.	D
8001-35-2	Toxaphene	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
12674-11-2	Aroclor-1016	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
11104-28-2	Aroclor-1221	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
11141-16-5	Aroclor-1232	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
53469-21-9	Aroclor-1242	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
12672-29-6	Aroclor-1248	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
11097-69-1	Aroclor-1254	43.	U	770.	U	380.	U	42.	U	42.	U	400.	U
11096-82-5	Aroclor-1260	43.	U	770.	U	210.	JD	42.	U	42.	U	210.	JD
12789-03-6	Technical Chlordane	43.	U	770.	U	NR		42.	U	42.	U	400.	U

*** Validatio[illegible]omplete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-PEST	SAMPLE ID ------->>	059-C-0004-02	059-S-0004-05	059-S-0004-11	059-S-0005-02	059-S-0005-05	059-S-0005-11
	ORIGINAL ID ----->>	059C200402	059S200405	059S000411	059S200502	059S200505	059S200511
	LAB SAMPLE ID --->>	137980	137982	137877	137983	137984	137985
	ID FROM REPORT -->>	059C200402	059S200405	059S000411	059S200502	059S200505	059S200511
	SAMPLE DATE ----->>	10/28/95	10/28/95	10/27/95	10/27/95	10/27/95	10/27/95
	DATE EXTRACTED -->>	11/04/95	11/04/95	11/08/95	11/04/95	11/04/95	11/04/95
	DATE ANALYZED --->>	11/24/95	11/24/95	11/22/95	11/25/95	11/25/95	11/25/95
	MATRIX ---------->>	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->>	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1591	VAL	1601	VAL	1601	VAL	1601	VAL
319-84-6	alpha-BHC	20.	U	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
319-85-7	beta-BHC	18.	JD	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
319-86-8	delta-BHC	27.	JD	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
58-89-9	gamma-BHC (Lindane)	20.	U	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
76-44-8	Heptachlor	20.	U	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
309-00-2	Aldrin	14.	JD	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
1024-57-3	Heptachlor epoxide	20.	U	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
959-98-8	Endosulfan I	20.	U	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
60-57-1	Dieldrin	20.	JD	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
72-55-9	4,4'-DDE	160.	D	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
72-20-8	Endrin	40.	U	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
33213-65-9	Endosulfan II	40.	U	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
72-54-8	4,4'-DDD	40.	U	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
1031-07-8	Endosulfan sulfate	40.	U	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
50-29-3	4,4'-DDT	150.	D	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
72-43-5	Methoxychlor	200.	U	20.	U	22.	U	21.	U	22.	U	23.	U
53494-70-5	Endrin ketone	25.	JD	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
7421-93-4	Endrin aldehyde	66.	D	4.1	U	4.3	U	4.2	U	4.5	U	4.6	U
5103-71-9	alpha-Chlordane	25.	D	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
5103-74-2	gamma-Chlordane	23.	D	2.	U	2.2	U	2.1	U	2.2	U	2.3	U
8001-35-2	Toxaphene	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
12674-11-2	Aroclor-1016	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
11104-28-2	Aroclor-1221	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
11141-16-5	Aroclor-1232	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
53469-21-9	Aroclor-1242	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
12672-29-6	Aroclor-1248	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
11097-69-1	Aroclor-1254	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
11096-82-5	Aroclor-1260	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U
12789-03-6	Technical Chlordane	400.	U	41.	U	43.	U	42.	U	45.	U	46.	U

0000033

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

000039

SWB46-PEST													
	SAMPLE ID ------>	059-S-0006-02		059-S-0006-05		059-S-0006-11		059-S-0007-02		059-S-0007-05		059-S-0007-11	
	ORIGINAL ID ----->	059S200602		059S200605		059S200611		059S200702		059S200705		059S200711	
	LAB SAMPLE ID --->	137986		137987		137988		137989		137990		137991	
	ID FROM REPORT -->	059S200602		059S200605		059S200611		059S200702		059S200705		059S200711	
	SAMPLE DATE ----->	10/27/95		10/27/95		10/27/95		10/28/95		10/28/95		10/28/95	
	DATE EXTRACTED -->	11/04/95		11/04/95		11/04/95		11/04/95		11/04/95		11/04/95	
	DATE ANALYZED --->	11/25/95		11/25/95		11/25/95		11/25/95		12/07/95		11/25/95	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ---------->	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL
319-84-6	alpha-BHC	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
319-85-7	beta-BHC	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
319-86-8	delta-BHC	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
58-89-9	gamma-BHC (Lindane)	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
76-44-8	Heptachlor	21.	U	2.3	U	2.2	U	99.	D	74.	D	2.	U
309-00-2	Aldrin	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
1024-57-3	Heptachlor epoxide	21.	U	2.3	U	2.2	U	140.	JD	160.	D	2.	U
959-98-8	Endosulfan I	21.	U	2.3	U	2.2	U	11.	U	11.	U	2.	U
60-57-1	Dieldrin	42.	U	4.6	U	4.3	U	18.	JD	25.	JD	4.1	U
72-55-9	4,4'-DDE	340.	D	29.		4.3	U	44.	JD	58.	D	4.1	U
72-20-8	Endrin	42.	U	4.6	U	4.3	U	22.	U	21.	U	4.1	U
33213-65-9	Endosulfan II	42.	U	4.6	U	4.3	U	22.	U	21.	U	4.1	U
72-54-8	4,4'-DDD	160.	D	16.		4.3	U	22.	U	21.	U	4.1	U
1031-07-8	Endosulfan sulfate	42.	U	4.6	U	4.3	U	22.	U	21.	U	4.1	U
50-29-3	4,4'-DDT	120.	D	8.2		4.3	U	25.	JD	47.	JD	4.1	U
72-43-5	Methoxychlor	210.	U	23.	U	22.	U	110.	U	110.	U	20.	U
53494-70-5	Endrin ketone	42.	U	4.6	U	4.3	U	22.	U	21.	U	4.1	U
7421-93-4	Endrin aldehyde	42.	U	4.6	U	4.3	U	22.	U	21.	U	4.1	U
5103-71-9	alpha-Chlordane	21.	U	2.3	U	2.2	U	370.	JD	410.	JD	1.2	J
5103-74-2	gamma-Chlordane	21.	U	2.3	U	2.2	U	490.	JD	480.	JD	1.3	J
8001-35-2	Toxaphene	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
12674-11-2	Aroclor-1016	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
11104-28-2	Aroclor-1221	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
11141-16-5	Aroclor-1232	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
53469-21-9	Aroclor-1242	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
12672-29-6	Aroclor-1248	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
11097-69-1	Aroclor-1254	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
11096-82-5	Aroclor-1260	420.	U	46.	U	43.	U	220.	U	210.	U	41.	U
12789-03-6	Technical Chlordane	420.	U	46.	U	43.	U	2900.	D	3200.	D	41.	U

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-PEST	SAMPLE ID ------>	059-S-0008-02	059-S-0008-05	059-S-0008-11	059-S-0009-02	059-S-0009-05	059-S-0009-11
	ORIGINAL ID ----->	059S200802	059S200805	059S200811	059S200902	059S200905	059S200911
	LAB SAMPLE ID --->	137992	137993	137994	137995	137996	137997
	ID FROM REPORT -->	059S200802	059S200805	059S200811	059S200902	059S200905	059S200911
	SAMPLE DATE ----->	10/28/95	10/28/95	10/28/95	10/28/95	10/28/95	10/28/95
	DATE EXTRACTED -->	11/04/95	11/04/95	11/04/95	11/04/95	11/04/95	11/04/95
	DATE ANALYZED --->	11/25/95	11/25/95	11/25/95	11/25/95	11/25/95	11/26/95
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL
319-84-6	alpha-BHC	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
319-85-7	beta-BHC	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
319-86-8	delta-BHC	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
58-89-9	gamma-BHC (Lindane)	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
76-44-8	Heptachlor	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
309-00-2	Aldrin	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
1024-57-3	Heptachlor epoxide	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
959-98-8	Endosulfan I	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
60-57-1	Dieldrin	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
72-55-9	4,4'-DDE	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
72-20-8	Endrin	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
33213-65-9	Endosulfan II	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
72-54-8	4,4'-DDD	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
1031-07-8	Endosulfan sulfate	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
50-29-3	4,4'-DDT	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
72-43-5	Methoxychlor	94.	U	22.	U	21.	U	1000.	U	110.	U	21.	U
53494-70-5	Endrin ketone	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
7421-93-4	Endrin aldehyde	19.	U	4.4	U	4.2	U	200.	U	22.	U	4.2	U
5103-71-9	alpha-Chlordane	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
5103-74-2	gamma-Chlordane	9.4	U	2.2	U	2.1	U	100.	U	11.	U	2.1	U
8001-35-2	Toxaphene	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
12674-11-2	Aroclor-1016	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
11104-28-2	Aroclor-1221	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
11141-16-5	Aroclor-1232	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
53469-21-9	Aroclor-1242	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
12672-29-6	Aroclor-1248	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
11097-69-1	Aroclor-1254	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
11096-82-5	Aroclor-1260	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U
12789-03-6	Technical Chlordane	190.	U	44.	U	42.	U	2000.	U	220.	U	42.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-PEST								
	SAMPLE ID ------>	059-S-0010-02		059-S-0010-05		059-S-0010-11		
	ORIGINAL ID ----->	059S201002		059S201005		059S201011		
	LAB SAMPLE ID --->	137998		137999		138000		
	ID FROM REPORT -->	059S201002		059S201005		059S201011		
	SAMPLE DATE ----->	10/28/95		10/28/95		10/28/95		
	DATE EXTRACTED -->	11/04/95		11/04/95		11/08/95		
	DATE ANALYZED --->	11/26/95		11/26/95		11/29/95		
	MATRIX ---------->	Soil		Soil		Soil		
	UNITS ---------->	UG/KG		UG/KG		UG/KG		
CAS #	Parameter	1601	VAL	1601	VAL	1603	VAL	
319-84-6	alpha-BHC	95.	U	43.	U	2.1	U	
319-85-7	beta-BHC	95.	U	43.	U	2.1	U	
319-86-8	delta-BHC	95.	U	43.	U	2.1	U	
58-89-9	gamma-BHC (Lindane)	95.	U	43.	U	2.1	U	
76-44-8	Heptachlor	95.	U	43.	U	2.1	U	
309-00-2	Aldrin	95.	U	43.	U	2.1	U	
1024-57-3	Heptachlor epoxide	95.	U	43.	U	2.1	U	
959-98-8	Endosulfan I	95.	U	43.	U	2.1	U	
60-57-1	Dieldrin	190.	U	85.	U	4.2	U	
72-55-9	4,4'-DDE	190.	U	85.	U	4.2	U	
72-20-8	Endrin	190.	U	85.	U	4.2	U	
33213-65-9	Endosulfan II	190.	U	85.	U	4.2	U	
72-54-8	4,4'-DDD	190.	U	85.	U	4.2	U	
1031-07-8	Endosulfan sulfate	190.	U	85.	U	4.2	U	
50-29-3	4,4'-DDT	190.	U	85.	U	4.2	U	
72-43-5	Methoxychlor	950.	U	430.	U	21.	U	
53494-70-5	Endrin ketone	190.	U	85.	U	4.2	U	
7421-93-4	Endrin aldehyde	190.	U	85.	U	4.2	U	
5103-71-9	alpha-Chlordane	95.	U	43.	U	2.1	U	
5103-74-2	gamma-Chlordane	95.	U	43.	U	2.1	U	
8001-35-2	Toxaphene	1900.	U	850.	U	42.	U	
12674-11-2	Aroclor-1016	1900.	U	850.	U	42.	U	
11104-28-2	Aroclor-1221	1900.	U	850.	U	42.	U	
11141-16-5	Aroclor-1232	1900.	U	850.	U	42.	U	
53469-21-9	Aroclor-1242	1900.	U	850.	U	42.	U	
12672-29-6	Aroclor-1248	1900.	U	850.	U	42.	U	
11097-69-1	Aroclor-1254	1900.	U	850.	U	42.	U	
11096-82-5	Aroclor-1260	1900.	U	850.	U	42.	U	
12789-03-6	Technical Chlordane	1900.	U	850.	U	42.	U	

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-VOA													
	SAMPLE ID ------->	059-S-0001-02		059-S-0001-05		059-S-0001-11		059-S-0002-02		059-C-0002-02		059-S-0002-05	
	ORIGINAL ID ----->	059S000102		059S000105		059S000111		059S000202		059C000202		059S000205	
	LAB SAMPLE ID --->	137870		137871		137872		137867		137866		137868	
	ID FROM REPORT -->	059S000102		059S000105		059S000111		059S000202		059C000202		059S000205	
	SAMPLE DATE ----->	10/27/95		10/27/95		10/27/95		10/27/95		10/27/95		10/27/95	
	DATE ANALYZED --->	10/31/95		10/31/95		11/01/95		11/10/95		11/10/95		11/10/95	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ----------->	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1591	VAL	1591	VAL	1591	VAL	1597	VAL	1597	VAL	1597	VAL
74-87-3	Chloromethane	12.	U	12.	U	13.	U	12.	U	4.	J	13.	U
74-83-9	Bromomethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-01-4	Vinyl chloride	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-00-3	Chloroethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-09-2	Methylene chloride	12.	U	12.	U	13.	U	3.	J	3.	J	3.	J
67-64-1	Acetone	2900.	UD	4800.	UD	1600.	UD	83.	U	350.	J	97.	U
75-15-0	Carbon disulfide	2.	J	12.	U	13.	U	12.	U	12.	U	13.	U
75-35-4	1,1-Dichloroethene	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-34-3	1,1-Dichloroethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
540-59-0	1,2-Dichloroethene (total)	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
67-66-3	Chloroform	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
107-06-2	1,2-Dichloroethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
78-93-3	2-Butanone (MEK)	12.	U	37.		13.	U	12.	U	12.	U	13.	U
71-55-6	1,1,1-Trichloroethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
56-23-5	Carbon tetrachloride	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-27-4	Bromodichloromethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
78-87-5	1,2-Dichloropropane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
10061-01-5	cis-1,3-Dichloropropene	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
79-01-6	Trichloroethene	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
124-48-1	Dibromochloromethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
79-00-5	1,1,2-Trichloroethane	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
71-43-2	Benzene	12.	U	12.	U	13.	U	12.	U	2.	J	13.	U
10061-02-6	trans-1,3-Dichloropropene	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
75-25-2	Bromoform	12.	U	12.	U	13.	U	12.	U	12.	U	13.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
591-78-6	2-Hexanone	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
127-18-4	Tetrachloroethene	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
108-88-3	Toluene	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
108-90-7	Chlorobenzene	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
100-41-4	Ethylbenzene	2.	J	1.	J	13.	U	12.	U	12.	U	13.	U
100-42-5	Styrene	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U
1330-20-7	Xylene (Total)	12.	U	12.	UJ	13.	U	12.	U	12.	U	13.	U

NSA MEMPHIS - SWMU 59
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DPT Soil Samples

SUB46-VOA	SAMPLE ID ------->	059-S-0002-11	059-S-0003-02	059-C-0003-02	059-S-0003-05	059-S-0003-11	059-S-0004-02
	ORIGINAL ID ----->	059S000211	059S000302	059C000302	059S000305	059S000311	059S200402
	LAB SAMPLE ID --->	137873	137874	137869	137875	137876	137981
	ID FROM REPORT -->	059S000211	059S000302	059C000302	059S000305	059S000311	059S200402
	SAMPLE DATE ----->	10/27/95	10/27/95	10/27/95	10/27/95	10/27/95	10/28/95
	DATE ANALYZED --->	11/01/95	11/01/95	11/01/95	11/01/95	11/12/95	11/02/95
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1591	VAL	1591	VAL	1591	VAL	1591	VAL	1591	VAL	1601	VAL
74-87-3	Chloromethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
74-83-9	Bromomethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-01-4	Vinyl chloride	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-00-3	Chloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-09-2	Methylene chloride	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
67-64-1	Acetone	480.	UD	22000.	UD	19.	U	620.	UD	17000.	U	190.	U
75-15-0	Carbon disulfide	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-35-4	1,1-Dichloroethene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-34-3	1,1-Dichloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
540-59-0	1,2-Dichloroethene (total)	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
67-66-3	Chloroform	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
107-06-2	1,2-Dichloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
78-93-3	2-Butanone (MEK)	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
71-55-6	1,1,1-Trichloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
56-23-5	Carbon tetrachloride	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-27-4	Bromodichloromethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
78-87-5	1,2-Dichloropropane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
10061-01-5	cis-1,3-Dichloropropene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
79-01-6	Trichloroethene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
124-48-1	Dibromochloromethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
79-00-5	1,1,2-Trichloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
71-43-2	Benzene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
10061-02-6	trans-1,3-Dichloropropene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
75-25-2	Bromoform	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	13.	U	11.	U	19.	U	1.	J	1600.	U	12.	U
591-78-6	2-Hexanone	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
127-18-4	Tetrachloroethene	13.	U	6.	J	19.	U	13.	U	1600.	U	12.	U
79-34-5	1,1,2,2-Tetrachloroethane	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
108-88-3	Toluene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
108-90-7	Chlorobenzene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
100-41-4	Ethylbenzene	13.	U	1.	J	19.	U	13.	U	1600.	U	12.	U
100-42-5	Styrene	13.	U	11.	U	19.	U	13.	U	1600.	U	12.	U
1330-20-7	Xylene (Total)	13.	U	7.	J	19.	U	13.	U	1600.	U	12.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-VOA	SAMPLE ID ------>	059-C-0004-02	059-S-0004-05	059-S-0004-11	059-S-0005-02	059-S-0005-05	059-S-0005-11
	ORIGINAL ID ----->	059C200402	059S200405	059S000411	059S200502	059S200505	059S200511
	LAB SAMPLE ID --->	137980	137982	137877	137983	137984	137985
	ID FROM REPORT -->	059C200402	059S200405	059S000411	059S200502	059S200505	059S200511
	SAMPLE DATE ----->	10/28/95	10/28/95	10/27/95	10/27/95	10/27/95	10/27/95
	DATE ANALYZED --->	11/01/95	11/03/95	11/02/95	11/12/95	11/12/95	11/04/95
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1591	VAL	1601	VAL	1601	VAL	1601	VAL
74-87-3	Chloromethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
74-83-9	Bromomethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-01-4	Vinyl chloride	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-00-3	Chloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-09-2	Methylene chloride	12.	U	12.	U	1.	J	1600.	U	1700.	U	69.	U
67-64-1	Acetone	12.	U	120.	U	90.	U	7000.	J	4200.	J	1600.	J
75-15-0	Carbon disulfide	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-35-4	1,1-Dichloroethene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-34-3	1,1-Dichloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
540-59-0	1,2-Dichloroethene (total)	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
67-66-3	Chloroform	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
107-06-2	1,2-Dichloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
78-93-3	2-Butanone (MEK)	12.	U	12.	U	7.	J	1600.	U	1700.	U	69.	U
71-55-6	1,1,1-Trichloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
56-23-5	Carbon tetrachloride	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-27-4	Bromodichloromethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
78-87-5	1,2-Dichloropropane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
10061-01-5	cis-1,3-Dichloropropene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
79-01-6	Trichloroethene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
124-48-1	Dibromochloromethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
79-00-5	1,1,2-Trichloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
71-43-2	Benzene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
10061-02-6	trans-1,3-Dichloropropene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
75-25-2	Bromoform	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
591-78-6	2-Hexanone	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
127-18-4	Tetrachloroethene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
108-88-3	Toluene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
108-90-7	Chlorobenzene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
100-41-4	Ethylbenzene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
100-42-5	Styrene	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U
1330-20-7	Xylene (Total)	12.	U	12.	U	13.	U	1600.	U	1700.	U	69.	U

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SW846-VOA	SAMPLE ID ------>	059-S-0006-02	059-S-0006-05	059-S-0006-11	059-S-0007-02	059-S-0007-05	059-S-0007-11
	ORIGINAL ID ----->	059S200602	059S200605	059S200611	059S200702	059S200705	059S200711
	LAB SAMPLE ID --->	137986	137987	137988	137989	137990	137991
	ID FROM REPORT -->	059S200602	059S200605	059S200611	059S200702	059S200705	059S200711
	SAMPLE DATE ----->	10/27/95	10/27/95	10/27/95	10/28/95	10/28/95	10/28/95
	DATE ANALYZED --->	11/04/95	11/03/95	11/03/95	11/04/95	11/12/95	11/06/95
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ----------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL
74-87-3	Chloromethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
74-83-9	Bromomethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-01-4	Vinyl chloride	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-00-3	Chloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-09-2	Methylene chloride	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
67-64-1	Acetone	850.		780.	D	89.	U	13.	U	1900.	J	370.	J
75-15-0	Carbon disulfide	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-35-4	1,1-Dichloroethene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-34-3	1,1-Dichloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
540-59-0	1,2-Dichloroethene (total)	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
67-66-3	Chloroform	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
107-06-2	1,2-Dichloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
78-93-3	2-Butanone (MEK)	63.	U	29.	J	13.	U	13.	U	1600.	U	13.	J
71-55-6	1,1,1-Trichloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
56-23-5	Carbon tetrachloride	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-27-4	Bromodichloromethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
78-87-5	1,2-Dichloropropane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
10061-01-5	cis-1,3-Dichloropropene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
79-01-6	Trichloroethene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
124-48-1	Dibromochloromethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
79-00-5	1,1,2-Trichloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
71-43-2	Benzene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
10061-02-6	trans-1,3-Dichloropropene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
75-25-2	Bromoform	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
591-78-6	2-Hexanone	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
127-18-4	Tetrachloroethene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
79-34-5	1,1,2,2-Tetrachloroethane	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
108-88-3	Toluene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
108-90-7	Chlorobenzene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
100-41-4	Ethylbenzene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
100-42-5	Styrene	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U
1330-20-7	Xylene (Total)	63.	U	14.	U	13.	U	13.	U	1600.	U	21.	U

*** Validation complete. ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-VOA	SAMPLE ID ------->	059-S-0008-02	059-S-0008-05	059-S-0008-11	059-S-0009-02	059-S-0009-05	059-S-0009-11
	ORIGINAL ID ----->	059S200802	059S200805	059S200811	059S200902	059S200905	059S200911
	LAB SAMPLE ID --->	137992	137993	137994	137995	137996	137997
	ID FROM REPORT -->	059S200802	059S200805	059S200811	059S200902	059S200905	059S200911
	SAMPLE DATE ----->	10/28/95	10/28/95	10/28/95	10/28/95	10/28/95	10/28/95
	DATE ANALYZED --->	11/12/95	11/06/95	11/12/95	11/02/95	11/12/95	11/12/95
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL	1601	VAL
74-87-3	Chloromethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
74-83-9	Bromomethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-01-4	Vinyl chloride	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-00-3	Chloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-09-2	Methylene chloride	1400.	U	4.	J	1600.	U	62.	U	1700.	U	1600.	U
67-64-1	Acetone	7200.	J	220.	U	4200.	J	700.	J	8600.	J	6400.	J
75-15-0	Carbon disulfide	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-35-4	1,1-Dichloroethene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-34-3	1,1-Dichloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
540-59-0	1,2-Dichloroethene (total)	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
67-66-3	Chloroform	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
107-06-2	1,2-Dichloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
78-93-3	2-Butanone (MEK)	1400.	U	22.		1600.	U	62.	U	1700.	U	1100.	J
71-55-6	1,1,1-Trichloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
56-23-5	Carbon tetrachloride	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-27-4	Bromodichloromethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
78-87-5	1,2-Dichloropropane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
10061-01-5	cis-1,3-Dichloropropene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
79-01-6	Trichloroethene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
124-48-1	Dibromochloromethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
79-00-5	1,1,2-Trichloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
71-43-2	Benzene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
10061-02-6	trans-1,3-Dichloropropene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
75-25-2	Bromoform	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
591-78-6	2-Hexanone	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
127-18-4	Tetrachloroethene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
79-34-5	1,1,2,2-Tetrachloroethane	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
108-88-3	Toluene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
108-90-7	Chlorobenzene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
100-41-4	Ethylbenzene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
100-42-5	Styrene	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U
1330-20-7	Xylene (Total)	1400.	U	13.	U	1600.	U	62.	U	1700.	U	1600.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Soil Samples

SW846-VOA	SAMPLE ID ------>	059-S-0010-02	059-S-0010-05	059-S-0010-11	059-S-3002-01
	ORIGINAL ID ----->	059S201002	059S201005	059S201011	059S300201
	LAB SAMPLE ID --->	137998	137999	138000	138534
	ID FROM REPORT -->	059S201002	059S201005	059S201011	059S300201
	SAMPLE DATE ----->	10/28/95	10/28/95	10/28/95	11/06/95
	DATE ANALYZED --->	11/02/95	11/06/95	11/06/95	11/16/95
	MATRIX ---------->	Soil	Soil	Soil	Soil
	UNITS ----------->	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1601	VAL	1601	VAL	1603	VAL	1609	VAL
74-87-3	Chloromethane	57.	U	13.	U	21.	U	12.	U
74-83-9	Bromomethane	57.	U	13.	U	21.	U	12.	U
75-01-4	Vinyl chloride	57.	U	13.	U	21.	U	12.	U
75-00-3	Chloroethane	57.	U	13.	U	21.	U	12.	U
75-09-2	Methylene chloride	57.	U	13.	U	2.	J	12.	U
67-64-1	Acetone	710.	J	320.	JD	420.	D	12.	U
75-15-0	Carbon disulfide	57.	U	13.	U	21.	U	12.	U
75-35-4	1,1-Dichloroethene	57.	U	13.	U	21.	U	12.	U
75-34-3	1,1-Dichloroethane	57.	U	13.	U	21.	U	12.	U
540-59-0	1,2-Dichloroethene (total)	57.	U	13.	U	21.	U	12.	U
67-66-3	Chloroform	57.	U	13.	U	21.	U	12.	U
107-06-2	1,2-Dichloroethane	57.	U	13.	U	21.	U	12.	U
78-93-3	2-Butanone (MEK)	57.	U	13.	U	15.	J	12.	U
71-55-6	1,1,1-Trichloroethane	57.	U	13.	U	21.	U	12.	U
56-23-5	Carbon tetrachloride	57.	U	13.	U	21.	U	12.	U
75-27-4	Bromodichloromethane	57.	U	13.	U	21.	U	12.	U
78-87-5	1,2-Dichloropropane	57.	U	13.	U	21.	U	12.	U
10061-01-5	cis-1,3-Dichloropropene	57.	U	13.	U	21.	U	12.	U
79-01-6	Trichloroethene	57.	U	13.	U	21.	U	12.	U
124-48-1	Dibromochloromethane	57.	U	13.	U	21.	U	12.	U
79-00-5	1,1,2-Trichloroethane	57.	U	13.	U	21.	U	12.	U
71-43-2	Benzene	57.	U	13.	U	21.	U	12.	U
10061-02-6	trans-1,3-Dichloropropene	57.	U	13.	U	21.	U	12.	U
75-25-2	Bromoform	57.	U	13.	U	21.	U	12.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	57.	U	13.	U	21.	U	12.	U
591-78-6	2-Hexanone	57.	U	13.	U	21.	U	12.	U
127-18-4	Tetrachloroethene	57.	U	13.	U	21.	U	12.	U
79-34-5	1,1,2,2-Tetrachloroethane	57.	U	13.	U	21.	U	12.	U
108-88-3	Toluene	57.	U	13.	U	21.	U	12.	U
108-90-7	Chlorobenzene	57.	U	13.	U	21.	U	12.	U
100-41-4	Ethylbenzene	57.	U	13.	U	21.	U	12.	U
100-42-5	Styrene	57.	U	13.	U	21.	U	12.	U
1330-20-7	Xylene (Total)	9.	J	13.	U	21.	U	12.	U

*** Validatic mplete ***

NSA MEMPHIS - SWMU 59
NSA MEMPHIS, RFI, ASSEMBLY E, 1st PHASE
Confirmation DPT Soil Sample

SW846-VOA

SAMPLE ID ------->	059-S-3002-01
ORIGINAL ID ----->	059S300201
LAB SAMPLE ID --->	56203-4
ID FROM REPORT -->	059S300201
SAMPLE DATE ----->	11/06/95
DATE ANALYZED --->	11/20/95
MATRIX ---------->	Soil
UNITS ----------->	ug/kg

CAS #	Parameter	HEM04	VAL
74-87-3	Chloromethane	12.	U
74-83-9	Bromomethane	12.	U
75-01-4	Vinyl chloride	12.	U
75-00-3	Chloroethane	12.	U
75-09-2	Methylene chloride	6.2	U
67-64-1	Acetone	6.2	U
75-15-0	Carbon disulfide	0.52	J
75-35-4	1,1-Dichloroethene	6.2	U
75-34-3	1,1-Dichloroethane	6.2	U
540-59-0	1,2-Dichloroethene (total)	6.2	U
67-66-3	Chloroform	6.2	U
107-06-2	1,2-Dichloroethane	6.2	U
78-93-3	2-Butanone (MEK)	31.	U
71-55-6	1,1,1-Trichloroethane	6.2	U
56-23-5	Carbon tetrachloride	6.2	U
75-27-4	Bromodichloromethane	6.2	U
78-87-5	1,2-Dichloropropane	6.2	U
10061-01-5	cis-1,3-Dichloropropene	6.2	U
79-01-6	Trichloroethene	6.2	U
124-48-1	Dibromochloromethane	6.2	U
79-00-5	1,1,2-Trichloroethane	6.2	U
71-43-2	Benzene	6.2	U
10061-02-6	trans-1,3-Dichloropropene	6.2	U
75-25-2	Bromoform	6.2	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	31.	U
591-78-6	2-Hexanone	31.	U
127-18-4	Tetrachloroethene	6.2	U
79-34-5	1,1,2,2-Tetrachloroethane	6.2	U
108-88-3	Toluene	5.	J
108-90-7	Chlorobenzene	6.2	U
100-41-4	Ethylbenzene	6.2	U
100-42-5	Styrene	6.2	U
1330-20-7	Xylene (Total)	6.4	U

DATALCP3
03/28/97

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 1st Phase
DPT Groundwater Samples

SW846-VOA

SAMPLE ID ------->	059-G-0002-40
ORIGINAL ID ----->	059G000240
LAB SAMPLE ID --->	137884
ID FROM REPORT -->	059G000240
SAMPLE DATE ----->	10/27/95
DATE ANALYZED --->	11/05/95
MATRIX ---------->	Water
UNITS ----------->	UG/L

CAS #	Parameter	1591	VAL
74-87-3	Chloromethane	10.	U
74-83-9	Bromomethane	10.	U
75-01-4	Vinyl chloride	10.	U
75-00-3	Chloroethane	10.	U
75-09-2	Methylene chloride	10.	U
67-64-1	Acetone	49.	U
75-15-0	Carbon disulfide	10.	U
75-35-4	1,1-Dichloroethene	10.	U
75-34-3	1,1-Dichloroethane	10.	U
540-59-0	1,2-Dichloroethene (total)	10.	U
67-66-3	Chloroform	10.	U
107-06-2	1,2-Dichloroethane	10.	U
78-93-3	2-Butanone (MEK)	10.	U
71-55-6	1,1,1-Trichloroethane	10.	U
56-23-5	Carbon tetrachloride	10.	U
75-27-4	Bromodichloromethane	10.	U
78-87-5	1,2-Dichloropropane	10.	U
10061-01-5	cis-1,3-Dichloropropene	10.	U
79-01-6	Trichloroethene	10.	U
124-48-1	Dibromochloromethane	10.	U
79-00-5	1,1,2-Trichloroethane	10.	U
71-43-2	Benzene	10.	U
10061-02-6	trans-1,3-Dichloropropene	10.	U
75-25-2	Bromoform	10.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	10.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	10.	U
79-34-5	1,1,2,2-Tetrachloroethane	10.	U
108-88-3	Toluene	3.	J
108-90-7	Chlorobenzene	10.	U
100-41-4	Ethylbenzene	10.	U
100-42-5	Styrene	10.	U
1330-20-7	Xylene (Total)	10.	U

*** Validation Complete ***

Appendix B

Summary Tables and Analytical Results

Hand Auger, Soil Boring, and Monitoring Well Samples

Table B-1
Detected Concentrations of Organic Compounds in Hand-Auger Surface Soil Samples
SWMU 59 — Building S-335 Old Pesticide Shop
(data in µg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
VOCs										
Toluene	0 - 6"	2/2	8 - 9	9	16,000,000	0	410,000,000	0	5,000	No
SVOCs										
Benzo(a)anthracene	0 - 6"	2/2	710 - 760	735	880	0	7,800	0	700	2 (059S0011, 059S0012)
Benzo(a)pyrene	0 - 6"	2/2	780 - 950	865	88	2 (059S0011, 059S0012)	780	1 (059S0012)	4,000	No
Benzo(b)fluoranthene	0 - 6"	2/2	840 - 1,200	1,020	880	1 (059S0012)	7,800	0	4,000	No
Benzo(g,h,i)perylene	0 - 6"	2/2	520 - 570	545	3,100,000[g]	0	82,000,000[g]	0	NA[h]	NA
Benzo(k)fluoranthene	0 - 6"	2/2	800 - 1,100	950	8,800	0	78,000	0	4,000	No
Chrysene	0 - 6"	2/2	880 - 1,200	1,040	88,000	0	780,000	0	1,000	1 (059S0012)
Fluoranthene	0 - 6"	2/2	1,100 - 1,200	1,150	3,100,000	0	82,000,000	0	980,000	No
Indeno(1,2,3-cd)pyrene	0 - 6"	2/2	480 - 490	485	880	0	7,800	0	35,000	No
Pentachlorophenol	0 - 6"	½	2,600	2,600	5,300	0	48,000	0	200	1 (059S0012)
Phenanthrene	0 - 6"	2/2	500 - 560	530	3,100,000[g]	0	82,000,000[g]	0	NA	NA
Pyrene	0 - 6"	2/2	910 - 990	950	2,300,000	0	61,000,000	0	1,400,000	No
Total Petroleum Hydrocarbons										
TPH - Diesel Range Organics	0 - 6"	2/2	51,000 - 78,000	64,500	100,000[i]	0	NA	NA	NA	NA
TPH - Gasoline Range Organics	0 - 6"	2/2	140 - 200	170	100,000[i]	0	NA	NA	NA	NA
Pesticides/PCBs										
4,4'-DDD	0 - 6"	½	700	700	2,700	0	24,000	0	700	No
4,4'-DDE	0 - 6"	2/2	1,300 - 2,300	1,800	1,900	1 (059S0012)	17,000	0	500	2 (059S0011, 059S0012)
4,4'-DDT	0 - 6"	2/2	1,300 - 4,000	2,650	1,900	1 (059S0012)	17,000	0	1,000	2 (059S0011, 059S0012)
Aldrin	0 - 6"	½	140	140	38	1 (059S0011)	340	0	5	1 (059S0011)
alpha-Chlordane	0 - 6"	2/2	860 - 6,500	3,680	490	2 (059S0011, 059S0012)	4,400	1 (059S0011)	2,000	1 (059S0011)
Aroclor-1260	0 - 6"	½	5,400	5,400	320	1 (059S0012)	2,850	1 (059S0012)	NA	NA
Dieldrin	0 - 6"	2/2	750 - 1,800	1,275	40	2 (059S0011, 059S0012)	360	2 (059S0011, 059S0012)	1	2 (059S0011, 059S0012)
Endrin aldehyde	0 - 6"	½	260	260	23,000	0	610,000	0	NA	NA
gamma-Chlordane	0 - 6"	2/2	790 - 6,900	3,845	490	2 (059S0011, 059S0012)	4,400	1 (059S0011)	2,000	1 (059S0011)
Heptachlor	0 - 6"	½	310	310	140	1 (059S0011)	1,300	0	60	1 (059S0011)
Heptachlor epoxide	0 - 6"	½	800	800	70	1 (059S0011)	630	1 (059S0011)	30	1 (059S0011)
Technical Chlordane	0 - 6"	2/2	5,100 - 52,000	28,550	490	2 (059S0011, 059S0012)	4,400	2 (059S0011, 059S0012)	2,000	2 (059S0011, 059S0012)

Table B-1
Detected Concentrations of Organic Compounds in Hand-Auger Surface Soil Samples
SWMU 59 — Building S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
Herbicides										
2,4-D	0 - 6"	2/2	25	25	780,000	0	20,000,000	0	1,700	No
Dichlorprop	0 - 6"	½	5.7	5.7	NA	NA	NA	NA	NA	NA
MCPA	0 - 6"	½	6,500	6,500	39,000	0	1,000,000	0	NA	NA

Notes:

a — Feet below land surface

b — Two surface soil samples were collected from 0 to 6 inches below land surface and analyzed for VOCs, SVOCs, TPH-GRO, TPH-DRO, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide.

c — Range lower limit is the lowest detected analyte concentration.

d — Mean based on detected analyte concentrations only.

e — Residential and industrial screening values (RBC-Res., RBC-Ind.) are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum). RBCs are only applicable for comparison to data from samples collected across the surface interval.

f — Soil Screening Levels (SSLs), considered protective of contaminant transfer from soil to groundwater, are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum).

g — The RBCs for fluoranthene were used as a surrogate for benzo(g,h,i)perylene and phenanthrene, which do not have RBCs.

h — NA denotes risk-based data not available for this analyte; therefore, no comparison can be made.

i — No RBC exists for TPH. ; therefore, the most conservation TDEC soil cleanup level of 100,000 μg/kg total TPH is used for the residential RBC (TDEC Policy Statement for Petroleum Contaminated Sites, February 14, 1997).

Table B-2
Detected Concentrations of Inorganics in Hand Auger Surface Soil Samples
SWMU 59 – Building S-335 Old Pesticide Shop
(data in mg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC – Res. Exceedances	Industrial Soil RBC[e]	RBC – Ind. Exceedances	Reference Concentration[f]	RC Exceedances	SSL[g]	SSL Exceedances
Arsenic	0 - 6"	2/2	15.3 - 27	21	0.43	2 (059S0011, 059S0012)	3.8	2 (059S0011, 059S0012)	14.58	2 (059S0011, 059S0012)	15	2 (059S0011, 059S0012)
Barium	0 - 6"	2/2	95.2 - 147	121	5,500	0	140,000	0	223.46	0	32	2 (059S0011, 059S0012)
Beryllium	0 - 6"	2/2	0.55 - 0.6	0.6	0.15	2 (059S0011, 059S0012)	1.3	0	1.0	0	180	No
Cadmium	0 - 6"	2/2	1.6 - 2.3	2	39	0	1,000	0	1.54	2 (059S0011, 059S0012)	6	No
Chromium	0 - 6"	2/2	23.2 - 40	32	390	0	10,000	0	23.89	1 (059S0011)	NA[h]	NA
Cobalt	0 - 6"	2/2	6.5 - 6.9	6.7	4,700	0	120,000	0	15.98	0	NA	NA
Copper	0 - 6"	2/2	46.2 - 73.5	59.9	3,100	0	82,000	0	24.19	2 (059S0011, 059S0012)	NA	NA
Lead	0 - 6"	2/2	521 - 625	573	400[i]	2 (059S0011, 059S0012)	1,300[i]	0	26.03	2 (059S0011, 059S0012)	NA	NA
Mercury	0 - 6"	2/2	0.35 - 0.54	0.45	23	0	610	0	0.46	1 (059S0011)	3	No
Nickel	0 - 6"	2/2	5.3 - 6.3	5.8	1,600	0	41,000	0	20.62	0	21	No
Tin	0 - 6"	½	7.9	7.9	47,000	0	1,000,000	0	33.56	0	NA	NA
Vanadium	0 - 6"	2/2	21.9 - 23.1	22.5	550	0	14,000	0	45.11	0	NA	NA
Zinc	0 - 6"	2/2	285 - 326	306	23000	0	610,000	0	98	2 (059S0011, 059S0012)	42,000	No

Notes:

a – Feet below land surface

b – Two hand-auger surface soil samples were collected from 0 to 6 inches below land surface. One of the samples was split as a duplicate. The samples were analyzed by the offsite laboratory for VOCs, SVOCs, TPH-GRO, TPH-DRO, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide.

c – Range lower limit is the lowest detected analyte concentration.

d – Mean based on detected analyte concentrations only.

e – Residential and industrial screening values (RBC-Res., RBC-Ind.) are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum). RBCs are only applicable for comparison to data from samples collected across the surface interval.

f – Reference concentration (RC) is two times the mean background concentration established for 13 background surface soil samples and five background subsurface soil samples collected throughout NSA Memphis. Refer to the *Technical Memorandum – Reference Concentrations* (E/A&H, August 1996) for background reference concentration calculations.

g – Soil Screening Levels (SSLs), considered protective of contaminant transfer from soil to groundwater, are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum).

h – NA denotes risk-based data not available for this analyte; therefore, no comparison can be made.

i – No RBC exists for lead; the soil screening value for residential and industrial soil (400 μg/kg and 1,300 μg/kg) from USEPA Office of Solid Waste and Emergency Response Directive 9355.4-12 are used for comparison.

Table B-3
Detected Concentrations of Organic Compounds in Soil Samples from RFI Soil Borings
SWMU 59 — S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
VOCs										
2-Butanone (MEK)	0 - 2	1/3	7	7	47,000,000	0	1,000,000,000	0	NA[g]	NA
	4 - 8	2/3	8 - 11	10	N/A[h]	N/A	N/A	N/A	NA	NA
Acetone	0 - 2	3/3	5 - 43	18	7,800,000	0	200,000,000	0	8,000	No
	4 - 8	3/3	6 - 47	29	N/A	N/A	N/A	N/A	8,000	No
	10 - 12	2/3	7 - 30	19	N/A	N/A	N/A	N/A	8,000	No
Carbon disulfide	0 - 2	1/3	2	2	7,800,000	0	200,000,000	0	14,000	No
SVOCs										
Anthracene	0 - 2	1/3	47	47	23,000,000	0	610,000,000	0	4,300,000	No
	10 - 12	1/3	58	58	N/A	N/A	N/A	N/A	4,300,000	No
Benzo(a)anthracene	0 - 2	1/3	220	220	880	0	7,800	0	700	No
	10 - 12	1/3	240	240	N/A	N/A	N/A	N/A	700	No
Benzo(a)pyrene	0 - 2	1/3	280	280	88	1 (059S02LS)	780	0	4,000	No
	10 - 12	1/3	320	320	N/A	N/A	N/A	N/A	4,000	No
Benzo(b)fluoranthene	0 - 2	1/3	300	300	880	0	7,800	0	4,000	No
	10 - 12	1/3	360	360	N/A	N/A	N/A	N/A	4,000	No
Benzo(g,h,i)perylene	0 - 2	1/3	150	150	3,100,000[i]	0	82,000,000[i]	0	NA	NA
	10 - 12	1/3	190	190	N/A	N/A	N/A	N/A	NA	NA
Benzo(k)fluoranthene	0 - 2	1/3	330	330	8,800	0	78,000	0	4,000	No
	10 - 12	1/3	340	340	N/A	N/A	N/A	N/A	4,000	No
bis(2-Ethylhexyl)phthalate (BEHP)	0 - 2	1/3	320	320	46,000	0	410,000	0	11,000	No
	4 - 8	1/3	380	380	N/A	N/A	N/A	N/A	11,000	No
	10 - 12	3/3	46 - 220	135	N/A	N/A	N/A	N/A	11,000	No
Butylbenzylphthalate	10 - 12	1/3	64	64	N/A	N/A	N/A	N/A	68,000	No
Carbazole	10 - 12	1/3	42	42	N/A	N/A	N/A	N/A	500	No
Chrysene	0 - 2	1/3	240	240	88,000	0	780,000	0	1,000	No
	10 - 12	1/3	280	280	N/A	N/A	N/A	N/A	1,000	No
Dibenz(a,h)anthracene	0 - 2	1/3	49	49	88	0	780	0	11,000	No
	10 - 12	1/3	63	63	N/A	N/A	N/A	N/A	11,000	No
Fluoranthene	0 - 2	1/3	330	330	3,100,000	0	82,000,000	0	980,000	No
	10 - 12	1/3	370	370	N/A	N/A	N/A	N/A	980,000	No

Table B-3
Detected Concentrations of Organic Compounds in Soil Samples from RFI Soil Borings
SWMU 59 — S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
Indeno(1,2,3-cd)pyrene	0 - 2	1/3	130	130	880	0	7,800	0	35,000	No
	10 - 12	1/3	170	170	N/A	N/A	N/A	N/A	35,000	No
Phenanthrene	0 - 2	1/3	150	150	3,100,000[i]	0	82,000,000[i]	0	NA	NA
	10 - 12	1/3	220	220	N/A	N/A	N/A	N/A	NA	NA
Pyrene	0 - 2	1/3	200	200	2,300,000	0	61,000,000	0	1,400,000	No
	10 - 12	1/3	230	230	N/A	N/A	N/A	N/A	1,400,000	No
Total Petroleum Hydrocarbons										
TPH - Diesel Range Organics	0 - 2	3/3	12,000 - 69,000	32,333	100,000[j]	0	NA	NA	NA	NA
	4 - 8	1/3	7,200	7,200	N/A	N/A	N/A	N/A	NA	NA
TPH - Gasoline Range Organics	4 - 8	1/3	69	69	N/A	N/A	N/A	N/A	NA	NA
Pesticides/PCBs										
4,4'-DDD	0 - 2	2/3	4.8 - 850	427	2,700	0	24,000	0	700	1 (059S02LS)
4,4'-DDE	0 - 2	2/3	12 - 2,500	1,256	1,900	1 (059S02LS)	17,000	0	500	1 (059S02LS)
	4 - 8	1/3	3.9	3.9	N/A	N/A	N/A	N/A	500	No
4,4'-DDT	0 - 2	2/3	7.2 - 1,700	854	1,900	0	17,000	0	1,000	1 (059S02LS)
Aldrin	0 - 2	1/3	840	840	38	1 (059S02LS)	340	1 (059S02LS)	5	1 (059S02LS)
	4 - 8	1/3	5.7	5.7	N/A	N/A	N/A	N/A	5	1 (059S02LS)
	10 - 12	1/3	3.1	3.1	N/A	N/A	N/A	N/A	5	No
alpha-Chlordane	0 - 2	1/3	4,800	4,800	490	1 (059S02LS)	4,400	1 (059S02LS)	2,000	1 (059S02LS)
	4 - 8	1/3	26	26	N/A	N/A	N/A	N/A	2,000	No
	10 - 12	1/3	15	15	N/A	N/A	N/A	N/A	2,000	No
Dieldrin	0 - 2	1/3	1,200	1,200	40	1 (059S02LS)	360	1 (059S02LS)	1	1 (059S02LS)
	4 - 8	1/3	3.4	3.4	N/A	N/A	N/A	N/A	1	1 (059S02LS)
	10 - 12	1/3	2.8	2.8	N/A	N/A	N/A	N/A	1	1 (059S02LS)
gamma-Chlordane	0 - 2	1/3	8,800	8,800	490	1 (059S02LS)	4,400	1 (059S02LS)	2,000	1 (059S02LS)
	4 - 8	1/3	52	52	N/A	N/A	N/A	N/A	2,000	No
	10 - 12	1/3	26	26	N/A	N/A	N/A	N/A	2,000	No
Heptachlor	0 - 2	1/3	3,900	3,900	140	1 (059S02LS)	1,300	1 (059S02LS)	60	1 (059S02LS)
	4 - 8	1/3	26	26	N/A	N/A	N/A	N/A	60	No
	10 - 12	1/3	11	11	N/A	N/A	N/A	N/A	60	No

Table B-3
Detected Concentrations of Organic Compounds in Soil Samples from RFI Soil Borings
SWMU 59 — S-335 Old Pesticide Shop
(data in μg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	SSL[f]	SSL Exceedances
Heptachlor epoxide	0 - 2	1/3	2,200	2,200	70	1 (059S02LS)	630	1 (059S02LS)	30	1 (059S02LS)
	4 - 8	1/3	12	12	N/A	N/A	N/A	N/A	30	No
	10 - 12	1/3	8	8	N/A	N/A	N/A	N/A	30	No
Technical Chlordane	0 - 2	1/3	46,000	46,000	490	1 (059S02LS)	4,400	1 (059S02LS)	2,000	1 (059S02LS)
	4 - 8	1/3	250	250	N/A	N/A	N/A	N/A	2,000	No
	10 - 12	1/3	140	140	N/A	N/A	N/A	N/A	2,000	No
Herbicides										
2,4,5-T	0 - 2	1/3	1.5	1.5	780,000	0	20,000,000	0	NA	NA
	4 - 8	1/3	1	1	N/A	N/A	N/A	N/A	NA	NA
2,4-D	0 - 2	2/3	12 - 18	15	780,000	0	20,000,000	0	1,700	No
2,4-DB	0 - 2	1/3	16	16	630,000	0	16,000,000	0	NA	NA
	10 - 12	1/3	6.4	6.4	N/A	N/A	N/A	N/A	NA	NA
Dicamba	0 - 2	1/3	12	12	2,300,000	0	61,000,000	0	NA	NA
Dinoseb	0 - 2	1/3	3	3	78,000	0	2,000,000	0	NA	NA
	4 - 8	1/3	7	7	N/A	N/A	N/A	N/A	NA	NA
	10 - 12	2/3	2.5	2.5	N/A	N/A	N/A	N/A	NA	NA

Notes:

a — Feet below land surface

b — Nine soil samples were collected; three from each loess soil boring location. One of the samples were split for duplicate analysis. The samples were analyzed by the offsite laboratory for VOCs, SVOCs, TPH-GRO, TPH-DRO, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide.

c — Range lower limit is the lowest detected analyte concentration.

d — Mean based on detected analyte concentrations only.

e — Residential and industrial screening values (RBC-Res., RBC-Ind.) are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum). RBCs are only applicable for comparison to data from samples collected across the surface interval.

f — Soil Screening Levels (SSLs), considered protective of contaminant transfer from soil to groundwater, are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum).

g — NA denotes risk-based data not available for this analyte; therefore, no comparison can be made.

h — N/A denotes RBC comparison is not applicable for this subsurface sample.

i — The RBCs for fluoranthene were used as a surrogate for benzo(g,h,i)perylene and phenanthrene, which do not have RBCs.

j — No RBC exists for TPH. ; therefore, the most conservation TDEC soil cleanup level of 100,000 μg/kg total TPH is used for the residential RBC (TDEC Policy Statement for Petroleum Contaminated Sites, February 14, 1997).

Table B-4
Detected Concentrations of Inorganics in Soil Samples from RFI Soil Borings
SWMU 59 — Building S-335 Old Pesticide Shop
(data in mg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	Reference Concentration	RC Exceedances	SSL[g]	SSL Exceedances
Arsenic	0 - 2	3/3	3.3 - 9.7	6.7	0.43	3 (059S01LS, 059S02LS, 059S03LS)	3.8	2 (059S02LS, 059S03LS)	14.58	0	15	No
	4 - 8	3/3	6 - 10.4	8	N/A[h]	N/A	N/A	N/A	20.32	0	15	No
	10 - 12	3/3	6.8 - 17.2	12.3	N/A	N/A	N/A	N/A	20.32	0	15	1 (059S01LS)
Barium	0 - 2	3/3	62.4 - 113	89	5,500	0	140,000	0	223.46	0	32	3 (059S01LS, 059S02LS, 059S03LS)
	4 - 8	3/3	81.5 - 166	110	N/A	N/A	N/A	N/A	265.12	0	32	3 (059S01LS, 059S02LS, 059S03LS)
	10 - 12	3/3	63.5 - 220	157	N/A	N/A	N/A	N/A	265.12	0	32	3 (059S01LS, 059S02LS, 059S03LS)
Beryllium	0 - 2	3/3	0.43 - 0.52	0.48	0.15	3 (059S01LS, 059S02LS, 059S03LS)	1.3	0	1.0	0	180	No
	4 - 8	3/3	0.42 - 0.56	0.50	N/A	N/A	N/A	N/A	1.0	0	180	No
	10 - 12	3/3	0.35 - 0.68	0.56	N/A	N/A	N/A	N/A	1.0	0	180	No
Cadmium	0 - 2	3/3	1.0 - 1.8	1.4	39	0	1,000	0	1.54	1 (059S02LS)	6	No
	4 - 8	3/3	1.1 - 1.6	1.4	N/A	N/A	N/A	N/A	3.24	0	6	No
	10 - 12	3/3	0.84 - 2.3	1.7	N/A	N/A	N/A	N/A	3.24	0	6	No
Chromium	0 - 2	3/3	9.8 - 15.3	12.1	390	0	10,000	0	23.89	0	NA[i]	NA
	4 - 8	3/3	6.3 - 12.8	9.9	N/A	N/A	N/A	N/A	28.28	0	NA	NA
	10 - 12	3/3	9 - 17.3	13	N/A	N/A	N/A	N/A	28.28	0	NA	NA
Cobalt	0 - 2	3/3	6.2 - 9.8	7.7	4,700	0	120,000	0	15.98	0	NA	NA
	4 - 8	3/3	7 - 8.8	8	N/A	N/A	N/A	N/A	14.36	0	NA	NA
	10 - 12	3/3	6.6 - 12	10	N/A	N/A	N/A	N/A	14.36	0	NA	NA
Copper	0 - 2	1/3	25.1	25.1	3,100	0	82,000	0	24.19	1 (059S02LS)	NA	NA
	4 - 8	1/3	20.2	20.2	N/A	N/A	N/A	N/A	32.52	0	NA	NA
	10 - 12	1/3	22.6	22.6	N/A	N/A	N/A	N/A	32.52	0	NA	NA
Lead	0 - 2	3/3	12.3 - 151	89	400[j]	0	1,300[j]	0	26.03	2 (059S01LS, 059S02LS)	NA	NA
	4 - 8	3/3	11.1 - 14.8	13.1	N/A	N/A	N/A	N/A	19.8	0	NA	NA
	10 - 12	4/4	8.3 - 14.8	11.8	N/A	N/A	N/A	N/A	19.8	0	NA	NA

Table B-4
Detected Concentrations of Inorganics in Soil Samples from RFI Soil Borings
SWMU 59 — Building S-335 Old Pesticide Shop
(data in mg/kg)

Analyte	Depth[a]	Number of Detections[b]	Range[c]	Mean[d]	Residential Soil RBC[e]	RBC — Res. Exceedances	Industrial Soil RBC[e]	RBC — Ind. Exceedances	Reference Concentration[f]	RC Exceedances	SSL[g]	SSL Exceedances
Nickel	0 - 2	3/3	9.4 - 14.6	11.6	1,600	0	41,000	0	20.62	0	21	No
	4 - 8	3/3	10.2 - 14.6	13.0	N/A	N/A	N/A	N/A	ND[k]	3 (059S01LS, 059S02LS, 059S03LS)	21	No
	10 - 12	3/3	12.2 - 27.8	19.4	N/A	N/A	N/A	N/A	ND	3 (059S01LS, 059S02LS, 059S03LS)	21	1 (059S02LS)
Selenium	0 - 2	2/3	0.31 - 0.32	0.32	390	0	10,000	0	ND	2 (059S02LS, 059S03LS)	3	No
	4 - 8	2/3	0.31 - 0.38	0.35	N/A	N/A	N/A	N/A	ND	2 (059S01LS, 059S02LS)	3	No
	10 - 12	2/3	0.26 - 0.35	0.31	N/A	N/A	N/A	N/A	ND	2 (059S01LS, 059S03LS)	3	No
Silver	0 - 2	1/3	4	4	390	0	10,000	0	2.05	1 (059S03LS)	NA	NA
Tin	0 - 2	3/3	21.7 - 27.9	25.5	47000	0	1,000,000	0	33.56	0	NA	NA
	4 - 8	3/3	17.8 - 31.4	25.0	N/A	N/A	N/A	N/A	ND	3 (059S01LS, 059S02LS, 059S03LS)	NA	NA
	10 - 12	3/3	21.2 - 33	27	N/A	N/A	N/A	N/A	ND	3 (059S01LS, 059S02LS, 059S03LS)	NA	NA
Vanadium	0 - 2	3/3	16.6 - 27.3	21.2	550	0	14,000	0	45.11	0	NA	NA
	4 - 8	3/3	18 - 27	23	N/A	N/A	N/A	N/A	43.68	0	NA	NA
	10 - 12	3/3	17 - 29.1	24	N/A	N/A	N/A	N/A	43.68	0	NA	NA
Zinc	0 - 2	2/3	49.5 - 102	76	23000	0	610,000	0	98	1 (059S02LS)	42,000	No
	4 - 8	3/3	38.3 - 58.8	51.3	N/A	N/A	N/A	N/A	109	0	42,000	No
	10 - 12	3/3	40.5 - 79.9	62.2	N/A	N/A	N/A	N/A	109	0	42,000	No

Notes:

a — Feet below land surface

b — Only primary sample results are shown on this table. Nine soil samples were collected; three from each loess soil boring location. One of the samples was split for duplicate analysis. The samples were analyzed by the offsite laboratory for VOCs, SVOCs, TPH-GRO, TPH-DRO, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide.

c — Range lower limit is the lowest detected analyte concentration.

d — Mean based on detected analyte concentrations only.

e — Residential and industrial screening values (RBC-Res., RBC-Ind.) are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum). RBCs are only applicable for comparison to data from samples collected across the surface interval.

f — Reference concentration (RC) is two times the mean background concentration established for 13 background surface soil samples and five background subsurface soil samples collected throughout NSA Memphis. Refer to the *Technical Memorandum – Reference Concentrations* (E/A&H, August 1996) for background reference concentration calculations.

g — Soil Screening Levels (SSLs), considered protective of contaminant transfer from soil to groundwater, are from the January to June 1996 Risk-Based Concentration Table (June 3, 1996, USEPA Region III RBC memorandum).

h — N/A denotes RBC comparison is not applicable for this subsurface sample.

i — NA denotes risk-based data not available for this analyte; therefore, no comparison can be made.

j — No RBC exists for lead; the soil screening value for residential and industrial soil (400 μg/kg and 1,300 μg/kg) from the USEPA Office of Solid Waste Emergency Response Directive 9355.4-12 are used for comparison.

k — ND denotes the indicated analyte was not detected in background samples.

Table B-5
Detected Concentrations of Organic Compounds in Groundwater Samples from RFI Monitoring Wells
SWMU 59 — Building S-335 Old Pesticide Shop
(data in μg/L)

Analyte[a]	Interval[b]	Number of Detections[b]	Range[c]	Mean Concentration[d]	RBC — Tap Water[e]	RBC Exceedances	MCL — Drinking Water[f]	MCL Exceedances
VOCs								
Acetone	LS	1/3	93	93	3,700	0	NA[g]	NA
SVOCs								
Bis(2-ethylhexyl)phthalate (BEHP)	LS	1/3	1	1	4.8	0	NA	NA
Diethylphthalate	LS	1/3	3	3	29,000	0	NA	NA
Total Petroleum Hydrocarbons								
TPH - Diesel Range Organics	LS	1/3	160	160	100[h]	1 (059G02LS)	NA	NA
Pesticides								
alpha-Chlordane	LS	1/3	0.085	0.085	0.052	1 (059G02LS)	2	0
gamma-Chlordane	LS	1/3	0.12	0.12	0.052	1 (059G02LS)	2	0
Technical chlordane	LS	1/3	1.1	1.1	0.052	1 (059G02LS)	2	0
Dieldrin	LS	1/3	0.052	0.052	0.0042	1 (059G02LS)	NA	NA
Heptachlor	LS	1/3	0.069	0.069	0.0023	1 (059G02LS)	0.4	0
Heptachlor epoxide	LS	1/3	0.19	0.19	0.0012	1 (059G02LS)	0.2	0

Notes:

a — Only primary samples are included on this table. Groundwater samples were collected from three loess monitoring wells and one well screened in the upper part of the fluvial deposits and analyzed the offsite laboratory for VOCs, SVOCs, TPH-DRO, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide. Organic compounds were only detected in loess groundwater.

b — Interval refers to the lithologic unit within the screened interval of the monitoring well. LS = loess groundwater. No organic compounds were detected in groundwater from the upper part of the fluvial deposits.

c — Range lower limit is the lowest detected analyte concentration.

d — Mean based on detected analyte concentrations only.

e — Risk-based concentrations (RBCs) for tap water obtained from the USEPA Region III Risk-Based Concentration, January to June 1996.

f — Maximum contaminant levels (MCLs) in drinking water obtained from the USEPA Drinking Water Regulations and Health Advisories, February 1996.

g — NA denotes MCL is not available for this analyte; therefore, no comparison can be made.

h — No RBC or MCL exists for TPH. The loess has not yet been established as a drinking water or nondrinking water aquifer; therefore the groundwater cleanup level of 100 μg/L for drinking water aquifers has been used for the tap water RBC (TDEC Policy Statement for Petroleum Contaminated Sites, February 14, 1997).

Table B-6
Detected Concentrations of Inorganics in Groundwater Samples from RFI Monitoring Wells
SWMU 59 — Building S-335 Old Pesticide Shop
(data in μg/L)

Analyte[a]	Interval[b]	Number of Detections[b]	Range[c]	Mean Concentration[d]	RBC — Tap Water[e]	RBC Exceedances	MCL — Drinking Water[f]	MCL Exceedances	Reference Concentration[g]	RC Exceedances
Arsenic	LS	3/3	2.3 - 7.2	4.2	0.045	3 (059G01LS, 059G02LS, 059G03LS)	50	0	7.32	0
Barium	LS	3/3	263 - 463	390	2,600	0	2,000	0	442	2 (059G01LS, 059G03LS)
	UF	1/1	203	203	2,600	0	2,000	0	232	0
Beryllium	LS	1/3	1.3	1.3	0.016	1 (059G03LS)	4	0	1.3	0
Chromium	LS	3/3	27.2 - 42.2	35.3	180	0	100	0	239	0
	UF	1/1	11.1	11.1	180	0	100	0	39.8	0
Cobalt	LS	3/3	13.6 - 37.7	27.5	2200	0	NA[h]	NA	17.8	2 (059G01LS, 059G03LS)
Lead	LS	3/3	16.5 - 30.6	21.7	15[i]	3 (059G01LS, 059G02LS, 059G03LS)	15[i]	3 (059G01LS, 059G02LS, 059G03LS)	17.5	2 (059G01LS, 059G03LS)
Mercury	LS	1/3	0.21	0.21	11	0	2	0	0.24	0
Nickel	LS	3/3	43.6 - 55.2	50.6	730	0	100	0	173.5	0
Tin	LS	1/3	64.7	64.7	22,000	0	NA	NA	ND[j]	1 (059G03LS)
Vanadium	LS	3/3	14.9 - 46.8	27	260	0	NA	NA	40.9	1 (059G03LS)
Zinc	LS	3/3	51.2 - 128	79	11,000	0	5,000	0	154.6	0

Notes:

a — Only primary samples are included on this table. Groundwater samples were collected from three loess monitoring wells and one well screened in the upper part of the fluvial deposits and analyzed the offsite laboratory for VOCs, SVOCs, TPH-diesel, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, and cyanide.

b — Interval refers to the lithologic unit within the screened interval of the monitoring well. LS = loess groundwater; UF = upper fluvial deposits groundwater

c — Range lower limit is the lowest detected analyte concentration.

d — Mean based on detected analyte concentrations only.

e — Risk-based concentrations (RBCs) for tap water obtained from the USEPA Region III Risk-Based Concentration, January to June 1996.

f — Maximum contaminant levels (MCLs) in drinking water obtained from the USEPA Drinking Water Regulations and Health Advisories, February 1996.

g — Reference concentration (RC) is two times the mean background concentration. Analytical data from two sampling events of four loess monitoring wells and 13 fluvial deposits monitoring wells were used to establish background concentrations. Refer to the *Technical Memorandum – Reference Concentrations* (E/A&H, August 1996) for background reference concentration calculations.

h — NA denotes risk-based data or background reference concentrations are not available for this analyte; therefore, no comparison can be made.

i — Lead does not have an RBC or MCL; therefore, the USEPA treatment technique action level of 15 μg/L has been substituted for the RBC and MCL.

j — ND denotes the indicated analyte was not detected in the background samples.

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

APX9-METAL											
	SAMPLE ID ------>	059-C-0011-01		059-S-0011-01		059-S-0012-01					
	ORIGINAL ID ----->	059C000101		059S000101		059S000201					
	LAB SAMPLE ID --->	136733S		136734S		136735S					
	ID FROM REPORT -->	059C000101		059S000101		059S000201					
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95					
	MATRIX ---------->	Soil		Soil		Soil					
	UNITS ----------->	MG/KG		MG/KG		MG/KG					
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL				
7440-36-0	Antimony (Sb)	12.9	UJ	13.2	UJ	12.1	UJ				
7440-38-2	Arsenic (As)	10.5		15.3		27.					
7440-39-3	Barium (Ba)	124.		147.		95.2					
7440-41-7	Beryllium (Be)	0.65	J	0.6	J	0.55	J				
7440-43-9	Cadmium (Cd)	2.4		2.3		1.6					
7440-47-3	Chromium (Cr)	46.5	J	40.	J	23.2	J				
7440-48-4	Cobalt (Co)	7.8	J	6.9	J	6.5	J				
7440-50-8	Copper (Cu)	80.4		73.5		46.2					
7439-92-1	Lead (Pb)	578.		625.		521.					
7439-97-6	Mercury (Hg)	0.25	J	0.54	J	0.35	J				
7440-02-0	Nickel (Ni)	8.9	J	6.3	J	5.3	J				
7782-49-2	Selenium (Se)	0.26	UJ	0.26	UJ	0.24	U				
7440-22-4	Silver (Ag)	0.77	UJ	0.79	UJ	0.73	UJ				
7440-28-0	Thallium (Tl)	0.52	UJ	0.53	UJ	0.48	UJ				
7440-62-2	Vanadium (V)	28.2		23.1		21.9					
7440-66-6	Zinc (Zn)	353.		326.		285.					
7440-31-5	Tin (Sn)	5.2	U	7.9	J	4.8	U				

T90061 000061

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

METAL-CN								
2900062	SAMPLE ID ------>	059-S-0011-01		059-C-0011-01		059-S-0012-01		
	ORIGINAL ID ----->	059S000101		059C000101		059S000201		
	LAB SAMPLE ID --->	136734		136733		136735		
	ID FROM REPORT -->	059S000101		059C000101		059S000201		
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95		
	DATE ANALYZED --->	10/23/95		10/23/95		10/23/95		
	MATRIX ---------->	Soil		Soil		Soil		
	UNITS ----------->	MG/KG		MG/KG		MG/KG		
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL	
57-12-5	Cyanide (CN)	0.01	U	0.01	U	0.01	U	

*** Validatio[illegible]omplete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-HERB									
	SAMPLE ID ------>	059-S-0011-01		059-C-0011-01		059-S-0012-01				
	ORIGINAL ID ----->	059S000101		059C000101		059S000201				
	LAB SAMPLE ID --->	136734		136733		136735				
	ID FROM REPORT -->	059S000101		059C000101		059S000201				
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95				
	DATE EXTRACTED -->	10/27/95		10/27/95		10/27/95				
	DATE ANALYZED --->	11/30/95		11/30/95		11/30/95				
	MATRIX ---------->	Soil		Soil		Soil				
	UNITS ---------->	UG/KG		UG/KG		UG/KG				
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL			
94-75-7	2,4-D	25.	J	14.	J	25.	J			
94-82-6	2,4-DB	9.5	U	0.95	UJ	11.	UJ			
88-85-7	Dinoseb	4.7	U	4.7	UJ	5.3	UJ			
93-76-5	2,4,5-T	0.95	U	0.95	UJ	1.1	UJ			
93-72-1	2,4,5-TP (Silvex)	0.95	U	0.95	UJ	1.1	UJ			
75-99-0	Dalapon	23.	U	23.	UJ	26.	UJ			
1918-00-9	Dicamba	0.94	U	0.94	UJ	1.	UJ			
120-36-5	Dichlorprop	9.4	U	9.4	UJ	5.7	J			
94-74-6	MCPA	6500.		5800.	J	1000.	UJ			
93-65-2	MCPP	940.	U	940.	UJ	1000.	UJ			

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-OP P								
	SAMPLE ID ------>	059-S-0011-01		059-C-0011-01		059-S-0012-01		
	ORIGINAL ID ----->	059S000101		059C000101		059S000201		
	LAB SAMPLE ID --->	136734		136733		136735		
	ID FROM REPORT -->	059S000101		059C000101		059S000201		
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95		
	DATE EXTRACTED -->	11/02/95		11/02/95		11/02/95		
	DATE ANALYZED --->	11/30/95		11/30/95		11/30/95		
	MATRIX ---------->	Soil		Soil		Soil		
	UNITS ---------->	UG/KG		UG/KG		UG/KG		
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL	
86-50-0	Guthion	110.	U	110.	U	100.	U	
35400-43-2	Sulprofos	110.	U	110.	U	100.	U	
2921-88-2	Chloropyrifos	110.	U	110.	U	100.	U	
56-72-4	Coumaphos	110.	U	110.	U	100.	U	
8065-48-3	Demeton,O	110.	U	110.	U	100.	U	
333-41-5	Diazinon	110.	U	110.	U	100.	U	
62-73-7	Dichlorvos	110.	U	110.	U	100.	U	
298-04-4	Disulfoton	110.	U	110.	U	100.	U	
13194-48-4	Ethoprop	110.	U	110.	U	100.	U	
115-90-2	Fensulfothion	110.	U	110.	U	100.	U	
55-38-9	Fenthion	110.	U	110.	U	100.	U	
150-50-5	Merphos	110.	U	110.	U	100.	U	
7786-34-7	Mevinphos, Alpha	110.	U	110.	U	100.	U	
300-76-5	Naled	220.	U	220.	U	200.	U	
298-00-0	Methyl parathion	110.	U	110.	U	100.	U	
298-02-2	Phorate	110.	U	110.	U	100.	U	
299-84-3	Ronnel	110.	U	110.	U	100.	U	
22248-79-9	Stirophos (Tetrachlorovinphos)	110.	U	110.	U	100.	U	
34643-46-4	Tokuthion	110.	U	110.	U	100.	U	
327-98-0	Trichloronate	110.	U	110.	U	100.	U	
126-75-0	Demeton,S	110.	U	110.	U	100.	U	

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-PEST									
	SAMPLE ID ------>	059-S-0011-01 DL		059-C-0011-01 DL		059-S-0012-01 DL			
	ORIGINAL ID ----->	059S000101DL		059C000101DL		059S000201DL			
	LAB SAMPLE ID --->	136734_50DL		136733_50DL		136735_100DL			
	ID FROM REPORT -->	059S000101DL		059C000101DL		059S000201DL			
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95			
	DATE EXTRACTED -->	10/18/09		10/18/09		10/18/09			
	DATE ANALYZED --->	11/10/09		11/10/09		11/16/09			
	MATRIX ---------->	Soil		Soil		Soil			
	UNITS ---------->	ug/Kg		ug/Kg		ug/Kg			
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL		
319-84-6	alpha-BHC	110.	U	110.	U	200.	U		
319-85-7	beta-BHC	110.	U	110.	U	200.	U		
319-86-8	delta-BHC	110.	U	110.	U	200.	U		
58-89-9	gamma-BHC (Lindane)	110.	U	110.	U	200.	U		
76-44-8	Heptachlor	310.	JD	810.	JD	200.	U		
309-00-2	Aldrin	140.	JD	260.	JD	200.	U		
1024-57-3	Heptachlor epoxide	800.	JD	1300.	JD	200.	U		
959-98-8	Endosulfan I	110.	U	110.	U	200.	U		
60-57-1	Dieldrin	1800.	JD	2500.	JD	750.	D		
72-55-9	4,4'-DDE	1300.	JD	1800.	JD	2300.	D		
72-20-8	Endrin	220.	U	220.	U	410.	U		
33213-65-9	Endosulfan II	220.	U	220.	U	410.	U		
72-54-8	4,4'-DDD	700.	JD	470.	JD	410.	U		
1031-07-8	Endosulfan sulfate	220.	U	220.	U	410.	U		
50-29-3	4,4'-DDT	1300.	JD	1400.	JD	4000.	D		
72-43-5	Methoxychlor	1100.	U	1100.	U	2000.	U		
53494-70-5	Endrin ketone	220.	U	220.	U	410.	U		
7421-93-4	Endrin aldehyde	260.	JD	270.	JD	410.	U		
5103-71-9	alpha-Chlordane	6500.	JD	11000.	JD	860.	D		
5103-74-2	gamma-Chlordane	6900.	JD	12000.	JD	790.	D		
8001-35-2	Toxaphene	2200.	U	2200.	U	4100.	U		
12674-11-2	Aroclor-1016	2200.	U	2200.	U	4100.	U		
11104-28-2	Aroclor-1221	2200.	U	2200.	U	4100.	U		
11141-16-5	Aroclor-1232	2200.	U	2200.	U	4100.	U		
53469-21-9	Aroclor-1242	2200.	U	2200.	U	4100.	U		
12672-29-6	Aroclor-1248	2200.	U	2200.	U	4100.	U		
11097-69-1	Aroclor-1254	2200.	U	2200.	U	4100.	U		
11096-82-5	Aroclor-1260	2200.	U	2200.	U	5400.	JD		
12789-03-6	Technical Chlordane	52000.	JD	79000.	JD	5100.	D		

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-SVOA

990006

	SAMPLE ID ------>	059-S-0011-01	059-C-0011-01	059-S-0012-01
	ORIGINAL ID ----->	059S000101	059C000101	059S000201
	LAB SAMPLE ID --->	136734	136733	136735
	ID FROM REPORT -->	059s000101	059c000101	059s000201
	SAMPLE DATE ----->	10/12/95	10/12/95	10/12/95
	DATE EXTRACTED -->	10/22/95	10/22/95	10/22/95
	DATE ANALYZED --->	11/06/95	11/02/95	11/06/95
	MATRIX ---------->	Soil	Soil	Soil
	UNITS ---------->	ug/Kg	ug/Kg	ug/Kg

CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL
108-95-2	Phenol	4400.	U	4400.	U	4100.	U
111-44-4	bis(2-Chloroethyl)ether	4400.	U	4400.	U	4100.	U
95-57-8	2-Chlorophenol	4400.	U	4400.	U	4100.	U
541-73-1	1,3-Dichlorobenzene	4400.	U	4400.	U	4100.	U
106-46-7	1,4-Dichlorobenzene	4400.	U	4400.	U	4100.	U
95-50-1	1,2-Dichlorobenzene	4400.	U	4400.	U	4100.	U
95-48-7	2-Methylphenol (o-Cresol)	4400.	U	4400.	U	4100.	U
108-60-1	2,2'-oxybis(1-Chloropropane)	4400.	U	4400.	U	4100.	U
106-44-5	4-Methylphenol (p-Cresol)	4400.	U	4400.	U	4100.	U
621-64-7	N-Nitroso-di-n-propylamine	4400.	U	4400.	U	4100.	U
67-72-1	Hexachloroethane	4400.	U	4400.	U	4100.	U
98-95-3	Nitrobenzene	4400.	U	4400.	U	4100.	U
78-59-1	Isophorone	4400.	U	4400.	U	4100.	U
88-75-5	2-Nitrophenol	4400.	U	4400.	U	4100.	U
105-67-9	2,4-Dimethylphenol	4400.	U	4400.	U	4100.	U
120-83-2	2,4-Dichlorophenol	4400.	U	4400.	U	4100.	U
120-82-1	1,2,4-Trichlorobenzene	4400.	U	4400.	U	4100.	U
91-20-3	Naphthalene	4400.	U	4400.	U	4100.	U
106-47-8	4-Chloroaniline	4400.	U	4400.	U	4100.	U
111-91-1	bis(2-Chloroethoxy)methane	4400.	U	4400.	U	4100.	U
87-68-3	Hexachlorobutadiene	4400.	U	4400.	U	4100.	U
59-50-7	4-Chloro-3-methylphenol	4400.	U	4400.	U	4100.	U
91-57-6	2-Methylnaphthalene	4400.	U	4400.	U	4100.	U
77-47-4	Hexachlorocyclopentadiene	4400.	U	4400.	U	4100.	U
88-06-2	2,4,6-Trichlorophenol	4400.	U	4400.	U	4100.	U
95-95-4	2,4,5-Trichlorophenol	11000.	U	11000.	U	10000.	U
91-58-7	2-Chloronaphthalene	4400.	U	4400.	U	4100.	U
88-74-4	2-Nitroaniline	11000.	U	11000.	U	10000.	U
131-11-3	Dimethyl phthalate	4400.	U	4400.	U	4100.	U
208-96-8	Acenaphthylene	4400.	U	4400.	U	4100.	U
606-20-2	2,6-Dinitrotoluene	4400.	U	4400.	U	4100.	U
99-09-2	3-Nitroaniline	11000.	U	11000.	U	10000.	U
83-32-9	Acenaphthene	4400.	U	4400.	U	4100.	U
51-28-5	2,4-Dinitrophenol	11000.	U	11000.	U	10000.	U
100-02-7	4-Nitrophenol	11000.	U	11000.	U	10000.	U
132-64-9	Dibenzofuran	4400.	U	4400.	U	4100.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-SVOA	SAMPLE ID ------>	059-S-0011-01		059-C-0011-01		059-S-0012-01				
	ORIGINAL ID ----->	059S000101		059C000101		059S000201				
	LAB SAMPLE ID --->	136734		136733		136735				
	ID FROM REPORT -->	059s000101		059c000101		059s000201				
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95				
	DATE EXTRACTED -->	10/22/95		10/22/95		10/22/95				
	DATE ANALYZED --->	11/06/95		11/02/95		11/06/95				
	MATRIX ---------->	Soil		Soil		Soil				
	UNITS ---------->	ug/Kg		ug/Kg		ug/Kg				
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL			
121-14-2	2,4-Dinitrotoluene	4400.	U	4400.	U	4100.	U			
84-66-2	Diethylphthalate	4400.	U	4400.	U	4100.	U			
7005-72-3	4-Chlorophenylphenylether	4400.	U	4400.	U	4100.	U			
86-73-7	Fluorene	4400.	U	4400.	U	4100.	U			
100-01-6	4-Nitroaniline	11000.	U	11000.	U	10000.	U			
534-52-1	2-Methyl-4,6-Dinitrophenol	11000.	U	11000.	U	10000.	U			
86-30-6	N-Nitrosodiphenylamine	4400.	U	4400.	U	4100.	U			
101-55-3	4-Bromophenyl-phenylether	4400.	U	4400.	U	4100.	U			
118-74-1	Hexachlorobenzene	4400.	U	4400.	U	4100.	U			
87-86-5	Pentachlorophenol	11000.	U	11000.	U	2600.	J			
85-01-8	Phenanthrene	560.	J	750.	J	500.	J			
120-12-7	Anthracene	4400.	U	4400.	U	4100.	U			
86-74-8	Carbazole	4400.	U	4400.	U	4100.	U			
84-74-2	Di-n-butylphthalate	4400.	U	4400.	U	4100.	U			
206-44-0	Fluoranthene	1200.	J	1700.	J	1100.	J			
129-00-0	Pyrene	990.	J	1300.	J	910.	J			
85-68-7	Butylbenzylphthalate	4400.	U	4400.	U	4100.	U			
91-94-1	3,3'-Dichlorobenzidine	4400.	U	4400.	U	4100.	U			
56-55-3	Benzo(a)anthracene	710.	J	950.	J	760.	J			
218-01-9	Chrysene	880.	J	1100.	J	1200.	J			
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	4400.	U	4400.	U	4100.	U			
117-84-0	Di-n-octyl phthalate	4400.	U	4400.	U	4100.	U			
205-99-2	Benzo(b)fluoranthene	840.	J	1200.	J	1200.	J			
207-08-9	Benzo(k)fluoranthene	800.	J	870.	J	1100.	J			
50-32-8	Benzo(a)pyrene	780.	J	970.	J	950.	J			
193-39-5	Indeno(1,2,3-cd)pyrene	480.	J	620.	J	490.	J			
53-70-3	Dibenz(a,h)anthracene	4400.	U	4400.	U	4100.	U			
191-24-2	Benzo(g,h,i)perylene	570.	J	740.	J	520.	J			

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

SW846-VOA

SAMPLE ID ------->	059-S-0011-01	059-C-0011-01	059-S-0012-01
ORIGINAL ID ----->	059S000101	059C000101	059S000201
LAB SAMPLE ID --->	136734	136733	136735
ID FROM REPORT -->	059S000101	059C000101	059S000201
SAMPLE DATE ----->	10/12/95	10/12/95	10/12/95
DATE ANALYZED --->	10/21/95	10/20/95	10/22/95
MATRIX ---------->	Soil	Soil	Soil
UNITS ----------->	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL
74-87-3	Chloromethane	14.	U	13.	U	12.	U
74-83-9	Bromomethane	14.	U	13.	U	12.	U
75-01-4	Vinyl chloride	14.	U	13.	U	12.	U
75-00-3	Chloroethane	14.	U	13.	U	12.	U
75-09-2	Methylene chloride	14.	U	13.	U	12.	U
67-64-1	Acetone	16.	U	13.	U	12.	U
75-15-0	Carbon disulfide	14.	U	13.	U	12.	U
75-35-4	1,1-Dichloroethene	14.	U	13.	U	12.	U
75-34-3	1,1-Dichloroethane	14.	U	13.	U	12.	U
540-59-0	1,2-Dichloroethene (total)	14.	U	13.	U	12.	U
67-66-3	Chloroform	14.	U	13.	U	12.	U
107-06-2	1,2-Dichloroethane	14.	U	13.	U	12.	U
78-93-3	2-Butanone (MEK)	14.	U	13.	U	12.	U
71-55-6	1,1,1-Trichloroethane	14.	U	13.	U	12.	U
56-23-5	Carbon tetrachloride	14.	U	13.	U	12.	U
75-27-4	Bromodichloromethane	14.	U	13.	U	12.	U
78-87-5	1,2-Dichloropropane	14.	U	13.	U	12.	U
10061-01-5	cis-1,3-Dichloropropene	14.	U	13.	U	12.	U
79-01-6	Trichloroethene	14.	U	13.	U	12.	U
124-48-1	Dibromochloromethane	14.	U	13.	U	12.	U
79-00-5	1,1,2-Trichloroethane	14.	U	13.	U	12.	U
71-43-2	Benzene	14.	U	13.	U	12.	U
10061-02-6	trans-1,3-Dichloropropene	14.	U	13.	U	12.	U
75-25-2	Bromoform	14.	U	13.	U	12.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	14.	U	13.	U	12.	U
591-78-6	2-Hexanone	14.	U	13.	U	12.	U
127-18-4	Tetrachloroethene	14.	U	13.	U	12.	U
79-34-5	1,1,2,2-Tetrachloroethane	14.	U	13.	U	12.	U
108-88-3	Toluene	9.	J	13.	U	8.	J
108-90-7	Chlorobenzene	14.	U	13.	U	12.	U
100-41-4	Ethylbenzene	14.	U	13.	U	12.	U
100-42-5	Styrene	14.	U	13.	U	12.	U
1330-20-7	Xylene (Total)	14.	U	13.	U	12.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

TPH-DRO								
	SAMPLE ID ------>	059-S-0011-01		059-C-0011-01		059-S-0012-01		
	ORIGINAL ID ----->	059S000101		059C000101		059S000201		
	LAB SAMPLE ID --->	136734		136733		136735		
	ID FROM REPORT -->	059S000101		059C000101		059S000201		
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95		
	DATE EXTRACTED -->	11/02/95		11/02/95		11/02/95		
	DATE ANALYZED --->	11/04/95		11/04/95		11/04/95		
	MATRIX ---------->	Soil		Soil		Soil		
	UNITS ---------->	UG/KG		UG/KG		UG/KG		
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL	
9999900-02-6	TPH - Diesel Range Organics	78000.		53000.	U	51000.		

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Hand-Auger Surface Soil Samples

TPH-GRO	SAMPLE ID ------>	059-S-0011-01 RE		059-C-0011-01 RE		059-S-0012-01 RE				
	ORIGINAL ID ----->	059S000101		059C000101		059S000201				
	LAB SAMPLE ID --->	136734		136733		136735				
	ID FROM REPORT -->	059S000101		059C000101		059S000201				
	SAMPLE DATE ----->	10/12/95		10/12/95		10/12/95				
	DATE ANALYZED --->	11/27/95		11/27/95		11/27/95				
	MATRIX ---------->	Soil		Soil		Soil				
	UNITS ---------->	UG/KG		UG/KG		UG/KG				
CAS #	Parameter	1564	VAL	1564	VAL	1564	VAL			
9999900-02-5	TPH - Gasoline Range Organics	200.	J	170.	J	140.	J			

*** Validation Complete ***

DATALCP3
03/28/97

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

APX9-METAL	SAMPLE ID ------->>	059-S-01LS-02		059-S-01LS-08		059-S-01LS-12		059-S-02LS-02		059-S-02LS-06		059-S-02LS-12	
	ORIGINAL ID ----->>	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	LAB SAMPLE ID --->>	143533S		143534S		143535S		143536S		143537S		143538S	
	ID FROM REPORT -->>	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	SAMPLE DATE ----->>	03/04/96		03/04/96		03/04/96		03/02/96		03/02/96		03/02/96	
	MATRIX ---------->>	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ----------->>	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
7440-36-0	Antimony (Sb)	6.9	UJ	7.8	UJ	7.6	UJ	7.9	UJ	7.5	UJ	7.9	UJ
7440-38-2	Arsenic (As)	3.3	J	6.2	J	17.2	J	9.7	J	6.	J	12.9	J
7440-39-3	Barium (Ba)	62.4		166.		220.		113.		82.		186.	
7440-41-7	Beryllium (Be)	0.5	J	0.51	J	0.64	J	0.43	J	0.56	J	0.68	J
7440-43-9	Cadmium (Cd)	1.	J	1.1	J	2.		1.8		1.6		2.3	
7440-47-3	Chromium (Cr)	11.1		6.3		12.9		15.3		12.8		17.3	
7440-48-4	Cobalt (Co)	7.2	J	8.4	J	11.	J	6.2	J	7.	J	12.	J
7440-50-8	Copper (Cu)	9.5	U	12.6	U	18.6	U	25.1		18.7	U	22.6	
7439-92-1	Lead (Pb)	104.	J	13.3	J	14.8	J	151.	J	11.1	J	14.	J
7439-97-6	Mercury (Hg)	0.11	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
7440-02-0	Nickel (Ni)	9.4		10.2	J	18.2		10.7		14.3		27.8	
7782-49-2	Selenium (Se)	0.23	UJ	0.38	J	0.35	J	0.32	J	0.31	J	0.26	UJ
7440-22-4	Silver (Ag)	0.69	UJ	0.78	UJ	0.76	UJ	0.79	UJ	0.75	UJ	0.79	UJ
7440-28-0	Thallium (Tl)	0.46	U	0.52	U	0.51	U	0.52	UJ	0.5	U	0.53	U
7440-62-2	Vanadium (V)	16.6		18.		25.6		19.6		27.		29.1	
7440-66-6	Zinc (Zn)	23.7	U	38.3		66.3		102.		58.8		79.9	
7440-31-5	Tin (Sn)	21.7	J	17.8	J	26.	J	26.9	J	31.4	J	33.	J

T20006

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

APX9-METAL												
	SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12				
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312				
	LAB SAMPLE ID --->	143539S		143540S		143541S		143532S				
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312				
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96				
	MATRIX ---------->	Soil		Soil		Soil		Soil				
	UNITS ----------->	MG/KG		MG/KG		MG/KG		MG/KG				
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL			
7440-36-0	Antimony (Sb)	7.4	UJ	7.4	UJ	7.9	UJ	7.8	UJ			
7440-38-2	Arsenic (As)	7.2	J	10.4	J	6.8	J	5.8	J			
7440-39-3	Barium (Ba)	91.4		81.5		63.5		58.6				
7440-41-7	Beryllium (Be)	0.52	J	0.42	J	0.35	J	0.32	J			
7440-43-9	Cadmium (Cd)	1.4		1.5		0.84	J	1.1	J			
7440-47-3	Chromium (Cr)	9.8		10.7		9.		8.8				
7440-48-4	Cobalt (Co)	9.8	J	8.8	J	6.6	J	6.	J			
7440-50-8	Copper (Cu)	15.4	U	20.2		14.8	U	14.7	U			
7439-92-1	Lead (Pb)	12.3	J	14.8	J	10.	J	2.8	J			
7439-97-6	Mercury (Hg)	0.12	U	0.12	U	0.13	U	0.13	U			
7440-02-0	Nickel (Ni)	14.6		14.6		12.2		12.5				
7782-49-2	Selenium (Se)	0.31	J	0.25	UJ	0.26	J	0.58	J			
7440-22-4	Silver (Ag)	4.	J	0.74	UJ	0.79	UJ	0.89	J			
7440-28-0	Thallium (Tl)	0.49	U	0.49	U	0.53	U	0.52	UJ			
7440-62-2	Vanadium (V)	27.3		25.4		17.		17.1				
7440-66-6	Zinc (Zn)	49.5		56.9		40.5		39.2				
7440-31-5	Tin (Sn)	27.9	J	25.8	J	21.2	J	23.7	J			

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

CATION							
	SAMPLE ID ------->	059-S-03LS-12		059-S-03UF-45			
	ORIGINAL ID ----->	059SMW0312		059SMW0345			
	LAB SAMPLE ID --->	143541		143543			
	ID FROM REPORT -->	059SMW0312		059SMW0345			
	SAMPLE DATE ----->	03/04/96		03/04/96			
	DATE ANALYZED --->	03/19/96		03/19/96			
	MATRIX ---------->	Soil		Soil			
	UNITS ----------->	meq/1		meq/1			
CAS #	Parameter	1713	VAL	1713	VAL		
9999900-04-3	Cation Exchange Capacity	74.		132.			

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

HPC							
	SAMPLE ID ------->	059-S-03LS-12		059-S-03UF-45			
	ORIGINAL ID ----->	059SMW0312		059SMW0345			
	LAB SAMPLE ID --->	143541		143543			
	ID FROM REPORT -->	059SMW0312		059SMW0345			
	SAMPLE DATE ----->	03/04/96		03/04/96			
	DATE ANALYZED --->	03/06/96		03/06/96			
	MATRIX ---------->	Soil		Soil			
	UNITS ----------->	cfu/g		cfu/g			
CAS #	Parameter	1713	VAL	1713	VAL		
9999900-04-6	Heterotrophic Plate Count	71.	J	5.	J		

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

KJELDAHL							
	SAMPLE ID ------>	059-S-03LS-12		059-S-03UF-45			
	ORIGINAL ID ----->	059SMW0312		059SMW0345			
	LAB SAMPLE ID --->	143542		143543			
	ID FROM REPORT -->	059SMW0312		059SMW0345			
	SAMPLE DATE ----->	03/04/96		03/04/96			
	DATE EXTRACTED -->	03/11/96		03/11/96			
	DATE ANALYZED --->	03/12/96		03/12/96			
	MATRIX ---------->	Soil		Soil			
	UNITS ----------->	MG/KG		MG/KG			
CAS #	Parameter	1713	VAL	1713	VAL		
9999000-72-6	Kjeldahl Nitrogen, Total	170.	J	6.7	J		

92006

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

METAL-CN												
	SAMPLE ID ------>	059-S-01LS-02		059-S-01LS-08		059-S-01LS-12		059-S-02LS-02		059-S-02LS-06		059-S-02LS-12	
	ORIGINAL ID ----->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	LAB SAMPLE ID --->	143533		143534		143535		143536		143537		143538	
	ID FROM REPORT -->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/02/96		03/02/96		03/02/96	
	DATE ANALYZED --->	03/20/96		03/20/96		03/20/96		03/20/96		03/20/96		03/20/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ----------->	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
57-12-5	Cyanide (CN)	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

METAL-CN												
		SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12			
		ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
		LAB SAMPLE ID --->	143539		143540		143541		143532			
		ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
		SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96			
		DATE ANALYZED --->	03/20/96		03/20/96		03/20/96		03/20/96			
		MATRIX ---------->	Soil		Soil		Soil		Soil			
		UNITS ---------->	MG/KG		MG/KG		MG/KG		MG/KG			
CAS #	Parameter		1713	VAL	1713	VAL	1713	VAL	1713	VAL		
57-12-5	Cyanide (CN)		0.5	U	0.5	U	0.5	U	0.5	U		

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

NITRATE								
	SAMPLE ID ------->>	059-S-03LS-12		059-S-03UF-45				
	ORIGINAL ID ----->>	059SMW0312		059SMW0345				
	LAB SAMPLE ID --->>	143542		143543				
	ID FROM REPORT -->>	059SMW0312		059SMW0345				
	SAMPLE DATE ----->>	03/04/96		03/04/96				
	DATE ANALYZED --->>	03/15/96		03/15/96				
	MATRIX ---------->>	Soil		Soil				
	UNITS ----------->>	MG/KG		MG/KG				
CAS #	Parameter	1713	VAL	1713	VAL			
14797-55-8	Nitrate (as N)	1.3		2.1				

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-HERB													
	SAMPLE ID ------>	059-S-01LS-02		059-S-01LS-08		059-S-01LS-12		059-S-02LS-02		059-S-02LS-06		059-S-02LS-12	
	ORIGINAL ID ----->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	LAB SAMPLE ID --->	143533		143534		143535		143536		143537		143538	
	ID FROM REPORT -->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/02/96		03/02/96		03/02/96	
	DATE EXTRACTED -->	03/16/96		03/16/96		03/16/96		03/16/96		03/16/96		03/16/96	
	DATE ANALYZED --->	03/20/96		03/20/96		03/20/96		03/20/96		03/20/96		03/20/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ---------->	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
94-75-7	2,4-D	12.	J	9.4	U	9.4	U	18.		9.4	U	9.4	U
94-82-6	2,4-DB	9.5	U	9.5	U	9.5	U	16.	J	9.5	U	6.4	J
88-85-7	Dinoseb	4.7	U	4.7	U	4.7	U	4.6	U	4.7	U	2.5	J
93-76-5	2,4,5-T	0.95	U	0.95	U	0.95	U	1.5	J	0.95	U	0.95	U
93-72-1	2,4,5-TP (Silvex)	0.95	U	0.95	U	0.95	U	0.94	U	0.95	U	0.95	U
75-99-0	Dalapon	23.	U	23.	U	23.	U	22.	U	23.	U	23.	U
1918-00-9	Dicamba	0.94	U	0.94	U	0.94	U	12.	J	0.94	U	0.94	U
120-36-5	Dichlorprop	9.4	U	9.4	U	9.4	U	9.3	U	9.4	U	9.4	U
94-74-6	MCPA	940.	U	930.	U	930.	U	920.	U	930.	U	930.	U
93-65-2	MCPP	940.	U	940.	U	940.	U	920.	U	940.	U	940.	U

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-HERB									
	SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12	
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	LAB SAMPLE ID --->	143539		143540		143541		143532	
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96	
	DATE EXTRACTED -->	03/16/96		03/16/96		03/16/96		03/16/96	
	DATE ANALYZED --->	03/20/96		03/20/96		03/20/96		03/20/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil	
	UNITS ---------->	UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL
94-75-7	2,4-D	9.4	U	9.4	U	9.3	U	9.4	U
94-82-6	2,4-DB	9.5	U	9.5	U	9.3	U	9.5	U
88-85-7	Dinoseb	3.	J	7.	J	2.5	J	4.7	U
93-76-5	2,4,5-T	0.95	U	1.	J	0.93	U	0.95	U
93-72-1	2,4,5-TP (Silvex)	0.95	U	0.95	U	0.94	U	0.95	U
75-99-0	Dalapon	23.	U	23.	U	22.	U	23.	U
1918-00-9	Dicamba	0.94	U	0.94	U	0.92	U	0.94	U
120-36-5	Dichlorprop	9.4	U	9.4	U	9.3	U	9.4	U
94-74-6	MCPA	930.	U	930.	U	920.	U	940.	U
93-65-2	MCPP	940.	U	940.	U	920.	U	940.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-OP P	SAMPLE ID ------->	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE EXTRACTED -->	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96
	DATE ANALYZED --->	03/16/96	03/16/96	03/16/96	03/16/96	03/16/96	03/16/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
86-50-0	Guthion	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
35400-43-2	Sulprofos	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
2921-88-2	Chloropyrifos	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
56-72-4	Coumaphos	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
8065-48-3	Demeton,O	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
333-41-5	Diazinon	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
62-73-7	Dichlorvos	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
298-04-4	Disulfoton	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
13194-48-4	Ethoprop	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
115-90-2	Fensulfothion	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
55-38-9	Fenthion	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
150-50-5	Merphos	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
7786-34-7	Mevinphos, Alpha	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
300-76-5	Naled	200.	U	210.	U	220.	U	220.	U	210.	U	220.	U
298-00-0	Methyl parathion	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
298-02-2	Phorate	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
299-84-3	Ronnel	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
22248-79-9	Stirophos (Tetrachlorovinphos)	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
34643-46-4	Tokuthion	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
327-98-0	Trichloronate	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U
126-75-0	Demeton,S	98.	U	110.	U	110.	U	110.	U	100.	U	110.	U

000681

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-OP P

280082

	SAMPLE ID ------->	059-S-03LS-02	059-S-03LS-06	059-S-03LS-12	059-C-03LS-12
	ORIGINAL ID ----->	059SMW0302	059SMW0306	059SMW0312	059CMW0312
	LAB SAMPLE ID --->	143539	143540	143541	143532
	ID FROM REPORT -->	059SMW0302	059SMW0306	059SMW0312	059CMW0312
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/04/96
	DATE EXTRACTED -->	03/11/96	03/11/96	03/11/96	03/11/96
	DATE ANALYZED --->	03/16/96	03/16/96	03/16/96	03/16/96
	MATRIX ---------->	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL
86-50-0	Guthion	100.	U	100.	U	110.	U	110.	U
35400-43-2	Sulprofos	100.	U	100.	U	110.	U	110.	U
2921-88-2	Chloropyrifos	100.	U	100.	U	110.	U	110.	U
56-72-4	Coumaphos	100.	U	100.	U	110.	U	110.	U
8065-48-3	Demeton,O	100.	U	100.	U	110.	U	110.	U
333-41-5	Diazinon	100.	U	100.	U	110.	U	110.	U
62-73-7	Dichlorvos	100.	U	100.	U	110.	U	110.	U
298-04-4	Disulfoton	100.	U	100.	U	110.	U	110.	U
13194-48-4	Ethoprop	100.	U	100.	U	110.	U	110.	U
115-90-2	Fensulfothion	100.	U	100.	U	110.	U	110.	U
55-38-9	Fenthion	100.	U	100.	U	110.	U	110.	U
150-50-5	Merphos	100.	U	100.	U	110.	U	110.	U
7786-34-7	Mevinphos, Alpha	100.	U	100.	U	110.	U	110.	U
300-76-5	Naled	210.	U	210.	U	220.	U	220.	U
298-00-0	Methyl parathion	100.	U	100.	U	110.	U	110.	U
298-02-2	Phorate	100.	U	100.	U	110.	U	110.	U
299-84-3	Ronnel	100.	U	100.	U	110.	U	110.	U
22248-79-9	Stirophos (Tetrachlorovinphos)	100.	U	100.	U	110.	U	110.	U
34643-46-4	Tokuthion	100.	U	100.	U	110.	U	110.	U
327-98-0	Trichloronate	100.	U	100.	U	110.	U	110.	U
126-75-0	Demeton,S	100.	U	100.	U	110.	U	110.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-PEST	SAMPLE ID ------>	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536_20	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE EXTRACTED -->	03/08/96	03/08/96	03/08/96	03/08/96	03/08/96	03/08/96
	DATE ANALYZED --->	03/19/96	03/19/96	03/19/96	03/19/96	03/19/96	03/19/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
319-84-6	alpha-BHC	2.	U	2.1	U	2.2	U	44.	U	2.1	U	2.2	U
319-85-7	beta-BHC	2.	U	2.1	U	2.2	U	44.	U	2.1	U	2.2	U
319-86-8	delta-BHC	2.	U	2.1	U	2.2	U	44.	U	2.1	U	2.2	U
58-89-9	gamma-BHC (Lindane)	2.	U	2.1	U	2.2	U	44.	U	2.1	U	2.2	U
76-44-8	Heptachlor	2.	U	2.1	U	2.2	U	3900.	D	26.		11.	
309-00-2	Aldrin	2.	U	2.1	U	2.2	U	840.	DJ	5.7	J	3.1	J
1024-57-3	Heptachlor epoxide	2.	U	2.1	U	2.2	U	2200.	D	12.		8.	
959-98-8	Endosulfan I	2.	U	2.1	U	2.2	U	44.	U	2.1	U	2.2	U
60-57-1	Dieldrin	3.9	U	4.3	U	4.4	U	1200.	D	3.4	J	2.8	J
72-55-9	4,4'-DDE	12.	J	4.3	U	4.4	U	2500.	DJ	3.9	J	4.5	U
72-20-8	Endrin	3.9	U	4.3	U	4.4	U	89.	U	4.2	U	4.5	U
33213-65-9	Endosulfan II	3.9	U	4.3	U	4.4	U	89.	U	4.2	U	4.5	U
72-54-8	4,4'-DDD	4.8	J	4.3	U	4.4	U	850.	DJ	4.2	U	4.5	U
1031-07-8	Endosulfan sulfate	3.9	U	4.3	U	4.4	U	89.	U	4.2	U	4.5	U
50-29-3	4,4'-DDT	7.2	J	4.3	U	4.4	U	1700.	DJ	4.2	U	4.5	U
72-43-5	Methoxychlor	20.	U	21.	U	22.	U	440.	U	21.	U	22.	U
53494-70-5	Endrin ketone	3.9	U	4.3	U	4.4	U	89.	U	4.2	U	4.5	U
7421-93-4	Endrin aldehyde	3.9	U	4.3	U	4.4	U	89.	U	4.2	U	4.5	U
5103-71-9	alpha-Chlordane	2.	U	2.1	U	2.2	U	4800.	DJ	26.		15.	
5103-74-2	gamma-Chlordane	2.	U	2.1	U	2.2	U	8800.	DJ	52.	J	26.	
8001-35-2	Toxaphene	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
12674-11-2	Aroclor-1016	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
11104-28-2	Aroclor-1221	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
11141-16-5	Aroclor-1232	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
53469-21-9	Aroclor-1242	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
12672-29-6	Aroclor-1248	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
11097-69-1	Aroclor-1254	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
11096-82-5	Aroclor-1260	39.	U	43.	U	44.	U	890.	U	42.	U	45.	U
12789-03-6	Technical Chlordane	39.	U	43.	U	44.	U	46000.	D	250.		140.	

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-PEST								
	SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12	
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	LAB SAMPLE ID --->	143539		143540		143541		143532	
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96	
	DATE EXTRACTED -->	03/08/96		03/08/96		03/08/96		03/08/96	
	DATE ANALYZED --->	03/19/96		03/19/96		03/19/96		03/18/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil	
	UNITS ---------->	ug/Kg		ug/Kg		ug/Kg		ug/Kg	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL
319-84-6	alpha-BHC	2.1	U	2.1	U	2.2	U	2.2	U
319-85-7	beta-BHC	2.1	U	2.1	U	2.2	U	2.2	U
319-86-8	delta-BHC	2.1	U	2.1	U	2.2	U	2.2	U
58-89-9	gamma-BHC (Lindane)	2.1	U	2.1	U	2.2	U	2.2	U
76-44-8	Heptachlor	2.1	U	2.1	U	2.2	U	2.2	U
309-00-2	Aldrin	2.1	U	2.1	U	2.2	U	2.2	U
1024-57-3	Heptachlor epoxide	2.1	U	2.1	U	2.2	U	2.2	U
959-98-8	Endosulfan I	2.1	U	2.1	U	2.2	U	2.2	U
60-57-1	Dieldrin	4.2	U	4.2	U	4.4	U	4.5	U
72-55-9	4,4'-DDE	4.2	U	4.2	U	4.4	U	4.5	U
72-20-8	Endrin	4.2	U	4.2	U	4.4	U	4.5	U
33213-65-9	Endosulfan II	4.2	U	4.2	U	4.4	U	4.5	U
72-54-8	4,4'-DDD	4.2	U	4.2	U	4.4	U	4.5	U
1031-07-8	Endosulfan sulfate	4.2	U	4.2	U	4.4	U	4.5	U
50-29-3	4,4'-DDT	4.2	U	4.2	U	4.4	U	4.5	U
72-43-5	Methoxychlor	21.	U	21.	U	22.	U	22.	U
53494-70-5	Endrin ketone	4.2	U	4.2	U	4.4	U	4.5	U
7421-93-4	Endrin aldehyde	4.2	U	4.2	U	4.4	U	4.5	U
5103-71-9	alpha-Chlordane	2.1	U	2.1	U	2.2	U	2.2	U
5103-74-2	gamma-Chlordane	2.1	U	2.1	U	2.2	U	2.2	U
8001-35-2	Toxaphene	42.	U	42.	U	44.	U	45.	U
12674-11-2	Aroclor-1016	42.	U	42.	U	44.	U	45.	U
11104-28-2	Aroclor-1221	42.	U	42.	U	44.	U	45.	U
11141-16-5	Aroclor-1232	42.	U	42.	U	44.	U	45.	U
53469-21-9	Aroclor-1242	42.	U	42.	U	44.	U	45.	U
12672-29-6	Aroclor-1248	42.	U	42.	U	44.	U	45.	U
11097-69-1	Aroclor-1254	42.	U	42.	U	44.	U	45.	U
11096-82-5	Aroclor-1260	42.	U	42.	U	44.	U	45.	U
12789-03-6	Technical Chlordane	42.	U	42.	U	44.	U	45.	U

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-SVOA	SAMPLE ID ------->	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE EXTRACTED -->	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96
	DATE ANALYZED --->	03/13/96	03/13/96	03/13/96	03/13/96	03/13/96	03/13/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
108-95-2	Phenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
111-44-4	bis(2-Chloroethyl)ether	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
95-57-8	2-Chlorophenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
541-73-1	1,3-Dichlorobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
106-46-7	1,4-Dichlorobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
95-50-1	1,2-Dichlorobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
95-48-7	2-Methylphenol (o-Cresol)	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
108-60-1	2,2'-oxybis(1-Chloropropane)	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
106-44-5	4-Methylphenol (p-Cresol)	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
621-64-7	N-Nitroso-di-n-propylamine	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
67-72-1	Hexachloroethane	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
98-95-3	Nitrobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
78-59-1	Isophorone	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
88-75-5	2-Nitrophenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
105-67-9	2,4-Dimethylphenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
120-83-2	2,4-Dichlorophenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
120-82-1	1,2,4-Trichlorobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
91-20-3	Naphthalene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
106-47-8	4-Chloroaniline	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
111-91-1	bis(2-Chloroethoxy)methane	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
87-68-3	Hexachlorobutadiene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
59-50-7	4-Chloro-3-methylphenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
91-57-6	2-Methylnaphthalene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
77-47-4	Hexachlorocyclopentadiene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
88-06-2	2,4,6-Trichlorophenol	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
95-95-4	2,4,5-Trichlorophenol	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
91-58-7	2-Chloronaphthalene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
88-74-4	2-Nitroaniline	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
131-11-3	Dimethyl phthalate	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
208-96-8	Acenaphthylene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
606-20-2	2,6-Dinitrotoluene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
99-09-2	3-Nitroaniline	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
83-32-9	Acenaphthene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
51-28-5	2,4-Dinitrophenol	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
100-02-7	4-Nitrophenol	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
132-64-9	Dibenzofuran	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-SVOA	SAMPLE ID ------->	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE EXTRACTED -->	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96
	DATE ANALYZED --->	03/13/96	03/13/96	03/13/96	03/13/96	03/13/96	03/13/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

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CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
121-14-2	2,4-Dinitrotoluene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
84-66-2	Diethylphthalate	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
7005-72-3	4-Chlorophenylphenylether	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
86-73-7	Fluorene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
100-01-6	4-Nitroaniline	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
534-52-1	2-Methyl-4,6-Dinitrophenol	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
86-30-6	N-Nitrosodiphenylamine	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
101-55-3	4-Bromophenyl-phenylether	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
118-74-1	Hexachlorobenzene	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
87-86-5	Pentachlorophenol	980.	U	1100.	U	1100.	U	1100.	U	1000.	U	1100.	U
85-01-8	Phenanthrene	390.	U	430.	U	220.	J	150.	J	420.	U	450.	U
120-12-7	Anthracene	390.	U	430.	U	58.	J	47.	J	420.	U	450.	U
86-74-8	Carbazole	390.	U	430.	U	42.	J	440.	U	420.	U	450.	U
84-74-2	Di-n-butylphthalate	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
206-44-0	Fluoranthene	390.	U	430.	U	370.	J	330.	J	420.	U	450.	U
129-00-0	Pyrene	390.	U	430.	U	230.	J	200.	J	420.	U	450.	U
85-68-7	Butylbenzylphthalate	390.	U	430.	U	64.	J	440.	U	420.	U	450.	U
91-94-1	3,3'-Dichlorobenzidine	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
56-55-3	Benzo(a)anthracene	390.	U	430.	U	240.	J	220.	J	420.	U	450.	U
218-01-9	Chrysene	390.	U	430.	U	280.	J	240.	J	420.	U	450.	U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	390.	U	430.	U	220.	J	320.	J	380.	J	140.	J
117-84-0	Di-n-octyl phthalate	390.	U	430.	U	440.	U	440.	U	420.	U	450.	U
205-99-2	Benzo(b)fluoranthene	390.	U	430.	U	360.	J	300.	J	420.	U	450.	U
207-08-9	Benzo(k)fluoranthene	390.	U	430.	U	340.	J	330.	J	420.	U	450.	U
50-32-8	Benzo(a)pyrene	390.	U	430.	U	320.	J	280.	J	420.	U	450.	U
193-39-5	Indeno(1,2,3-cd)pyrene	390.	U	430.	U	170.	J	130.	J	420.	U	450.	U
53-70-3	Dibenz(a,h)anthracene	390.	U	430.	U	63.	J	49.	J	420.	U	450.	U
191-24-2	Benzo(g,h,i)perylene	390.	U	430.	U	190.	J	150.	J	420.	U	450.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-SVOA	SAMPLE ID ------->	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12			
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
	LAB SAMPLE ID --->	143539		143540		143541		143532			
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96			
	DATE EXTRACTED -->	03/11/96		03/11/96		03/11/96		03/11/96			
	DATE ANALYZED --->	03/13/96		03/13/96		03/13/96		03/13/96			
	MATRIX ---------->	Soil		Soil		Soil		Soil			
	UNITS ---------->	ug/Kg		ug/Kg		ug/Kg		ug/Kg			
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL		
108-95-2	Phenol	420.	U	420.	U	440.	U	450.	U		
111-44-4	bis(2-Chloroethyl)ether	420.	U	420.	U	440.	U	450.	U		
95-57-8	2-Chlorophenol	420.	U	420.	U	440.	U	450.	U		
541-73-1	1,3-Dichlorobenzene	420.	U	420.	U	440.	U	450.	U		
106-46-7	1,4-Dichlorobenzene	420.	U	420.	U	440.	U	450.	U		
95-50-1	1,2-Dichlorobenzene	420.	U	420.	U	440.	U	450.	U		
95-48-7	2-Methylphenol (o-Cresol)	420.	U	420.	U	440.	U	450.	U		
108-60-1	2,2'-oxybis(1-Chloropropane)	420.	U	420.	U	440.	U	450.	U		
106-44-5	4-Methylphenol (p-Cresol)	420.	U	420.	U	440.	U	450.	U		
621-64-7	N-Nitroso-di-n-propylamine	420.	U	420.	U	440.	U	450.	U		
67-72-1	Hexachloroethane	420.	U	420.	U	440.	U	450.	U		
98-95-3	Nitrobenzene	420.	U	420.	U	440.	U	450.	U		
78-59-1	Isophorone	420.	U	420.	U	440.	U	450.	U		
88-75-5	2-Nitrophenol	420.	U	420.	U	440.	U	450.	U		
105-67-9	2,4-Dimethylphenol	420.	U	420.	U	440.	U	450.	U		
120-83-2	2,4-Dichlorophenol	420.	U	420.	U	440.	U	450.	U		
120-82-1	1,2,4-Trichlorobenzene	420.	U	420.	U	440.	U	450.	U		
91-20-3	Naphthalene	420.	U	420.	U	440.	U	450.	U		
106-47-8	4-Chloroaniline	420.	U	420.	U	440.	U	450.	U		
111-91-1	bis(2-Chloroethoxy)methane	420.	U	420.	U	440.	U	450.	U		
87-68-3	Hexachlorobutadiene	420.	U	420.	U	440.	U	450.	U		
59-50-7	4-Chloro-3-methylphenol	420.	U	420.	U	440.	U	450.	U		
91-57-6	2-Methylnaphthalene	420.	U	420.	U	440.	U	450.	U		
77-47-4	Hexachlorocyclopentadiene	420.	U	420.	U	440.	U	450.	U		
88-06-2	2,4,6-Trichlorophenol	420.	U	420.	U	440.	U	450.	U		
95-95-4	2,4,5-Trichlorophenol	1000.	U	1000.	U	1100.	U	1100.	U		
91-58-7	2-Chloronaphthalene	420.	U	420.	U	440.	U	450.	U		
88-74-4	2-Nitroaniline	1000.	U	1000.	U	1100.	U	1100.	U		
131-11-3	Dimethyl phthalate	420.	U	420.	U	440.	U	450.	U		
208-96-8	Acenaphthylene	420.	U	420.	U	440.	U	450.	U		
606-20-2	2,6-Dinitrotoluene	420.	U	420.	U	440.	U	450.	U		
99-09-2	3-Nitroaniline	1000.	U	1000.	U	1100.	U	1100.	U		
83-32-9	Acenaphthene	420.	U	420.	U	440.	U	450.	U		
51-28-5	2,4-Dinitrophenol	1000.	U	1000.	U	1100.	U	1100.	U		
100-02-7	4-Nitrophenol	1000.	U	1000.	U	1100.	U	1100.	U		
132-64-9	Dibenzofuran	420.	U	420.	U	440.	U	450.	U		

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

880006

SW846-SVOA								
SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12	
ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
LAB SAMPLE ID --->	143539		143540		143541		143532	
ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96	
DATE EXTRACTED -->	03/11/96		03/11/96		03/11/96		03/11/96	
DATE ANALYZED --->	03/13/96		03/13/96		03/13/96		03/13/96	
MATRIX ---------->	Soil		Soil		Soil		Soil	
UNITS ---------->	ug/Kg		ug/Kg		ug/Kg		ug/Kg	
CAS #	Parameter	1713 VAL	1713 VAL		1713 VAL		1713 VAL	
121-14-2	2,4-Dinitrotoluene	420. U	420. U		440. U		450. U	
84-66-2	Diethylphthalate	420. U	420. U		440. U		450. U	
7005-72-3	4-Chlorophenylphenylether	420. U	420. U		440. U		450. U	
86-73-7	Fluorene	420. U	420. U		440. U		450. U	
100-01-6	4-Nitroaniline	1000. U	1000. U		1100. U		1100. U	
534-52-1	2-Methyl-4,6-Dinitrophenol	1000. U	1000. U		1100. U		1100. U	
86-30-6	N-Nitrosodiphenylamine	420. U	420. U		440. U		450. U	
101-55-3	4-Bromophenyl-phenylether	420. U	420. U		440. U		450. U	
118-74-1	Hexachlorobenzene	420. U	420. U		440. U		450. U	
87-86-5	Pentachlorophenol	1000. U	1000. U		1100. U		1100. U	
85-01-8	Phenanthrene	420. U	420. U		440. U		450. U	
120-12-7	Anthracene	420. U	420. U		440. U		450. U	
86-74-8	Carbazole	420. U	420. U		440. U		450. U	
84-74-2	Di-n-butylphthalate	420. U	420. U		440. U		450. U	
206-44-0	Fluoranthene	420. U	420. U		440. U		450. U	
129-00-0	Pyrene	420. U	420. U		440. U		450. U	
85-68-7	Butylbenzylphthalate	420. U	420. U		440. U		450. U	
91-94-1	3,3'-Dichlorobenzidine	420. U	420. U		440. U		450. U	
56-55-3	Benzo(a)anthracene	420. U	420. U		440. U		450. U	
218-01-9	Chrysene	420. U	420. U		440. U		450. U	
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	420. U	420. U		46. J		450. U	
117-84-0	Di-n-octyl phthalate	420. U	420. U		440. U		450. U	
205-99-2	Benzo(b)fluoranthene	420. U	420. U		440. U		450. U	
207-08-9	Benzo(k)fluoranthene	420. U	420. U		440. U		450. U	
50-32-8	Benzo(a)pyrene	420. U	420. U		440. U		450. U	
193-39-5	Indeno(1,2,3-cd)pyrene	420. U	420. U		440. U		450. U	
53-70-3	Dibenz(a,h)anthracene	420. U	420. U		440. U		450. U	
191-24-2	Benzo(g,h,i)perylene	420. U	420. U		440. U		450. U	

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-VOA	SAMPLE ID ------->	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE ANALYZED --->	03/12/96	03/12/96	03/12/96	03/13/96	03/13/96	03/13/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
74-87-3	Chloromethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
74-83-9	Bromomethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-01-4	Vinyl chloride	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-00-3	Chloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-09-2	Methylene chloride	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
67-64-1	Acetone	43.		33.		30.		5.	J	47.	J	7.	J
75-15-0	Carbon disulfide	2.	J	13.	U	13.	U	13.	U	13.	U	14.	U
75-35-4	1,1-Dichloroethene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-34-3	1,1-Dichloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
540-59-0	1,2-Dichloroethene (total)	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
67-66-3	Chloroform	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
107-06-2	1,2-Dichloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
78-93-3	2-Butanone (MEK)	7.	J	8.	J	13.	U	13.	U	11.	J	14.	U
71-55-6	1,1,1-Trichloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
56-23-5	Carbon tetrachloride	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-27-4	Bromodichloromethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
78-87-5	1,2-Dichloropropane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
10061-01-5	cis-1,3-Dichloropropene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
79-01-6	Trichloroethene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
124-48-1	Dibromochloromethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
79-00-5	1,1,2-Trichloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
71-43-2	Benzene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
10061-02-6	trans-1,3-Dichloropropene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
75-25-2	Bromoform	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
591-78-6	2-Hexanone	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
127-18-4	Tetrachloroethene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
108-88-3	Toluene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
108-90-7	Chlorobenzene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
100-41-4	Ethylbenzene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
100-42-5	Styrene	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U
1330-20-7	Xylene (Total)	12.	U	13.	U	13.	U	13.	U	13.	U	14.	U

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

SW846-VOA								
SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12	
ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
LAB SAMPLE ID --->	143539		143540		143541		143532	
ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96	
DATE ANALYZED --->	03/13/96		03/13/96		03/13/96		03/12/96	
MATRIX ---------->	Soil		Soil		Soil		Soil	
UNITS ----------->	UG/KG		UG/KG		UG/KG		UG/KG	
CAS # Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL
74-87-3 Chloromethane	13.	U	12.	U	13.	U	14.	U
74-83-9 Bromomethane	13.	U	12.	U	13.	U	14.	U
75-01-4 Vinyl chloride	13.	U	12.	U	13.	U	14.	U
75-00-3 Chloroethane	13.	U	12.	U	13.	U	14.	U
75-09-2 Methylene chloride	13.	U	12.	U	13.	U	14.	U
67-64-1 Acetone	6.	J	6.	J	13.	UJ	10.	J
75-15-0 Carbon disulfide	13.	U	12.	U	13.	U	14.	U
75-35-4 1,1-Dichloroethene	13.	U	12.	U	13.	U	14.	U
75-34-3 1,1-Dichloroethane	13.	U	12.	U	13.	U	14.	U
540-59-0 1,2-Dichloroethene (total)	13.	U	12.	U	13.	U	14.	U
67-66-3 Chloroform	13.	U	12.	U	13.	U	14.	U
107-06-2 1,2-Dichloroethane	13.	U	12.	U	13.	U	14.	U
78-93-3 2-Butanone (MEK)	13.	U	12.	U	13.	U	14.	U
71-55-6 1,1,1-Trichloroethane	13.	U	12.	U	13.	U	14.	U
56-23-5 Carbon tetrachloride	13.	U	12.	U	13.	U	14.	U
75-27-4 Bromodichloromethane	13.	U	12.	U	13.	U	14.	U
78-87-5 1,2-Dichloropropane	13.	U	12.	U	13.	U	14.	U
10061-01-5 cis-1,3-Dichloropropene	13.	U	12.	U	13.	U	14.	U
79-01-6 Trichloroethene	13.	U	12.	U	13.	U	14.	U
124-48-1 Dibromochloromethane	13.	U	12.	U	13.	U	14.	U
79-00-5 1,1,2-Trichloroethane	13.	U	12.	U	13.	U	14.	U
71-43-2 Benzene	13.	U	12.	U	13.	U	14.	U
10061-02-6 trans-1,3-Dichloropropene	13.	U	12.	U	13.	U	14.	U
75-25-2 Bromoform	13.	U	12.	U	13.	U	14.	U
108-10-1 4-Methyl-2-Pentanone (MIBK)	13.	U	12.	U	13.	U	14.	U
591-78-6 2-Hexanone	13.	U	12.	U	13.	U	14.	U
127-18-4 Tetrachloroethene	13.	U	12.	U	13.	U	14.	U
79-34-5 1,1,2,2-Tetrachloroethane	13.	U	12.	U	13.	U	14.	U
108-88-3 Toluene	13.	U	12.	U	13.	U	14.	U
108-90-7 Chlorobenzene	13.	U	12.	U	13.	U	14.	U
100-41-4 Ethylbenzene	13.	U	12.	U	13.	U	14.	U
100-42-5 Styrene	13.	U	12.	U	13.	U	14.	U
1330-20-7 Xylene (Total)	13.	U	12.	U	13.	U	14.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TOC							
	SAMPLE ID ------>	059-S-03LS-12		059-S-03UF-45			
	ORIGINAL ID ----->	059SMW0312		059SMW0345			
	LAB SAMPLE ID --->	143542		143543			
	ID FROM REPORT -->	059SMW0312		059SMW0345			
	SAMPLE DATE ----->	03/04/96		03/04/96			
	DATE ANALYZED --->	03/25/96		03/25/96			
	MATRIX ---------->	Soil		Soil			
	UNITS ----------->	MG/KG		MG/KG			
CAS #	Parameter	1713	VAL	1713	VAL		
9999900-01-4	Total Organic Carbon (TOC)	1400.	J	230.	J		

T60000

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TOTAL PB								
	SAMPLE ID ------>	059-S-03LS-12		059-S-03UF-45				
	ORIGINAL ID ----->	059SMW0312		059SMW0345				
	LAB SAMPLE ID --->	143542S		143543S				
	ID FROM REPORT -->	059SMW0312		059SMW0345				
	SAMPLE DATE ----->	03/04/96		03/04/96				
	MATRIX ---------->	Soil		Soil				
	UNITS ---------->	MG/KG		MG/KG				
CAS #	Parameter	1713	VAL	1713	VAL			
7439-92-1	Lead (Pb)	8.3	J	0.97	J			

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TOTAL PHOS							
	SAMPLE ID ------->	059-S-03LS-12	059-S-03UF-45				
	ORIGINAL ID ----->	059SMW0312	059SMW0345				
	LAB SAMPLE ID --->	143542	143543				
	ID FROM REPORT -->	059SMW0312	059SMW0345				
	SAMPLE DATE ----->	03/04/96	03/04/96				
	DATE ANALYZED --->	03/10/96	03/10/96				
	MATRIX ---------->	Soil	Soil				
	UNITS ----------->	MG/KG	MG/KG				
CAS #	Parameter	1713 VAL	1713 VAL				
22569-71-7	Total phosphorus	180.	47.				

000093

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TPH-DRO	SAMPLE ID ------>	059-S-01LS-02	059-S-01LS-08	059-S-01LS-12	059-S-02LS-02	059-S-02LS-06	059-S-02LS-12
	ORIGINAL ID ----->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	LAB SAMPLE ID --->	143533	143534	143535	143536	143537	143538
	ID FROM REPORT -->	059SMW0102	059SMW0108	059SMW0112	059SMW0202	059SMW0206	059SMW0212
	SAMPLE DATE ----->	03/04/96	03/04/96	03/04/96	03/02/96	03/02/96	03/02/96
	DATE EXTRACTED -->	03/12/96	03/12/96	03/12/96	03/12/96	03/12/96	03/12/96
	DATE ANALYZED --->	03/15/96	03/15/96	03/15/96	03/15/96	03/15/96	03/15/96
	MATRIX ---------->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ---------->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
9999900-02-6	TPH - Diesel Range Organics	12000.		5100.	U	5300.	U	69000.		7200.		5400.	U

0000094

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TPH-DRO									
	SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12			
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
	LAB SAMPLE ID --->	143539		143540		143541		143532			
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312			
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96			
	DATE EXTRACTED -->	03/12/96		03/12/96		03/12/96		03/12/96			
	DATE ANALYZED --->	03/15/96		03/15/96		03/15/96		03/15/96			
	MATRIX ---------->	Soil		Soil		Soil		Soil			
	UNITS ---------->	UG/KG		UG/KG		UG/KG		UG/KG			
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL		
9999900-02-6	TPH - Diesel Range Organics	16000.		5000.	U	5300.	U	4000.	U		

SG0006

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

960000

TPH-GRO												
	SAMPLE ID ------->	059-S-01LS-02		059-S-01LS-08		059-S-01LS-12		059-S-02LS-02		059-S-02LS-06		059-S-02LS-12	
	ORIGINAL ID ----->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	LAB SAMPLE ID --->	143533		143534		143535		143536		143537		143538	
	ID FROM REPORT -->	059SMW0102		059SMW0108		059SMW0112		059SMW0202		059SMW0206		059SMW0212	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/02/96		03/02/96		03/02/96	
	DATE ANALYZED --->	03/11/96		03/11/96		03/11/96		03/11/96		03/11/96		03/11/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ----------->	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL	1713	VAL
9999900-02-5	TPH - Gasoline Range Organics	59.	U	64.	U	66.	U	67.	U	69.	J	68.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, RFI, Assembly E, 2nd Phase
RFI Soil Samples

TPH-GRO									
	SAMPLE ID ------>	059-S-03LS-02		059-S-03LS-06		059-S-03LS-12		059-C-03LS-12	
	ORIGINAL ID ----->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	LAB SAMPLE ID --->	143539		143540		143541		143532	
	ID FROM REPORT -->	059SMW0302		059SMW0306		059SMW0312		059CMW0312	
	SAMPLE DATE ----->	03/04/96		03/04/96		03/04/96		03/04/96	
	DATE ANALYZED --->	03/11/96		03/11/96		03/11/96		03/08/96	
	MATRIX ---------->	Soil		Soil		Soil		Soil	
	UNITS ----------->	UG/KG		UG/KG		UG/KG		UG/KG	
CAS #	Parameter	1713	VAL	1713	VAL	1713	VAL	1713	VAL
9999900-02-5	TPH - Gasoline Range Organics	63.	U	62.	U	67.	U	68.	U

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

APX9-METAL															
	SAMPLE ID ------>	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01					
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301					
	LAB SAMPLE ID --->	146393S		146394S		146395S		146396S		146397S					
	ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301					
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96					
	MATRIX ---------->	Water		Water		Water		Water		Water					
	UNITS ----------->	UG/L		UG/L		UG/L		UG/L		UG/L					
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL				
7440-36-0	Antimony (Sb)	30.	U	30.	U	30.	U	30.	U	30.	U				
7440-38-2	Arsenic (As)	3.	J	2.3	J	7.2	J	2.	UJ	2.	UJ				
7440-39-3	Barium (Ba)	463.		263.		445.		203.		198.	J				
7440-41-7	Beryllium (Be)	1.	U	1.	U	1.3	J	1.	U	1.	U				
7440-43-9	Cadmium (Cd)	3.	U	3.	U	3.	U	3.	U	3.	U				
7440-47-3	Chromium (Cr)	27.2		36.4		42.2		11.1		7.2	J				
7440-48-4	Cobalt (Co)	37.7	J	13.6	J	31.2	J	4.	U	4.2	J				
7440-50-8	Copper (Cu)	22.	U	18.4	U	44.9	U	4.	U	4.	U				
7439-92-1	Lead (Pb)	18.		16.5		30.6		2.	U	2.	U				
7439-97-6	Mercury (Hg)	0.2	U	0.2	U	0.21		0.2	U	0.2	U				
7440-02-0	Nickel (Ni)	43.6		55.2		52.9		25.	U	25.	U				
7782-49-2	Selenium (Se)	1.	U	1.	U	1.	U	1.	U	1.	U				
7440-22-4	Silver (Ag)	3.	UJ	3.	UJ	3.	UJ	3.	UJ	3.	UJ				
7440-28-0	Thallium (Tl)	10.	UJ	10.	UJ	2.	UJ	2.	UJ	10.	UJ				
7440-62-2	Vanadium (V)	14.9	J	19.2	J	46.8	J	4.	U	4.	U				
7440-66-6	Zinc (Zn)	57.3		51.2		128.		5.3	U	5.	U				
7440-31-5	Tin (Sn)	45.	U	45.	U	64.7	J	45.	U	45.	U				

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

METAL-CN												
		SAMPLE ID ------>	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
		ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
		LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
		ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
		SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
		DATE ANALYZED --->	04/24/96		04/24/96		04/24/96		04/24/96		04/24/96	
		MATRIX ---------->	Water		Water		Water		Water		Water	
		UNITS ----------->	MG/L		MG/L		MG/L		MG/L		MG/L	
CAS #	Parameter		1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
57-12-5	Cyanide (CN)		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U

669006

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

SW846-HERB										
	SAMPLE ID ------>	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
	ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE EXTRACTED -->	04/29/96		04/29/96		04/29/96		04/29/96		04/29/96	
	DATE ANALYZED --->	04/30/96		04/30/96		04/30/96		04/30/96		04/30/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ----------->	UG/L		UG/L		UG/L		UG/L		UG/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
94-75-7	2,4-D	0.47	U	0.47	U	0.47	U	0.47	U	0.47	U
94-82-6	2,4-DB	0.47	U	0.47	U	0.47	U	0.47	U	0.47	U
88-85-7	Dinoseb	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
93-76-5	2,4,5-T	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U
93-72-1	2,4,5-TP (Silvex)	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U
75-99-0	Dalapon	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U
1918-00-9	Dicamba	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U
120-36-5	Dichlorprop	0.47	U	0.47	U	0.47	U	0.47	U	0.47	U
94-74-6	MCPA	47.	U	47.	U	47.	U	47.	U	47.	U
93-65-2	MCPP	47.	U	47.	U	47.	U	47.	U	47.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

SW846-OP P	SAMPLE ID ------->	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
	ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE EXTRACTED -->	04/25/96		04/25/96		04/25/96		04/25/96		04/25/96	
	DATE ANALYZED --->	04/27/96		04/27/96		04/27/96		04/27/96		04/27/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ----------->	UG/L		UG/L		UG/L		UG/L		UG/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
86-50-0	Guthion	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
35400-43-2	Sulprofos	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
2921-88-2	Chloropyrifos	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
56-72-4	Coumaphos	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
8065-48-3	Demeton,O	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
333-41-5	Diazinon	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
62-73-7	Dichlorvos	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
298-04-4	Disulfoton	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
13194-48-4	Ethoprop	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
115-90-2	Fensulfothion	2.5	U	2.5	U	2.5	U	2.5	U	2.5	UJ
55-38-9	Fenthion	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
150-50-5	Merphos	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
7786-34-7	Mevinphos, Alpha	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
300-76-5	Naled	5.	UJ	5.	UJ	5.	UJ	5.	UJ	5.	UJ
298-00-0	Methyl parathion	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
298-02-2	Phorate	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
299-84-3	Ronnel	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
22248-79-9	Stirophos (Tetrachlorovinphos)	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
34643-46-4	Tokuthion	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
327-98-0	Trichloronate	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ
126-75-0	Demeton,S	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ	2.5	UJ

*** Validation Complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

SW846-PEST	SAMPLE ID ------>	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
	ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE EXTRACTED -->	04/23/96		04/23/96		04/23/96		04/23/96		04/23/96	
	DATE ANALYZED --->	04/25/96		05/06/96		04/26/96		04/26/96		04/26/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ----------->	ug/L		ug/L		ug/L		ug/L		ug/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
11141-16-5	Aroclor-1232	1.	U	1.	U	1.	U	1.	U	1.	U
319-84-6	alpha-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
319-85-7	beta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
319-86-8	delta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
76-44-8	Heptachlor	0.05	U	0.069		0.05	U	0.05	U	0.05	U
309-00-2	Aldrin	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U	0.19	J	0.05	U	0.05	U	0.05	U
959-98-8	Endosulfan I	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
60-57-1	Dieldrin	0.1	U	0.052	J	0.1	U	0.1	U	0.1	U
72-55-9	4,4'-DDE	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-20-8	Endrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
33213-65-9	Endosulfan II	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-54-8	4,4'-DDD	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
50-29-3	4,4'-DDT	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-43-5	Methoxychlor	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
53494-70-5	Endrin ketone	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
7421-93-4	Endrin aldehyde	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
5103-71-9	alpha-Chlordane	0.05	U	0.085		0.05	U	0.05	U	0.05	U
5103-74-2	gamma-Chlordane	0.05	U	0.12		0.05	U	0.05	U	0.05	U
8001-35-2	Toxaphene	1.	U	1.	U	1.	U	1.	U	1.	U
12674-11-2	Aroclor-1016	1.	U	1.	U	1.	U	1.	U	1.	U
11104-28-2	Aroclor-1221	1.	U	1.	U	1.	U	1.	U	1.	U
53469-21-9	Aroclor-1242	1.	U	1.	U	1.	U	1.	U	1.	U
12672-29-6	Aroclor-1248	1.	U	1.	U	1.	U	1.	U	1.	U
11097-69-1	Aroclor-1254	1.	U	1.	U	1.	U	1.	U	1.	U
11096-82-5	Aroclor-1260	1.	U	1.	U	1.	U	1.	U	1.	U
12789-03-6	Technical Chlordane	1.	U	1.1		1.	U	1.	U	1.	U

*** Validation complete ***

NSA MEMPHIS - SWMU 59
NSA Memphis, Assembly E, 2nd Phase
RFI Groundwater Samples, 1st Quarter

SW846-SVOA												
	SAMPLE ID ------->	059-G-01LS-01 RE		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01		
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301		
	LAB SAMPLE ID --->	146393RE		146394		146395		146396		146397		
	ID FROM REPORT -->	059ga101RE		059ga00201		059ga00301		059GD00301		059hd00301		
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96		
	DATE EXTRACTED -->	04/25/96		04/23/96		04/23/96		04/23/96		04/23/96		
	DATE ANALYZED --->	04/26/96		04/26/96		04/26/96		04/26/96		04/26/96		
	MATRIX ---------->	Water		Water		Water		Water		Water		
	UNITS ---------->	ug/L		ug/L		ug/L		ug/L		ug/L		
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL	
108-95-2	Phenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
111-44-4	bis(2-Chloroethyl)ether	10.	U	10.	U	10.	U	10.	U	10.	U	
95-57-8	2-Chlorophenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
541-73-1	1,3-Dichlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U	
106-46-7	1,4-Dichlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U	
95-50-1	1,2-Dichlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U	
95-48-7	2-Methylphenol (o-Cresol)	10.	U	10.	U	10.	UR	10.	U	10.	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	10.	U	10.	U	10.	U	10.	U	10.	U	
106-44-5	4-Methylphenol (p-Cresol)	10.	U	10.	U	10.	UR	10.	U	10.	U	
621-64-7	N-Nitroso-di-n-propylamine	10.	U	10.	U	10.	U	10.	U	10.	U	
67-72-1	Hexachloroethane	10.	U	10.	U	10.	U	10.	U	10.	U	
98-95-3	Nitrobenzene	10.	U	10.	U	10.	U	10.	U	10.	U	
78-59-1	Isophorone	10.	U	10.	U	10.	U	10.	U	10.	U	
88-75-5	2-Nitrophenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
105-67-9	2,4-Dimethylphenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
120-83-2	2,4-Dichlorophenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
120-82-1	1,2,4-Trichlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U	
91-20-3	Naphthalene	10.	U	10.	U	10.	U	10.	U	10.	U	
106-47-8	4-Chloroaniline	10.	U	10.	U	10.	U	10.	U	10.	U	
87-68-3	Hexachlorobutadiene	10.	U	10.	U	10.	U	10.	U	10.	U	
111-91-1	bis(2-Chloroethoxy)methane	10.	U	10.	U	10.	U	10.	U	10.	U	
59-50-7	4-Chloro-3-methylphenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
91-57-6	2-Methylnaphthalene	10.	U	10.	U	10.	U	10.	U	10.	U	
77-47-4	Hexachlorocyclopentadiene	10.	U	10.	U	10.	U	10.	U	10.	U	
88-06-2	2,4,6-Trichlorophenol	10.	U	10.	U	10.	UR	10.	U	10.	U	
95-95-4	2,4,5-Trichlorophenol	25.	U	25.	U	25.	UR	25.	U	25.	U	
91-58-7	2-Chloronaphthalene	10.	U	10.	U	10.	U	10.	U	10.	U	
88-74-4	2-Nitroaniline	25.	U	25.	U	25.	U	25.	U	25.	U	
131-11-3	Dimethyl phthalate	10.	U	10.	U	10.	U	10.	U	10.	U	
208-96-8	Acenaphthylene	10.	U	10.	U	10.	U	10.	U	10.	U	
606-20-2	2,6-Dinitrotoluene	10.	U	10.	U	10.	U	10.	U	10.	U	
99-09-2	3-Nitroaniline	25.	U	25.	U	25.	U	25.	U	25.	U	
83-32-9	Acenaphthene	10.	U	10.	U	10.	U	10.	U	10.	U	
51-28-5	2,4-Dinitrophenol	25.	U	25.	U	25.	UR	25.	U	25.	U	
100-02-7	4-Nitrophenol	25.	U	25.	U	25.	UR	25.	U	25.	U	
132-64-9	Dibenzofuran	10.	U	10.	U	10.	U	10.	U	10.	U	

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SW846-SVOA	SAMPLE ID ------>	059-G-01LS-01 RE		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393RE		146394		146395		146396		146397	
	ID FROM REPORT -->	059ga101RE		059ga00201		059ga00301		059GD00301		059hd00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE EXTRACTED -->	04/25/96		04/23/96		04/23/96		04/23/96		04/23/96	
	DATE ANALYZED --->	04/26/96		04/26/96		04/26/96		04/26/96		04/26/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ----------->	ug/L		ug/L		ug/L		ug/L		ug/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
121-14-2	2,4-Dinitrotoluene	10.	U	10.	U	10.	U	10.	U	10.	U
84-66-2	Diethylphthalate	10.	U	10.	U	3.	J	10.	U	10.	U
7005-72-3	4-Chlorophenylphenylether	10.	U	10.	U	10.	U	10.	U	10.	U
86-73-7	Fluorene	10.	U	10.	U	10.	U	10.	U	10.	U
100-01-6	4-Nitroaniline	25.	U	25.	U	25.	U	25.	U	25.	U
534-52-1	2-Methyl-4,6-Dinitrophenol	25.	U	25.	U	25.	U	25.	U	25.	U
86-30-6	N-Nitrosodiphenylamine	10.	U	10.	U	10.	UR	10.	U	10.	U
101-55-3	4-Bromophenyl-phenylether	10.	U	10.	U	10.	U	10.	U	10.	U
118-74-1	Hexachlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U
87-86-5	Pentachlorophenol	25.	U	25.	U	25.	UR	25.	U	25.	U
85-01-8	Phenanthrene	10.	U	10.	U	10.	U	10.	U	10.	U
120-12-7	Anthracene	10.	U	10.	U	10.	U	10.	U	10.	U
86-74-8	Carbazole	10.	U	10.	U	10.	U	10.	U	10.	U
84-74-2	Di-n-butylphthalate	10.	U	10.	U	10.	U	10.	U	10.	U
206-44-0	Fluoranthene	10.	U	10.	U	10.	U	10.	U	10.	U
129-00-0	Pyrene	10.	U	10.	U	10.	U	10.	U	10.	U
85-68-7	Butylbenzylphthalate	10.	U	10.	U	10.	U	10.	U	10.	U
91-94-1	3,3'-Dichlorobenzidine	10.	U	10.	U	10.	U	10.	U	10.	U
56-55-3	Benzo(a)anthracene	10.	U	10.	U	10.	U	10.	U	10.	U
218-01-9	Chrysene	10.	U	10.	U	10.	U	10.	U	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	1.	J	10.	U	10.	U	10.	U	10.	U
117-84-0	Di-n-octyl phthalate	10.	U	10.	U	10.	U	10.	U	10.	U
205-99-2	Benzo(b)fluoranthene	10.	U	10.	U	10.	U	10.	U	10.	U
207-08-9	Benzo(k)fluoranthene	10.	U	10.	U	10.	U	10.	U	10.	U
50-32-8	Benzo(a)pyrene	10.	U	10.	U	10.	U	10.	U	10.	U
193-39-5	Indeno(1,2,3-cd)pyrene	10.	U	10.	U	10.	U	10.	U	10.	U
53-70-3	Dibenz(a,h)anthracene	10.	U	10.	U	10.	U	10.	U	10.	U
191-24-2	Benzo(g,h,i)perylene	10.	U	10.	U	10.	U	10.	U	10.	U

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SW846-VOA	SAMPLE ID ------->	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
	ID FROM REPORT -->	059ga00101		059ga00201		059ga00301		059GD00301		059hd00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE ANALYZED --->	05/01/96		05/01/96		05/01/96		05/01/96		05/01/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ----------->	ug/L		ug/L		ug/L		ug/L		ug/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
74-87-3	Chloromethane	10.	UJ	10.	UJ	10.	UJ	10.	UJ	10.	UJ
74-83-9	Bromomethane	10.	UJ	10.	UJ	10.	UJ	10.	UJ	10.	UJ
75-01-4	Vinyl chloride	10.	U	10.	U	10.	U	10.	U	10.	U
75-00-3	Chloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
75-09-2	Methylene chloride	10.	U	10.	U	10.	U	10.	U	10.	U
67-64-1	Acetone	93.	J	10.	UJ	10.	UJ	10.	UJ	10.	UJ
75-15-0	Carbon disulfide	10.	U	10.	U	10.	U	10.	U	10.	U
75-35-4	1,1-Dichloroethene	10.	U	10.	U	10.	U	10.	U	10.	U
75-34-3	1,1-Dichloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
540-59-0	1,2-Dichloroethene (total)	10.	UJ	10.	UJ	10.	UJ	10.	UJ	10.	UJ
67-66-3	Chloroform	10.	U	10.	U	10.	U	10.	U	10.	U
107-06-2	1,2-Dichloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
78-93-3	2-Butanone (MEK)	10.	U	10.	U	10.	U	10.	U	10.	U
71-55-6	1,1,1-Trichloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
56-23-5	Carbon tetrachloride	10.	U	10.	U	10.	U	10.	U	10.	U
75-27-4	Bromodichloromethane	10.	U	10.	U	10.	U	10.	U	10.	U
78-87-5	1,2-Dichloropropane	10.	U	10.	U	10.	U	10.	U	10.	U
10061-01-5	cis-1,3-Dichloropropene	10.	U	10.	U	10.	U	10.	U	10.	U
79-01-6	Trichloroethene	10.	U	10.	U	10.	U	10.	U	10.	U
124-48-1	Dibromochloromethane	10.	U	10.	U	10.	U	10.	U	10.	U
79-00-5	1,1,2-Trichloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
71-43-2	Benzene	10.	U	10.	U	10.	U	10.	U	10.	U
10061-02-6	trans-1,3-Dichloropropene	10.	U	10.	U	10.	U	10.	U	10.	U
75-25-2	Bromoform	10.	U	10.	U	10.	U	10.	U	10.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	10.	U	10.	U	10.	U	10.	U	10.	U
591-78-6	2-Hexanone	10.	U	10.	U	10.	U	10.	U	10.	U
127-18-4	Tetrachloroethene	10.	U	10.	U	10.	U	10.	U	10.	U
79-34-5	1,1,2,2-Tetrachloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
108-88-3	Toluene	10.	U	10.	U	10.	U	10.	U	10.	U
108-90-7	Chlorobenzene	10.	U	10.	U	10.	U	10.	U	10.	U
100-41-4	Ethylbenzene	10.	U	10.	U	10.	U	10.	U	10.	U
100-42-5	Styrene	10.	U	10.	U	10.	U	10.	U	10.	U
1330-20-7	Xylene (Total)	10.	U	10.	U	10.	U	10.	U	10.	U

*** Validation Complete ***

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TPH-DRO										
	SAMPLE ID ------>	059-G-01LS-01		059-G-02LS-01		059-G-03LS-01		059-G-03UF-01		059-H-03UF-01	
	ORIGINAL ID ----->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	LAB SAMPLE ID --->	146393		146394		146395		146396		146397	
	ID FROM REPORT -->	059GA00101		059GA00201		059GA00301		059GD00301		059HD00301	
	SAMPLE DATE ----->	04/18/96		04/18/96		04/18/96		04/18/96		04/18/96	
	DATE EXTRACTED -->	04/23/96		04/23/96		04/23/96		04/23/96		04/23/96	
	DATE ANALYZED --->	04/25/96		04/25/96		04/25/96		04/25/96		04/25/96	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ---------->	UG/L		UG/L		UG/L		UG/L		UG/L	
CAS #	Parameter	1780	VAL	1780	VAL	1780	VAL	1780	VAL	1780	VAL
9999900-02-6	TPH - Diesel Range Organics	100.	U	100.	U	160.		100.	U	100.	U

*** Validation complete ***

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SW846-PEST											
	SAMPLE ID ------>	059-G-01LS-03		059-G-02LS-03		059-H-02LS-03		059-G-03LS-03		059-G-03UF-03	
	ORIGINAL ID ------>	059G01LS03		059G02LS03		059H02LS03		059G03LS03		059G03UF03	
	LAB SAMPLE ID --->	S772526*1		S772392*4		S772392*6		S772425*8		S772392*5	
	ID FROM REPORT -->	059G01LS03		059G02LS03		059H02LS03		059G03LS03		059G03UF03	
	SAMPLE DATE ----->	05/05/97		04/29/97		04/29/97		04/29/97		04/29/97	
	DATE EXTRACTED -->	05/07/97		05/02/97		05/02/97		05/02/97		05/02/97	
	DATE ANALYZED --->	05/12/97		05/06/97		05/06/97		05/06/97		05/06/97	
	MATRIX ---------->	Water		Water		Water		Water		Water	
	UNITS ---------->	UG/L		UG/L		UG/L		UG/L		UG/L	
CAS #	Parameter	MEM16	VAL	MEM15	VAL	MEM15	VAL	MEM15	VAL	MEM15	VAL
319-84-6	alpha-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
319-85-7	beta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
319-86-8	delta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
76-44-8	Heptachlor	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
309-00-2	Aldrin	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U	0.084	NJ	0.1	NJ	0.05	U	0.05	U
959-98-8	Endosulfan I	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
60-57-1	Dieldrin	0.1	U	0.027	J	0.017	J	0.1	U	0.1	U
72-55-9	4,4'-DDE	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-20-8	Endrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
33213-65-9	Endosulfan II	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-54-8	4,4'-DDD	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
50-29-3	4,4'-DDT	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
72-43-5	Methoxychlor	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
7421-93-4	Endrin aldehyde	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
8001-35-2	Toxaphene	5.	U	5.	U	5.	U	5.	U	5.	U
12674-11-2	Aroclor-1016	1.	U	1.	U	1.	U	1.	U	1.	U
11104-28-2	Aroclor-1221	2.	U	2.	U	2.	U	2.	U	2.	U
11141-16-5	Aroclor-1232	1.	U	1.	U	1.	U	1.	U	1.	U
53469-21-9	Aroclor-1242	1.	U	1.	U	1.	U	1.	U	1.	U
12672-29-6	Aroclor-1248	1.	U	1.	U	1.	U	1.	U	1.	U
11097-69-1	Aroclor-1254	1.	U	1.	U	1.	U	1.	U	1.	U
11096-82-5	Aroclor-1260	1.	U	1.	U	1.	U	1.	U	1.	U
57-74-9	Chlordane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

*** Validation Complete ***

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RFI Groundwater Samples, 3rd Quarter

SW846-VOA	SAMPLE ID ------->	059-G-01LS-03	059-G-02LS-03	059-H-02LS-03	059-G-03LS-03	059-G-03UF-03
	ORIGINAL ID ----->	059G01LS03	059G02LS03	059H02LS03	059G03LS03	059G03UF03
	LAB SAMPLE ID --->	S772526*1	S772392*4	S772392*6	S772392*12	S772392*5
	ID FROM REPORT -->	059G01LS03	059G02LS03	059H02LS03	059G03LS03	059G03UF03
	SAMPLE DATE ----->	05/05/97	04/29/97	04/29/97	04/29/97	04/29/97
	DATE ANALYZED --->	05/09/97	05/01/97	05/01/97	05/02/97	05/01/97
	MATRIX ---------->	Water	Water	Water	Water	Water
	UNITS ----------->	UG/L	UG/L	UG/L	UG/L	UG/L

CAS #	Parameter	MEM16	VAL	MEM15	VAL	MEM15	VAL	MEM15	VAL	MEM15	VAL
74-87-3	Chloromethane	10.	U	10.	U	10.	U	10.	U	10.	U
75-01-4	Vinyl chloride	10.	U	10.	U	10.	U	10.	U	10.	U
74-83-9	Bromomethane	10.	U	10.	U	10.	U	10.	U	10.	U
75-00-3	Chloroethane	10.	U	10.	U	10.	U	10.	U	10.	U
75-35-4	1,1-Dichloroethene	5.	U	5.	U	5.	U	5.	U	5.	U
75-09-2	Methylene chloride	5.	U	5.	U	5.	U	1.	J	5.	U
75-34-3	1,1-Dichloroethane	5.	U	5.	U	5.	U	5.	U	5.	U
67-66-3	Chloroform	5.	U	5.	U	5.	U	5.	U	5.	U
71-55-6	1,1,1-Trichloroethane	5.	U	5.	U	5.	U	5.	U	5.	U
56-23-5	Carbon tetrachloride	5.	U	5.	U	5.	U	5.	U	5.	U
71-43-2	Benzene	5.	U	5.	U	5.	U	5.	U	5.	U
107-06-2	1,2-Dichloroethane	5.	U	5.	U	5.	U	5.	U	5.	U
79-01-6	Trichloroethene	5.	U	5.	U	5.	U	5.	U	5.	U
78-87-5	1,2-Dichloropropane	5.	U	5.	U	5.	U	5.	U	5.	U
75-27-4	Bromodichloromethane	5.	U	5.	U	5.	U	5.	U	5.	U
108-88-3	Toluene	5.	U	5.	U	5.	U	5.	U	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U	5.	U	5.	U	5.	U	5.	U
127-18-4	Tetrachloroethene	5.	U	5.	U	5.	U	5.	U	5.	U
124-48-1	Dibromochloromethane	5.	U	5.	U	5.	U	5.	U	5.	U
108-90-7	Chlorobenzene	5.	U	5.	U	5.	U	5.	U	5.	U
100-41-4	Ethylbenzene	5.	U	5.	U	5.	U	5.	U	5.	U
100-42-5	Styrene	5.	U	5.	U	5.	U	5.	U	5.	U
75-25-2	Bromoform	5.	U	5.	U	5.	U	5.	U	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U	5.	U	5.	U	5.	U	5.	U
67-64-1	Acetone	50.	U	50.	U	50.	U	50.	U	50.	U
75-15-0	Carbon disulfide	5.	U	5.	U	5.	U	5.	U	5.	U
78-93-3	2-Butanone (MEK)	25.	U	25.	U	25.	U	25.	U	25.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	25.	U	25.	U	25.	U	25.	U	25.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U	5.	U	5.	U	5.	U	5.	U
10061-02-6	trans-1,3-Dichloropropene	5.	U	5.	U	5.	U	5.	U	5.	U
591-78-6	2-Hexanone	25.	U	25.	U	25.	U	25.	U	25.	U
1330-20-7	Xylene (Total)	5.	U	5.	U	5.	U	5.	U	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U	5.	U	5.	U	5.	U	5.	U

*** Validation Complete ***

Appendix C

Comprehensive Health and Safety Plan

7.0 COMPREHENSIVE HEALTH AND SAFETY PLAN (CHASP)

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) is being conducted at the Naval Air Station (NAS) Memphis, Tennessee. The purpose of this program is to assess the nature and extent of contamination at the site and to determine if follow-up action is required to maintain compliance with environmental regulations.

This Comprehensive Health and Safety Plan (CHASP) is applicable to field operations to be conducted during the RFI at NAS Memphis. The Navy project contract number with EnSafe/Allen & Hoshall (E/A&H) is N62467-89-D-0318. A Site-Specific Health and Safety Plan (SSHSP) will be developed and implemented to address site-specific activities and hazards.

The provisions of this plan are mandatory for E/A&H personnel and those personnel under contract to E/A&H or the Navy e.g., the United States Geological Survey (USGS) whose work responsibilities call for them to enter a work zone (See 7.3 Work Areas). Such personnel must read this plan and sign the plan acceptance form (See Attachment C) before starting site activities. In addition, such personnel will operate in accordance with the most current requirements of 29 CFR 1910.120, *Standards for Hazardous Waste Workers and Emergency Responders* (HAZWOPER). These regulations include the following provisions for employees exposed to hazardous substances, health hazards, or safety hazards: training as described in 120(e), medical surveillance as described in 120(f), and personal protective equipment (PPE) described in 120(g).

All non-E/A&H personnel present in E/A&H work areas shall either adopt and abide by this CHASP and the corresponding SSHSP or shall have their own safety plan which, at a minimum, meets the requirements of the E/A&H CHASP and SSHSP.

- contamination reduction zone (CRZ), and the
- support zone (SZ)

Field personnel shall enter the SZ and don their PPE, then they will move through the CRZ and into the EZ. After completing their work or when taking a break they will leave the EZ through the CRZ, decontaminate themselves and their equipment, and leave the area through the SZ.

The exclusion zone is the area being investigated, sampled, or otherwise of interest. It is where chemical contamination is known or suspected to exist. The EZ includes the work area except for areas set aside as either the CRZ or SZ. The EZ will be defined and demarcated in the field; in the case of drilling, the EZ is typically about 50 feet in diameter with the borehole located in the middle.

Only authorized personnel that meet the training requirements of OSHA 29 CFR 1910.120 (40 hour HAZWOPER course/8-hour annual refresher course/24-hour supervised onsite training or equivalent) are permitted within the exclusion and contamination reduction zones. Documentation of these certifications will be maintained on site, as well as in the site trailer, at all times. Prior to entering the EZ, and at all times when in the EZ, all personnel shall be outfitted in and properly use all required PPE. A checkpoint may be established at the edge of the EZ to regulate the flow of personnel and equipment in and out of the area.

When using Level A, B, or C PPE, all personnel entering the EZ must use the "buddy system". All persons entering the EZ must be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical or heat exposure
- Periodically check the integrity of his or her partner's protective clothing
- Notify the shift supervisor, his representative, or others if emergency help is needed

7.1.2 Work Area Access

A file will be maintained onsite that includes a current OSHA initial HAZWOPER training certificate (or copy) and an up-to-date refresher certificate for all employees involved in field activities. Employees that are unsure that a copy of their certificate is onsite shall bring a copy of their certificate with them and present it to the Site Health and Safety Officer before beginning field work. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

Subcontractors, DOD oversight personnel, and other site visitors must provide the Site Health and Safety Officer with documentation showing that their HAZWOPER training is current and must agree to comply with this CHASP and the corresponding SSHSP or equivalent health and safety requirements prior to site entry. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

The Site Health and Safety Officer may suspend site work and may instruct personnel to evacuate the area. Examples of situations when this may happen are:

- Site conditions have changed, for whatever reason, such that the SSHSP does not adequately address the current situation,

- Safety precautions being used are inadequate for the situation, or

- Personnel including E/A&H, subcontractors, visitors, or DOD are or may be exposed to an immediate health hazard.

7.1.3 Site History and Description

A review of the existing site data will be conducted to assess the potential hazards to be encountered by E/A&H and contractor personnel and addressed in the SSHSP. The location of NAS Memphis is shown on Figure 2-1, Vicinity Map.

Health recommended exposure limits (NIOSH RELs), auto-ignition temperatures, and flammability ranges. Material Safety Data Sheets for these materials will be included in Attachment A of each SIP.

7.4 Operations and Physical Hazards

Field personnel should be aware of and act in a manner to minimize the dangers associated with physical hazards typically encountered during environmental investigations. These hazards include heat-related illnesses, uneven terrain, slippery surfaces, lifting, and use of heavy equipment. Electrical lines may be present either above or below ground, and underground gas lines may be present. Prior to the initiation of drilling activities, drilling locations must be cleared by the Naval Public Works Center (PWC).

Heavy equipment and drill rig operations will be conducted in accordance with the procedures outlined in Attachment A — *Drilling Safety Guide*, provided in this plan. Personnel conducting drill rig operations shall keep clear of all moving parts. To prevent entanglement with the drill rig, loose clothing shall not be worn. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and shall implement appropriate work regimens to minimize the likelihood of field personnel becoming ill. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling. When working in areas that support habitat for poisonous snakes, personnel shall wear protective chaps made of a heavy material designed to prevent snake bites to the legs.

7.5 Employee protection

Employee protection for this project includes standard safe work practices, NAS Memphis rules of conduct, PPE, personal decontamination procedures, equipment for extreme weather conditions, work limitations, and exposure evaluation.

- Due to the possible presence of underground utilities (including electric, natural gas, water, sewer, telephone, etc.), the activity and local utility representatives should be contacted and requested to identify all lines at the ground surface using characteristic spray paint or labeled stakes. A 3-yard buffer zone should be maintained during all subsurface investigations.

- Due to the flammable properties of some of the potential chemical hazards, all spark or ignition sources should be bonded and/or grounded or mitigated before soil boring advancement or other site activities begin.

7.5.2 NAS Memphis General Rules of Conduct:

- Liquor, firearms, narcotics, tape recorders, and other contraband items are not permitted on the premises.

- Any violation of local, state, or federal laws, or conduct which is outside the generally accepted moral standards of the community is prohibited.

- Violation of the Espionage Act, willfully hindering or limiting production, or sabotage is not permitted.

- Willfully damaging or destroying property or removing government records is forbidden.

- Misappropriation or unauthorized altering of any government records is forbidden.

- Securing government tools in a personal or contractor's tool box is forbidden.

- Gambling in any form, selling tickets or articles, taking orders, soliciting subscriptions, taking up collections, etc., is forbidden.

Table 7-1
Level of Protection and Criteria

Level of Protection	Criteria for Use	Equipment
Level A	• When atmospheres are "immediately dangerous to life and health" (IDLH in the NIOSH/OSHA Pocket Guide to Chemical Hazards or other guides.) • When known atmospheres or potential situations exist that would affect the skin or eyes or be absorbed into the body through these surfaces. Consult standard references to obtain concentrations hazardous to skin, eyes, or mucous membranes. • Potential situations include those where immersion may occur, vapors may be generated, or splashing may occur through site activities. • Where atmospheres are oxygen deficient. • When the type(s) and or potential concentration of toxic substances are not known.	• Positive-pressure full facepiece self-contained breathing apparatus (SCBA) or positive-pressure supplied air respirator with escape SCBA. • Fully-encapsulating chemical protective suit. • Chemical-resistant inner and outer gloves. • Steel toe and shank chemical resistant boots. • Hard hat under suit. • Two-way radios worn inside suit. • Optional: coveralls, long cotton underwear, disposable protective suit, gloves and boots, over fully encapsulating suit.
Level B	• When respiratory protection is warranted and cartridge respirators are not appropriate. Examples of these conditions are: When work areas contain less than 19.5 percent oxygen, When expected contaminants do not have appropriate warning properties e.g. vinyl chloride, or When cartridges are not available to protect against all contaminants of concern.	• Chemical resistant clothes, long sleeves, hooded, one or two pieces. • Positive-pressure full facepiece supplied air breathing apparatus or airline system with a 30-minute escape bottle. • Hard hat. • Inner gloves and chemical resistant gloves. • Steel toe and shank boots. • Optional: coveralls and disposable outer boots.
Level C	• When respiratory protection is warranted and cartridge respirators are appropriate. • When work areas contain at least 19.5 percent oxygen.	• Chemical resistant clothes, long sleeves, hood optional, one or two pieces. • Full-facepiece, air purifying respirator equipped with cartridges suitable for the hazard. • Hard hat. • Inner gloves and chemical resistant gloves. • Steel toe and shank boots. • Coveralls and disposable outer boots.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. **The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.**

Field activities which disturb soils will be initiated in Modified Level D protection except when stated otherwise in the SSHSP or site conditions (e.g., sampling results from previous studies) indicate that modified Level D is inappropriate. Modified Level D protection consists of a hard hat, appropriate chemical-resistant gloves (vinyl or nitrile), eye protection, and chemical-resistant, steel-toed and shank boots. Work coveralls (full length sleeves and pants) will be worn if free product or contaminants identified as skin irritants are encountered. This level of protection was selected because the levels of contamination detected in previous studies were low and free product was not detected.

PPE upgrades to Level C will be initiated if airborne concentrations exceeds 2 ppm above the background concentration in the breathing zone or if concentrations of any contaminant exceeds 50 percent of the OSHA PEL. See Table 7-1 for the specific criteria for use and the equipment required for each level of protection.

7.5.4 Air Monitoring

Previous site work indicates that workers may potentially be exposed to low concentrations of numerous chemicals including volatile organic compounds (VOCs), halogenated compounds, and combustible gases/vapors. Based on site history and existing sampling data, "worst case" contaminated areas will be identified prior to initiation of field activities.

Air monitoring using a photoionization detector (PID) and/or other appropriate sampling equipment will be conducted prior to beginning field activities at a new EZ and during ground disturbing activities. The PID will be field calibrated to measure VOCs relative to a 100 ppm

On a daily basis, PIDs, CGIs, and other monitoring equipment shall be calibrated or their proper function verified before being used. Throughout the day this equipment shall be periodically checked to ensure that it is working properly. A final calibration shall be conducted at the end of the work day at which time each instrument will be checked to ensure that it is free from surface contamination. Field staff shall record in their field notebooks the fact that they conducted these calibrations and checks and note whether the equipment was or was not functioning properly. When equipment is not functioning properly, it should be brought to the attention of the Site Supervisor or Site Health and Safety Officer who will arrange for repairs and/or replacement of that equipment as needed.

7.5.5 Procedures and Equipment for Extreme Weather Conditions

The seasonal climate in Memphis can be expected to be hot with high relative humidity in the summer months and moderately cold to extremely cold in the winter months. Therefore, heat-and-cold stress will be of concern for all personnel. Adverse weather conditions are important considerations in planning and conducting site operations. Extremes in hot and cold weather can cause physical discomfort, loss of efficiency, and personal injury.

7.5.5.1 Exposure to Hot Weather

Heat stress can result when the protective clothing decreases natural body ventilation even when temperatures are moderate. Various levels of personal protection may require wearing low permeability disposable suits, gloves, and boots which will prevent most natural body ventilation. Discomfort due to increased sweating and body temperature (heat stress) will be expected at the work site.

Heat stress is the metabolic and environmental heat to which an individual is exposed. The manifestations of heat strain are the adjustments made by an individual in response to the stress. The three most important categories of heat-induced illness are: heat exhaustion, heat cramps, and heat stroke. These disorders can occur when the normal responses to increased sweat

Heat cramps result when the working muscles go into painful spasms. This may occur in people who perspire profusely in heat and who drink large quantities of water, but who fail to replace their bodies' salt. It is the low salt content in the blood that causes the cramping. The abdominal muscles as well as the muscles in the arms and legs may be affected. The cramps may appear during or even after work hours. Persons on a low sodium diet should not be given salt. A physician must be consulted for care of people with this condition.

Heat stroke is the most serious of the health problems that can arise while working in hot environments. It is caused by the breakdown of the thermo-regulatory system under conditions of stress. When this happens, perspiration stops, and the body can no longer regulate its own temperature.

Heat Stroke Symptoms — A heat stroke victim may be identified by hot, dry, and unusually red or spotted skin. The body core temperature can exceed 105°F. Mental confusion, irritability, and chills are common. These are all early warning signs of heat stroke; if the sufferer is not removed from the hot environment at once, more severe symptoms can follow, including unconsciousness, delirium, and convulsions, possibly ending in death.

Heat Stroke Treatment — Heat stroke must be treated as a major medical emergency; medical assistance must be summoned immediately.

Additional treatment:

- First aid must be administered.
- Individual must be moved to a cool location.
- Individual must be cooled through wetting, fanning, or immersion.

Care should be taken to avoid over-cooling and to begin treatment for shock by raising the legs. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

Frostbite is a condition in which the cold temperature forms ice crystals in the cells and tissues, dehydrating protoplasm and killing tissues. At the same time, circulation of the blood is blocked. Frostbite could lead to gangrene and amputation.

Frostbite damage occurs in several degrees:

- Frost nip, or incipient frostbite is characterized by sudden whitening of the skin.

- When superficial frostbite occurs, the skin has a waxy or whitish look and is firm to the touch; however, the tissue underneath has retained it resiliency.

- In deep frostbite, the tissues are cold, pale, and solid. The injury is severe. In addition to frostbite, other physiological reactions to cold may be experienced as well. Trench foot, for example, may result from prolonged exposure to low temperatures near, though possibly above, freezing. Walking on the foot is very painful. In very severe cases, the flesh dies and the foot may have to be amputated. Immersion foot is very similar although it is less severe. Although amputation is unusual, some mobility of the limb is lost. Blisters may occur around the lips, nostrils, and eyelids.

Chilblain (pernio), which is an inflammation of the hands and feet caused by exposure to cold and moisture, is characterized by a recurrent localized itching, swelling, and painful inflammation on the fingers, toes, or ears, produced by mild frostbite. Such a sequence produces severe spasms and is accompanied by pain.

Hypothermia occurs when the body loses heat faster than it can produce it. The initial reaction involves the constriction of blood vessels in the hands and feet in an attempt to conserve the heat. After the initial reaction, involuntary shivering begins in an attempt to produce more heat.

- **Never ignore shivering.** Persistent shivering is a clear warning that a person is on the verge of hypothermia. Allow for the fact that exposure greatly reduces normal endurance. Warmth generated by physical activity may be the only factor preventing hypothermia.

7.5.6 Personal Decontamination

A CRZ will be established immediate to each sampling/boring site and will include a station for decontaminating equipment and personnel. The CRZ will be covered with sheets of 6-mil polyethylene (typically an area 20-feet by 20-feet is sufficient) with specific stations that will accommodate the removal and disposal of the protective clothing, boot covers, gloves, and respiratory protection if required.

As a general rule, equipment will be decontaminated using a soap and clean water wash solution. Equipment decontamination will be completed by personnel in Level D PPE. In the event of inclement weather (e.g., lightning) or an emergency requiring immediate evacuation, all contaminated equipment will be wrapped and taped in 6-mil polyethylene sheeting and tagged as "contaminated" for later decontamination.

Personnel working in the CRZ will be in one Level of PPE lower than personnel in the EZ. For example, if personnel in the EZ are in Level B, decon workers will be in Level C.

7.5.6.1 Personal Decontamination Procedures

The decontamination procedures, based on Level D protection, will consist of the following:

- Brushing heavily soiled boots and rinsing outer gloves and boots with soap and water.
- Removing outer gloves and depositing them in a plastic-lined container.
- Removing outer chemical protective clothing.

specified in 29 CFR 1910.120(e). All supervisors must complete an additional 8 hours of training in site management. All personnel must complete an 8-hour refresher training course on an annual basis in order to continue working at the site.

7.5.8 Exposure Evaluation

All personnel scheduled for site activities will have had a baseline physical examination which includes a stressing exam of the neurologic, cardiopulmonary, musculoskeletal and dermatological systems, pulmonary function testing, multi-chemistry panel and urinalysis, and will have been declared fit for duty. An exposure history form will be completed for each worker participating in site activities. An examination and updated occupational history will be repeated on an annual basis and upon termination of employment, as required by 29 CFR 1910.120(f). The content of the annual or termination examination will be the same as the baseline physical. A qualified physician will review the results of the annual examination and exposure data and request further tests or issue medical clearances as appropriate.

After any job-related injury or illness, there will be a medical examination to determine fitness for duty or any job restrictions. The Site Health and Safety Manager will review the results with the examining physician before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job related injury or illness requiring medical attention. Medical records shall be maintained by the employer or the physician for at least 30 years following the termination of employment.

7.6 Medical Monitoring Program

All E/A&H or USGS personnel who enter hazardous-waste/spill sites or have the potential for exposure to hazardous materials from these sites must participate in the E/A&H Medical Monitoring Program or an equivalent program. The program is conducted by E/A&H's company doctor with the company Health and Safety Officer. The purpose of the program is to identify any pre-existing illnesses or problems that would put an employee at unusual risk

7.6.1 Preplacement Examinations

Each E/A&H employee will be given a preplacement examination: to identify any preexisting illness or problem that would put the employee at an unusual risk from certain exposures; to assure that each employee can safely use negative-pressure respirators; and to develop a database to assess any exposure-related events detected during periodic medical monitoring. Data accumulation will include variables such as age, sex, race, smoking history, prior employment history, and other conditions that might bear upon the occurrence of subsequent events once employment begins.

The preplacement examination includes:

- Occupational history including previous chemical and carcinogenic exposures.
- Medical history including demographic data, family history, personal habits, past medical history, and a review of current systems.
- Fertility history.
- Physical examination stressing the neurologic, cardiopulmonary, musculoskeletal, and dermatological systems.
- Physiological parameters including blood pressure and visual acuity testing.
- Pulmonary function testing including FVC, FEVI, and FEV 25-75.
- Electrocardiogram.
- PA and lateral chest X-ray.

The company doctor will review the results of annual examination and exposure data and request further tests or issue medical clearances as appropriate. An examination will also be administered when an employee leaves the company. The company doctor will be consulted for the contents of the exam except when the employee has had an exam within 6 months, or when there has been no site work since the last examination.

7.6.3 Return-to-Work Examinations

After any job-related injury or illness, a medical examination is required to determine fitness for duty or to identify any job restrictions. The medical examiner will review the results of this back-to-work examination with the company doctor before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job-related injury requiring medical attention.

7.6.4 Confidentiality

Medical records will be maintained in a confidential manner so that only authorized persons will have access to the records. The authorized personnel will include medical staff of the joint venture or contract medical personnel, the individual, the individual's personal physician, or the individual's designated representative. Upon written request, the individual may obtain a copy of the medical file which will be provided within 15 days of the receipt of the written request. Information used for research, testing, statistical, or epidemiologic purposes will have all identifying data removed including the identity of the individual. Any medical information or findings obtained which do not affect the individual's job performance will not be made available to E/A&H in order to maintain the patient-physician confidentiality. Upon death, retirement, resignation, or other termination of services, the records will be retained by E/A&H or contracting physician.

- Field staff participate in the E/A&H Medical surveillance program (or in the case of subcontractors, an equivalent program).

- Field staff attend safety and health "kick-off" orientation and other site safety briefings.

The Site Supervisor is also responsible for assuring that field staff who may be exposed to unique or special hazards have the training or experience necessary to safely conduct their work.

7.7.2 Responsibilities of Site Health and Safety Officer

The responsibilities of the Site Health and Safety Officer include:

- Providing the Site Supervisor with technical input on site health and safety issues.

- Observing field personnel and reporting to the Site Supervisor on the effectiveness of the CHASP and SSHSP, and observing whether field staff are utilizing proper work practices and decontamination procedures.

- Reporting significant safety violations to the Project Manager and/or Project Health and Safety Officer.

- Conducting safety briefings during field activities.

- Assuring that a copy of the Health and Safety Plan is maintained onsite during all field activities.

- Maintaining a file of HAZWOPER training certificates and appropriate refresher training certificates for onsite personnel.

- Properly utilizing required PPE, including respiratory protective equipment.

- Having up to date HAZWOPER training and then providing the Site Supervisor with documentation that their training is current.

- Being an up to date participant in an acceptable medical surveillance program.

- Using the buddy system when wearing respiratory protective equipment. When working in Level C or higher, a third person shall be at the work area. This person shall be suitably equipped to provide logistical and safety support to the entry team.

- Being fit-tested and physically capable of using a respirator. Should the use of respiratory protection be required, then field workers shall not have facial hair which interferes with achieving a proper fit.

In addition, field staff should always be alert and use their senses (sight, smell, etc.) to identify and react to potentially dangerous situations. When working in the EZ, visual contact should be maintained between personnel and field personnel should be close enough to assist each other during an emergency. Procedures for leaving a contaminated area must be planned and implemented before going onsite in accordance with the SSHSP.

The number of personnel and equipment in the contaminated area should be kept to a minimum in order to achieve effective site operations. All visitors to the job site must comply with the SSHSP procedures. PPE may be modified for visitors depending on the situation. Modifications must be approved by the Project Health and Safety Officer.

Mark Taylor, SOUTHDIV Engineer-in-Charge will be contacted after appropriate emergency measures have been initiated onsite.

7.8.1 Site Resources

Cellular telephones will be used for emergency use and communication/coordination with NAS Memphis. First aid and eye wash equipment will be available at the work area.

7.8.2 Emergency Procedures

Conditions which may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite, or if a condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer.

- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately halt work and act according to the instructions provided by the Site Health and Safety Officer.

- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer that indicate possible routes for upwind escape.

are provided in Attachment B of this CHASP. Directions from individual sites to the NAS Memphis South Gate will be provided as Attachment B of each SIP.

7.9 Forms

The following forms will be used in implementing this CHASP:

Plan Acceptance Form
Plan Feedback Form
Exposure History Form
Accident Report Form

A SSHSP Plan Acceptance Form will be filled out by all employees working on the site before site activities begin. The Plan Feedback Form will be filled out by the Site Health and Safety Officer and any other onsite employee who wishes to fill one out. The Exposure History Form will be completed by both the Project Manager and the individual(s) for whom the form is intended. Examples of each form are provided in Attachment C of this plan.

All completed forms must be returned to the Task Order Manager at EnSafe/Allen & Hoshall, Memphis, Tennessee.

ATTACHMENT A

ENSAFE CORPORATE *HEALTH AND SAFETY MANUAL*

DRILLING SAFETY GUIDE

Appendix B

Drilling Safety Guide

Drilling Safety Guide B-2
Drill Rig Safety Supervisor B-2
Drill Rig Personnel Protective Equipment B-3
Drill Rig Housekeeping B-3
Maintenance Safety B-4
Safe Use of Hand Tools B-4
Safety During Drilling Operations B-5
Working on Derrick Platforms B-6
Working on the Ground B-6
Wire Rope Safety B-7
Cathead and Rope Hoist Safety B-8
Auger Safety B-9
Rotary and Core Drilling Safety B-9

Drilling Safety Guide

EnSafe is concerned about employee safety while working on or around drill rigs as well as when traveling to and from a drilling site, moving the drill rig and tools from location to location on a site, and during maintenance of the drill rig. Every drill crew will have a designated safety supervisor. The safety supervisor will have the responsibility for ensuring that all drilling operations are conducted in a safe manner. All personnel working on, with, or around a drill rig will be under the jurisdiction of the rig safety supervisor.

Drill Rig Safety Supervisor

The safety supervisor for the drill crew will be the drill rig operator. However, the EnSafe safety officer still maintains the overall safety responsibility for the site. The drill crew safety supervisor is a direct representative of the site health and safety supervisor and will report any safety problems directly to the site health and safety officer. The drill rig safety supervisor will:

- Be the leader in using proper personal protective equipment. He/she will set an example for other personnel to follow.
- Enforce the requirements of the health and safety plan and take appropriate actions when other personal are not following the requirements of the health and safety plan.
- Ensure that all drill rig and associated drill rig equipment is properly maintained.
- Ensure that all drill rig operating personnel are thoroughly familiar with the drill operations.
- Enspect the drill rig and associated drill rig equipment for damage before starting drilling operations. Check for structural damage, loose bolts or nuts, correct tension in chains and cables, loose or missing guards or protective covers, fluid leaks, damaged hoses and/or damaged pressure gauges and pressure relief valves.
- Test all emergency and warning devices such as emergency shut-down switches at least daily (prior to starting drilling operations). Drilling will not be permitted until all emergency and warning devices are functioning.
- Conduct a safety briefing daily before starting drilling operations. Any new employee will receive a copy of the drilling operations safety manual, and the drill rig manufacturer's operating and maintenance manual.
- Ensure that each employee reads and understands the drill rig manufacturer's operating and maintenance manual.
- Observe the mental, emotional, and physical capabilities of each worker.
- Ensure that each drill rig has a first aid kit and fire extinguisher.
- Maintain a list of emergency contact telephone numbers. This list will be posted in a prominent location and each drill rig employee will be informed of the list's location.

Drill Rig Personnel Protective Equipment

For most geotechnical, mineral, and/or groundwater drilling, drill rig personal protective equipment will include the following:

- Hard hat
- Safety shoes with steel toe and steel shank (or equivalent)
- Gloves
- Safety glasses with side shields
- Close-fitting but comfortable clothes
- Hearing protection

It is important that clothing does not have loose ends, straps, drawstrings or belts, or other unfastened parts that might become caught in or on a rotating or translating part of the drill rig.

Rings, necklaces, or other jewelry will not be worn during drilling operations.

Additional protective equipment may be required by the Site-Specific Health and Safety Plan.

Drill Rig Housekeeping

The following housekeeping measures must be taken for all drilling operations.

- Suitable storage locations will be provided for all tools, materials, and supplies. The storage should be conveniently located and will provide for safe handling of all supplies.
- Drill tools, supplies, and materials will not be transported on the drill rig unless the drill rig is designed and equipped to carry drill tools, supplies, and materials.
- Pipe, drill rods, casing, augers, and similar drilling tools when stored will be stacked in a manner that will prevent spreading, rolling, or sliding.
- Penetration or other driving hammers will be secured to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding, and other access ways will be kept free of materials, debris and obstructions and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- Never store gasoline in a nonapproved container. Red, nonsparking, vented containers marked with the word gasoline will be used. The fill spout will have a flame arrester.
- Prior to drilling, adequate site clearing and leveling will be performed to accommodate the drill rig and supplies and to provide a safe working area. Drilling will not be started when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

Maintenance Safety

Well maintained drilling equipment makes drilling operations safer. When performing equipment/tool maintenance, the follow safety precautions will be followed:

- Safety glasses will be worn when maintenance is performed on drill rigs or drilling tools.
- Shut down the drill rig engine to make repairs or adjustments to the rig or to lubricate fittings (except to make repairs or adjustments that can only be made while the engine is running).
- Always block the wheels or lower the leveling jacks or both. Set the hand brake before working under a drill rig.
- Release all pressure on hydraulic systems, the drilling fluid system, and the air operating system of the drill rig prior to performing maintenance.
- Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.
- Allow time for the engine and exhaust to cool before performing maintenance on these systems.
- Never weld or cut on or near the fuel tank.
- Do not use gasoline or other volatile or flammable liquids as a cleaning agent.
- Follow the manufacturer's recommendations for quantity and type of lubricants, hydraulic fluids and coolants.
- Replace all caps, filler plugs, protective guards or panels, and high pressure hose clamps and chains or cables that have been removed during maintenance.
- Perform a safety inspection prior to starting drilling equipment after maintenance is performed.

Safe Use of Hand Tools

There are a large number of hand tools that can be used on or around a drill rig. The most important rule of hand tools is to use a tool for its intended purpose. The following are a few general and specific safety rules to follow when using hand tools.

- When using a hammer, wear safety glasses and require all others around you to wear safety glasses.
- When using a chisel, wear safety glasses and require all others around you to wear safety glasses.
- Keep all tools cleaned and stored in an orderly manner.
- Use wrenches on nuts, not pliers.
- Use screwdrivers with blades that fit the screw slot.
- When using a wrench on a tight nut, use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and apply force to the wrench with both hands when possible and with both feet firmly placed. Do not push or pull with one or both feet on the drill rig or the side of a mud pit or some other blocking-

off device. Always assume that you may lose your footing. To avoid serious injury if you fall, remove sharp objects from the area near you.

- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches will be wire brushed frequently to prevent accumulation of dirt and grease which cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hock and heel jaws when visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position hands so that fingers will not be smashed between the wrench handle and the ground or the platform if the wrench were to slip or the joint suddenly to let go.

Safety During Drilling Operations

- Do not drive a drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast. look up to check for overhead obstructions.
- Before raising the mast, all drill rig personnel (except the person raising the mast) and visitors will be cleared from the area immediately to the rear and sides of the mast. All drill rig personnel and visitors will be informed that the mast is being raised prior to raising the mast.
- All drill rig personnel and visitors will be instructed to stand clear of the drill rig immediately prior to and during starting of the engine.
- All gear boxes will be in the neutral position, all hoist levers will be disengaged, all hydraulic levers will be in the nonactuating positions, and the cathead rope will not be on the cathead before starting the drill rig engine.
- The drill rig must be leveled and stabilized with leveling jacks and/or solid cribbing before the mast is raised. The drill rig will be leveled if settling occurs after initial setup.
- The mast will be lowered only when the leveling jacks are down. The leveling jacks must be in the down position until the mast is completely lowered.
- Secure and/or lock the mast according to the drill rig manufacturer's recommendations before starting drilling operations.
- The drill rig must only be operated from the control position. If the operator must leave the control position, the rotary drive and the feed control must be placed in the neutral position. The drill engine will be shut down when the operator leaves the vicinity of the drill rig.
- Throwing or dropping of tools is not permitted. All tools will be carefully passed by hand between personnel or a hoist line will be used.
- When drilling within an enclosed area, ensure that fumes are exhausted out of the area. Exhaust fumes can be toxic and may not be detected by smell.
- Clean mud and grease from boots before mounting the drill platform. Use hand holds and railings. Watch for slippery ground when dismounting from the drill platform.
- Do not touch any metal parts of the drill rig with exposed flesh during freezing weather. Freezing of moist skin to metal can occur almost instantaneously.
- All unattended boreholes must be covered or otherwise protected to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole.

- Do not attempt to use one or both hands to carry tools when climbing ladders.

Working on Derrick Platforms

- When working on a derrick platform, us a safety belt and a lifeline. The safety belt will be at least 4 inches wide and will fit snugly but comfortably. The lifeline, will be less than 6 feet long and attached to the derrick.
- The safety belt and lifeline will be strong enough to withstand the dynamic force of a 250-pound weight falling 6 feet.
- A safety climbing device will be used when climbing to a derrick platform that is higher than 20 feet.
- The lifeline will be fastened to the derrick just above the derrick platform to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- Tools will be securely attached to the platform with safety lines. Do not attach a tool to a line attached to the wrist or other body part.
- When working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Derrick platforms over 4 feet above the ground will have toe boards and safety railings.

Working on the Ground

- Workers on the ground must avoid going under elevated platforms.
- Terminate drilling operations and, if possible, lower the mast during an electrical storm.
- Overhead and buried utilities must be located and marked on all boring location plans and boring assignment sheets.
- When there are overhead electrical power lines at or near a drilling site or project, consider all wire to be charged and dangerous.
- Watch for sagging power lines before entering a site. Do not lift power lines to gain entry. Call the utility to have them lift the power lines or to deenergize the power.
- Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:
  - — Power has been shut off and positive means taken to prevent the lines from being energized.
  - — Equipment, or any part, does not have the capability of coming within the following minimum clearance from energized overhead lines, or the equipment has been positioned and blocked to assure no part, including cables, can come within the minimum clearances listed in the adjacent table.

Power lines nominal system kv	Minimum required clearance
0-50	10 feet
51-100	12 feet
101-200	15 feet
201-300	20 feet
301-500	25 feet
501-750	35 feet
751-1000	45 feet

- While in transit with boom lowered and no load, the equipment clearance will be a minimum of 4 feet for voltages less than 50kv, 10 feet for voltages 51kv to 345kv, and 16 feet for voltages over 345kv.
- Before working near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter will be de-energized. The following precautions will be taken to dissipate induced voltages:
  - The equipment will be provided with an electrical ground to the upper rotating structure supporting the boom.
  - Ground jumper cables will be attached to materials being handled by boom equipment when electrical charge may be induced while working near energized transmitters. Crews will be provided nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load. Insulating gloves will be used.
- Continue to watch overhead power lines. Both hoist lines and overhead power lines can be moved toward each other by the wind.
- If there are any questions concerning drill rig operations on a site in the vicinity of overhead power lines, call the power company. The power company will provide expert advice as a public service.
- Look for warning signs indicating underground utilities. Underground utilities may be located a considerable distance away from the warning sign. Call the utility and jointly determine the precise location of all underground utility lines, mark and flag the locations, and determine the specific precautions to be taken to ensure safe drilling operations.

Wire Rope Safety

- All wire ropes and fittings will be visually inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, and damage to lifting hardware.
- Wire ropes must be replaced when inspection indicates excessive damage. The *Wire Rope User's Manual* may be used as a guide for determining excessive damage.
- Wire ropes that have not been used for a period of a month or more will be thoroughly inspected before being returned to service.
- All manufactured and end fittings and connections must be installed according to the manufacturer's specifications.
- Swivel bearings on ball-bearing type hoisting swivels must be inspected and lubricated daily to ensure that the swivel rotates freely under load.
- Do not drill through or rotate drill through a slipping device, do not hoist more that 10 feet of the drill rod column above the top of the last (mast), do not hoist a rod column with loose tool joints, and do not make up, tighten, or loosen tool hoists while the rod column is being supported by a rod slipping device.

- Do not attempt to brake the fall of a drill rod column with your hands or by increasing tension on the rod slipping device.
- Wire ropes must be properly matched with each sheave. The sheave will pinch wire rope that is too large. Wire rope that is too small will groove the sheave. Once a sheave is grooved, it will severely pinch and damage larger sized wire rope.
- Use tool handling hoists only for vertical lifting of tools. Do not use tool handling hoists to pull on objects away from the drill rig.
- All hoisting hooks will be equipped with safety latches.
- When tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull for the hoist line or the feed mechanism of the drill.
- Minimize shock loading of a wire rope; apply loads smoothly and steadily.
- Avoid sudden loading in cold weather.
- Never use frozen ropes.
- Protect wire rope from sharp corners or edges.
- Replace faulty guides and rollers.
- Replace worn sheaves or worn sheave bearings.
- Know the safe working load of the equipment and tackle. Never exceed safe working limits.
- Periodically inspect clutches and brakes of hoists.
- Always wear gloves when handling wire ropes.
- Do not guide wire rope onto hoist drums with your hands.
- After installation of a new wire rope, the first lift must be a light load to allow the wire rope to adjust.
- Never leave a load suspended when the hoist is unattended.
- Never use a hoist line to ride up the mast.

Cathead and Rope Hoist Safety

- Keep the cathead clean and free of rust and oil and/or grease. The cathead must be cleaned with a wire brush when it becomes rusty.
- Check the cathead for rope-wear grooves. If a rope groove forms that is deeper than 1/8-inch, the cathead must be replaced.
- Always start work with a clean, dry, sound rope. A wet or oily rope may grab the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast. If the rope grabs the cathead or otherwise becomes tangled in the drum, release the rope and sound the alarm for all personnel to clear the area rapidly.
- The rope must not be permitted to contact chemicals.
- Never wrap the rope from a cathead around a hand, wrist, arm, foot, ankle, leg, or any other body part.
- Attach the hammer to the ropeusing a knot that will not slip, such as a bowline.

- A minimum of 18 inches must be maintained between the operating hand and the cathead drum when driving samplers, casing , or other tools. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground. Loosen grip on the rope as the hammer falls. Maintaining a tight grip on the rope increases the chances of being pulled into the cathead.
- Do not use a rope that is longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not leave a cathead unattended with the rope wrapped on the drum.
- Position all other hoist lines to prevent contact with the operating cathead rope.
- The cathead operator must be on a level surface with good, firm footing conditions.

Auger Safety

- The drill rig must be level, the clutch or hydraulic rotation control disengaged, the transmission in low gear and the engine running at low RPM when starting an auger boring.
- Seat the auger head below the ground surface with an adequate amount of downward pressure prior to rotation.
- Observe the auger head while slowly engaging the clutch or rotation control and start rotation. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply downward pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated about one foot or more below the surface.
- Follow manufacturer's recommended methods for securing the auger to the power coupling.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never place feet under the auger section that is being hoisted.
- Stay clear of rotating augers and other rotating components of the drill rig.
- Never reach behind or around a rotating auger.
- Use a long-handle shovel to move auger cuttings away from the auger.
- Augers will be cleaned only when the drill rig is in neutral and the augers have stopped rotating.

Rotary and Core Drilling Safety

- Water swivels and hoist plugs must be lubricated and checked for frozen bearings before use.
- Drill rod chuck jaws must be checked periodically and replaced as necessary.
- The weight of the drill rod string and other expected hoist loads must not exceed the hoist and sheave capacities.
- Only the operator of the drill rig will brake or set a manual chuck to ensure that rotation of the chuck will not occur prior to removing the wrench from the chuck.

- The drill rod chuck jaws will not be used to brake drill rods during lowering into the hole.
- Drill rods will not be held or lowered into the hole with pipe wrenches.
- Do not attempt to grab falling drill rods with hands or wrenches.
- In the event of a plugged bit or other circulation blockage, the high pressure in the piping and hose between the pump and the obstruction must be relieved or bled down prior to breaking the first tool joint.
- Use a rubber or other suitable rod wiper to clean rods during removal from the hole. Do not use hands to clean drilling fluids from the drill rods.
- Do not lean unsecured drill rods against the mast.

ATTACHMENT B

DIRECTIONS TO EMERGENCY MEDICAL FACILITIES

DIRECTIONS TO THE NEAREST MEDICAL FACILITIES

The nearest hospital **and** the nearest facility capable of treating chemical burns are the same facility, which is located at Methodist North Hospital. Therefore, there is only one set of directions.

Nearest Hospital

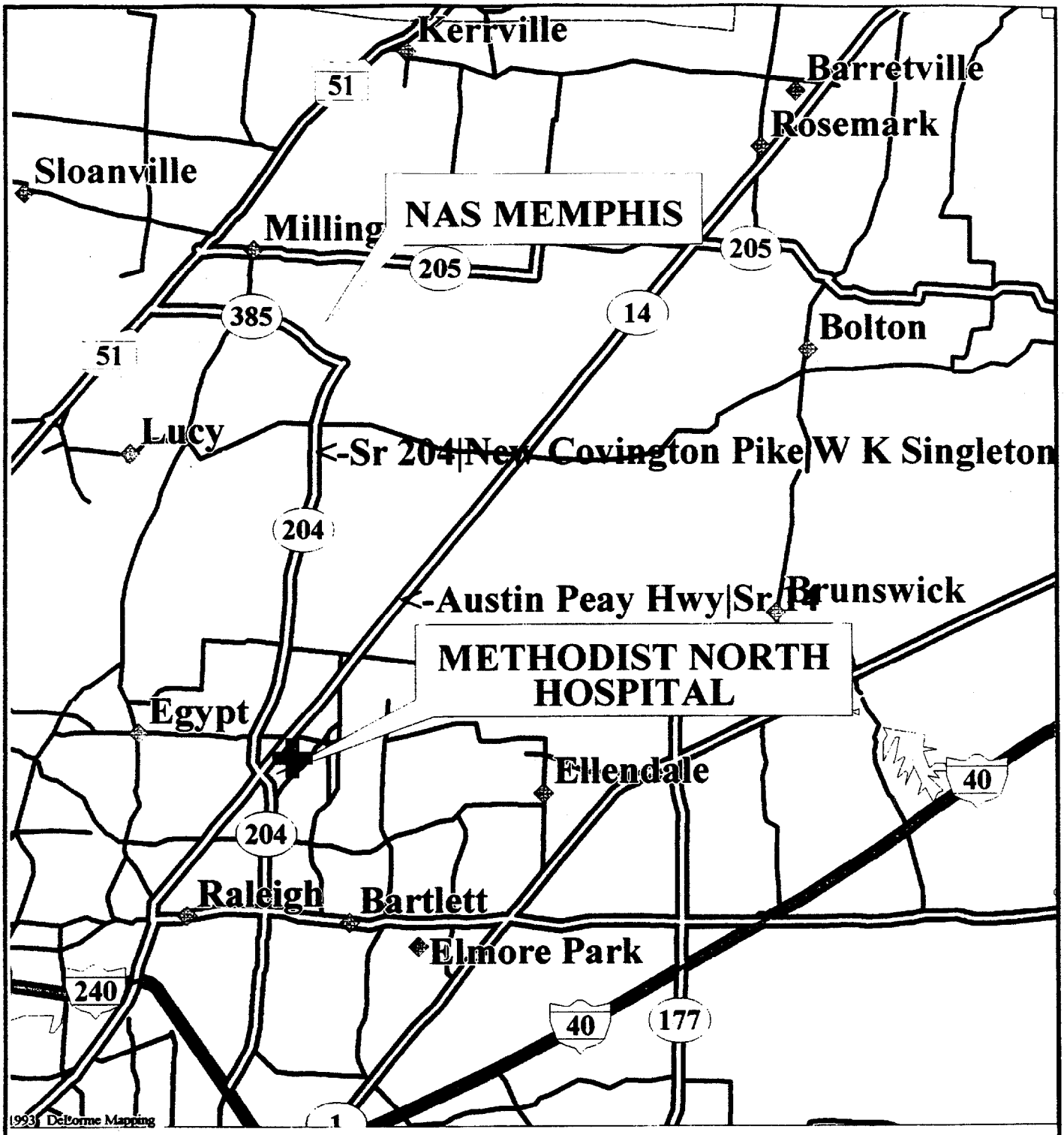
Methodist North Hospital
3960 Covington Pike
Memphis, Tennessee

Emergency Room Telephone Number - (901) 372-5211

Directions to Methodist North Hospital from NAS Memphis Main Gate:

1. Exit base through South Gate (Singleton Parkway).
2. Continue on Singleton Parkway through the stop signs.
4 Singleton Parkway and Covington Pike will intersect at a red light (about 5 miles).
4. You will see the entrance to the emergency room 700 feet past this light on the left.

Also, refer to the Route to Hospital Map on the following page.



HEALTH & SAFETY PLAN
NAS MEMPHIS
MILLINGTON, TN

DIRECTIONS TO THE HOSPITAL

DWG DATE: 10/04/94 | DWG NAME: BOARD

000141

ATTACHMENT C

HEALTH AND SAFETY PLAN FORMS

PLAN ACCEPTANCE FORM

PROJECT HEALTH AND SAFETY PLAN

INSTRUCTIONS: This form is to be completed by each person working on the project work site and returned to EnSafe/Allen & Hoshall, Memphis, Tennessee.

Job No: 2151-016

Contract No: N62467-89-D-0318

Project: Comprehensive Health and Safety Plan

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it.

_____

Signed

_____

Print Name

_____

Company

_____

Date

PLAN FEEDBACK FORM

Problems with plan requirements:

Unexpected situations encountered:

Recommendations for revisions:

EMPLOYEE EXPOSURE HISTORY FORM

Employee: _____

Job Name: _____

Date(s) From/To: _____

Hours Onsite: _____

Contaminants (Suspected/Reported):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(See Attached Laboratory Analysis)

ACCIDENT REPORT FORM

SUPERVISOR'S REPORT OF ACCIDENT	DO NOT USE FOR MOTOR VEHICLE OR AIRCRAFT ACCIDENTS
TO	FROM TELEPHONE (Include area code)

NAME OF INJURED OR ILL WORKER AND COMPANY
WORKER'S SOCIAL SECURITY NUMBER

DATE OF ACCIDENT	TIME OF ACCIDENT	EXACT LOCATION OF ACCIDENT

NARRATIVE DESCRIPTION OF ACCIDENT

NATURE OF ILLNESS OR INJURY AND PART OF BODY INVOLVED	LOST TIME YES ☐ NO ☐

PROBABLE DISABILITY (Check one)

FATAL ☐

LOST WORK DAY WITH ____DAYS AWAY FROM WORK

LOST WORK DAY WITH ____DAYS OF RESTRICTED ACTIVITY

NO LOST WORK DAY ☐

FIRST-AID ONLY ☐

CORRECTIVE ACTION RECOMMENDED (By whom and by when)

NAME OF SUPERVISOR	TITLE
SIGNATURE	DATE

000146

Appendix D

Site-Specific Health and Safety Plan

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1.0 INTRODUCTION

As part of the U.S. Navy Installation Restoration Program, the following Voluntary Corrective Action Work Plan has been prepared for the demolition of Building S-335 and the excavation of pesticide-contaminated soil at Solid Waste Management Unit (SWMU) 59, at Naval Support Activity (NSA) Memphis, Millington, Tennessee. The SWMU 59 building demolition will mitigate risk to human health and the environment through the demolition, removal, excavation, and disposal of the contents of Building S-335 along with associated building materials, asphalt foundation, and surrounding soils contaminated with pesticides.

This Site-Specific Health and Safety Plan (SSHSP) is to be used in conjunction with the approved NSA Memphis *Comprehensive Health and Safety Plan* (CHASP). Copies of both this plan and the CHASP will be onsite during all field operations.

Applicability

Current Hazardous Waste Operations and Emergency Response (HAZWOPER) training certificates for EnSafe/Allen & Hoshall (E/A&H) employees and subcontractors anticipated to be conducting fieldwork will be filed onsite and available for review. Individuals whose certifications are not on file, or those who have more recent certificates (have attended a refresher course), will provide the Onsite Supervisor with copies of their certificates before being allowed to enter a work area.

Current Occupational Safety and Health Administration (OSHA) refresher training certificates will be available onsite for all employees involved in field activities. All subcontractors, Department of Defense oversight personnel, and any other site visitors must provide health and safety certification with appropriate refresher course documentation prior to site entry.

2.0 SITE CHARACTERIZATION

2.1 Site Description

SWMU 59 consists of Building S-335, which is framed with wood and has a sheet metal exterior. On the north and southwest sides of the building are small unpaved areas, separating it from the adjacent asphalt lot, which borders the building on the north, south, and west. An unpaved area on the east side of the building separates it from First Avenue. Figure 1 provides a vicinity map of SWMU 59.

The exact age of the building is unknown, but it is estimated to be at least 30 years old. The building stored pesticides and fertilizers used throughout NSA Memphis. Pesticides reportedly stored in the building included chlordane, dieldrin, DDT, and arsenic, which was formerly a common component of pesticide formulations. SWMU 59 was flooded in 1974 and 1987. The building was locked and had not been cleaned up following the floods. At present, a chlorinated pesticide odor is evident near the window and door of the building.

2.2 Work Areas

Site control will be established and maintained around any ground-intrusive activities in accordance with the recommendations in the U.S. Environmental Protection Agency's *Interim Standard Operating Safety Guides*, revised September 1982. Three general zones of operation will be established in the field to reduce the potential for contaminant migration and risk of personnel exposure:

- The exclusion zone
- The contamination reduction zone
- The support zone

Figure 1 Vicinity Map

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The exclusion zone is the area where contamination is identified. All personnel within it must use the prescribed levels of personal protective equipment (PPE). The exclusion zone boundary (hotline) is established based upon the suspected presence of contaminated materials. The boundary may be adjusted based on subsequent observations and/or measurements of the contaminant concentrations and/or level of effort. Gross decontamination of personnel (i.e., protective coveralls, gloves, etc.) will occur in the work area, as required, with most personnel decontamination activities occurring in a decontamination area. Only authorized personnel with at least of 40 hours health and safety training meeting the requirements of OSHA Title 29 Code of Federal Regulations (CFR) Part 1910.120 and three days of supervised field experience are permitted within the exclusion and contamination reduction zones.

The person entering the exclusion zone must be accompanied by a person who is able to:

- Assist his or her partner.
- Observe his or her partner for signs of chemical or heat/cold exposure.
- Periodically check the integrity of his or her partner's protective clothing.
- Notify the site manager, his representative, or others if emergency help is needed.

The **contamination reduction zone** will serve as a decontamination area for most site activities and will serve as a buffer between the primary exclusion zone and the support zone. It is intended to prevent the spread of contaminants from the work areas. All decontamination procedures will be conducted in this area. Personnel will leave the support zone and enter the contamination reduction zone through a controlled access point. They must wear the prescribed PPE. Exiting from the contamination reduction zone to the support zone requires the removal of all contaminants through compliance with established decontamination procedures (Section 6.6).

The support zone is the outermost area and is considered an uncontaminated or clean area. It contains the first aid equipment and other supplies and equipment necessary to support the exclusion zone and the contamination reduction zone activities. Normal street clothes can be worn here.

2.3 Work Area Access

Authorized personnel will be allowed access to work areas as long as they follow the requirements of this SSHSP and the CHASP. See also Work Area Access, Section 7.1.2 of the CHASP.

2.4 Work Zones

The actual work zone locations will be based on physical layout of the site, work task requirements, and current meteorological conditions (see Figure 2).

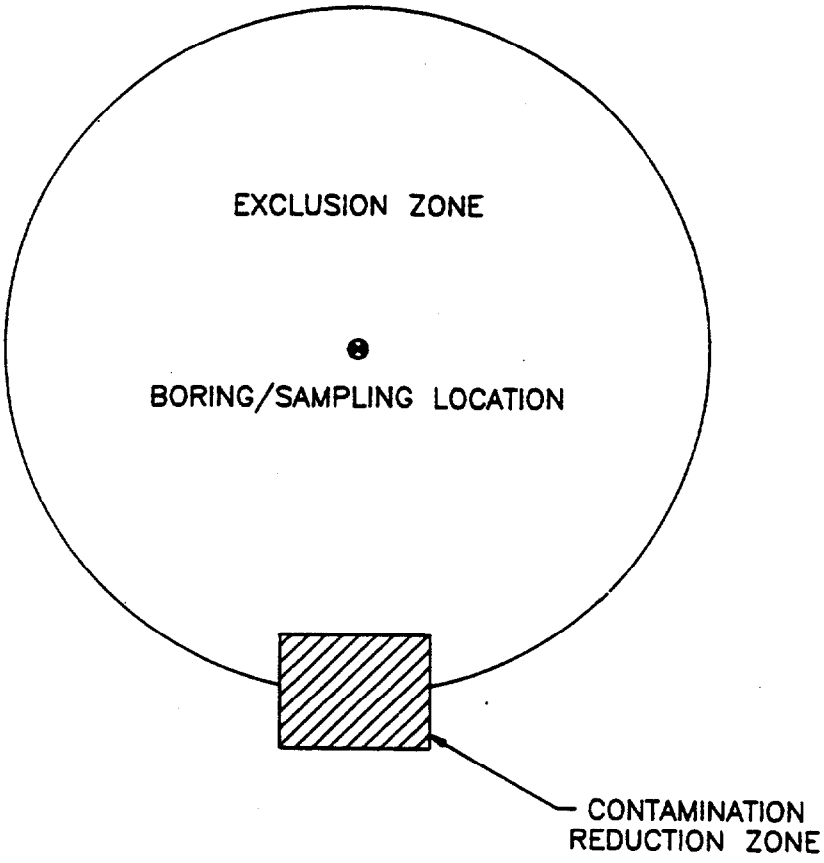
3.0 SITE ACTIVITIES

3.1 Electrical Cutoff and Old Pesticide Removal

Before soil removal or building demolition, NSA Memphis personnel will disconnect any electrical connections to Building S-335. Any old pesticides still in the building will be removed and disposed.

3.2 Building Demolition

The building will be demolished by the removal contractor using heavy equipment. Building debris will be placed in lined roll-off boxes.



NOT TO SCALE

RFI WORK PLAN
NSA MEMPHIS
MILLINGTON, TN

FIGURE 2
SITE WORK ZONES

DWG DATE: 09/12/95 | DWG NAME: 094SWZ01

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3.3 Soil Excavation

Soil will be excavated from the grassy area adjacent to Building S-335 and the asphalt flooring of the building. Contaminated soil will be place in a plastic-lined roll off box. Initially, 2 feet of soil will be excavated.

3.4 Soil Sampling

After excavation activities are completed, grab confirmation soil samples will be collected by E/A&H personnel based on a 20-foot by 20-foot grid system. The samples will be collected with a hand auger and analyzed for pesticides.

4.0 CHEMICAL HAZARDS

Exposure guidelines for chemical hazards expected to be encountered at the site are listed in Table 4-1. The constituents that may be encountered include: DDT, DDE, DDD, dieldrin, aldrin, heptachlor, heptachlor epoxide, chlordane, and arsenic. Additional constituents identified during site activities will be incorporated in the health and safety plan addendum. Material Safety Data Sheets (MSDS) for the constituents listed below are included as Appendix A of this SSHSP.

Table 4-1
Exposure Guidelines for Site Chemical Hazards

Chemical Name	Odor Threshold(ppm)	OSHA PEL[a](ppm)	ACGIH TLV[b](ppm)	NIOSH REL[c](ppm)	Action Level [d,e] (ppm)	Air Monitoring Device [f]
Arsenic	N.A.	0.01 mg/m^3	0.2	0.002	0.001	Miniram
Chlordane	N.A.	0.5 mg/m^3 "Skin"	0.5 mg/m^3 "Skin"	0.5 mg/m^3 "Skin"	0.25 mg/m^3 "Skin"	Miniram
Dieldrin	0.041 mg/m^3	0.25 mg/m^3 "Skin"	0.25 mg/m^3 "Skin"	Potential Occ. Carcinogen	0.12 mg/m^3	Miniram
DDT	N.A.	1 mg/m^3	1 mg/m^3	0.5 mg/m^3	0.25 mg/m^3	Miniram
DDD	N.A.	Not Listed	Not Listed	Not Listed	N.A.	Miniram

Table 4-1
Exposure Guidelines for Site Chemical Hazards

Chemical Name	Odor Threshold(ppm)	OSHA PEL[a](ppm)	ACGIH TLV[b](ppm)	NIOSH REL[c](ppm)	Action Level [d,e] (ppm)	Air Monitoring Device [f]
DDE	N.A.	Not Listed	Not Listed	Not Listed	N.A.	Miniram
Aldrin	N.A.	0.25 mg/m^3 "Skin"	0.25 mg/m^3 "Skin"	0.25 mg/m^3 "Skin"	0.12 mg/m^3	Miniram
Heptachlor Epoxide	N.A.	0.5 mg/m^3 "Skin"	0.5 mg/m^3 "Skin"	0.5 mg/m^3	0.25 mg/m^3	Miniram
Heptachlor	N.A.	0.5 mg/m^3 "Skin"	0.5 mg/m^3 "Skin"	0.5 mg/m^3	0.25 mg/m^3	Miniram

Notes:
a = 29 CFR 1910.1000, Table Z-1-A. Limits For Air Contaminants, as amended through 1/15/91.
b = 1990-1991 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, ACGIH
c = NIOSH Pocket Guide to Chemical Hazards, June 1990
d = Site Action Levels calculated as 50% of TLV or PEL (as measured by NIOSH methods)-which ever is lower
e = Site Action levels for unknown VOCs as measured by Real Time Photoionization detector = 1 ppm. Site Action levels (for upgrading from Level C to Level B) for unknown VOCs as measured by Real Time Photoionization detector = 5 ppm.
f = A Miniram will be used only if dust is a problem after attempting dust suppression with water and performing industrial hygiene personnel air sampling.
mg/m^3 = milligram per cubic meter
REL = Recommended Exposure Limit
N.A. = Not Available

5.0 OPERATIONS AND PHYSICAL HAZARDS

Physical hazards typically encountered during environmental investigations will be present onsite. These hazards include heat-related illnesses, slippery surfaces, lifting, and use of heavy equipment. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and as necessary, implement appropriate work regimens to minimize the possibility of illness.

Heavy equipment operations will be conducted in accordance with the procedures outlined in the CHASP, Attachment B. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling.

6.0 EMPLOYEE PROTECTION

Employee protection for this project includes standard safe work practices, NSA Memphis rules of conduct, PPE, personal decontamination procedures, and equipment for extreme weather conditions, work limitations, and exposure evaluation.

6.1 Standard Safe Work Practices

See Section 7.5.1 of the CHASP for Standard Safe Work Practices.

6.2 NSA Memphis General Rules of Conduct

See Section 7.5.2 of the CHASP for NSA Memphis General Rules of Conduct.

6.3 Selection of Personal Protective Equipment

It is important that PPE be appropriate to protect against the potential or known hazards at each cleanup or investigation site. Protective equipment will be selected based on the types, concentrations, and routes of personal exposure that may be encountered. In situations where the types of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required, based on experience and sound safety practices.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial site entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. **The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.**

Field activities will be initiated in Level C protection except when stated otherwise in this plan or when site conditions (e.g., sampling results from previous studies) indicate that Level C is

inappropriate. Level C protection consists of appropriate chemical-resistant nitrile gloves, hooded chemical protective coveralls; chemical-resistant, steel-toed and shank boots; latex overboots; and an air purifying respirator with HEPA filter cartridges.

When work is being conducted with heavy equipment, a hard hat will be added to the Level C ensemble. When performing building demolition and/or soil removal, tight Level C will be worn. This level of protection was selected due to the potential for contaminated dust generation during site activities.

PPE will be upgraded to Level B if sustained dust concentrations exceed 0.5 milligrams per cubic meters (mg/m^3) concentration in the breathing zone. (See Section 6.4) See Table 7-1 in the Comprehensive Health and Safety Plan for the specific criteria for use and equipment for each level of protection.

6.4 Air Monitoring

At present, there is no direct-reading instrument for detecting pesticides. If conditions are dusty, a Miniram will be used to monitor for respirable dust. However, dust generation will be suppressed with water and the use of a Miniram is not expected.

When breathing zone levels exceed the action levels or site conditions indicate that additional health and safety precautions are needed, field activities in the area shall stop. Field staff shall notify the Onsite Supervisor of the situation and he/she shall contact both the Project Manager and the Project Health and Safety Officer. The Project Health and Safety Officer will be responsible for reassessing the hazards and prescribing revised health and safety requirements, as necessary, including upgraded PPE requirements, revised work schedules, and revised decontamination procedures. (Typically, PPE will be upgraded to Level B). Work shall not proceed until

breathing zone concentrations return to background levels and it is reasonably anticipated that breathing zone samples will stay approximately at background levels, or until the chemical constituent(s) are identified and appropriate PPE is donned.

6.5 Procedures and Equipment for Extreme Hot or Cold Weather Conditions

See CHASP Section 7.5.5.

Severe Weather Conditions

All fieldwork shall immediately cease at the first sign of thunder or lightning. Field personnel shall perform emergency personal and equipment decontamination (see Section 6.6) and seek immediate shelter.

6.6 Personal Decontamination

See Section 7.5.6 of the CHASP for information on personal decontamination.

6.6.1 Personal Decontamination Procedures

See Section 7.5.6.1 of the CHASP for information on personal decontamination procedures. All wastes (soil and water) generated during personal decontamination will be consolidated with the excavated soils and building debris.

6.6.2 Closure of the Personal Decontamination Station

All disposable clothing and plastic sheeting used during site activities will be double-bagged and discarded in a labeled refuse container. Decontamination and rinse solutions will be placed in a 55-gallon barrel for later analysis and disposal. All washtubs, pails, buckets, etc. will be washed, rinsed, and dried at the end of each workday.

6.7 Work Limitations

All site activities will be conducted during daylight hours only. All personnel scheduled for these activities will have completed initial health and safety training and actual field training as specified in 29 CFR 1910.120(e). All supervisors must complete an additional eight hours of training in site management. All personnel must complete an eight-hour refresher training course annually to continue working onsite.

6.8 Exposure Evaluation

See Section 7.5.8 of the CHASP for information on exposure evaluation.

7.0 MEDICAL MONITORING PROGRAM

See CHASP Section 7.6.

8.0 AUTHORIZED PERSONNEL

Personnel anticipated to be onsite at various times during site activities include:

- Principal-in-Charge — Dr. James Speakman (E/A&H)
- Task Order Manager/Project Manager — Mr. Lawson Anderson (E/A&H)
- Project Health and Safety Officer — Mr. Bill Bradshaw (E/A&H)
- Onsite Supervisor — Rob Lawyer (E/A&H)
- Engineer-in-Charge — Mr. Mark Taylor (SOUTHDIV)
- NSA Memphis Site Contact — Mr. Rob Williamson

8.1 Responsibilities of Onsite Supervisor

See Section 7.7.1 of the CHASP for responsibilities of the site manager.

8.2 Responsibilities of Site Health and Safety Officer

See Section 7.7.2 of the CHASP for responsibilities of site health and safety officer.

8.3 Responsibilities of Onsite Field Staff

See Section 7.7.3 of the CHASP for responsibilities of onsite field staff.

9.0 EMERGENCY INFORMATION

All hazardous waste site activities present a risk to onsite personnel. Risk is minimized during routine operations by establishing good work practices, staying alert, and using proper PPE. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated.

If any situation or unplanned occurrence requires outside or support service, Mr. Williamson, the NSA Memphis site contact, will be informed and the appropriate contact from the following list will be made:

Contact	Agency or Organization	Telephone
Rob Williamson	NSA Memphis	(901) 874-5461/5462
Mark Taylor	SOUTHDIV EIC	(803) 820-5573
Law Enforcement	NSA Memphis Base Security	9-911
Fire Department	NSA Memphis	9-911
Ambulance Service	Naval Hospital, Millington Navy Road	(901) 874-5801/5802 or 9-911
Hospital	Methodist North Hospital	(901) 372-5211

	3960 Covington Pike	or 9-911
Southern Poison Control Center	—	(901) 528-6048
Lawson Anderson	EnSafe/Allen & Hoshall	(901) 372-7962
Bill Bradshaw	EnSafe/Allen & Hoshall	(901) 372-7962

Mark Taylor, Southern Division Engineer in Charge (SOUTHDIV EIC) will be contacted after appropriate emergency measures have been initiated onsite.

9.1 Site Resources

Cellular telephones may be used for emergencies and communication/coordination with NSA Memphis. First-aid and eyewash equipment will be available at the work area.

9.2 Emergency Procedures

Conditions that may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite or if a condition is discovered that suggests the situation is more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer. Copies of the emergency contacts and routes will be posted onsite.

- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately stop work and act according to the Site Health and Safety Officer's instruction..

- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer to indicate possible routes for upwind escape.

- The discovery of any conditions that would suggest the situation is more hazardous than anticipated will result in the suspension of work until the Site Health and Safety Officer has evaluated the situation and provided the appropriate instructions to the field team.

- If an accident occurs, the Field Site Manager is to complete an Accident Report Form (See Attachment B of CHASP) for submittal to the managing principal-in-charge of the project.

- If a member of the field crew suffers a personal injury, the Site Health and Safety Officer will call **(901) 372-5211 (Methodist North Hospital) or 9-911** (serious injury) to alert appropriate emergency response agencies or administer onsite first aid (minor injury) as the situation dictates. An Accident Report Form will be completed for any such incident.

- If a member of the field crew suffers chemical exposure, the affected areas should be flushed immediately with copious amounts of clean water, and if the situation dictates, the Site Health and Safety Officer should alert appropriate emergency response agencies, or personally ensure that the exposed individual is transported to the nearest medical facility for prompt treatment. (See Attachment C for map to the emergency medical facility.) An Accident Report Form will be completed for any such incident.

Additional information on appropriate chemical exposure treatment methods will be provided through the MSDS, which is in the NSA Memphis Field Trailer.

10.0 FORMS

The following forms will be used in implementing this Health and Safety Plan:

- Plan Acceptance Form
- Plan Feedback Form
- Exposure History Form
- Accident Report Form

The Plan Acceptance Form will be filled out by all employees working onsite before site activities begin. The Plan Feedback Form will be filled out by the Site Safety Officer and any other onsite employee who wishes to fill one out. The Exposure History Form will be completed by both the Site Manager and the individual(s) for whom the form is intended. Examples of each form are provided in Attachment B. **All completed forms must be returned to the Project Manager at E/A&H, Memphis, Tennessee.**

Attachment A

Material Safety Data Sheets

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: ARSENIC, 1000 PPM (0.100% W/V)
FORMULA: AS2O3 IN HCL
FORMULA WT: 74.90
CAS NO.: - -
PRODUCT CODES: 6919
EFFECTIVE: 08/15/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	4	EXTREME (CANCER CAUSING)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	2	MODERATE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES IRRITATION
MAY BE FATAL IF SWALLOWED
CAUTION: CONTAINS INORGANIC ARSENIC, CANCER HAZARD
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ARSENIC TRIOXIDE	0-1	1327-53-3
HYDROCHLORIC ACID (0.3 MOLAR)	0-1	7647-01-0

3 - PHYSICAL DATA

BOILING POINT: 100 C (212 F)
MELTING POINT: 0 C (32 F)
SPECIFIC GRAVITY: N/A
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A

(H2O=1) (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: ~100

APPEARANCE & ODOR: CLEAR COLORLESS SOLUTION WITH NO ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A NFPA 704M RATING: 3-0-0

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE

---

5 - HEALTH HAZARD DATA

THIS SUBSTANCE IS LISTED AS ACGIH SUSPECT HUMAN CARCINOGEN, NTP HUMAN CARCINOGEN, AND IARC HUMAN CARCINOGEN (GROUP 1).

THRESHOLD LIMIT VALUE (TLV/TWA): 0.2 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.5 MG/M3 (PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 20

CARCINOGENICITY: NTP: YES IARC: YES Z LIST: YES OSHA REG: YES

EFFECTS OF OVEREXPOSURE
INGESTION IS HARMFUL AND MAY BE FATAL.
VAPORS MAY BE IRRITATING TO SKIN, EYES, AND MUCOUS MEMBRANES.
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
INGESTION MAY CAUSE NAUSEA, VOMITING, PARALYSIS.
INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION.

TARGET ORGANS
LIVER, KIDNEYS, SKIN, LUNGS, LYMPHATIC SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, ABSORPTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNT OF MILK, MILK OF MAGNESIA, OR WHITES OF EGGS BEATEN WITH WATER. INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

TOXICITY TEST RESULTS AND SAFETY AND HEALTH EFFECTS ARE BASED ON THE SOLUTE.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: SODIUM METAL, ALUMINUM, STRONG BASES, STRONG OXIDIZING AGENTS, CHEMICALLY ACTIVE METALS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: P012 (ACUTE HAZARDOUS WASTE)

8 - PROTECTIVE EQUIPMENT

EYE/SKIN PROTECTION: THIS IS A LABORATORY-USE PRODUCT FOR WHICH NO INDUSTRIAL PROTECTIVE EQUIPMENT HAS BEEN DESIGNATED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	HYDROCHLORIC ACID, SOLUTION
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1789
LABELS	CORROSIVE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	HYDROCHLORIC ACID, SOLUTION, MIXTURE
HAZARD CLASS	8
UN/NA	UN1789
LABELS	CORROSIVE

000172

ddt

Synonyms

- 2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane
- dichlorodiphenyl-trichloroethane
- p,p'-ddt

Formula

- CAS Format: C14H9Cl5
- Structural: (ClC6H4)2CHCCl3

Physical Data

- Molecular Weight: 355
- Vapor pressure at 20°C (mm Hg): 1.5E-7
- Melting point °C : 108.5
- Boiling point °C : 260
- Flash point °C : 162
- Solubility in water at 20°C: < 1 mg/ml
- Specific Gravity: 1.56

Registry Numbers

- Chemical Abstracts: 50-29-3
- RTECS: KJ3325000
- DOT
  - 2761

Click on DOT number to retrieve safety guide.

Description white to yellowish solid with a weak chemical odor

Incompatabilities strong oxidizers, iron, aluminum and their salts.

GUIDE 151

Substances -Toxic (Non-Combustible)

POTENTIAL HAZARDS

HEALTH

- ☐ Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin.
- ☐ Avoid any skin contact.
- ☐ Effects of contact or inhalation may be delayed.
- ☐ Fire may produce irritating, corrosive and/or toxic gases.
- ☐ Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- ☐ Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- ☐ Containers may explode when heated.
- ☐ Runoff may pollute waterways.

PUBLIC SAFETY

- ☐ **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- ☐ Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions.
- ☐ Keep unauthorized personnel away.
- ☐ Stay upwind.
- ☐ Keep out of low areas.

PROTECTIVE CLOTHING

- ☐ Wear positive pressure self-contained breathing apparatus (SCBA).
- ☐ Wear chemical protective clothing which is specifically recommended by the manufacturer.
- ☐ Structural firefighters' protective clothing is recommended for fire situations ONLY; it is not effective in spill situations.

EVACUATION

Spill

See the Table of initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under 'PUBLIC SAFETY".

Fire

- ☐ If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all

directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fires

- ☐ Dry chemical, CO_2 or water spray.

Large Fires

- ☐ Water spray, fog or regular foam.
- ☐ Move containers from fire area if you can do it without risk.
- ☐ Dike fire control water for later disposal; do not scatter the material.
- ☐ Do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- ☐ Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- ☐ Do not get water inside containers.
- ☐ Cool containers with flooding quantities of water until well after fire is out.
- ☐ Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ☐ ALWAYS stay away from the ends of tanks.
- ☐ For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible,
- ☐ withdraw from area and let fire burn.

SPILL OR LEAK

- ☐ Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- ☐ Stop leak if you can do it without risk.
- ☐ Prevent entry into waterways, sewers, basements or confined areas.
- ☐ Cover with plastic sheet to prevent spreading.
- ☐ Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- ☐ DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- ☐ Move victim to fresh air.
- ☐ Call emergency medical care.
- ☐ Apply artificial respiration if victim is not breathing.
- ☐ **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- ☐ Administer oxygen if breathing is difficult.
- ☐ Remove and isolate contaminated clothing and shoes.
- ☐ In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

000175

- ☐ For minor skin contact, avoid spreading material on unaffected skin.
- ☐ Keep victim warm and quiet.
- ☐ Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed
- ☐ Ensure that medical personnel are aware of the materials) involved, and take precautions to protect themselves.

chlordane

Synonyms

- 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetra-hydro-4,7-methan-
- chlordan
- octachlor
- toxichlor

Formula

- CAS Format: C10H6Cl8
- Structural: N/A

Physical Data

- Molecular Weight: 410
- Vapor pressure at 20°C (mm Hg): 0.00001
- Vapor density: 14
- Melting point °C : 104
- Boiling point °C : 175 (decomposes)
- Flash point °C : 56
- Lower explosive limit: 0.7 %
- Upper explosive limit: 5 %
- Solubility in water at 20°C: insoluble
- Specific Gravity: 1.57-1.63

Registry Numbers

- Chemical Abstracts: 57-74-9
- RTECS: PB8900000
- NFPA Ratings
  - Health: 3
  - Flammability:
  - Reactivity:
- DOT
  - 2762

Click on DOT number to retrieve safety guide.

Description colorless liquid with an chlorine-like odor

Incompatabilities strong oxidizers

Guide 131

Flammable Liquids - Toxic

Potential Hazards

Health

- ☐ **Toxic; may be fatal if inhaled, ingested or absorbed through skin.**
- ☐ Inhalation or contact with some of these materials will irritate or burn skin and eyes.
- ☐ Fire will produce irritating, corrosive and/or toxic gases.
- ☐ Vapors may cause dizziness or suffocation.
- ☐ Runoff from fire control or dilution water may cause pollution.

Fire or Explosion

- ☐ **Highly flammable: Will be easily ignited by heat, sparks or flames.**
- ☐ Vapors may form explosive mixtures with air.
- ☐ Vapors may travel to source of ignition and flash back.
- ☐ Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- ☐ Vapor explosion and poison hazard indoors, outdoors or in sewers.
- ☐ Some may polymerize **(P)** explosively when heated or involved in a fire.
- ☐ Runoff to sewer may create fire or explosion hazard.
- ☐ Containers may explode when heated.
- ☐ Many liquids are lighter than water.

Public Safety

- ☐ **Call Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- ☐ Isolate spill or leak area immediately for at least 100 to 200 meters (330 to 660 feet) in all directions.
- ☐ Keep unauthorized personnel away.
- ☐ Stay upwind.
- ☐ Keep out of low areas.
- ☐ Ventilate closed spaces before entering.

Protective Clothing

- ☐ Wear positive pressure self-contained breathing apparatus (SCBA).
- ☐ Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- ☐ Structural firefighters' protective clothing is recommended for fire situations only; it is not effective in spill situations.

Evacuation

Spill

- ☐ See the Table of Initial Isolation and Protective Action Distances fore highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under "Public Safety".

Fire

- ☐ If tank, rail car or tank truck is involved in a fire, isolate fore 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Emergency Response

Fire

Caution: All these products have a very low flash point; Use of water spray when fighting fire may be inefficient.

Small Fires

- ☐ Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fires

- ☐ Water spray, fog or alcohol-resistant foam.
- ☐ Move containers from fire area if you can do it without risk.
- ☐ Dike fire control water for later disposal; do not scatter the material.
- ☐ Do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- ☐ Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- ☐ Cool containers with flooding quantities of water until well after fire is out.
- ☐ Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ☐ Always stay away from the ends of tanks.
- ☐ For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Spill or Leak

- ☐ Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ☐ Eliminate all ignition sources (no smoking, flares, sparks or flames in immediately area).
- ☐ All equipment used when handling the product must be grounded.
- ☐ Do not touch or walk through spilled material.
- ☐ Stop leak if you can do it without risk.
- ☐ Prevent entry into waterways, sewers, basements or confined areas.
- ☐ A vapor suppressing foam may be used to reduce vapors.

Small Spills

- ☐ Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
- ☐ Use clean non-sparking tools to collect absorbed material.

Large Spills

- ☐ Dike far ahead of liquid spill for later disposal.
- ☐ Water spray may reduce vapor; but may not prevent ignition in closed spaces.

First Aid

- ☐ Move victim to fresh air.
- ☐ Call emergency medical care.
- ☐ Apply artificial respiration if victim is not breathing.
- ☐ Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiration medical device.
- ☐ Administer oxygen if breathing is difficult.
- ☐ Remove and isolate contaminated clothing and shoes.
- ☐ In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- ☐ Wash skin with soap and water.
- ☐ Keep victim warm and quiet.
- ☐ Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- ☐ Ensure that medical personnel are aware of the materials(s) involved, and take precautions to protect themselves.

dieldrin

Synonyms

- 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octa-
- hydro-1,4-endo-exo-5,8-dimethanonaphthalene

Formula

- CAS Format: C12H8Cl6O
- Structural: N/A

Physical Data

- Molecular Weight: 381
- Vapor pressure at 20°C (mm Hg): 3.1E-6
- Vapor density: 13.2
- Melting point °C : 176
- Solubility in water at 20°C: 110 ppb
- Specific Gravity: 1.75

Registry Numbers

- Chemical Abstracts: 60-57-1
- RTECS: IO1750000
- DOT
  - 2761

Click on DOT number to retrieve safety guide.

Description colorless to a light tan solid with a mild, chemical odor

Incompatabilities strong oxidizers, active metals like sodium, strong acids, phenols

GUIDE 151

Substances -Toxic (Non-Combustible)

POTENTIAL HAZARDS

HEALTH

- ☐ Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin.
- ☐ Avoid any skin contact.
- ☐ Effects of contact or inhalation may be delayed.
- ☐ Fire may produce irritating, corrosive and/or toxic gases.
- ☐ Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- ☐ Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- ☐ Containers may explode when heated.
- ☐ Runoff may pollute waterways.

PUBLIC SAFETY

- ☐ **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- ☐ Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions.
- ☐ Keep unauthorized personnel away.
- ☐ Stay upwind.
- ☐ Keep out of low areas.

PROTECTIVE CLOTHING

- ☐ Wear positive pressure self-contained breathing apparatus (SCBA).
- ☐ Wear chemical protective clothing which is specifically recommended by the manufacturer.
- ☐ Structural firefighters' protective clothing is recommended for fire situations ONLY; it is not effective in spill situations.

EVACUATION

Spill

See the Table of initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under 'PUBLIC SAFETY".

Fire

- ☐ If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all

directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fires

- ☐ Dry chemical, CO_2 or water spray.

Large Fires

- ☐ Water spray, fog or regular foam.
- ☐ Move containers from fire area if you can do it without risk.
- ☐ Dike fire control water for later disposal; do not scatter the material.
- ☐ Do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- ☐ Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- ☐ Do not get water inside containers.
- ☐ Cool containers with flooding quantities of water until well after fire is out.
- ☐ Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ☐ ALWAYS stay away from the ends of tanks.
- ☐ For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible,
- ☐ withdraw from area and let fire burn.

SPILL OR LEAK

- ☐ Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- ☐ Stop leak if you can do it without risk.
- ☐ Prevent entry into waterways, sewers, basements or confined areas.
- ☐ Cover with plastic sheet to prevent spreading.
- ☐ Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- ☐ DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- ☐ Move victim to fresh air.
- ☐ Call emergency medical care.
- ☐ Apply artificial respiration if victim is not breathing.
- ☐ **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- ☐ Administer oxygen if breathing is difficult.
- ☐ Remove and isolate contaminated clothing and shoes.
- ☐ In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

- ☐ For minor skin contact, avoid spreading material on unaffected skin.
- ☐ Keep victim warm and quiet.
- ☐ Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed
- ☐ Ensure that medical personnel are aware of the materials) involved, and take precautions to protect themselves.

POLYSCIENCE -- HEPTACHLOR EPOXIDE, 590C-12
MATERIAL SAFETY DATA SHEET
FSC: 6810
NIIN: 00N047421
Manufacturer's CAGE: 58378
Part No. Indicator: A
Part Number/Trade Name: HEPTACHLOR EPOXIDE, 590C-12

==========

General Information

==========

Company's Name: POLYSCIENCE
Company's Street: 7800 MERRIMAC AVE
Company's City: NILES
Company's State: IL
Company's Country: US
Company's Zip Code: 60648
Company's Emerg Ph #: 321-965-0611
Company's Info Ph #: 321-965-0611
Safety Data Action Code: C
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01APR92
Safety Data Review Date: 14NOV95 *
MSDS Serial Number: BVBVP
Hazard Characteristic Code: T4 *

==========

Ingredients/Identity Information

==========

Proprietary: NO
Ingredient: 4,7-METHANOINDAN, 1,4,5,6,7,8,8-HEPTACHLORO-2, 3-EPOXY-3A,4,7, 7A-TETRAHYDRO-; (HEPTACHLOR EPOXIDE)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: PB9450000
CAS Number: 1024-57-3
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

==========

Physical/Chemical Characteristics

==========

Appearance And Odor: WHITE CRYSTAL

==========

Fire and Explosion Hazard Data

==========

Extinguishing Media: CO*2 OR DRY POWDER EXTINGUISHER.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

==========

Reactivity Data

==========

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

==========

Health Hazard Data

==========

LD50-LC50 Mixture: LD50:(ORAL,RAT)62 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO

Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: NONE SPECIFIED BY MANUFACTURER.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: HEPTACHLOR EPOXIDE: IARC MONOGRAPHS ON EVAL OF CARCIN RISK OF CHEMS TO MAN, VOL 53, PG 115, 1991: GRP 2B. ANIMAL LIVER.
Signs/Symptoms Of Overexp: NONE SPECIFIED BY MANUFACTURER.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INHAL: REMOVE TO FRESH AIR. SUPPORT BRTHG (GIVE O*2/ARTF RESP) (FP N). INGEST: CALL MD IMMED (FP N). EYE: IMMED FLUSH WITH POTABLE WATER FOR A MINIMUM OF 15 MIN, SEEK ASSISTANCE FROM MD (FP N). SKIN: FLUSH WITH COPIOUS AMOUNTS OF WATER. CALL MD (FP N).

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: COVER W/SAND/VERMICULITE, SWEEP UP AND PLACE IN CLOSED CONTAINERS.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: KEEP IN COOL, DRY PLACE.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: WEAR NIOSH/MSHA APPROVED SCBA.
Ventilation: MECHANICAL EXHAUST FAN. *
Protective Gloves: RUBBER GLOVES.
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES(FP N).
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 25JAN94
Label Date: 25JAN94
Label Status: G
Common Name: HEPTACHLOR EPOXIDE, 590C-12
Chronic Hazard: NO
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
NONE SPECIFIED BY MANUFACTURER.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: POLYSCIENCE
Label Street: 7800 MERRIMAC AVE
Label City: NILES
Label State: IL
Label Zip Code: 60648
Label Country: US

Label Emergency Number: 321-965-0611

==========

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POLYSCIENCE -- HEPTACHLOR, 510C-9
MATERIAL SAFETY DATA SHEET
FSC: 6810
NIIN: 00N047400
Manufacturer's CAGE: 58378
Part No. Indicator: A
Part Number/Trade Name: HEPTACHLOR, 510C-9

General Information

Company's Name: POLYSCIENCE
Company's Street: 7800 MERRIMAC AVE
Company's City: NILES
Company's State: IL
Company's Country: US
Company's Zip Code: 60648
Company's Emerg Ph #: 321-965-0611
Company's Info Ph #: 321-965-0611
Safety Data Action Code: C
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01MAR92
Safety Data Review Date: 14NOV95 *
MSDS Serial Number: BVBVF
Hazard Characteristic Code: T3 *

Ingredients/Identity Information

Proprietary: NO
Ingredient: 4,7-METHANOINDENE, 1,4,5,6,7,8,8-HEPTACHLORO-3A, 4,7,7A-TETRAHYDRO-; (HEPTACHLOR) (SARA III)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: PC0700000
CAS Number: 76-44-8
OSHA PEL: 0.5 PPM, S
ACGIH TLV: 0.5 PPM, S

Physical/Chemical Characteristics

Appearance And Odor: NONE SPECIFIED BY MANUFACTURER.
Melting Point: >203F,>95C
Specific Gravity: 1.57
Solubility In Water: INSOLUBLE

Fire and Explosion Hazard Data

Extinguishing Media: USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE CONDITIONS.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: ALKALI METALS.
Hazardous Decomp Products: TOXIC FUMES OF: CARBON MONOXIDE, CARBON DIOXIDE, HYDRO-GEN CHLORIDE GAS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50:(ORAL,RAT) 40 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED,

OR ABSORBED THROUGH SKIN. EXPOSURE CAN CAUSE: TREMORS, CONVULSIONS,KIDNEY DAMAGE, RESPIRATORY COLLAPSE AND DEATH. CHRONIC: CARCINOGEN. REPEATED EXPOSURE CAN CAUSE: DAMAGE TO LIVER. TARGET ORGANS(S): CENTRAL NERVOUS SYSTEM, LIVER.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: HEPTACHLOR:IARC MONOGRAPHS ON THE EVALUATION OF CARCIN RISK OF CHEMS TO MAN, VOL 53, PG 115, 1991: GRP 2B. ANIMAL LIVER.
Signs/Symptoms Of Overexp: HLTH HAZ: MAY PRODUCE CANCER AND GENETIC MUTATION.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INGEST: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN. SKIN: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MIN. REMOVE CONTAMINATED CLOTHING AND SHOES. CALL A PHYSICIAN. EYE: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MIN. ASSURE ADEQUATE FLUSHING BY SEPARATING THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR APPROP NIOSH/MSHA APPRVD SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENT AREA & WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: OBSERVE ALL FEDERAL, STATE AND LOCAL LAWS.
Precautions-Handling/Storing: DANGER: HIGHLY TOXIC. CARCINOGEN. AVOID ALL CONTACT.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED SCBA.
Ventilation: USE ONLY IN CHEMICAL FUME HOOD. *
Protective Gloves: RUBBER GLOVES.
Eye Protection: CHEMICAL SAFETY GOGGLES.
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 16FEB94
Label Date: 15FEB94
Label Status: G
Common Name: HEPTACHLOR, 510C-9
Chronic Hazard: YES

Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED/ ABSORBED THROUGH SKIN, CAUSING TREMORS, CONVULSIONS, KIDNEY DAMAGE, RESPIRATORY COLLAPSE & DEATH. CHRONIC: CANCER HAZARD. CONTAINS HEPTACHLOR, WHICH IS LISTED AS A LIVER CARCINOGEN TO ANIMALS (FP N).
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: POLYSCIENCE
Label Street: 7800 MERRIMAC AVE
Label City: NILES
Label State: IL
Label Zip Code: 60648
Label Country: US
Label Emergency Number: 321-965-0611

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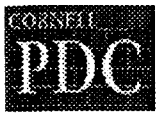

DOD Hazardous Materials Information
DOD 6050.5-L
As of June 1995

ALDRIN, 510C-11

FSC: 6810

NIIN: 00N047402

NSN: 681000N0474025

MANUFACTURERS CAGE: 58378

PART NO INDICATOR: A

PART NUMBER TRADE NAME: ALDRIN, 510C-11

Nuclear Water Data

NUCLEAR WATER FSC:

NUCLEAR WATER NIIN:

NUCLEAR WATER COG:

NUCLEAR WATER NOMENCLATURE:

NUCLEAR WATER REMARKS:

Standard PMS Identification Data

SPIN FSC:

SPIN NIIN:

SPIN:

General Information

ITEM NAME:

MANUFACTURERS NAME: POLYSCIENCE

MANUFACTURERS STREET: 7800 MERRIMAC AVE

MANUFACTURERS P O BOX:

MANUFACTURERS CITY: NILES

MANUFACTURERS STATE: IL

MANUFACTURERS COUNTRY: US

MANUFACTURERS ZIP CODE: 60648

MANUFACTURERS EMERG PH: 321-965-0611

MANUFACTURERS INFO PH: 321-965-0611

DISTRIBUTOR VENDOR 1:

DISTRIBUTOR VENDOR 1 CAGE:

DISTRIBUTOR VENDOR 2:

DISTRIBUTOR VENDOR 2 CAGE:

DISTRIBUTOR VENDOR 3:

DISTRIBUTOR VENDOR 3 CAGE:

DISTRIBUTOR VENDOR 4:

DISTRIBUTOR VENDOR 4 CAGE:

SAFETY DATA ACTION CODE:

SAFETY FOCAL POINT: N

RECORD NO FOR SAFETY ENTRY: 001

TOT SAFETY ENTRIES THIS STK: 001

STATUS: SMJ

DATE MSDS PREPARED: 01MAR92

SAFETY DATA REVIEW DATE: 16FEB94

SUPPLY ITEM MANAGER:

MSDS PREPARERS NAME:

PREPARERS COMPANY:

PREPARERS ST OR P O BOX:

PREPARERS CITY:

PREPARERS STATE:

PREPARERS ZIP CODE:

OTHER MSDS NUMBER:

MSDS SERIAL NUMBER: BVBVH

SPECIFICATION NUMBER:

SPEC TYPE GRADE CLASS:

HAZARD CHARACTERISTIC CODE: NK

UNIT OF ISSUE:

UNIT OF ISSUE CONTAINER QTY:

TYPE OF CONTAINER:

NET UNIT WEIGHT:

NRC STATE LICENSE NUMBER:

NET EXPLOSIVE WEIGHT:

NET PROPELLANT WEIGHT AMMO:

COAST GUARD AMMUNITION CODE:

Physical & Chemical Characteristics

APPEARANCE AND ODOR: SOLID.

BOILING POINT: N/K

MELTING POINT: N/K

VAPOR PRESSURE MM HG 70 F: N/K

VAPOR DENSITY AIR 1: N/K

SPECIFIC GRAVITY: N/K

DECOMPOSITION TEMPERATURE: N/K

EVAPORATION RATE AND REF: N/K

SOLUBILITY IN WATER: INSOLUBLE

PERCENT VOLATILES BY VOLUME: N/K

VISCOSITY:

PH: N/K

RADIOACTIVITY:

FORM RADIOACTIVE MATL:

MAGNETISM MILLIGAUSS:

CORROSION RATE IPY: N/K

AUTOIGNITION TEMPERATURE:

Fire and Explosion Hazard Data

FLASH POINT: N/K

FLASH POINT METHOD: N/P

LOWER EXPLOSIVE LIMIT: N/K

UPPER EXPLOSIVE LIMIT: N/K

EXTINGUISHING MEDIA: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIRE FIGHTING PROC: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

UNUSUAL FIRE AND EXPL HAZRDS: EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

Reactivity Data

STABILITY: YES

COND TO AVOID STABILITY: NONE SPECIFIED BY MANUFACTURER.

MATERIALS TO AVOID: NONE SPECIFIED BY MANUFACTURER.

HAZARDOUS DECOMP PRODUCTS: HYDROGEN CHLORIDE GAS.

HAZARDOUS POLY OCCUR: NO

CONDITIONS TO AVOID POLY: NOT RELEVANT

Health Hazard Data

LD50 LC50 MIXTURE: NONE SPECIFIED BY MANUFACTURER.

ROUTE OF ENTRY INHALATION: YES

ROUTE OF ENTRY SKIN: NO

ROUTE OF ENTRY INGESTION: YES

HEALTH HAZ ACUTE AND CHRONIC: ACUTE:MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN. MAY CAUSE IRRIT. READILY ABSORBED THROUGH SKIN. MAY CAUSE VOMITING, DIARRHEA, RENAL DAMAGE, TREMORS, ATAXIA, CONVULSIONS FOLLOWED BY CNS DEPRESSION, RESP FAILURE, DEATH. CHRONIC: POSSIBLE CARCINOGEN. MAY CAUSE REPRODUCTIVE (EFTS OF OVEREXP)

CARCINOGENICITY NTP: NO

CARCINOGENICITY IARC: NO

CARCINOGENICITY OSHA: NO

EXPLANATION CARCINOGENICITY: NOT RELEVANT

SIGNS SYMPTOMS OF OVEREXP: HLTH HAZ: DISORDERS. PROLONGED EXPOSURE CAN

CAUSE: NEUROTOXIC EFFECTS. DAMAGE TO THE LIVER. IMMUNOSUPPRESSION.

MED COND AGGRAVATED BY EXP: NONE SPECIFIED BY MANUFACTURER.

EMERGENCY FIRST AID PROC: INGEST:WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL MD. SKIN: FLUSH W/COPIOUS AMTS OF WATER FOR AT LEAST 15 MIN. REMOVE CONTAM CLTHG & SHOES. CALL MD. INHAL: REMOVE TO FRESH AIR. IF BRTHG BECOMES DFCLT, CALL MD. EYE: FLUSH W/COPIOUS AMTS OF WATER FOR @ LEAST 15 MIN. ASSURE ADEQUATE FLUSHING BY SEPARATING THE EYELIDS W/ FINGERS. CALL A PHYSICIAN.

Precautions for Safe Handling and Use

STEPS IF MATL RELEASED SPILL: WEAR NIOSH/MSHA APPROVED RESP, CHEM SAFETY GOGGLES, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENT AREA & WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE.

NEUTRALIZING AGENT: NONE SPECIFIED BY MANUFACTURER.

WASTE DISPOSAL METHOD: OBSERVE ALL FEDERAL, STATE AND LOCAL LAWS.

PRECAUTIONS HANDLING STORING: DANGER: POISON. MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN. POSSIBLE CARCINOGEN. MAY CAUSE REPRODUCTIVE DISORDERS.

OTHER PRECAUTIONS: READILY ABSORBED THROUGH SKIN. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE DUST. USE PROTECTIVE CLOTHING, GLOVES AND DUST.

Control Measures

RESPIRATORY PROTECTION: WEAR NIOSH/MSHA APPROVED RESPIRATOR.

VENTILATION: MECHANICAL EXHAUST REQUIRED.

PROTECTIVE GLOVES: CHEMICAL-RESISTANT GLOVES.

EYE PROTECTION: SAFETY GOGGLES.

OTHER PROTECTIVE EQUIPMENT: OTHER PROTECTIVE CLOTHING.

WORK HYGIENIC PRACTICES: WASH THOROUGHLY AFTER HANDLING.

SUPPL SAFETY HEALTH DATA: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

TRANSPORTATION ACTION CODE:

TRANSPORTATION FOCAL POINT:

TRANS DATA REVIEW DATE:

DOT PSN CODE:

DOT SYMBOL:

DOT PROPER SHIPPING NAME:

DOT CLASS:

DOT ID NUMBER:

DOT PACK GROUP:

DOT LABEL:

DOT DOD EXEMPTION NUMBER:

IMO PSN CODE:

IMO PROPER SHIPPING NAME:

IMO REG PAGE NUMBER:

IMO UN NUMBER:

IMO UN CLASS:

IMO SUBSID RISK LABEL:

IATA PSN CODE:

IATA UN ID NUMBER:

IATA PROPER SHIP NAME:

IATA UN CLASS:

IATA SUBSID RISK CLASS:

IATA LABEL:

AFI PSN CODE:

AFI SYMBOLS:

AFI PROP SHIPPING NAME:

AFI CLASS:

AFI ID NUMBER:

AFI PACK GROUP:

AFI LABEL:

AFI SPECIAL PROV:

AFI BASIC PAC REF:

MMAC CODE:

N O S SHIPPING NAME:

ADDITIONAL TRANS DATA:

Disposal Data

DISPOSAL DATA ACTION CODE:

DISPOSAL DATA FOCAL POINT:

DISPOSAL DATA REVIEW DATE:

RECNUM FOR THIS DISP ENTR:

TOT DISP ENTRIES PER NSN:

LANDFILL BAN ITEM:

DISPOSAL SUPPLEMENTAL DAT:

EPAHAZWST 1ST CODE NEW:

EPAHAZWST 1ST NAME NEW:

EPAHAZWST 1ST CHAR NEW:

EPAACUTEHAZARD 1ST NEW:

EPAHAZWST 2ND CODE NEW:

EPAHAZWST 2ND NAME NEW:

EPAHAZWST 2ND CHAR NEW:

EPAACUTEHAZARD 2ND NEW:

EPAHAZWST 3RD CODE NEW:

EPAHAZWST 3RD NAME NEW:

EPAHAZWST 3RD CHAR NEW:

EPAACUTE 3RD HAZARD NEW:

Label Data

LABEL REQUIRED: YES

TECHNICAL REVIEW DATE: 16FEB94

LABEL DATE: 15FEB94

MFR NUMBER:

LABEL STATUS: G

COMMON NAME: ALDRIN, 510C-11

CHRONIC HAZARD: YES

SIGNAL WORD: DANGER!

ACUTE HEALTH HAZARD NONE:

ACUTE HEALTH HAZARD SLIGHT:

ACUTE HEALTH HAZARD MODERATE:

ACUTE HEALTH HAZARD SEVERE: X

CONTACT HAZARD NONE:

CONTACT HAZARD SLIGHT: X

CONTACT HAZARD MODERATE:

CONTACT HAZARD SEVERE:

FIRE HAZARD NONE: X

FIRE HAZARD SLIGHT:

FIRE HAZARD MODERATE:

FIRE HAZARD SEVERE:

REACTIVITY HAZARD NONE: X

REACTIVITY HAZARD SLIGHT:

REACTIVITY HAZARD MODERATE:

REACTIVITY HAZARD SEVERE:

SPECIAL HAZARD PRECAUTIONS: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH THE SKIN. MAY CAUSE CNS DEPRESSION, KIDNEY DAMAGE, LUNG FAILURE, IRRITATION. CHRONIC: NERVE & LIVER DAMAGE.

PROTECT EYE: Y

PROTECT SKIN: Y

PROTECT RESPIRATORY: Y

LABEL NAME: POLYSCIENCE

LABEL STREET: 7800 MERRIMAC AVE

LABEL P O BOX:

LABEL CITY: NILES

LABEL STATE: IL

LABEL ZIP CODE: 60648

LABEL COUNTRY: US

LABEL EMERGENCY NUMBER: 321-965-0611

YEAR PROCURED:

FIRE HAZARD SEVERE:

REACTIVITY HAZARD NONE: X

REACTIVITY HAZARD SLIGHT:

REACTIVITY HAZARD MODERATE:

REACTIVITY HAZARD SEVERE:

SPECIAL HAZARD PRECAUTIONS: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH THE SKIN. MAY CAUSE CNS DEPRESSION, KIDNEY DAMAGE, LUNG FAILURE, IRRITATION. CHRONIC: NERVE & LIVER DAMAGE.

PROTECT EYE: Y

PROTECT SKIN: Y

PROTECT RESPIRATORY: Y

LABEL NAME: POLYSCIENCE

LABEL STREET: 7800 MERRIMAC AVE

LABEL P O BOX:

LABEL CITY: NILES

LABEL STATE: IL

LABEL ZIP CODE: 60648

LABEL COUNTRY: US

LABEL EMERGENCY NUMBER: 321-965-0611

YEAR PROCURED:

Page Created 1/5/97 8:00:16 PM

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Attachment B

Forms

PLAN ACCEPTANCE FORM

SITE HEALTH AND SAFETY PLAN

INSTRUCTIONS: This form is to be completed by each person working on the project work site and returned to the Site Manager, EnSafe/Allen & Hoshall, Memphis, Tennessee.

Job No: 0106-001-28-000-00

Contract No: N62467-89-D-0318

Project: SWMU 59 Old Pesticide Shop

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it. I certify I am in compliance with the applicable OSHA training requirements pertaining to the following:

Check all that apply

- ☐ 40-hour HAZWOPER training per 29 CFR 1910.120 (**required**)
- ☐ 8-hour HAZWOPER Refresher per 29 CFR 1910.120 (**required**; if applicable)
- ☐ 8-hour HAZWOPER Site Supervisor per 29 CFR 1910.120 (**required**; if applicable)
- ☐ First Aid (if applicable)
- ☐ CPR (if applicable)

_____

Signed

_____

Print Name

_____

Company

_____

Date

EMPLOYEE EXPOSURE HISTORY FORM

Employee:

Job Name:

Date(s) From/To:

Hours Onsite:

Contaminants (Suspected/Reported):

PLAN FEEDBACK FORM

Problems with plan requirements:

Unexpected situations encountered:

Recommendations for revisions:

Attachment C
Directions to the Nearest Hospital

DIRECTIONS TO THE NEAREST MEDICAL FACILITIES

The nearest hospital **and** the nearest facility capable of treating chemical burns are the same facility, which is located at Methodist North Hospital. Therefore, there is only one set of directions.

Nearest Hospital

Methodist North Hospital
3960 Covington Pike
Memphis, Tennessee

•

Emergency Room Telephone Number — (901) 372-5211

Directions to Methodist North Hospital from NAS Memphis Main Gate:

1) Exit site through South Gate (Singleton Parkway).

2) Continue on Singleton Parkway through the stop signs.

3) Singleton Parkway and Covington Pike will intersect at a red light (about 5 miles).

4) You will see the entrance to the emergency room 700 feet past this light on the left.