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ENVIRONMENTAL ASSESSMENT REPORT TANK SYSTEMS 1489 AND 1508 AIRCRAFT  
FIREFIGHTING TRAINING FACILITY MILLINGTON SUPPACT TN  
10/9/1992  
ENSAFE/ ALLEN AND HOSHALL

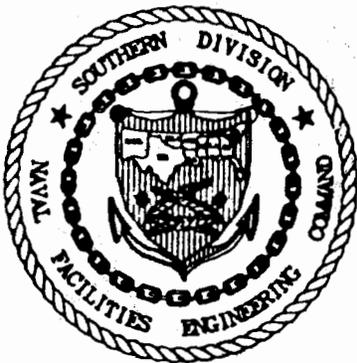
**Environmental Assessment Report  
Tank Systems 1489 and 1508  
Aircraft Firefighting Training Facility  
Naval Air Station Memphis  
Millington, Tennessee**



**Prepared for:**

**Department of the Navy  
Southern Division  
Naval Facilities Engineering Command  
Charleston, South Carolina**

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## ACRONYMS AND ABBREVIATIONS

|        |  |
|--------|--|
| AFFTF  | Aircraft Firefighting Training Facility  |
| ASTM   | American Society of Testing and Materials  |
| BNA    | Base/Neutral and Acid Extractables   |
| B      | Soil Boring  |
| BTX    | Sum of the Concentrations of Benzene, Toluene and Total Xylenes                            |
| BTEX   | Sum of the Concentrations of Benzene, Toluene, Ethylbenzene, and Total Xylenes in a Sample |
| CLEAN  | Comprehensive Long-Term Environmental Action Navy  |
| CLP    | USEPA Contract Laboratory Program  |
| CN     | Cyanide  |
| DI     | Deionized Water  |
| DI/OF  | Deionized/Organic-Free Water   |
| DWS    | Federal Primary and Secondary Drinking Water Standards                                     |
| E/A&H  | EnSafe/Allen & Hoshall   |
| EAP    | Environmental Assessment Plan  |
| EAR    | Environmental Assessment Report  |
| EPA    | United States Environmental Protection Agency  |
| ER     | Equipment Rinsate Blank  |
| FB     | Field Blank  |
| FD     | Field Duplicate  |
| FID    | Flame Ionization Detector  |
| GC     | Gas Chromatograph  |
| GC/FID | Gas Chromatograph/Flame Ionization Detector  |
| GRO    | Gasoline Range Organics (the lower boiling range compounds of TPH)                         |
| GW     | Groundwater (sample)   |
| HCl    | Hydrochloric Acid  |
| ID     | Identification   |
| ID     | Inside Diameter  |
| IT     | International Technologies   |
| ITAS   | International Technologies Analytical Services   |
| K      | Hydraulic Conductivity   |
| MCL    | Federal Maximum Contaminant Level in Drinking Water  |
| mg/kg  | Milligrams/Kilogram (ppm)  |
| mg/L   | Milligrams/Liter (ppm)   |
| MS     | Matrix Spike   |
| MSD    | Matrix Spike Duplicate   |
| msl    | Mean Sea Level   |
| MW     | Monitoring Well  |
| NAD    | North American Datum   |
| NAS    | Naval Air Station  |
| NCR    | NEESA Contract Representative  |
| NEESA  | Naval Energy and Environmental Support Activity  |
| OD     | Outside Diameter   |

|          |   |
|----------|---|
| PCB      | Polychlorinated Biphenyl                                |
| PES      | Plains Environmental Services                           |
| pest/PCB | Pesticides and Polychlorinated Biphenyls                |
| pH       | Negative log of the Hydrogen Ion Concentration          |
| PID      | Photoionization Detector                                |
| ppb      | Parts per Billion                                       |
| ppm      | Parts per Million                                       |
| PVC      | Polyvinyl Chloride                                      |
| QA       | Quality Assurance                                       |
| QA/QC    | Quality Assurance/Quality Control                       |
| QC       | Quality Control   |
| RCRA     | Resource Conservation and Recovery Act                  |
| RFI      | RCRA Facility Investigation                             |
| SOUTHDIV | Southern Division, Naval Facilities Engineering Command |
| SWMU     | Solid Waste Management Unit                             |
| TAP      | Tap Water   |
| TB       | Trip Blank  |
| TCLP     | Toxicity Characteristic Leaching Procedure              |
| TDEC     | Tennessee Department of Environment and Conservation    |
| TDS      | Total Dissolved Solids                                  |
| TN       | Tennessee   |
| TPH      | Total Petroleum Hydrocarbons                            |
| TVO      | Total Volatile Organics                                 |
| ug/kg    | Micrograms/Kilogram (ppb)                               |
| ug/L     | Micrograms/liter (ppb)                                  |
| UST      | Underground Storage Tank                                |
| VOA      | Volatile Organic Analysis                               |
| VOC      | Volatile Organic Compounds                              |

## EXECUTIVE SUMMARY

The following is an Environmental Assessment Report (EAR) for the underground storage tank (UST) systems 1489 and 1508 at the Aircraft Firefighting Training Facility of the Naval Air Station (NAS) Memphis (Facility I.D. # 9-791683) in Millington, Tennessee. This EAR is submitted following implementation of the Environmental Assessment Plan (EAP) dated June 4, 1992. Findings of the following report are summarized below:

- Groundwater in the vicinity of UST 1489 and UST 1508 is shallow (encountered at 9 to 12 feet) and flows north-northwest toward an onsite stream.
- Isolated groundwater contamination of limited extent exists at USTs 1489, 1508, and one other unrelated area to the north. Groundwater contamination at the USTs exceeds State-regulated cleanup levels.
- Background groundwater quality exceeds several Federal Primary and Secondary Drinking Water Standards, and therefore is unsuitable as a potential drinking water supply.
- Subsurface soil and aquifer media have very low permeabilities, retarding the migration of site contamination.
- Soil contamination is of multiple sources, many of which are unrelated to the USTs. Zones of contamination vary areally and vertically, and overlap in many places.
- Soil contamination from UST 1508 is very limited. Soil contamination from UST 1489 is ill-defined due to overlap and intrusion of other unrelated zones of contamination.
- Due to very low site soil permeabilities and the aquifer's unsuitability as a drinking water supply, UST-derived soil contamination does not exceed State-regulated cleanup levels.

Recommendations for corrective action, to be discussed in the forthcoming Corrective Action Plan (CAP), will call for excavation and removal of the subject USTs, limited tank bed over-excavation and soil testing, and a schedule of continued groundwater monitoring. The practicality and alternative of a limited groundwater remediation program will be discussed.

## **A. INTRODUCTION**

The Aircraft Firefighting Training Facility (AFFTF) has been active since 1949. It consists of east (MAT 305) and west (MAT 392) fire mats on several acres of land in an area designated as Solid Waste Management Unit (SWMU) No. 5 for an upcoming RCRA Facility Investigation (RFI). The fire mats are circular, bermed concrete pads upon which exist mock aircraft cockpits used in firefighting and pilot rescue drills. During training drills the cockpits are sprayed with JP-5 jet fuel and ignited. Firefighters extinguish the blaze with high pressure sprays of water or foam. The jet fuel is electrically pumped on demand to the cockpits from underground storage tanks (USTs) via underground piping to the cockpits. Waste water, foam and fuel collect in drains and are channelled to an oil/water separator via underground piping. Separated fuel is then pumped back to fire MAT 305 on demand. The east mat has three 1,800-gallon USTs for storage of JP-5 fuel, while the west mat has one 5,000-gallon JP-5 UST. Previously, the tanks stored JP-4 fuel. A tank tightness test conducted on July 2, 1991, indicated that the west tank (UST 1508) and one of the east tanks (UST 1489) were leaking. The condition of these tanks was reported to the TDEC on July 3, 1991, and the two tanks were taken out of service. The amount of fuel released was not known.

Prior to 1977, the water-fuel-foam mixture from training activities routinely overflowed onsite. There have been several documented releases since 1977, including explosions in the underground drain lines, and overflows of the oil/water separator. It is believed that waste oils and solvents were burned with the fuel in the past.

A former firefighting training area exists approximately 120 feet northwest of eastern UST 1489. Controlled fires were extinguished with hand extinguishers. An inactive concrete pit and concrete trough apparently held the fuel that was burned during the operations and discharged waste to nearby drainage ditches.

### **A.1 Project Objective and Scope of Work**

The project objective was to assess the vertical and lateral extent of contamination of the shallow soil zone and water table aquifer resulting from UST-fuel oil releases. An EAP was developed and implemented to produce data of sufficient quality to assess the current site conditions. It included tasks necessary to determine the presence of contamination and the appropriate corrective action. The EAP was consistent with the Tennessee State UST Guidelines (January 1992) and the appropriate NEESA (Naval Energy and Environmental Support Activity) requirements.

Due to the complexity of the site history and usage, the functional association of the USTs with other potentially overlapping contaminant sources not applicable to the TDEC UST program, and the inclusion of this UST study into an initial segment of an RFI for the Navy's environmental program, a larger, more involved scope of work than that stipulated by the state's UST program was warranted. The enlarged UST and site study included a groundwater screening survey, an expanded boring and monitoring well network, and a more extensive sampling and analysis program.

Field work required by the combined EAP/RFI began on June 13, 1992, and ended on August 6, 1992. A soil gas survey for both UST systems was conducted on June 13 and 14, 1992. Nineteen soil borings (B-01 through B-19) were completed during a drilling phase of June 20 to June 27, 1992. Eleven of the borings were completed as monitoring wells (MW-01 through MW-11). Soil samples were collected from all borings. Groundwater samples were collected from the installed wells during the sampling event of July 8 to 10, 1992, and from two wells on August 6, 1992, due to laboratory-exceeded sample holding times. Soil and groundwater samples were submitted for TDEC-required laboratory analyses. Additional comprehensive analyses were conducted on soil and groundwater from selected borings and monitoring wells to collect information useful for the upcoming RFI of the facility. Groundwater levels were

measured during the sampling events. A cadastral survey of the monitoring wells and facility was conducted from July 17 to 20, 1992.

### A.2 Sample Convention

Eleven groundwater samples and 37 soil samples were submitted for laboratory analysis. Individual samples were identified with unique codes which documented borehole or monitoring well number, and sampling depth where applicable for soils, as shown on Table A-1. Boreholes and monitoring wells were separately assigned consecutive numbers in order of completion in the field. Where monitoring wells were installed, samples were identified by the monitoring well number which superceded and replaced the boring number.

| <b>Table A-1<br/>Sample Identification Convention</b> |   |              |                |              |
|---|---|--------------|----------------|--------------|
|   | Example   | Station Type | Station Number | Sample Depth |
| Soils   | B-03-8: Boring #3,<br>sample from 8 to 10 ft.           | B            | 03             | 8            |
|   | MW-07-6: Monitoring well #07,<br>sample from 6 to 8 ft. | MW           | 07             | 6            |
| Groundwater   | MW-11: Monitoring well #11                              | MW           | 11             | —            |

Legend:

- Station Type:        B = Boring  
                          MW = Monitoring Well
  
- Station Number:    Nth Boring  
                          Nth Monitoring Well
  
- Sample Depth:      Generally a 2-foot depth from the depth noted: x to (x + 2) ft.  
                          Sample depths refer to soils. No specific sampling depths noted for  
                          groundwater.

### **A.3 Quality Assurance/Quality Control**

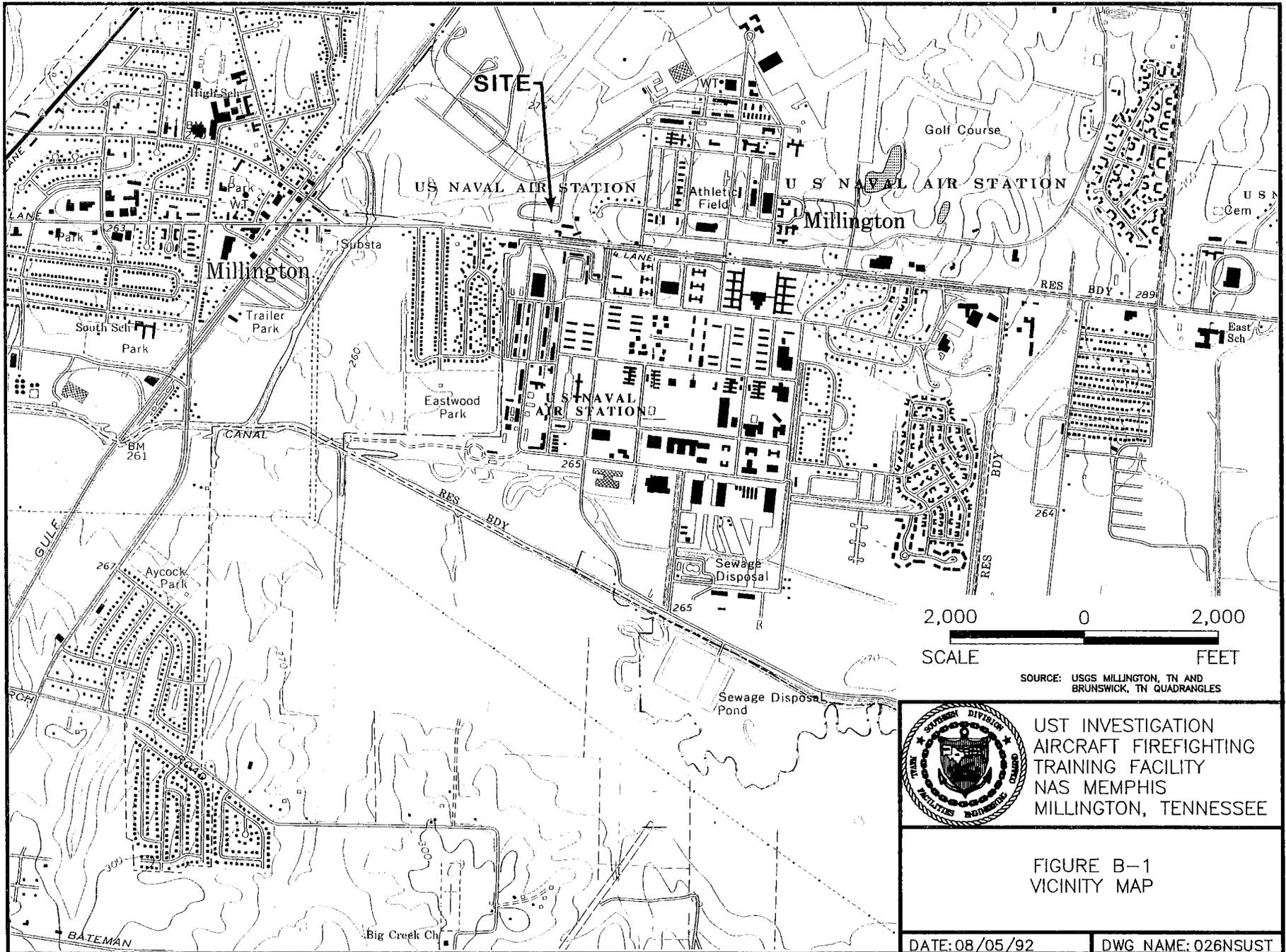
The samples for this project were analyzed and reported by International Technology Analytical Services Corporation (IT Analytical Services) in Knoxville, Tennessee. The quality assurance objectives for laboratory procedures, analysis, review and reporting were conducted in accordance with the *EPA's Office of Solid Waste and Emergency Response (OSWER), SW-846 Test Methods for Evaluating Solid Waste (3rd Edition)*, and as determined by the contract laboratory's historical data evaluation for the chosen methods. As part of analytical data deliverables, the contract laboratory provided case narrative summaries of QC issues that were encountered.

Analytical data for the TDEC-UST required samples were reviewed by E/A&H QA/QC manager. Analytical data were determined to be acceptable for use in UST applications, with appropriate qualifiers. Final samples were analyzed within the appropriate holding times, with the exception of those samples which were re-analyzed for further confirmation of results. Certain samples exhibited minor problems with surrogate recoveries because of the matrix effects of the soil. Affected samples were qualified accordingly. Overall, data quality was determined to be satisfactory and in compliance with the EPA method in use.

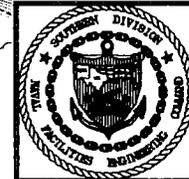
## **B. SITE LOCATION AND LAYOUT**

Figure B-1 presents a site location map with topography of the site and surrounding area. Figure B-2 details the site of the AFFTF, specifically the subject USTs, utilities, and boring and monitoring well locations. Figure B-3 shows the orientation of cross-section lines which will be used in interpreting subsurface conditions around the USTs.

The site and surrounding area are characterized by rolling, low-relief topography. The site itself rests upon and on the flanks of a broad, flat to subtly mounded area which descends slightly to the north and northwest to a lowland occupied by a creek. The site has been partly filled and graded from construction of the fire mats, and partly excavated and bermed for water control



SOURCE: USCS MILLINGTON, TN AND  
BRUNSWICK, TN QUADRANGLES

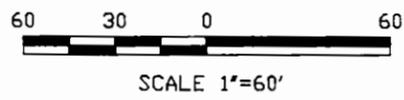


UST INVESTIGATION  
AIRCRAFT FIREFIGHTING  
TRAINING FACILITY  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

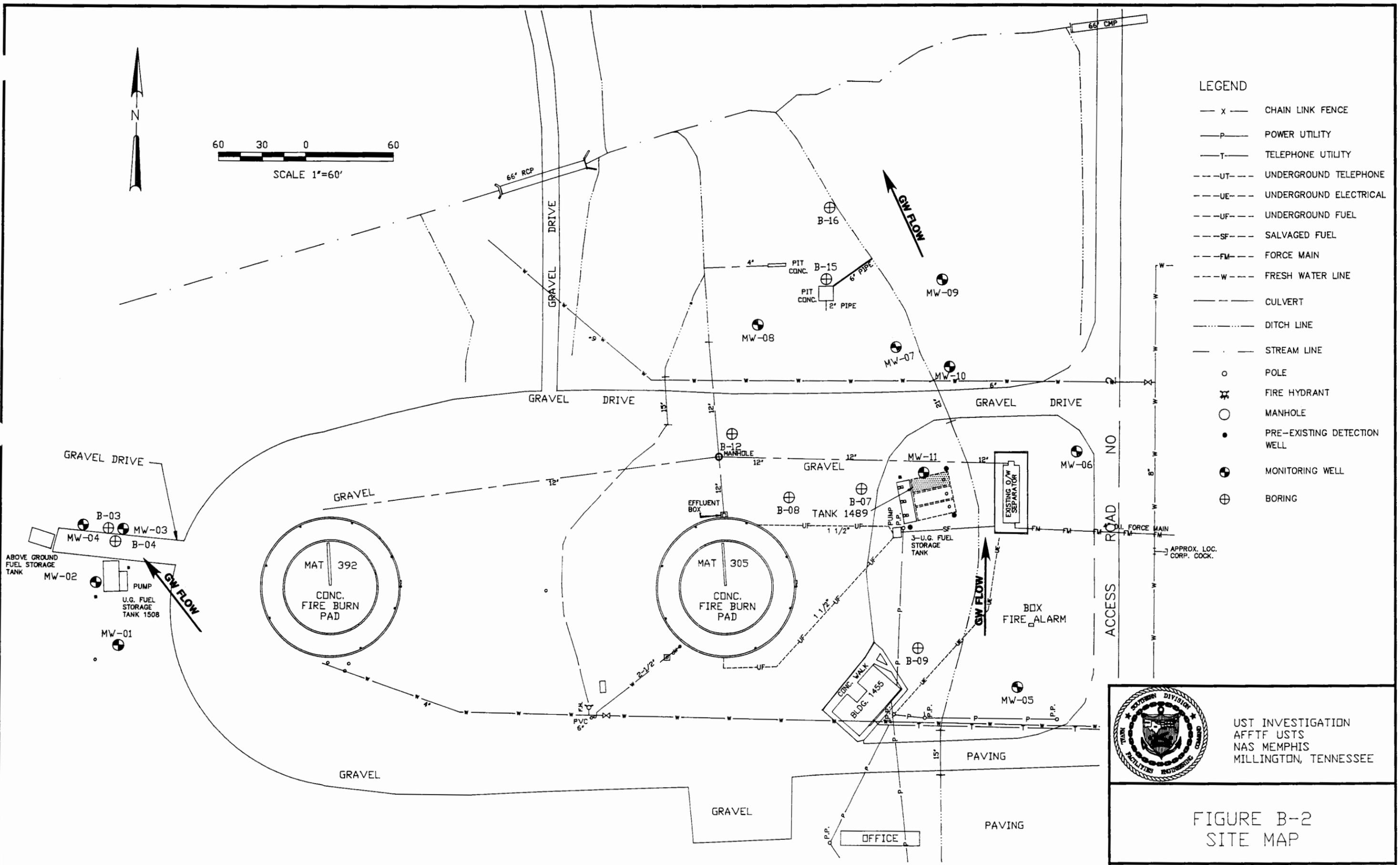
FIGURE B-1  
VICINITY MAP

DATE: 08/05/92

DWG NAME: 026NSUST

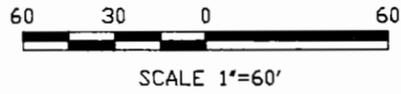


- LEGEND
- x — CHAIN LINK FENCE
  - P — POWER UTILITY
  - T — TELEPHONE UTILITY
  - - - UT - - - UNDERGROUND TELEPHONE
  - - - UE - - - UNDERGROUND ELECTRICAL
  - - - UF - - - UNDERGROUND FUEL
  - - - SF - - - SALVAGED FUEL
  - - - FM - - - FORCE MAIN
  - - - W - - - FRESH WATER LINE
  - — — CULVERT
  - - - DITCH LINE
  - - - STREAM LINE
  - o POLE
  - ⊕ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING



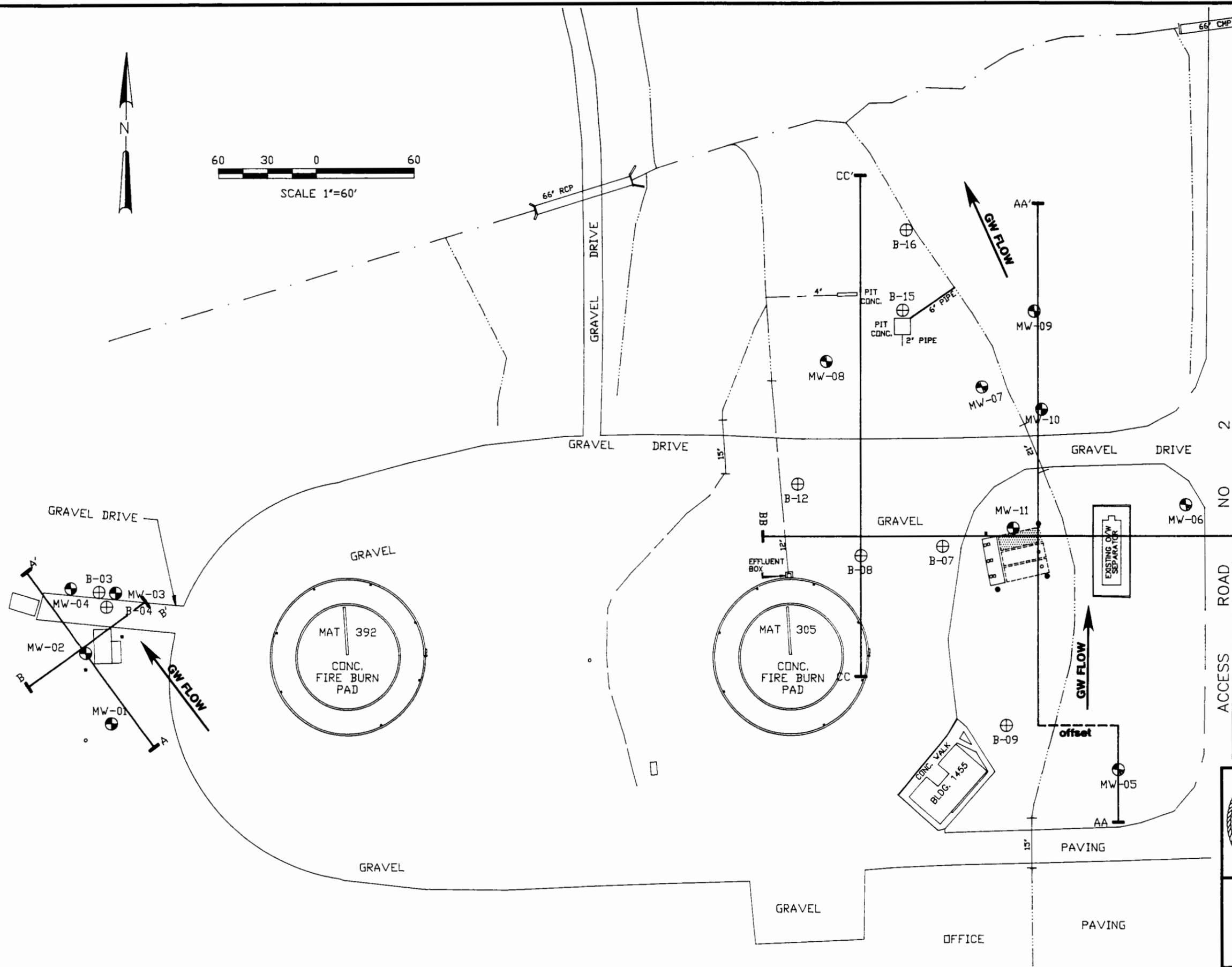
UST INVESTIGATION  
 AFFTF USTS  
 NAS MEMPHIS  
 MILLINGTON, TENNESSEE

FIGURE B-2  
 SITE MAP



LEGEND

- CULVERT
- - - DITCH LINE
- - - STREAM LINE
- o POLE
- ⊗ FIRE HYDRANT
- MANHOLE
- PRE-EXISTING DETECTION WELL
- ⊕ MONITORING WELL
- ⊕ BORING



Note: Cross Sectional Profiles are provided in Section D, Figures D-1 and D-2



UST INVESTIGATION  
AFTTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

FIGURE B-3  
LOCATION OF  
CROSS SECTIONS

and drainage to the creek. The fire mats themselves have been constructed as a broad subtle mound intersected by a drainage ditch. The USTs are located at the lower flanks or lateral ends of this broad mound, east-northeast of east MAT 305 and west-northwest of west MAT 392.

Surface water flow is directed by topography and drainage ditches toward the northern creek. Groundwater flow would generally follow the influences of north-northwest sloping topography, and of discharge to the creek. However, the mounded fire mats and the potential water recharge from firefighting activities may produce a radial influence over the general north-northwest groundwater flow.

## **C. GROUNDWATER INVESTIGATION**

The groundwater investigation consisted of an initial groundwater screening procedure followed by a soil boring, well installation and groundwater sampling program.

### **C.1 Groundwater Screening Survey**

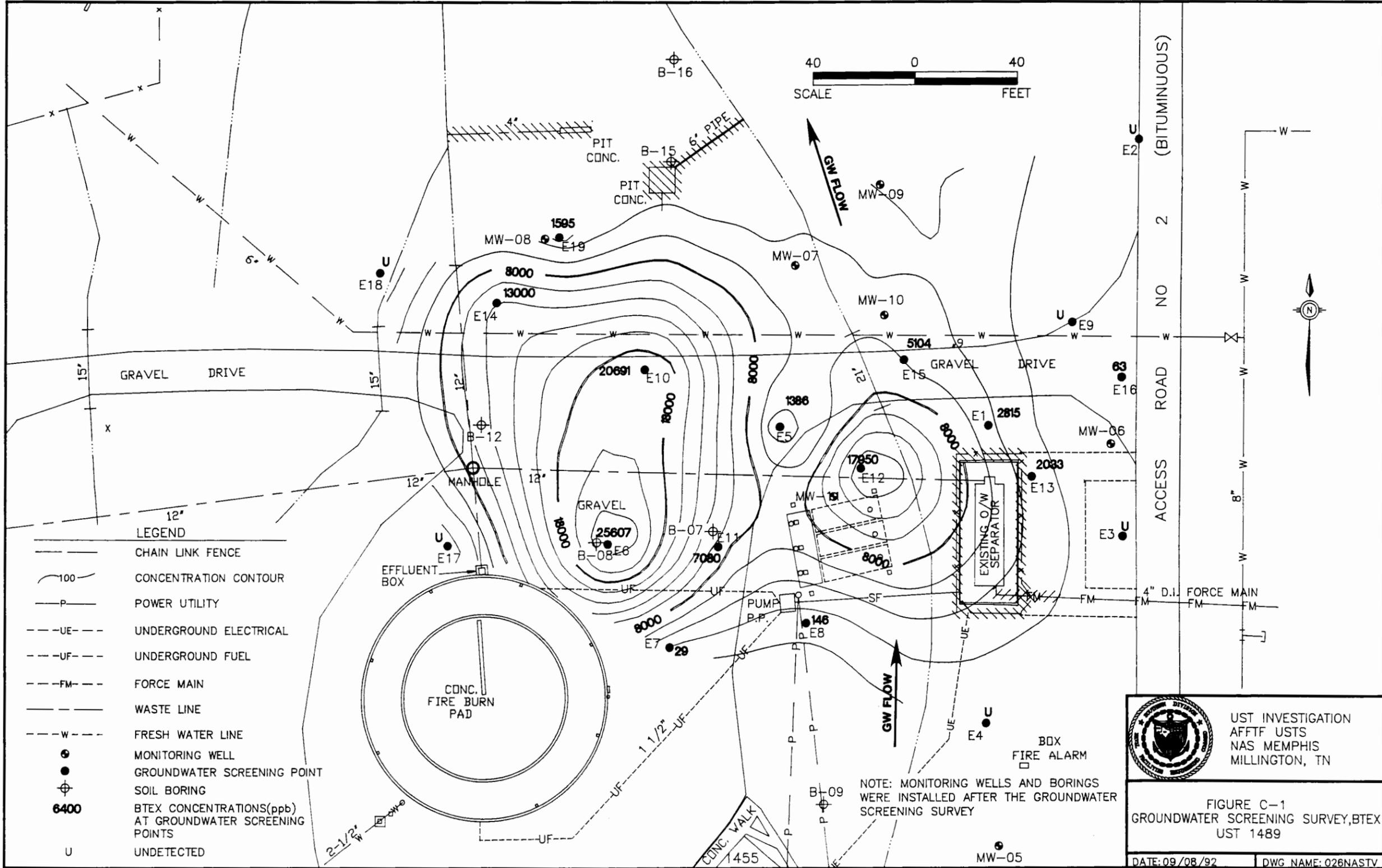
A soil gas survey at the AFFTF was originally planned to assist in defining the extent of contamination at each of the tank sites and to aid in the proper placement of monitoring wells. However, site conditions required the alteration of the survey to a groundwater screening procedure.

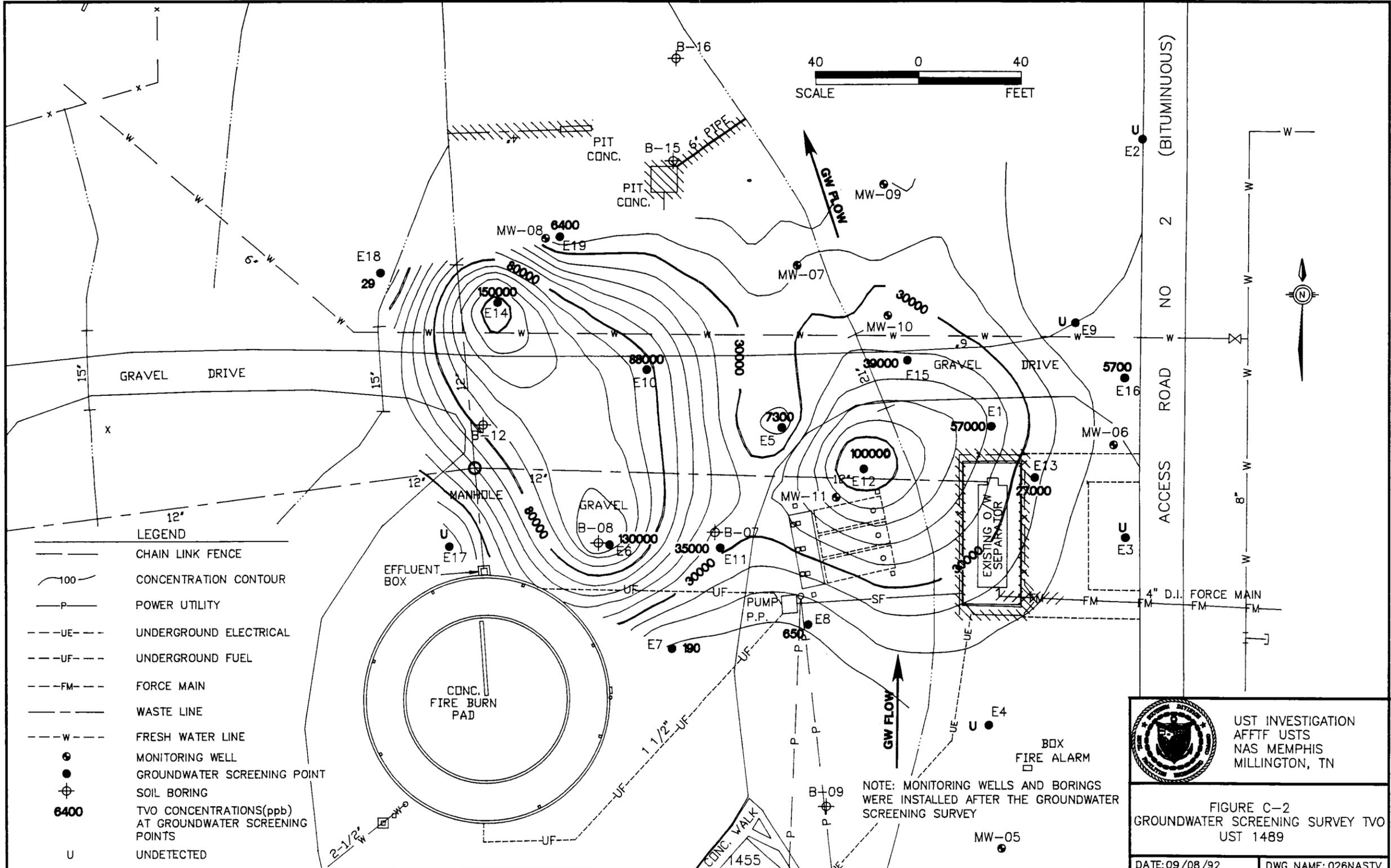
Plains Environmental Services (PES) of Salina, Kansas, was subcontracted to perform the survey. E/A&H and PES personnel were onsite the weekend of June 13 to 14, 1992, to conduct the survey when firefighting training activities were not taking place. PES used a self-contained mobile laboratory to perform all of the work onsite. A hydraulically powered percussion probe mounted on the rear of a long-wheelbase van was used to collect samples. Probe accessories were available for collecting soil gas, soil core, or groundwater samples. A laboratory-quality (Shimadzu GC-14A with C-R4A Chromatopac data processor) gas chromatograph/flame ionization detector (GC/FID) was set up inside the van to analyze the samples.

Soil gas sampling was initially attempted. One-inch OD rods were driven into the ground to desired sampling depth and then withdrawn several inches, leaving behind a disposable rod tip, thus exposing an open end of the rod. Extraction of soil gas was attempted by inserting and screwing a polyethylene tube to the bottom end of the rod and applying a vacuum. However, tight and/or wet soil conditions prevented the vacuum collection of soil gas.

E/A&H decided to alter the procedure to collection of groundwater samples for heated headspace analysis. Groundwater samples were collected by pushing the probe to the depth of groundwater and then pulling the probe and rods out. The polyethylene tubing was placed into the hole. After allowing time for water to collect in the hole, the water sample was drawn into the tube by applying a vacuum. At most sample locations, water would not enter the hole until the probe was pushed past a depth of 12 feet, suggesting that the top of the water-bearing zone was 12 to 15 feet below ground surface. Pumped groundwater was collected in a 40-ml VOA vial to half capacity. The capped vial was heated for 30 minutes at 60°C to drive the volatile components from the aqueous phase into the headspace. A headspace sample was then withdrawn with a syringe and injected into the GC for analyses of benzene, toluene, ethylbenzene, xylenes (BTEX) and total volatile organics (TVO).

Survey data for the east side of the site indicated widespread contamination (Figures C-1 and C-2) and suggested, by the apparent position of the groundwater plumes, that groundwater flow was toward the creek on the north side of the site. Sample locations were based on test results for previous samples and the need to determine the extent of contamination, as well as the sources.





Four possible sources were identified as a result of field observations and the survey results:

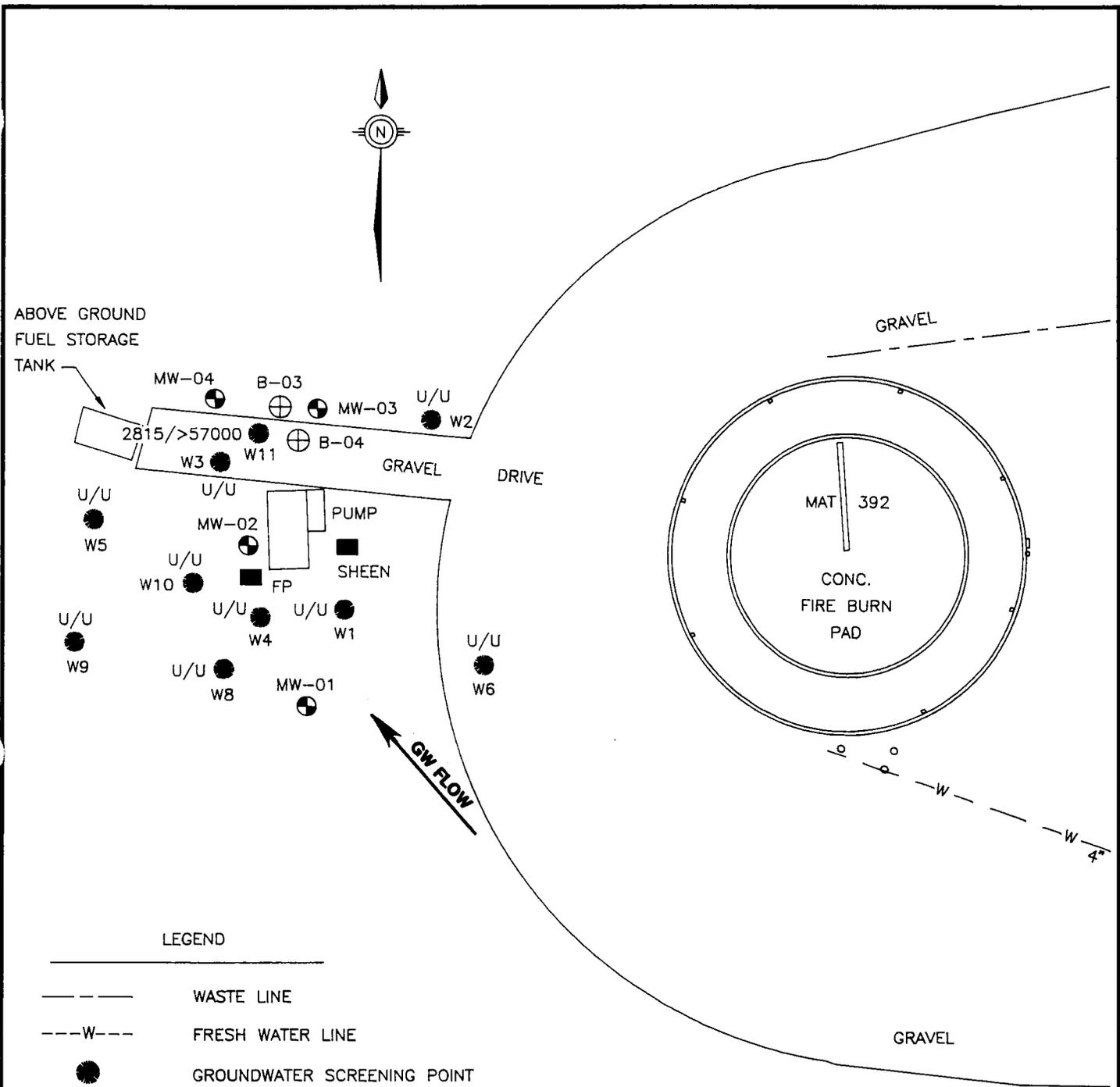
- The USTs, including spillage from overfilling in the past.
- The oil/water separator.
- The fire mats, including surface runoff and leakage from underground piping.
- The abandoned concrete pits on the north side of the gravel drive where training was conducted in the past with hand-held fire extinguishers.

A visual inspection was made of the release detection wells at the four corners of the east tank pit. There was no indication of free product in the wells.

Survey data for the west side of the site indicated very little contamination. BTEX or volatile compounds were detected in only one of the 11 samples collected (Figure C-3). However, free product was observed in the release detection well on the southwest corner of the tank pit and a product sheen in the well on the east side of the pit.

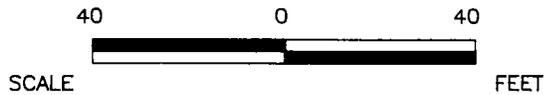
After all water samples were collected, three soil samples from different depths within the same hole were collected to obtain a vertical profile. These samples were taken approximately 10 feet north of the east tank. Analytical results indicated greater than 52,000 ug/kg TVO at 5 feet, 880 ug/kg TVO at 10 feet, and "None Detected" at 16 feet.

As a result of this survey, the assumed direction of groundwater flow and the planned location of groundwater monitoring wells were changed considerably. It must be stressed that these results are a screening tool only. The measurements are intended to indicate the presence and relative degree of contamination. They are not intended to correlate directly with actual levels of soil and/or groundwater contamination. Quantitative laboratory analyses employing specific analytical procedures are a more accurate means of determining what levels of contamination may be present. The PES analytical data and report are included in this report as Appendix A.



LEGEND

- WASTE LINE
- W--- FRESH WATER LINE
- GROUNDWATER SCREENING POINT
- ⊕ MONITORING WELL
- ⊕ BORING
- RELEASE DETECTION WELL
- U/U CONCENTRATIONS BTEX(ppb)/TVO(ppb)
- U NONDETECTED



NOTE: MONITORING WELLS AND BORINGS WERE INSTALLED AFTER THE GROUNDWATER SCREENING SURVEY.



UST INVESTIGATION  
 AFFTF USTS  
 NAS MEMPHIS  
 MILLINGTON, TN

FIGURE C-3  
 GROUNDWATER SCREENING SURVEY  
 BTEX AND TVO  
 UST 1508

DATE: 09/08/92

DWG NAME: 026NASWT

## **C.2 Boring and Monitoring Well Placement**

Professional Service Industries, Inc., in Memphis, Tennessee, was subcontracted to drill at the site. Borings and monitor wells were placed around UST systems 1489 and 1508 in a manner intended to: (1) identify and define the extent of UST-derived contamination, (2) identify other source areas of contamination and dissociate them from the USTs, and (3) determine any complications in overlapping influences of UST and non-UST contamination.

Soil boring and monitor well completion logs are provided in Appendix B.

Six borings were completed around western UST system 1508 (B-01 through B-06), four of which were completed as monitoring wells (MW-01 through MW-04) (see Figure B-2). Thirteen borings were completed around the eastern UST system 1489 (B-07 through B-19), seven of which were completed as monitoring wells (MW-05 through MW-11) (see Figure B-2). The rationale for the number and placement of these borings and wells is explained below:

| <b>Boring/<br/>Monitoring Well #</b> | <b>Rationale of Placement</b>  |
|--------------------------------------|--|
| B-01/MW-01                           | Placed in the presumed upgradient direction, based on groundwater screening data.  |
| B-02/MW-02                           | Placed at the UST System 1508 tank bed as a monitor for any source contamination. Placed second to qualify groundwater screening data with actual in-hole contamination and correlate data to optimum downgradient well placement. |
| B-03                                 | Placed downgradient of UST 1508 to further qualify groundwater screening data with in-hole conditions.   |
| B-04                                 | Placed downgradient of UST 1508 to qualify a groundwater screening hot spot that did not correlate to any in-hole contamination in nearby B-03.  |

| <b>Boring/<br/>Monitoring Well #</b> | <b>Rationale of Placement</b>   |
|--------------------------------------|---|
| B-05/MW-03                           | Placed as a downgradient well for UST 1508 in a position based on previous boring and groundwater screening data to locate the fringe of any contaminant plume.   |
| B-06/MW-04                           | Placed as a downgradient well for UST 1508 in a position based on previous boring and groundwater screening data to locate the fringes of any contaminant plume.  |
| B-07                                 | Placed between the eastern fire mat and UST 1489 to evaluate the effect of spray from fire mat operations on shallow soils in the reported prevailing downwind direction, and to define and separate areal limits of any UST contamination and fire mat contamination.      |
| B-08                                 | Placed northwest of the eastern fire mat near its underground fuel/water drainage line to qualify a groundwater screening hot spot and to evaluate the possible impact on subsurface soils from a past explosion in the line (believed to be in this approximate location). |
| B-09                                 | Placed with the original intention of installing an upgradient monitor well due south of UST 1489. The proposed well location was dropped after encountering appreciable soil contamination.  |
| B-10/MW-05                           | Placed as an alternative location for an upgradient well for UST 1489, far enough east of and on the opposite side of a drainage ditch from the contaminated soils in B-09 so as to anticipate unimpacted soils or groundwater.   |
| B-11/MW-06                           | Placed northeast of the oil/water separator to evaluate the impact of reported overflows of the separator, and to evaluate the furthest practical eastern extent of soil and groundwater conditions that site constraints would allow.                                      |

| <b>Boring/<br/>Monitoring Well #</b> | <b>Rationale of Placement</b>   |
|--------------------------------------|---|
| B-12                                 | Placed further downgradient of the eastern fire mat to document any northward continuity of fire mat-derived soils contamination.   |
| B-13/MW-07                           | Placed in the presumed downgradient direction of UST 1489 to evaluate any UST contaminant plume and qualitatively calibrate general groundwater screening data with in-hole conditions. Also placed to evaluate the contribution (whole or partial) of contamination from fire mat operations on soils and groundwater downgradient of the UST.                                       |
| B-14/MW-08                           | Placed in the presumed downgradient direction of the fire mat to evaluate contamination that would likely be derived wholly from the fire mat and/or a formerly active concrete firefighting pit nearby. Also to compare data with that of MW-07 in an attempt to eliminate any fire mat/concrete pit contamination characteristics downgradient of UST 1489 from UST considerations. |
| B-15                                 | Placed adjacent to the formerly active concrete pit to evaluate its impact as a potential downgradient contaminant source which might impede attempts to track the fringes of any contaminant plumes derived from USTs or fire mats.  |
| B-16                                 | Placed further downgradient of the concrete pit and B-15 to demonstrate the final extent of sitewide soil contamination.  |
| B-17/MW-09                           | Placed downgradient of UST 1489 where groundwater screening suggested the limits of contamination, and east of a major drainage ditch that likely has impeded any influence of surface-flow contamination from the fire mat and concrete pit.   |

| <b>Boring/<br/>Monitoring Well #</b> | <b>Rationale of Placement</b>   |
|--------------------------------------|---|
| B-18/MW-10                           | Placed downgradient of UST 1489 and near to, but on the opposite side of the drainage ditch from, MW-07 to evaluate conditions less impacted by surface flow from the fire mat or concrete pit and more likely influenced by any potential UST-derived contamination. |
| B-19/MW-11                           | Placed adjacent to the UST-1489 bed to evaluate potential contaminant-source conditions.  |

### **C.3 Hydrogeology**

In the vicinity of the site, soil borings and well logs indicate that the uppermost stratigraphic units encountered to depths of 20 to 50 feet are soft, pliable, brown and gray clay, silt and clay, and silt. Groundwater occurs under semiconfined conditions in the silt beds capped beneath clays or silty clays. Groundwater was typically encountered at 9 to 12 feet, but rose in monitoring wells to about 3 to 6 feet below ground surface.

#### **Water Level Data:**

The groundwater potentiometric surface, as measured in the completed monitoring wells, ranges from 264 to 260 feet above mean sea level (msl) (Figures C-4 and C-5). Tables C-1 and C-2 present the water level data collected on July 8, July 27, and August 6, 1992. Horizontal groundwater flow in the vicinity of western UST system 1508 is to the northwest from upgradient well MW-01 through UST bed MW-02, to downgradient well MW-04 toward a stream channel in the woods. Groundwater in the vicinity of eastern UST system 1489 flows to the north from the area of upgradient well MW-05, through MW-06 and UST bed MW-11, to downgradient wells MW-07, MW-09, MW-10 where the flow bends to the northwest apparently controlled by the channelized stream. Calculated groundwater hydraulic gradients around UST 1508 varied from 0.0075 to 0.0046 between measuring events 7/27/92 and 9/06/92, respectively. Calculated groundwater hydraulic gradients around UST 1489 varied from 0.0060

| <b>Table C-1</b>   |                        |                                     |   |  |                      |
|--|------------------------|-------------------------------------|---|--|----------------------|
| <b>Water Level Data, Sampling Event #1 (7/08 &amp; 7/27)</b> |                        |                                     |   |  |                      |
| <b>Fire Fighting Training Area, NAS Millington, TN</b>       |                        |                                     |   |  |                      |
| <b>Monitor Well</b>  | <b>Well Depth (ft)</b> | <b>Top-of-Casing Elevation (ft)</b> | <b>Depth to Water from Top of Casing (ft)</b> | <b>Potentiometric Surface Elevation (ft)</b> | <b>Date Measured</b> |
| MW-01  | 20.30                  | 268.77                              | 8.58  | 260.19                                       | 7/27/92              |
| MW-02  | 20.26                  | 267.91                              | 8.05  | 259.86                                       | 7/27/92              |
| MW-03  | 21.29                  | 268.15                              | 8.40  | 259.75                                       | 7/27/92              |
| MW-04  | 18.30                  | 267.54                              | 7.95  | 259.59                                       | 7/27/92              |
| MW-05  | 18.06                  | 268.83                              | 4.96  | 263.87                                       | 7/08/92              |
| MW-06  | 22.88                  | 270.32                              | 7.16  | 263.16                                       | 7/08/92              |
| MW-07  | 17.92                  | 267.94                              | 5.39  | 262.55                                       | 7/08/92              |
| MW-08  | 18.02                  | 268.12                              | 6.10  | 262.02                                       | 7/08/92              |
| MW-09  | 18.14                  | 267.81                              | 5.59  | 262.22                                       | 7/08/92              |
| MW-10  | 19.33                  | 268.26                              | 5.66  | 262.60                                       | 7/08/92              |
| MW-11  | 18.23                  | 270.16                              | 6.88  | 263.28                                       | 7/08/92              |

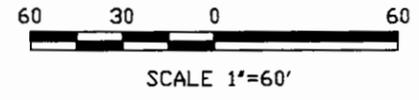
Notes:           Top-of-casing elevations and potentiometric surface elevations are relative to msl.

                    Depth-to-water and casing elevations were measured from a designated mark at the top of each well casing.

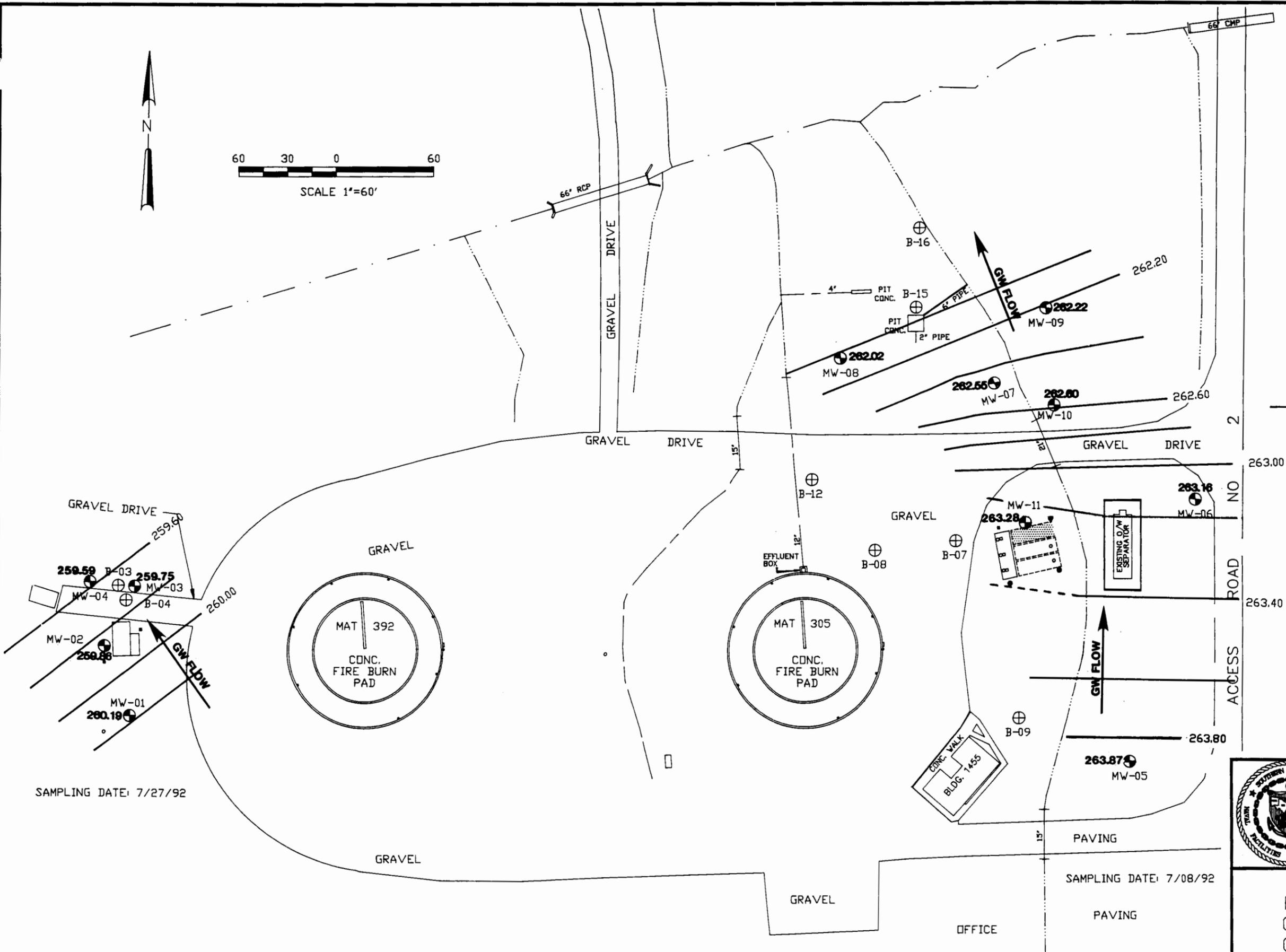
| Table C-2<br>Water Level Data, Sampling Event #2 (8/06/92)<br>Firefighting Training Area, NAS Millington, TN |                 |                              |  |                                       |               |
|--|-----------------|------------------------------|--|---------------------------------------|---------------|
| Monitor Well   | Well Depth (ft) | Top-of-Casing Elevation (ft) | Depth to Water from Top of Casing (ft) | Potentiometric Surface Elevation (ft) | Date Measured |
| MW-01  | 20.30           | 268.77                       | 8.70                                   | 260.07                                | 8/06/92       |
| MW-02  | 20.26           | 267.91                       | 8.00                                   | 259.91                                | 8/06/92       |
| MW-03  | 21.29           | 268.15                       | 8.37                                   | 259.78                                | 8/06/92       |
| MW-04  | 18.30           | 267.54                       | 7.87                                   | 259.67                                | 8/06/92       |
| MW-05  | 18.06           | 268.83                       | 3.73                                   | 265.10                                | 8/06/92       |
| MW-06  | 22.88           | 270.32                       | 6.80                                   | 263.52                                | 8/06/92       |
| MW-07  | 17.92           | 267.94                       | 5.01                                   | 262.93                                | 8/06/92       |
| MW-08  | 18.02           | 268.12                       | 5.55                                   | 262.57                                | 8/06/92       |
| MW-09  | 18.14           | 267.81                       | 5.05                                   | 262.76                                | 8/06/92       |
| MW-10  | 19.33           | 268.26                       | 5.28                                   | 262.98                                | 8/06/92       |
| MW-11  | 18.23           | 270.16                       | 6.75                                   | 263.41                                | 8/08/92       |

Notes:            Top-of-casing elevations and potentiometric surface elevations are relative to msl.

                      Depth-to-water and casing elevations were measured from a designated mark at the top of each well casing.



- LEGEND
- CULVERT
  - - - DITCH LINE
  - - - STREAM LINE
  - o POLE
  - ⊗ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING
  - ← FLOW DIRECTION
  - CONTOUR INTERVAL 0.20 FT.



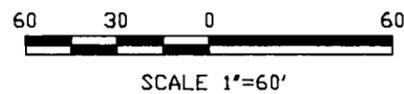
SAMPLING DATE: 7/27/92

SAMPLING DATE: 7/08/92

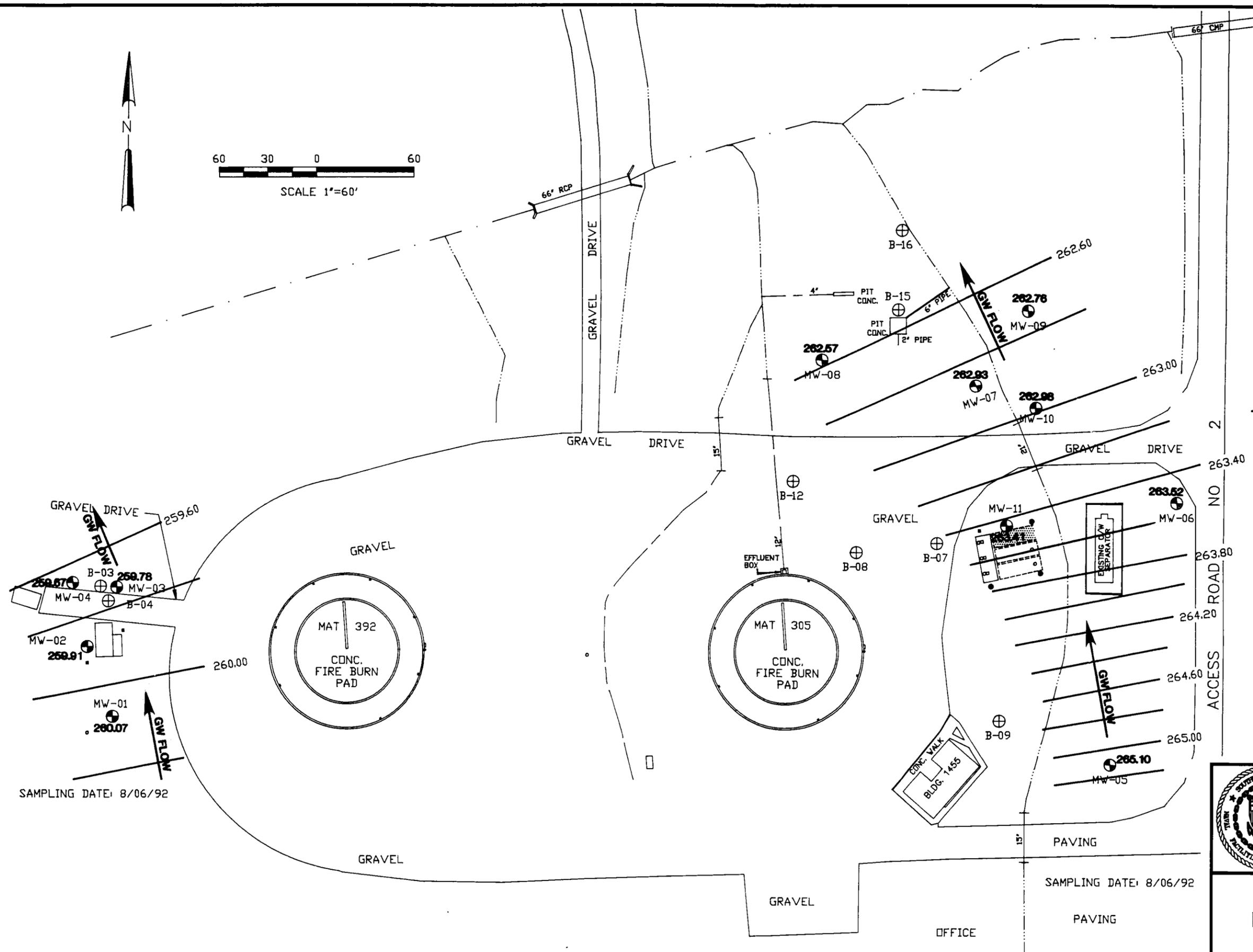


UST INVESTIGATION  
 AFTTF USTS  
 NAS MEMPHIS  
 MILLINGTON, TENNESSEE

FIGURE C-4  
 POTENTIOMETRIC MAP  
 07/08/92 (UST 1489)  
 07/27/92 (UST 1508)



- LEGEND NOT TO SCALE
- CULVERT
  - - - - - DITCH LINE
  - . - . - . STREAM LINE
  - o POLE
  - ⊕ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊙ MONITORING WELL
  - ⊕ BORING
  - ← FLOW DIRECTION
- CONTOUR INTERVAL 0.20 FT.



SAMPLING DATE: 8/06/92

SAMPLING DATE: 8/06/92



UST INVESTIGATION  
AFFTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

FIGURE C-5  
POTENTIOMETRIC MAP  
08/06/92

to 0.0077 between measuring events 7/08/92 and 8/06/92, respectively. The gradients were calculated from the potentiometric contours in Figures C-4 and C-5 as shown below:

**Calculation:**

$$\text{Hydraulic Gradient} = \frac{\text{Change in Groundwater Elevation}}{\text{Horizontal Distance}}$$

$$i = \frac{\Delta H}{L}$$

**UST 1508:**

|         |                            |   |
|---------|----------------------------|---|
| 7/27/92 | ΔH = 0.60 ft<br>L = 80 ft  | i = $\frac{0.60 \text{ ft.}}{80 \text{ ft}} = 0.0075$ |
| 8/06/92 | ΔH = 0.60 ft<br>L = 130 ft | i = $\frac{0.60 \text{ ft}}{130 \text{ ft}} = 0.0046$ |

**UST 1489:**

|         |                            |   |
|---------|----------------------------|---|
| 7/08/92 | ΔH = 1.80 ft<br>L = 300 ft | i = $\frac{1.80 \text{ ft}}{300 \text{ ft}} = 0.0060$ |
| 8/06/92 | ΔH = 2.40 ft<br>L = 310 ft | i = $\frac{2.40 \text{ ft}}{310 \text{ ft}} = 0.0077$ |

**Groundwater Flow and Hydraulic Conductivity:**

Groundwater flow rate is likely highly retarded in the water-bearing silts. Freeze and Cherry (1979) have tabulated a range of hydraulic conductivities for silt and loess. From this data, non-sandy silt representative of the uniform silt retrieved in borehole samples is reported to range between  $10^{-7}$  and  $10^{-5}$  cm/sec. Field conditions verify such low conductivities, as wells were consistently handpumped dry during development. Horizontal groundwater flow rates were thus calculated using the high end of the hydraulic conductivity range for silt and the average hydraulic gradients determined for the UST areas. The resultant groundwater flow rates, representing high estimates of flow, are 0.48 ft/year for western UST system 1508, and 0.54 ft/year for eastern UST system 1489. This would indicate that the horizontal flow of groundwater since the facility's inception in 1949 has totalled 20.64 feet on the western side and 23.22 feet on the eastern side. Calculations are shown below:

**Calculation:**

$$\text{Groundwater Flow Rate} = \frac{(\text{Hydraulic Conductivity}) \times (\text{Hydraulic Gradient})}{(\text{Porosity of the Water Bearing Medium})}$$

$$v = \frac{Ki}{n} \quad \text{where } K = 10^{-5} \text{ cm/sec} \text{ or } 10^{-6} \text{ ft/sec}$$

$$n = 0.40 \text{ (typical porosity of silt)}$$

**UST 1508:**

for average  $i = 0.0061$ ,

$$v = \frac{(10^{-6} \text{ ft/sec}) \times (0.0061)}{0.40}$$

$$= 1.5 \times 10^{-8} \text{ ft/sec}$$

$$\text{or } 0.48 \text{ ft/year}$$

**UST 1489:**

for average  $i = 0.0069$ ,

$$v = \frac{(10^{-6} \text{ ft/sec}) \times (0.0069)}{0.40}$$

$$= 1.7 \times 10^{-8} \text{ ft/sec}$$

$$\text{or } 0.54 \text{ ft/year}$$

Vertical permeabilities in the confining strata overlying the silt aquifer were determined in the laboratory. Four Shelby tube samples were collected, two at each of the two UST tank beds adjacent to MW-02 and MW-11. Professional Service Industries analyzed the samples using the triaxial cell procedure of SW-846, Method 9100. Results indicate that the materials are highly impermeable with an average conductivity on the order of  $10^{-8}$  cm/sec (Table C-3). Hence, downward migration of water toward the silt aquifer is extremely inhibited.

| Table C-3<br>Vertical Permeabilities in Contaminated Soils<br>(from Shelby Tube Sample Analyses) |            |                             |
|--|------------|-----------------------------|
| Location   | Depth (ft) | Vertical Permeability       |
| MW-02  | 5 - 7      | $8.4 \times 10^{-8}$ cm/sec |
| UST 1508   | 9.5 - 11.5 | $7.6 \times 10^{-7}$ cm/sec |
| MW-11  | 5 - 7      | $6.3 \times 10^{-8}$ cm/sec |
| UST-1489   | 9 - 11     | $5.5 \times 10^{-8}$ cm/sec |

Previous investigations conducted by ERC Environmental and Energy Service Co. (1990) at NAS Memphis concluded that the upper strata of silts and clays are underlain by hard blue clay across the NAS at depths ranging from 20 to 50 feet. The blue clay would restrict downward movement of groundwater, thus occluding near-surface groundwaters from deeper aquifers.

#### **C.4 Monitoring Well Construction**

Boreholes completed as monitoring wells were drilled with 6.25-inch inner diameter (ID) hollow-stem augers. The boreholes were augered approximately 7 feet below first-encountered groundwater to set screens that would intersect 7 feet of saturated strata and 3 feet of unsaturated strata.

Exceptions include:

- MW-06 — Appreciable vadose-soil contamination apparently ceased at 2 feet above water strike; hence the boring was advanced deeper in order to set a 10-foot screened well sealed 2 feet above water strike, thereby preventing enhancement of downward migration from the contaminated vadose soils.
- MW-11 — A perched water table was encountered above the site-wide water-bearing horizon; hence the boring was advanced in order to set a well that would intersect both water strikes.

Monitoring wells were constructed inside the auger column in the following manner:

1. Ten feet of 2-inch ID, 0.010-inch factory slotted PVC well screen was installed into the aquifer, an upward extension of 2-inch ID flush-threaded PVC riser-pipe to 2 feet above ground surface. The exposed riser was secured with an expandable locking cap.
2. A filter pack of 10-20 silica-sand was emplaced by free fall to a depth of 2 feet above the top of the well screen.

3. A seal of one-quarter inch bentonite pellets was emplaced by free fall to a depth of 2 feet above the top of the filter pack. Twelve hours of hydration time was given to ensure a proper annular seal.
4. A bentonite-cement-water grout mixture was poured to within 2 feet of ground surface in borings where the bentonite seal was greater than 2 feet below surface.
5. A steel, lockable security casing was set over the PVC riser pipe, and a concrete pad, 4' x 4' x 6", was constructed around the casing. Four-inch diameter, 3- to 4-foot-high bumper guards were installed in the corners of the concrete pad to a depth of 2 feet below ground surface. Locks were transferred from the riser caps to the exterior security casing.

All augers were thoroughly steam cleaned with an Alconox-water solution between use on each borehole. Table C-4 presents the calculated versus actual volumes of construction materials used in each well for filter pack, seal and hole plug.

| Table C-4<br>Well Construction Materials |                             |                        |                    |                              |           |       |
|--|-----------------------------|------------------------|--------------------|------------------------------|-----------|-------|
| Monitoring<br>Well<br>Identification     | Calculated Material Volumes |                        |                    | Actual Material Volumes Used |           |       |
|  | Sand <sup>1</sup>           | Bentonite <sup>2</sup> | Grout <sup>3</sup> | Sand                         | Bentonite | Grout |
| MW-01                                    | 7                           | 2                      | 2                  | 6.5                          | 2         | 2     |
| MW-02                                    | 7                           | 2                      | 2                  | 6.5                          | 2         | 1     |
| MW-03                                    | 7                           | 2                      | 2                  | 6.5                          | 2         | 2.5   |
| MW-04                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |
| MW-05                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |
| MW-06                                    | 6.5                         | 2                      | 4                  | 6.5                          | 2         | 4.5   |
| MW-07                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |
| MW-08                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |
| MW-09                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |
| MW-10                                    | 7                           | 2                      | 1.5                | 6.5                          | 2         | 1.5   |
| MW-11                                    | 7                           | 2                      | 1                  | 6.5                          | 2         | 1     |

**Notes:**

- 1 Sand = 20/40 sieve size (100 pound bag)
- 2 Bentonite = ¼-inch pellets (5-gallon bucket)
- 3 Grout = Portland Type 1/Bentonite (95/5%) mixture (94 pound bag)

**C.5 Well Development**

Wells were developed with a hand pump. Development proceeded very slowly due to the slow well recharge. Wells were repeatedly pumped dry and allowed to recover. Purged water continued to be silty and turbid although a partial clearing was observed. Development was stopped when silt content did not appear to decrease any further. All development and purge water was containerized in 55-gallon steel drums.

## **C.6 Monitoring Well Sampling**

Monitoring wells were sampled for UST and RFI parameters on July 9 and 10, 1992. MW-08 and MW-11 were subsequently resampled on August 6, 1992, due to laboratory-exceeded holding times. MW-05 was additionally sampled for Primary and Secondary Drinking Water Standards (DWS) on July 27, 1992.

Wells were purged with dedicated hand bailers. PVC bailers and Teflon line were used in wells from which TDEC-required samples only were to be collected. Stainless steel bailers and Teflon line were used in four wells (MW-05, 06, 08 and 11) from which additional RFI samples would be drawn.

Well volumes were calculated by measuring water level and total well depth. Purged waters were monitored for pH, conductivity and temperature with each well volume removed. Groundwater conditions suitable for sampling were reached when three consecutive well volumes yielded stable readings. One well, MW-11, bailed dry before stabilizing. Sampling was accomplished with the same dedicated bailers and line.

Sampling was conducted for the TDEC-required parameters of benzene/toluene/total xylenes (BTX), and of gasoline range organics (GRO) in lieu of total petroleum hydrocarbons (TPH). GRO analysis targets the lower boiling-point range of the more encompassing TPH, and was chosen in accordance with TDEC guideline to most accurately measure contamination from jet fuel. Sampling was also conducted for RFI parameters of volatile organic compounds (VOC), base/neutral and acid extractibles (BNA), cyanide (CN<sup>-</sup>), pesticides/polychlorinated biphenyls (pest/PCBs) and total unfiltered metals. All wells were sampled for the TDEC-required parameters. Wells MW-05, 06, 08, 11 were additionally sampled for RFI parameters.

GRO, BTX and VOC samples were preserved with preadministered aliquots of HCl in the laboratory-provided sample vials. CN<sup>-</sup> and total metals were preserved with laboratory-issued ampules of NaOH and HNO<sub>3</sub>, respectively.

QA/QC samples were collected for all TDEC-required and RFI parameters. These samples included a rinsate blank taken from one of the new, factory packaged stainless steel bailers, one duplicate, one matrix spike and one matrix spike duplicate. Since the dedicated bailers were new and factory packaged, cleaning water sources were not used in the sampling process. Laboratory-provided trip blanks were placed in storage with collected samples.

Samples were labeled and documented on chain-of-custody records, and carried in the field in coolers with ice. At the end of each day, the samples were packaged with ice, trip blanks and temperature blanks in coolers and sent via Federal Express to IT Analytical Services in Knoxville, Tennessee.

## **C.7 Analytical Results**

### **UST Parameters:**

Analytical results for GRO and BTX are listed in Table C-5. Results indicate elevated levels of groundwater contamination at MW-02 (UST-1508 bed) and MW-11 (UST-1489 bed). Upgradient wells MW-01 and MW-05 are unimpacted. Wells immediately downgradient of UST 1508 show little or no impact. Well MW-10, most immediately downgradient of UST-1489, shows no impact, whereas results from some wells further downgradient (MW-07, 08) indicate appreciable to high levels of contamination. MW-06, far later-gradient from UST 1489 and near the oil/water separator, is also impacted. Copies of the laboratory reported results are included in this report as Appendix C.

| <b>Table C-5<br/>Groundwater Analytical Results<br/>UST Parameters<br/>Results in ug/L (ppb)</b> |                |                |                          |            |
|--|----------------|----------------|--------------------------|------------|
| <b>Sample ID<br/>(Date)</b>  | <b>Benzene</b> | <b>Toluene</b> | <b>Total<br/>Xylenes</b> | <b>GRO</b> |
| MW-01 - (07/09/92)   | (1) U          | (1) U          | (1) U                    | (100) U    |
| MW-02 - (07/09/92)   | 350            | 51             | 460                      | 1,200      |
| MW-03 - (07/09/92)   | (1) U          | 1              | (1) U                    | (100) U    |
| MW-04 - (07/09/92)   | (1) U          | (1) U          | (1) U                    | (100) U    |
| MW-05 - (07/09/92)   | (1) U          | (1) U          | (1)                      | (100) U    |
| MW-06 - (07/09/92)   | 2              | (1)U           | 9                        | (100) U    |
| MW-07 - (07/10/92)   | 5              | (1) U          | 8                        | (100) U    |
| MW-08 - (07/10/92)   | 1,100 D        | 9              | 150 D                    | 2,600 D    |
| MW-09 - (07/10/92)   | (1) U          | (1) U          | (1) U                    | (100) U    |
| MW-10 - (07/10/92)   | (1) U          | (1) U          | (1) U                    | (100) U    |
| MW-11 - (07/10/92)   | 130 D          | (2.5) U*       | 45                       | 420        |

**NOTES:**

- U Compound was analyzed for but not detected. The number in parentheses is the detection limit.
- D Quantitated from 1:5 dilution.
- \* Detection limit higher than normal due to sample matrix interferences.

These results indicate GRO/BTX contamination at UST 1508; groundwater has been impacted by the UST in a tightly confined area at the tank bed. The situation around UST 1489 is much more complex. Whereas groundwater has apparently been impacted by the UST at its bed, other zones of groundwater contamination seem unrelated to the UST by the discontinuity with the downgradient plume, and by appreciable lateral distance unconnected by groundwater flow. It will be demonstrated in the soils investigation section that these apparently unrelated groundwater plumes are indeed caused by other contaminant sources unrelated to the UST. As for groundwater impact that is apparently attributable to the UST, the unimpacted well MW-10 immediately downgradient of the UST bed constrains the extent of any groundwater contamination from the UST source.

**RFI Parameters:**

Analytical results for RFI Parameters from wells MW-05, 06, 08 and 11 are listed in Tables C-6 through C-9. Results indicate VOC and BNA fuel-constituent contamination in distributions compatible with the UST parameter analyses. Trace concentrations of non-fuel chlorinated solvents were detected in upgradient well MW-05 only. Low to moderate concentrations of Appendix IX metals appear in all sampled wells. However, Federal Maximum Contaminant Levels (MCLs) were modestly exceeded for arsenic, cadmium and chromium in some analyses. Cyanide is present at a low concentration in all four wells. Pesticides and PCBs were not detected. Low concentrations of common laboratory contaminants (methylene chloride, acetone, bis(2-Ethylhexyl)phthalate and Di-n-butylphthalate) were reported for several samples and method blanks. These compounds were determined to be laboratory artifacts during data validation by the E/A&H QA Manager.

| Table C-6<br>Groundwater Analytical Results<br>Volatile Organic Compounds<br>Results in ug/L (ppb) |   |                          |
|--|---|--------------------------|
| Sample ID/Date   | Compound Detected                                     | Concentration (ppb)      |
| MW-05<br>(07/09/92)  | 1,2 - Dichloroethene (total)                          | 5 J                      |
| MW-06<br>(07/09/92)  | Benzene<br>Ethylbenzene                               | 2 J<br>9 J               |
| MW-08<br>(07/10/92)  | Benzene<br>Ethylbenzene<br>Xylenes (total)            | 1300 E<br>14<br>100      |
| MW-11<br>(07/10/92)  | Benzene<br>Toluene<br>Ethylbenzene<br>Xylenes (total) | 280 E<br>1 J<br>13<br>83 |

**NOTES:**

- J Compound detected, but below quantitation limit; value estimated
- E Compound exceeded calibration range

| Table C-7<br>Groundwater Analytical Results<br>Base/Neutral Acid Extractables<br>Results in ug/L (ppb) |  |                       |
|--|--|-----------------------|
| Sample ID/Date   | Compound Detected  | Concentration (ppb)   |
| MW-05<br>(07/09/92)  | 1,2 - Dichlorobenzene  | 1 J                   |
| MW-06<br>(07/09/92)  | Naphthalene  | 7 J                   |
| MW-08 (Re)<br>(08/06/92)   | Phenol<br>Naphthalene<br>2-Methylnaphthalene                 | 26<br>17<br>9 J       |
| MW-11 (Re)<br>(08/06/92)   | Phenol<br>Naphthalene<br>2-Methylnaphthalene<br>Acenaphthene | 12<br>28<br>21<br>1 J |

**NOTES:**

- J      Compound detected but below quantitation limit; value estimated
- Re     Well resampled after laboratory exceeded holding times

| Table C-8<br>Groundwater Analytical Results<br>Appendix IX Metals<br>Results in ug/L (ppb) |                     |                     |                     |                     |  |  |
|--|---------------------|---------------------|---------------------|---------------------|--|--|
| Sample ID<br>Date  |                     |                     |                     |                     |  |  |
| Parameter  | MW-05<br>(07/09/92) | MW-06<br>(07/09/92) | MW-08<br>(07/10/92) | MW-11<br>(07/10/92) |  |  |
| Antimony   | (4.0) U             | (4.0) U             | (4.0) U             | (4.0) U             |  |  |
| Arsenic <sub>1</sub>   | 20.9                | 12.9                | 82.5 <sub>1</sub>   | 26.2                |  |  |
| Barium   | 617                 | 183 B               | 583                 | 355                 |  |  |
| Beryllium  | 4.0 B               | 1.7 B               | 3.8 B               | 2.3 B               |  |  |
| Cadmium <sub>2</sub>   | 11.3 <sub>2</sub>   | 9.1                 | 14.4 <sub>2</sub>   | 11.3 <sub>2</sub>   |  |  |
| Chromium <sub>3</sub>  | 92.4 <sub>3</sub>   | 42.2                | 70.0 <sub>3</sub>   | 57.6 <sub>3</sub>   |  |  |
| Cobalt   | 36.6 B              | 22.9 B              | 46.8 B              | 29.3                |  |  |
| Copper   | 60.1                | 17.8 B              | 68.2                | 44.1                |  |  |
| Lead   | 37.7                | (2.0) U             | 26.7                | 9.9                 |  |  |
| Mercury  | (0.20) U            | (0.20) U            | (0.20) U            | (0.20) U            |  |  |
| Nickel   | 88.4                | 37.9 B              | 98.8                | 56.0                |  |  |
| Selenium   | (6.0) U             | (2.0) U             | (4.0) U             | (4.0) U             |  |  |
| Silver   | 9.7 B               | 10.6                | 14.7                | 12.6                |  |  |
| Thallium   | (2.0) U             | (2.0) U             | (2.0) U             | (2.0) U             |  |  |
| Tin  | 381                 | 317                 | 514                 | 344                 |  |  |
| Vanadium   | 73.6                | 33.3 B              | 81.4                | 53.1                |  |  |
| Zinc   | 217                 | 46.0                | 134                 | 92.8                |  |  |

**NOTES:**

- U Compound was analysed for but not detected. The number in parentheses is the detection limit.
- B Compound found in method blank
- <sub>1</sub> Federal MCL for Arsenic is 50 ug/L
- <sub>2</sub> Federal MCL for Cadmium is 10 ug/L
- <sub>3</sub> Federal MCL for Chromium is 50 ug/L

| <b>Table C-9<br/>Groundwater Analytical Results<br/>Cyanide<br/>Results are in ug/L (ppb)</b> |                               |
|---|-------------------------------|
| <b>Sample ID/Date</b>   | <b>CN Concentration (ppb)</b> |
| MW-05 07/09/92  | 40                            |
| MW-06 07/09/92  | 90                            |
| MW-08 07/10/92  | 70                            |
| MW-11 07/10/92  | 20                            |

These results are intended to provide a background or baseline for the upcoming RFI at the site. The limited data of the present investigation have indicated undefined solvent contamination in the southeast of the site and areawide cyanide contamination, —the sources have not been identified. Future RFI work will address these discoveries.

Copies of the laboratory reported results are included in this report as Appendix C.

### **C.8 Groundwater Classification Procedure**

The Tennessee State UST Guidelines set forth requirements to determine if the impacted aquifer is a drinking water source or a non-drinking water source. The cleanup level is directly dependent on classification of the aquifer use. This process consists of three parts including: (1) water use survey, (2) water quality analysis, and (3) yield testing. Each step is completed in sequence until the results of one step show that the aquifer is not suitable as a drinking water source.

The steps completed in this investigation are discussed below.

**Water Use Survey:**

A water well search conducted by the Memphis and Shelby County Health Department does not indicate any use of shallow groundwater for the purposes of domestic or agricultural use within one mile of the site (Sherrill, 8/06/92). Active public water supply wells in the area tap deeper aquifers hydraulically separated from upper groundwater by the clays of the Jackson Upper Claiborne Confining Unit (E/A&H 1992). The nearest wells include two Navy base supply wells 2700 ft. northeast and 1600 ft. southeast of the site drawing from the Memphis Sand and Fort Pillow Formation, respectively, and a Millington supply well 3800 ft. due west of the site tapping the Memphis Sand (E/A&H 1992). Between 34 to 108 ft. of clays of the Jackson Upper Claiborne Confining Unit separate these deep aquifers from shallow groundwater throughout the area (Parks 1990).

**Analytical Results for Drinking Water Standards:**

Groundwater samples to be analyzed for Primary and Secondary Drinking Water Standards were taken from the representative background well MW-05 on July 27, 1992, and sent to Specialized Assays in Nashville, Tennessee, for analysis. Results are presented in Table C-10. The analyses reveal that the shallow groundwater beneath the site exceeds the drinking water standards for detergents, iron, manganese and turbidity. Thus the viability of use as a potential water supply resource is negated.

**Groundwater Cleanup Levels:**

Based upon the collected water use and analytical data, the shallow groundwater in the vicinity of the site is a "non-drinking water supply." TDEC-UST regulations indicate that for any UST-derived petroleum groundwater contamination in an aquifer unsuitable for drinking water supply, groundwater cleanup levels are 0.070 ppm benzene and 1.000 ppm TPH.

| <b>Table C-10<br/>Groundwater Analytical Results<br/>Primary and Secondary Drinking Water Standards<br/>MW-05 (07/27/92)</b> |        |           |                        |
|--|--------|-----------|------------------------|
| Parameter  | Result | Standard  | Units                  |
| <b>Primary Standards</b>   |        |           |                        |
| Arsenic  | 0.007  | 0.05      | PPM                    |
| Barium   | 0.75   | 1.0       | PPM                    |
| Cadmium  | <0.001 | 0.01      | PPM                    |
| Chromium, Total  | 0.050  | 0.05      | PPM                    |
| Fluoride, Electrode  | 0.33   | 4.0       | PPM                    |
| Lead   | 0.028  | 0.05      | PPM                    |
| Mercury  | <0.001 | 0.002     | PPM                    |
| Nitrogen, Nitrate  | <0.10  | 10.0      | PPM                    |
| Selenium   | <0.005 | 0.01      | PPM                    |
| Silver   | <0.005 | 0.05      | PPM                    |
| <b>Secondary Standards</b>   |        |           |                        |
| Total Hardness   | 318    | —         | MG/L CaCO <sub>3</sub> |
| Chloride   | 5.3    | 250       | PPM                    |
| Color  | 5      | 15        | PT-CO Units            |
| Copper   | 0.12   | 1.0       | PPM                    |
| Detergents (MBAS)  | 0.22*  | 0.05      | PPM                    |
| Iron   | 70.8*  | 0.03      | PPM                    |
| Manganese  | 2.09*  | 0.05      | PPM                    |
| Odor   | 0      | 3         | T.O.N. UNIT            |
| pH   | 6.8    | 6.5 - 8.5 | PPM                    |
| Sodium   | 15.0   | —         | PPM                    |
| Sulfate  | 18     | 250       | PPM                    |
| Solids, Dissolved  | 403    | 500       | PPM                    |
| Zinc   | 0.31   | 5.0       | PPM                    |
| Turbidity  | 6.6*   | 1.0       | N.T. UNITS             |

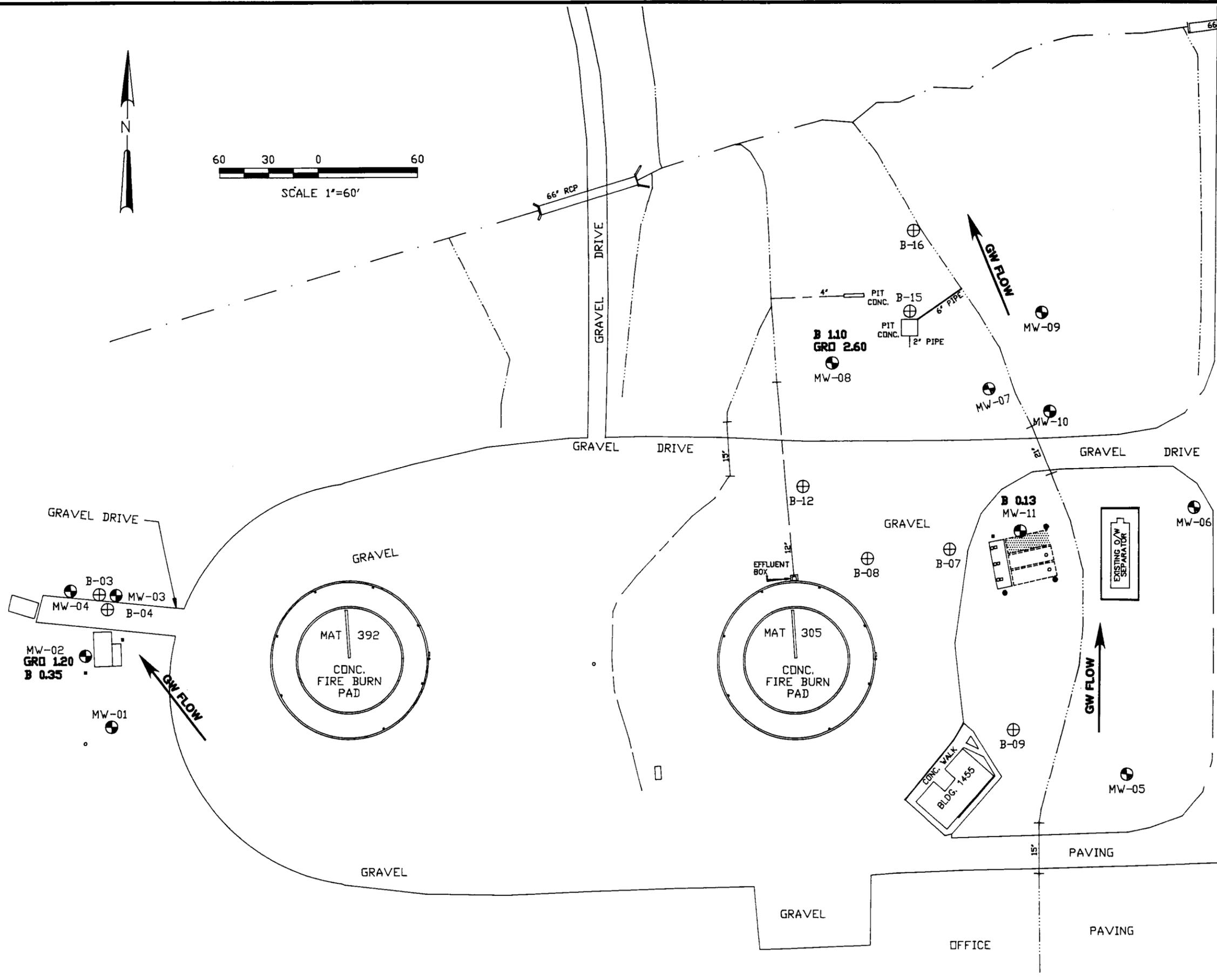
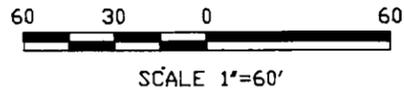
**NOTE:**

\* Exceeds Drinking Water Standards

### **C.9 Groundwater Contaminant Plumes**

As discussed in Section C.7, groundwater GRO and BTX contamination have been detected in monitoring wells MW-02 and MW-11 of the UST beds, MW-06 by the oil/water separator, and MW-07 and MW-08 around an abandoned concrete firefighting pit. Soil analytical data (to be discussed in Section D) and groundwater flow patterns corroborate the conclusion that MW-06, 07 and 08 contamination are from sources other than the USTs, and hence are not part of any UST-derived groundwater plume. MW-02 and MW-11 indicate groundwater contamination at each of the UST beds, but their immediately downgradient wells are reported as non-detect. Therefore the UST-derived contaminant plumes are confined to their respective tank beds and no further than the immediate surroundings. The limited nature of groundwater plumes at the site is logical based on the extremely low permeabilities of aquifer soils, as previously discussed in Section C.3.

Figure C-6 presents the levels of groundwater contamination for benzene and GRO in map view. Contamination contours were not applicable due to the single point registers of both UST-derived contaminant plumes.



LEGEND

- CULVERT
- - - DITCH LINE
- . - . STREAM LINE
- o POLE
- ⊕ FIRE HYDRANT
- MANHOLE
- PRE-EXISTING DETECTION WELL
- ⊕ MONITORING WELL
- ⊕ BORING
- B BENZENE
- GRO GASOLINE RANGE ORGANICS

NOTE: INDICATED VALUES ARE IN PARTS/MILLION CONCENTRATIONS IN BOLD ARE LABORATORY ANALYTICAL RESULTS.



UST INVESTIGATION  
AFTF USTs  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

FIGURE C-6  
GROUNDWATER CONTAMINATION  
EXCEEDING UST-PROGRAM  
CLEANUP LEVELS

DATE: 09/08/92

DWG NAME: 026BASE4

## **D. SOIL INVESTIGATION**

Nineteen soil borings were completed between June 20 and 27, 1992. The recorded geological data from the borings were compared and combined with regional geology. Field screening and analytical results, complimented by data from the groundwater screening programs, were used to assess the nature of contamination around the USTs and adjacent areas.

### **D.1 Geology**

The regional geology and hydrogeology consists of a thick sequence of unconsolidated Quaternary and Tertiary sediments (Graham and Parks, 1986). This sequence comprises (in ascending order) the Wilcox Group, Claiborne Group and Terrace Deposits and the surficial Loess deposits. Two major aquifer systems are included in this sequence, the Fort Pillow Formation (Wilcox Group) and the Memphis Sand Formation (Lower Claiborne Group). These aquifers are overlain by the Jackson-Upper Claiborne confining unit (Jackson Clay, Cockfield, and Cook Mountain Formations). This significant confining unit retards the downward migration of shallow groundwater to the subordinate aquifers. Reported thicknesses of the Jackson-Upper Claiborne beneath the NAS are from 105 to 175 feet, with a total aggregate thickness of clay between 63 and 161 feet (Parks, 1990). Hence, due to this confining unit, the limited release of contamination from the tight soils at the site, groundwater control by and discharge to a close-by stream, the impact to the lower aquifer systems is not a concern at the AFFTF.

The Terrace deposits and the surficial loess deposits stratigraphically overlie the Jackson Clay. The Terrace deposits consist of Pleistocene and Pliocene age sand, gravel, some clay with thin layers of a ferruginous sandstone and conglomerates at the base. This unit ranges in thickness from 0 to 100 feet and is regionally used as a groundwater source for agricultural applications.

The surficial loess deposits are windblown sediments comprising silt, silty clay, clay and minor amounts of sand. Loess is typically 0 to 65 feet in the Memphis area. Water-bearing zones are present in this unit; however, yield is low and water quality is poor.

**Site Geology:**

Figures D-1 and D-2 present cross sections of the UST 1508 and UST 1489 areas coinciding with their expressed map locations in Figure B-3. Boring logs, included in Appendix B, document the lithology of the soil horizons encountered. For this report, the writer has used the term "silt and clay" to describe soils with matrices of similar proportions of silt and clay. "Silt" or "clay" used separately refer to soils with only one predominant grainsize category.

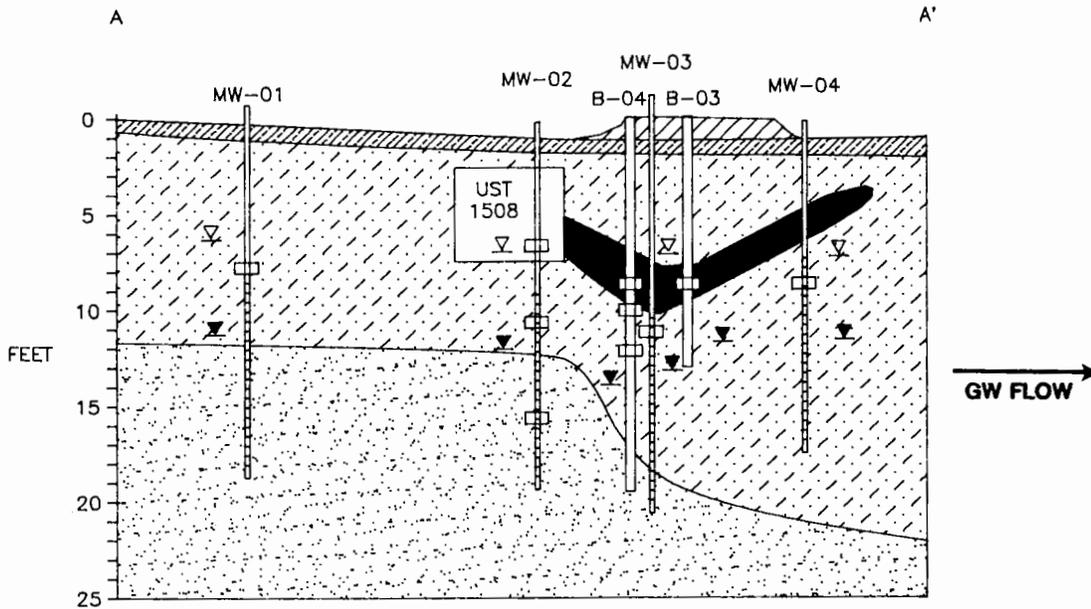
The shallow geological profile at the site (0 to 20 feet) consists of mottled orange/brown/gray, silt and clay with discontinuous horizons and lenses of brown to black organic-rich clay, underlain by similarly mottled or uniform gray silt. The soils correlate with the regional Pleistocene loess deposits. Groundwater was generally encountered at the interface between the underlying silt and overlying silt and clay. This underlying silt acts as a semi-confined aquifer, containing pressurized groundwater. Upon boring into this aquifer, groundwater slowly rises several feet into the open boreholes.

**Soil permeabilities** of the unsaturated zone and shallow aquifer are very low. As discussed in Section C.3 (Hydrogeology), physical soil testing indicates that the unsaturated silt and clay has vertical permeabilities on the order of  $10^{-8}$  to  $10^{-7}$  cm/sec (or  $10^{-9}$  to  $10^{-8}$  ft/sec). Permeabilities of the aquifer silt are assumed to range on the order of  $10^{-5}$  cm/sec (or  $10^{-6}$  ft/sec) (see Section C.3 for detailed discussion).

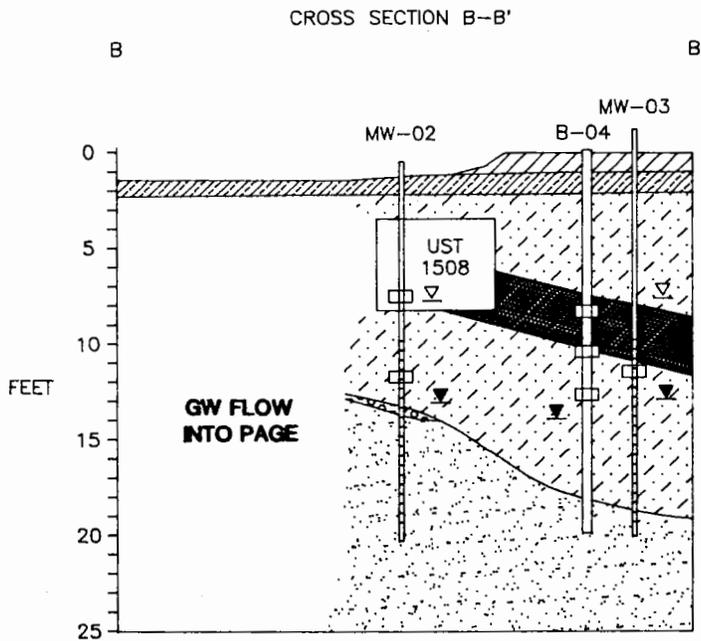
**D.2 Drilling and Soil Sampling Methods**

Soil borings were conducted with a mobile drill rig and hollow stem augers. Borings to be completed as monitoring wells were drilled with 6.25-inch ID augers to approximately 7 feet below the water table. Borings completed solely for soil exploration were drilled with 4.25-inch ID augers to water table. Samples were collected continuously in 2-foot intervals with 2-inch OD split-barrel samplers in accordance with the American Society for Testing and Materials (ASTM) method D-1586.

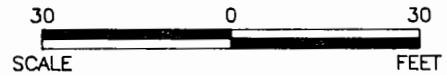
CROSS SECTION A-A'



LEGEND



-  - FILL
-  - TOPSOIL: SILT, SAND AND ORGANICS
-  - SILT AND CLAY
-  - SILT
-  - CLAY
-  - SAND, SILT AND GRAVEL
-  - LOCATION OF ANALYZED SOIL SAMPLE
-  - PIEZOMETRIC WATER LEVEL IN WELL
-  - TOP OF WATER-BEARING ZONE
-  - SCREENED INTERVAL IN WELL



**SEE FIGURE B-3 FOR MAP  
LOCATION OF CROSS SECTIONS**

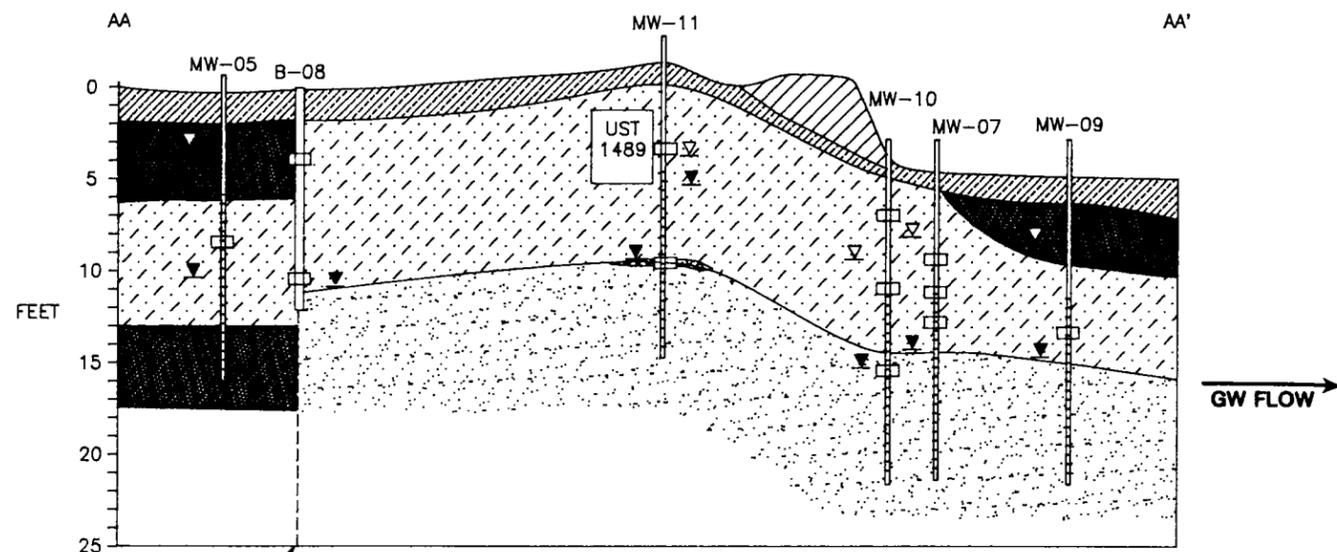
NOTE: WATER LEVELS IN WELLS ARE HIGHER THAN WHEN ORIGINALLY ENCOUNTERED UNDER SEMI-CONFINED CONDITIONS. STRATIGRAPHIC LOG FOR B-03 IS INCONSISTENT WITH GENERAL STRATIGRAPHY. DISCREPANCIES IN THIS BORING HAVE BEEN OMITTED.



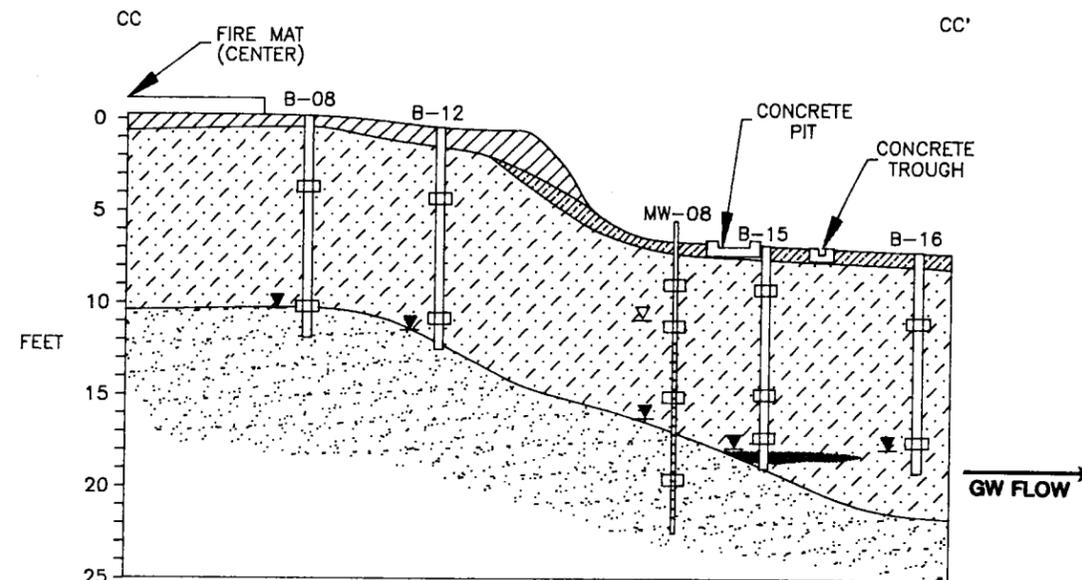
UST INVESTIGATION  
AFTF USTS  
NAS MEMPHIS  
MILLINGTON, TN.

FIGURE D-1  
GEOLOGICAL CROSS SECTIONS  
UST 1508

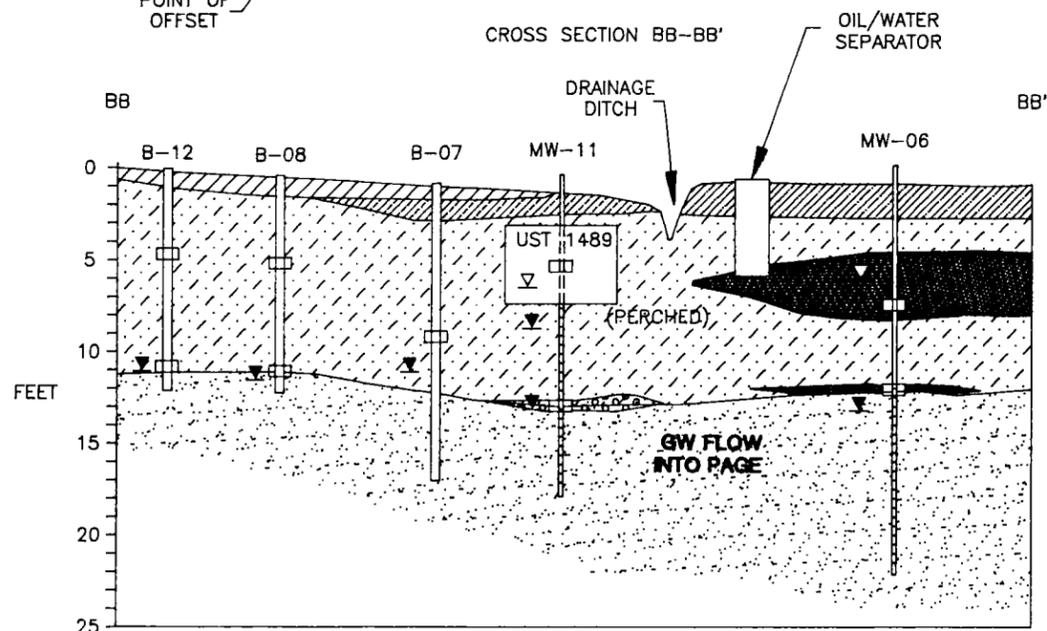
CROSS SECTION AA-AA'



CROSS SECTION CC-CC'



CROSS SECTION BB-BB'

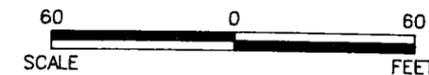


SEE FIGURE B-3 FOR MAP  
LOCATION OF CROSS SECTIONS

NOTE: WATER LEVELS IN WELLS ARE HIGHER  
THAN WHEN ORIGINALLY ENCOUNTERED  
UNDER SEMI-CONFINED CONDITIONS

LEGEND

- FILL
- TOPSOIL: SILT, SAND AND ORGANICS
- SILT AND CLAY
- SILT
- CLAY
- EXTREMELY HARD, COMPACT SILT AND CLAY
- LOCATION OF ANALYZED SOIL SAMPLE
- PIEZOMETRIC WATER LEVEL IN WELL
- TOP OF WATER-BEARING ZONE
- SCREENED INTERVAL IN WELL



UST INVESTIGATION  
AFTTF USTs  
NAS MEMPHIS  
MILLINGTON, TN.

FIGURE D-2  
GEOLOGICAL CROSS SECTIONS  
UST 1489

DATE: 09/08/92

DWG NAME: 026CRS1

Decontamination of drilling materials between borings was accomplished by steam cleaning with an Alconox-water solution. Split-barrel samplers were hand washed in an Alconox-water solution and rinsed with deionized water. Where RFI soil samples were to be collected, the split-barrel samplers were additionally rinsed with pesticide-grade isopropanol, and then with deionized, organic-free water. Cleaning water sources including tap for washing, deionized, and deionized/organic-free water were sampled and submitted for UST and RFI analyses as field blanks.

Soil samples were collected for laboratory analyses in accordance with TDEC guidelines. Determination of samples selection for analysis was based on organic vapor readings measured by an HNu-Systems photoionization detector (PID). Vapors were measured immediately upon opening the split-barrel samplers and after 15 minutes of volatilization in sealed plastic bags. Non-volatilized aliquots representing soils of greatest contamination, soils from the base of contamination, and soils immediately above water table were sent to IT Analytical Services for TDEC-required analyses of GRO and BTX.

Samples from selectively chosen borings and depth intervals which yielded significant PID readings were also collected for RFI-parameter analyses for the purpose of searching for uniquely identifiable characteristics of potentially different sources of contamination.

Shelby tube samples for soil permeability analyses were taken at the UST beds adjacent to MW-02 and MW-11. Two samples were taken at each location: one at the horizon of greatest UST-derived soil contaminations, and one immediately above water table. Samples were sent to Professional Service Industries, Inc. in Memphis, Tennessee, for analysis.

### **D.3 Analytical Results**

#### **UST Parameters:**

Analytical results for BTX and GRO indicate specific limited soil contamination in places at UST 1508, and general areal soil contamination at and around UST 1489. Concentrations are presented in Table D-1.

Results for western UST 1508 indicate elevated BTX/GRO levels at MW-02 (tank bed) up to 60 ppm and 640 ppm, respectively. B-04 yielded BTX/GRO levels of 7 ppm and 240 ppm, respectively. No other borings yielded any detectable quantities of soil contamination. These analytical data are in agreement with the groundwater screening survey results which found no contamination but for the sampling station where B-04 was later drilled.

Results from eastern UST 1489 and its environs indicate elevated BTX/GRO levels areawide. MW-11 yielded levels of 41 ppm BTX and 500 ppm GRO. Most other borings yielded similar levels or greater. Highest concentrations were found in the vicinity of the abandoned concrete pit and old firefighting training area, ranging from 18.3 to 134 ppm BTX and 230 to 3,300 ppm GRO. Only the outlying borings represented by B-16, MW-09, and the upgradient well MW-05 yielded no detectable quantities of UST parameters.

Falling head permeability analyses, conducted on Shelby tube samples from near the UST beds, yielded very low permeabilities of soils at UST-contamination horizons and the water table. Permeabilities are on the order of  $10^{-7}$  to  $10^{-8}$  cm/sec. The results were presented in Section C, Table C-5.

Copies of the laboratory-reported results are included in this report as Appendix C.

| Table D-1<br>Soil Analytical Results<br>UST Parameters<br>Results in mg/kg (ppm) |         |    |         |    |               |   |           |   |         |
|--|---------|----|---------|----|---------------|---|-----------|---|---------|
| Sample ID/Date   | Benzene |    | Toluene |    | Total Xylenes |   | Total BTX |   | GRO     |
| MW-01-9 (06/22/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-02-06 (06/22/92)  | 4.2     |    | 1.6     |    | 54            |   | 59.8      |   | 640 D   |
| MW-02-10 (06/22/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | 16      |
| MW-03/10 (06/23/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-04-8 (06/23/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-05-8 (06/24/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-06-6 (06/24/92)   | (0.1)   | U  | 0.2     |    | 5.4           |   | 5.6       |   | 170     |
| MW-06-8 (06/24/92)   | (0.1)   | U  | (0.1)   | U  | 0.4           |   | 0.4       |   | 21      |
| MW-06-10 (06/24/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-07-4 (06/25/92)   | 0.5     |    | 0.8     |    | 17            |   | 18.3      |   | 230     |
| MW-07-6 (06/25/92)   | (0.1)   | U  | (0.1)   | U  | 0.2           |   | 0.2       |   | (10) U  |
| MW-07-8 (06/25/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-08-2 (06/25/92)   | 1 D     |    | 40 D    |    | 83            |   | 134 D     |   | 3,300 D |
| MW-08-8 (06/25/92)   | 0.1     |    | (0.1)   | U  | (0.1)         | U | 0.1       |   | (10) U  |
| MW-09-8 (06/25/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-10-2 (06/26/92)   | (0.2)   | U* | (0.2)   | U* | 11            | D | 11        | D | 210 D   |
| MW-10-6 (06/26/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | 10 U    |
| MW-10-10 (06/26/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| MW-11-4 (06/26/92)   | 1.5     | D  | 4.5     | D  | 35            | D | 41.0      | D | 500     |
| MW-11-11 (06/26/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| B-03-8 (06/22/92)  | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| B-04-8 (06/22/92)  | (1.3)   | U* | (1.3)   | U* | 6.7           |   | 6.7       |   | 210 D   |
| B-04-10 (06/22/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| B-04-12 (06/22/92)   | (0.1)   | U  | (0.1)   | U  | (0.1)         | U | (0.1)     | U | (10) U  |
| B-07-2 (06/23/92)  | 2.5     |    | 4.5     |    | 61            |   | 68        |   | 230 D   |
| B-07-8 (06/23/92)  | 2.8     |    | 2.4     |    | 7.7           |   | 12.9      |   | 320     |
| B-08-4 (06/23/92)  | (0.1)   | U  | 0.5     |    | 2.2           |   | 2.7       |   | 300     |
| B-08-10 (06/23/92)   | (1.3)   | U* | 1.3     |    | 2.4           |   | 3.7       |   | 140     |

| Table D-1<br>Soil Analytical Results<br>UST Parameters<br>Results in mg/kg (ppm) |          |           |               |           |      |                |
|--|----------|-----------|---------------|-----------|------|----------------|
| Sample ID/Date   | Benzene  | Toluene   | Total Xylenes | Total BTX | GRO  |                |
| B-09-4 (06/24/92)  | (0.1) U  | 0.5 *     | 9.1           | 9.6       | 130  | D              |
| B-09-9 (06/24/92)  | (0.1) U  | (0.1) U   | (0.1) U       | (0.1) U   | (10) | U              |
| B-12-4 (06-24-92)  | (0.5) U* | 0.7       | 3.4           | 4.1       | 230  | D              |
| B-12-10 (06/24/92)   | (0.5) U  | 5.2       | 33            | 38.2      | 960  | D              |
| B-15-2 (06/25/92)  | 0.6      | 0.4 D     | 33            | 33.4 D    | 950  | D <sub>1</sub> |
| B-15-8 (06/25/92)  | (0.1) U  | (0.1) U   | (0.1) U       | (0.1) U   | (10) | U              |
| B-15-10 (06/26/92)   | (0.1) U  | (0.1) U   | (0.1) U       | (0.1) U   | (10) | U              |
| B-16-10 (06/25/92)   | (0.1) U  | (0.1) U U | (0.1) U       | (0.1) U   | (10) |                |

**NOTES:**

Sample depths are indicated in the last number of each sample ID. The number represents the top of the 2-foot collection interval. An exception is MW-11-11, which was collected between 11 and 1.5 ft.

- U - Compound was analyzed for but not detected. The number in parentheses is the detection limit for the sample.
- D - Quantitation taken from a dilution.
- \* - Detection limit is higher than normal due to sample matrix interferences.

**RFI Parameters:**

RFI analytical results reveal only the presence of hydrocarbon fuel contamination. Concentrations are presented in Tables D-2, D-3 and D-4. With the exception of common laboratory contaminants, VOC analyses yielded only BTEX constituents, and BNA analysis yielded only compounds expected in hydrocarbon fuel. Pesticides, PCBs and cyanide were not detected. Appendix IX metals analyses yielded concentrations lower than metals concentrations in groundwater analyses. Most notably, cadmium and tin were reported at one order of magnitude and two orders of magnitude less concentrated, respectively, than in groundwater.

Low concentrations of common laboratory contaminants (methylene chloride, acetone, bis (2-Ethylhexyl) phthalate, and Di-n-butylphthalate) were reported for many of the soil samples and method blanks. Most of these were determined to be laboratory artifacts by the E/A&H QA Manager, with the remainder as likely laboratory artifacts.

The results of both UST and RFI analyses did not indicate uniquely identifiable and separable characteristics between soil samples or groups of samples. However, as will be shown in Section D.5, individual source areas of the contamination can be separated based on distribution of contamination. Copies of the laboratory-reported results are included in this report as Appendix C.

**D.4 Soil Cleanup Levels**

TDEC-UST regulations base soil cleanup levels upon permeability of soils at the source of UST-contamination. Shelby tube samples from the heart of contamination and directly above the water-bearing zone at USTs 1508 and 1489 yielded permeabilities on the order of  $10^{-7}$  to  $10^{-8}$  cm/sec. TDEC regulations indicate that for sites with permeabilities lower than  $10^{-6}$  cm/sec where groundwater has been determined unsuitable for drinking water supply, applicable soil

| <b>Table D-2<br/>Soil Analytical Results<br/>Volatile Organic Compounds<br/>Results in ug/kg (ppb)</b> |                         |         |              |               |
|--|-------------------------|---------|--------------|---------------|
| Sample ID/Date   | Compound Concentrations |         |              |               |
|  | Benzene                 | Toluene | Ethylbenzene | Total Xylenes |
| MW-02-6 (06/22/92)   | 3,000 E                 | 1,700 E | 8,200 E      | 26,000 E      |
| MW-02-6 DL (06/22/92)  | 4,800 J                 | 3,300 J | 19,000       | 97,000        |
| MW-05-8 (06/24/92)   | —                       | —       | —            | —             |
| MW-06-6 (06/24/92)   | 3 J                     | —       | 62           | 380 E         |
| MW-06-6 DL (06/24/92)  | —                       | —       | 920 J        | 5,600         |
| MW-08-4 (06/25/92)   | 2,500                   | —       | 4,600        | 21,000        |
| MW-08-14 (06/25/92)  | —                       | —       | —            | —             |
| MW--11-4 (06/26/92)  | 6,500                   | —       | 20,000       | 120,000 E     |
| MW-11-4 DL (06/26/92)  | 6,800 J                 | —       | 17,000       | 75,000        |
| B-08-4 (06/23/92)  | —                       | —       | 2,400        | 1,700         |
| B-08-4 RE (06/23/92)   | —                       | —       | 730 J        | 1,300 J       |
| B-08-10 (06/23/92)   | 140                     | —       | 440 E        | 630 E         |
| B-08-10 DL (06/23/92)  | 250 J                   | —       | 2,600        | 5,000         |
| B-09-4 (06/24/92)  | —                       | —       | —            | 1,500         |
| B-15-2 (06/25/92)  | 110                     | —       | 110          | —             |

**NOTES:**

- E - Compound exceeded calibration range.
- DL - Diluted
- J - Compound detected but below quantitation limit; value estimated.
- RE - Reanalyzed

| <b>Table D-3</b>                          |                         |                      |               |               |              |         |
|---|-------------------------|----------------------|---------------|---------------|--------------|---------|
| <b>Soil Analytical Results</b>            |                         |                      |               |               |              |         |
| <b>Base/Neutral and Acid Extractables</b> |                         |                      |               |               |              |         |
| <b>Results in ug/kg (ppb)</b>             |                         |                      |               |               |              |         |
| Sample/ID/Date                            | Compound Concentrations |                      |               |               |              |         |
|   | Naphthalene             | 2-Methyl-naphthalene | Ace-naphthene | Phen-anthrene | Fluoranthene | Pyrene  |
| MW-02-6 (06/22/92)                        | 3,000 J                 | 3,900 J              | 8,200 E       | 1,800         | 1,400 J      | 1,100 J |
| MW-05-6 (06/24/92)<br>(6-10 ft.)          | —                       | —                    | —             | —             | —            | —       |
| MW-06-4 (06/24/92)<br>(4-8 ft.)           | 280 J                   | 100 J                | —             | —             | —            | —       |
| MW-11-3 (06/26/92)<br>(3-7 ft.)           | 4,100                   | 18,000               | 440 J         | —             | —            | —       |
| B-07-2 (06/24/92)                         | 3,200 J                 | 2,000 J              | —             | —             | —            | —       |
| B-08-4 (06/23/92)                         | 320 J                   | 2,500                | 41 J          | —             | —            | —       |
| B-09-4 (06/24/92)                         | 530 J                   | 3,000                | —             | —             | —            | —       |
| B-15-2 (06/25/92)                         | 6,300 J                 | 24,000               | —             | —             | —            | —       |

**NOTES:**

Unless otherwise noted, sample depths are in 2-foot intervals; the top is noted (in ft.) by the last number in the sample ID.

- J - Compound detected but below quantitation limit; value estimated.
- E - Compound exceeded calibration range.

**Table D-4**  
**Soil Analytical Results**  
**Appendix IX Metals**  
**Results in mg/kg (ppm)**

| Sample ID | MW-02-6<br>(06/22/92) | MW-05-06 (6-10 ft)<br>(06/24/92) | MW-06-4 (4-8 ft)<br>(06/24/92) | MW-11-3 (3-7 ft)<br>(06/26/92) | B-07-2<br>(06/25/92) | B-08-4<br>(06/23/92) | B-09-4<br>(06/24/92) | B-15-2 (2-6 ft)<br>(06/25/92) |
|-----------|-----------------------|----------------------------------|--------------------------------|--------------------------------|----------------------|----------------------|----------------------|-------------------------------|
| Parameter |                       |                                  |                                |                                |                      |                      |                      |                               |
| Antimony  | (0.48) U              | (0.50) U                         | (0.51) U                       | (0.51) U                       | (0.50) U             | (0.50) U             | (0.50) U             | (0.50) U                      |
| Arsenic   | 10.5                  | 12.9                             | 2.5                            | 11.3                           | 12.0                 | 12.9                 | 7.2                  | 1.5                           |
| Barium    | 53                    | 173                              | 272                            | 201                            | 151                  | 173                  | 151                  | 183                           |
| Beryllium | 0.73                  | 1.2                              | 0.77                           | 0.75                           | 0.72                 | 1.2                  | 0.77                 | 0.80                          |
| Cadmium   | (0.60) U              | 0.96                             | 0.96                           | (0.64) U                       | (0.63) U             | 0.96                 | (0.63) U             | (0.63) U                      |
| Chromium  | 14.6                  | 16.3                             | 15.3                           | 16.4                           | 17.3                 | 16.3                 | 13.4                 | 12.1                          |
| Cobalt    | 7.0                   | 14.0                             | 10.7                           | 8.2                            | 10.6                 | 14.0                 | 9.2                  | (2.5) U                       |
| Copper    | 15.1                  | 21.1                             | 10.2                           | 17.9                           | 17.4                 | 21.1                 | 10.8                 | 7.2                           |
| Lead      | 9.1                   | 12.5                             | 10.2                           | 10.4                           | 14.1                 | 12.5                 | 14.2                 | 10.4                          |
| Mercury   | 0.03                  | 0.03                             | 0.04                           | 0.04                           | 0.03                 | 0.03                 | 0.03                 | 0.04                          |
| Nickel    | 17.4                  | 19.5                             | 14.4                           | 21.4                           | 14.4                 | 19.5                 | 13.0                 | 11.9                          |
| Selenium  | (0.24) U              | (0.25) U                         | 0.26 B                         | (0.25) U                       | (0.25) U             | (0.25) U             | (0.25) U             | 0.31 B                        |
| Silver    | (0.60) U              | (0.62) U                         | (0.63) U                       | (0.64) U                       | (0.63) U             | (0.62) U             | (0.63) U             | (0.63) U                      |
| Thallium  | 0.27 B                | 0.26 B                           | (0.25) U                       | 0.29 B                         | 0.28                 | 0.26 B               | (0.25) U             | (0.25) U                      |
| Vanadium  | 27.5                  | 34.7                             | 25.9                           | 33.0                           | 36.4                 | 34.7                 | 36.5                 | 16.1                          |
| Zinc      | 55.2                  | 72.0                             | 58.2                           | 67.5                           | 63.5                 | 72.0                 | 41.9                 | 49.6                          |
| Tin       | 3.9 B                 | 6.0 B                            | 6.9 B                          | —                              | 7.7 B                | 6.0 B                | 8.0 B                | 5.5 B                         |

**NOTES:**  
Unless otherwise noted, sample depths are 2-foot intervals, the top of which is denoted by the last number of the sample ID.  
B - Compound found in method blank.  
U - Compound analyzed for but not detected; value given in parentheses is quantitation limit.

cleanup levels are 500 ppm for BTX and 1000 ppm for TPH. These cleanup levels, therefore, apply to the site.

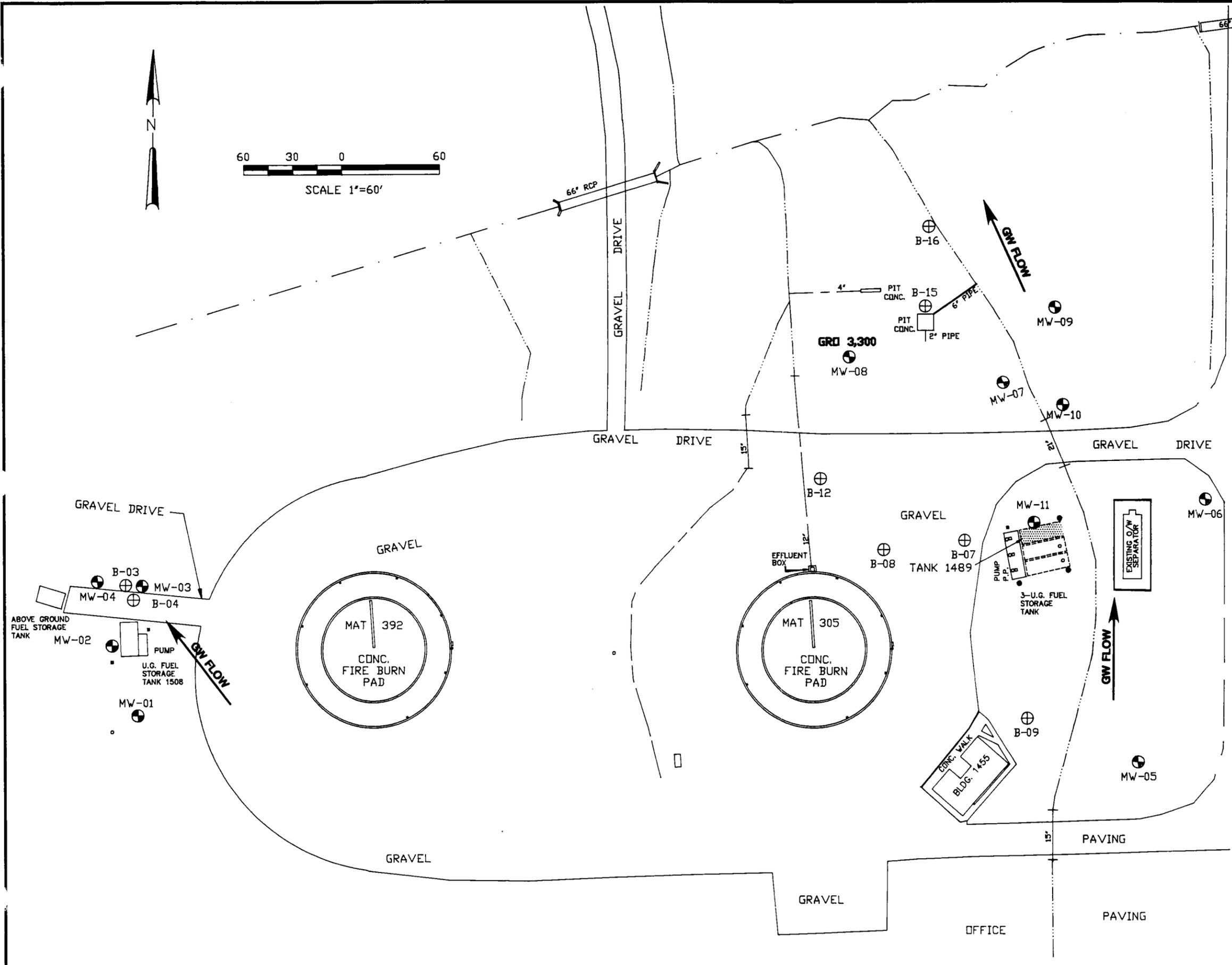
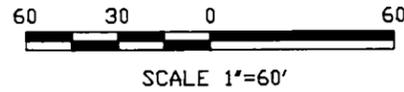
#### **D.5 Soil Contaminant Plumes**

Soil contamination exceeding cleanup levels was not encountered at the tank beds or in any plumes associated with the USTs. Sitewide, only one value exceeding cleanup levels was encountered (MW-08; 3,300 ppm GRO) (Figure D-3). This is because the applicable cleanup criteria reflect the sites low contaminant migration potential due to very low permeabilities, and the unsuitability of the groundwater as a potential drinking water supply. Nevertheless, low to moderate levels of soil contamination occur over large portions of the site.

The spatial distribution of soil contamination at the AFFTF was determined by studying analytical results in terms of variabilities in area and depth. The objective was to determine the zones of contamination that were attributable to the USTs, and to identify other zones attributable to other sources and separate them from consideration in delineation of a UST plume.

Concentration distribution maps were prepared for both BTX and GRO contamination at specific depth intervals of 0 to 4 feet, 4 to 8 feet, and 8 to 12 feet. Since the analytical data were limited and did not represent all depth intervals for each boring, the available information was enhanced by using the PID screening results collected during the soils boring program. For each boring, the PID results were calibrated with the available analytical data, allowing an estimation of concentration values for depth intervals where hard data was not available. The resulting contaminant distribution maps are included as Appendix D of this report.

Six separate zones of soil contamination and their likely sources were identified in the spatial study, and are described in the following paragraphs.



- LEGEND
- CULVERT
  - - - - DITCH LINE
  - . - . - . STREAM LINE
  - o POLE
  - ⊗ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING
  - GRO GASOLINE RANGE ORGANICS

2  
NO  
ROAD  
ACCESS

NOTE: INDICATED VALUES ARE IN PARTS/MILLION. CONCENTRATIONS IN BOLD ARE LABORATORY ANALYTICAL RESULTS.



UST INVESTIGATION  
AFTF USTs  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

FIGURE D-3  
SOIL CONTAMINATION  
EXCEEDING UST-PROGRAM  
CLEANUP LEVELS

DATE: 09/08/92      DWG NAME: 026BASE4

Shallow, mid- and deep-level soil contamination (0-4 ft., 4-8 ft., 8-12 ft.) is concentrated around UST 1508; the UST apparently is the source. Groundwater screening data points and unimpacted downgradient monitoring wells indicate the zone of contamination is limited to very near the UST. A slight northward extension of contamination is represented by B-04. Contamination in this zone is well below TDEC-UST cleanup levels.

Mid-depth soil contamination (4-8 ft.) is concentrated around UST 1489, represented by contamination in MW-11. The UST is the apparent source. The lateral extent of contamination is ill defined due to overlap with one and possibly two other unrelated zones of contamination. MW-10 is contaminated at shallow levels (0-4 ft.), and hence not derived from the deeper level contamination around the UST, but rather from another source (see below). Concentrations in this zone are well below TDEC-UST cleanup levels.

Shallow to mid-depth soil contamination (0-4 ft., 4-8 ft.) is concentrated at the former firefighting training area and concrete pit northwest of UST 1489, represented by contamination in MW-08, B-15 and MW-07. The source is likely the past operations and overflow of fuel and water from the pit. The highest contamination exists at or near the surface well away from all other site facilities, and decreases laterally. Hence there is no association with the mid-depth contamination around UST 1489 which is 120 ft. to the southeast. Contaminant concentrations are high (up to 3,300 ppm GRO in MW-08), but UST Program regulations do not apply to this area. This contamination will be further investigated during the RFI.

Shallow to mid-depth soil contamination (0-4 ft., 4-8 ft.) exists around the eastern fire mat, represented by concentrations in B-07, B-08, B-09 and B-12. The source is likely spray and overflow from the present firefighting operations at the eastern fire mat. Apparent prevailing winds to the northeast and consequent spray, as reported by Public Works personnel, appear to match with shallow-level concentration distributions. The zone of the fire mat-derived contamination appears widespread and overlaps with UST 1489 contamination, resulting in ill-

defined boundaries of the two zones. The reported routine overflow of wastewater from the fire mat before installation of the wastewater capture and fuel recycling system likely resulted in widespread overland flow across the UST area and downhill into the lowland to the north. Near-surface contamination in MW-07 and MW-10 likely contains a component derived from the fire mat overflow.

Deep soil contamination (8-12 ft.) is concentrated in the vicinity of the underground drain line from the eastern fire mat, represented by deep-level contamination in B-07, B-08 and B-12. The possible source is a reported past explosion and rupture of the underground line. The lateral extent of this contamination has not been thoroughly defined. Deep soils in B-07 yielded high PID readings, suggesting that this contamination zone overlaps into the UST-derived contamination. Vertically, the deep contamination merges at mid-depth with the shallow fire mat contamination. Concentrations are high, as indicated in B-12. This zone is unrelated to UST 1489 due to the large lateral distance and markedly higher contaminant concentrations in B-12 than at the UST.

Shallow to mid-depth soil contamination (0-4 ft., 4-8 ft.) exists around the oil/water separator east of UST 1489, represented by mid-depth concentrations in MW-06. The likely source is the reported incidences of overflow from the oil/water separator. A component of shallow contamination in MW-10 may also be attributed to this overflow. Increased contamination with depth at MW-06 may indicate subsurface leakage as well. The lateral extent of contamination was not determined in this project. The historical overflows probably spread laterally from the separator overlapping or approaching the area of UST 1489 contamination. This zone of contamination is unrelated to UST 1489 due to its wide lateral extent away from the UST.

In conclusion, soil contamination at the site is complex and of multiple sources. Some soil contamination is, however, attributed to each of the USTs of this study. UST 1508 soil contamination is limited to a small area and well delineated by borings and groundwater

screening points. UST 1489 soil contamination is ill defined due to overlap with other contamination zones. Sitewide, contamination exceeding UST-regulation clean-up levels was encountered only at MW-08 and is unrelated to UST contamination. Soils around and impacted by the USTs themselves yield contamination concentrations well below applicable cleanup levels.

**E. SIGNATURE PAGE**

I, the undersigned, do hereby affirm that the information contained in this report is accurate and correct to the best of my knowledge and belief.

Respectfully submitted,



Scott Ryan, P.G.  
Registered Professional Geologist

Oct 12, 1992

Date

TN 2668

License Number

## F. REFERENCES

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**APPENDIX A**

**GROUNDWATER SCREENING SURVEY ANALYTICAL DATA**



**Plains Environmental Services**

P.O. Box 2026 • Freeport, TX 77541-2026 • (409) 265-2471  
 Environmental Consulting & Mobile Laboratory Services

**LABORATORY REPORT**

CLIENT: EnSafe/ Allen & Hoshall      DATE REPORTED: 06-22-92  
 5720 Summer Trees Dr.      PROJECT LOCATION:  
 Suite 8      Millington, TN  
 Memphis, TN 38134      NAS

Attn: Lawson Anderson

=====

SAMPLE NO: E1-4.10'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 182.    | ug/L  | 1.   |
| TOLUENE                 | 103.    | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 2530.   | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >57000. | ug/L  | 5.   |

=====

SAMPLE NO: E1-15'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 17.     | ug/L  | 1.   |
| TOLUENE                 | 12.     | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 161.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | 4300.   | ug/L  | 5.   |

=====

SAMPLE NO: E1-15'Dup.      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 22.     | ug/L  | 1.   |
| TOLUENE                 | 15.     | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 231.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | 6100.   | ug/L  | 5.   |

=====

SAMPLE NO: E2-15'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

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=====

SAMPLE NO: E3-7.3'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: E3-15'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: E4-8.9'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: E5-16'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 934.    | ug/L  | 1.   |
| TOLUENE                 | 244.    | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 208.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | 7300.   | ug/L  | 5.   |

=====

SAMPLE NO: E6-12'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS  | UNITS | D.L. |
|-------------------------|----------|-------|------|
| BENZENE                 | >9700.   | ug/L  | 1.   |
| TOLUENE                 | 6450.    | ug/L  | 1.   |
| ETHYLBENZENE            | 547.     | ug/L  | 2.   |
| XYLENES, TOTAL          | 8910.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >130000. | ug/L  | 5.   |

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=====

SAMPLE NO: E7-13'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 20.     | ug/L  | 1.   |
| TOLUENE                 | 4.      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 5.      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | 190.    | ug/L  | 5.   |

=====

SAMPLE NO: E8-13'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 93.     | ug/L  | 1.   |
| TOLUENE                 | 18.     | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 35.     | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | 650.    | ug/L  | 5.   |

=====

SAMPLE NO: E9-9.5'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: E10-11'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 11700.  | ug/L  | 1.   |
| TOLUENE                 | 1990.   | ug/L  | 1.   |
| ETHYLBENZENE            | 481.    | ug/L  | 2.   |
| XYLENES, TOTAL          | 6520.   | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >88000. | ug/L  | 5.   |

=====

SAMPLE NO: E11-12'      DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 3660.   | ug/L  | 1.   |
| TOLUENE                 | 1780.   | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 1640.   | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >35000. | ug/L  | 5.   |

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=====

SAMPLE NO: E12-7' DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS  | UNITS | D.L. |
|-------------------------|----------|-------|------|
| BENZENE                 | 7430.    | ug/L  | 1.   |
| TOLUENE                 | 3480.    | ug/L  | 1.   |
| ETHYLBENZENE            | ND       | ug/L  | 2.   |
| XYLENES, TOTAL          | 7040.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >100000. | ug/L  | 5.   |

=====

SAMPLE NO: SS-E12-5' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 3550.   | ug/L  | 20.  |
| TOLUENE                 | 1880.   | ug/L  | 20.  |
| ETHYLBENZENE            | 355.    | ug/L  | 40.  |
| XYLENES, TOTAL          | 6340.   | ug/L  | 40.  |
| TOTAL VOLATILE ORGANICS | >52000. | ug/L  | 100. |

=====

SAMPLE NO: SS-E12-10' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 57.     | ug/L  | 20.  |
| TOLUENE                 | 21.     | ug/L  | 20.  |
| ETHYLBENZENE            | ND      | ug/L  | 40.  |
| XYLENES, TOTAL          | 95.     | ug/L  | 40.  |
| TOTAL VOLATILE ORGANICS | 880.    | ug/L  | 100. |

=====

SAMPLE NO: SS-E12-16' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 20.  |
| TOLUENE                 | ND      | ug/L  | 20.  |
| ETHYLBENZENE            | ND      | ug/L  | 40.  |
| XYLENES, TOTAL          | ND      | ug/L  | 40.  |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 100. |

=====

SAMPLE NO: E13-4' DATE SAMPLED AND ANALYZED: 6-13-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 253.    | ug/L  | 1.   |
| TOLUENE                 | 100.    | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | 1680.   | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >27000. | ug/L  | 5.   |



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=====

SAMPLE NO: E19-10'D DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 1080.   | ug/L  | 1.   |
| TOLUENE                 | 165.    | ug/L  | 1.   |
| ETHYLBENZENE            | 36.     | ug/L  | 2.   |
| XYLENES, TOTAL          | 314.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >6400.  | ug/L  | 5.   |

=====

SAMPLE NO: W1-10' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W2-10' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W3-10' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W4-10' DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

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=====

SAMPLE NO: W5-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W6-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W7-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W8-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W9-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

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=====

SAMPLE NO: W10-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | ND      | ug/L  | 1.   |
| TOLUENE                 | ND      | ug/L  | 1.   |
| ETHYLBENZENE            | ND      | ug/L  | 2.   |
| XYLENES, TOTAL          | ND      | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | ND      | ug/L  | 5.   |

=====

SAMPLE NO: W11-10'      DATE SAMPLED AND ANALYZED: 6-14-92

-----

| ANALYSES                | RESULTS | UNITS | D.L. |
|-------------------------|---------|-------|------|
| BENZENE                 | 514.    | ug/L  | 1.   |
| TOLUENE                 | 427.    | ug/L  | 1.   |
| ETHYLBENZENE            | 102.    | ug/L  | 2.   |
| XYLENES, TOTAL          | 868.    | ug/L  | 2.   |
| TOTAL VOLATILE ORGANICS | >12000. | ug/L  | 5.   |

D.L. = reporting limit  
 ND = not detected  
 ug/L = micrograms per liter

> Detector saturation occurred during the analysis of these compounds. The values reported represent minimum values of the analytes present in the sample.

Results with a prefix of SS represent soil samples that were analyzed by headspace analysis. Several grams of soil were accurately weighed into a 40-mL VOC vial. The sample vial was capped tightly and heated at 60 C for 30 minutes. This technique drives the volatile components from the soil material into the headspace. A 1-cc sample of headspace was injected into the gas chromatograph for analysis.

All results without a prefix represent water samples that were analyzed by headspace analysis. A 40-mL VOC vial was filled one-half full with sample. The sample vial was capped tightly and heated at 60 C for 30 minutes. This technique drives the volatile components from the aqueous phase into the headspace. A sample of headspace was injected into the gas chromatograph for analysis. No correction was made on the reported results to account for any volatile compounds that may have remained in the aqueous phase.

Facility ID #: 9-791683

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Page 9 of 9

All analyses were performed on-site by Plains  
Environmental Services using GC/FID.

PLAINS ENVIRONMENTAL SERVICES

*Lynn R Newcomer* /RAC

Lynn R. Newcomer  
President

**APPENDIX B**

**SOIL BORING AND MONITORING WELL COMPLETION LOGS**

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS  |
|--------------|-----------------|---------------|-----------------------------|---------------------|--|--|
| 0            | MW01            | 1/2           |                             |                     | 0-0.5 LIGHT BROWN SAND AND SILT WITH ORGANICS AND ROOTS.                                     | <p>CEMENT-BENTONITE GROUT</p> <p>2" DIAMETER SCHEDULE 40 PVC RISER</p> <p>BENTONITE SEAL FROM 4 TO 6 FT.</p> <p>10-20 SAND FROM 6 TO 18.5 FT.</p> <p>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 8 TO 18 FT.</p> <p>10.5 IN. DIAMETER BOREHOLE</p> |
| 0.5-2        | MW01            | 1/2           |                             |                     | DARK BROWN SILT AND CLAY WITH LAYERED TEXTURE, TIGHT, DRY.                                   |  |
| 2-4          | MW01            | 1/2           |                             |                     | MOTTLED BROWN, LIGHT-BROWN, ORANGE-BROWN SILT AND CLAY WITH DARK ORGANIC SPECKS. TIGHT, DRY. |  |
| 4-12         | MW01            | 1/2           |                             |                     | MOTTLED CLAY, SOME SILT BECOMING LIGHT GRAY/BROWN. TIGHT, MOIST.                             |  |
| 5            | MW01            | 1/2           |                             |                     |  |  |
| 6            | MW01            | 1/2           |                             |                     |  |  |
| 8            | MW01            | 1/3           |                             | GRD, BTX            |  |  |
| 10           | MW01            | 1/3           |                             |                     | ● WATER AT 10-12 FT.   |  |
| 12           | MW01            | 1/3           |                             |                     | 12-18 HOMOGENOUS GRAY SILT. FIRM TO SOFT, WET  |  |
| 14           | MW01            | 1/5           |                             |                     |  |  |
| 16           | MW01            | 1/3           |                             |                     |  |  |
| 18-18.5      |                 |               |                             |                     | NO SAMPLE<br>END OF BORING AT 18.5 FT.   |  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW STEM AUGERS  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER

DATE OF COMPLETION: 06/22/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-01  
MW-01

DATE: 08/08/92

DWG NAME: 026MW-01

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSIS   | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS |
|--------------|-----------------|---------------|-----------------------------|-----------------------|--|---------------------------|
| 0            | MW02 0          | 1/11          |                             |                       | 0-0.5 LIGHT BROWN SAND AND SILT WITH ORGANICS AND ROOTS.   |                           |
| 0.5-2        | MW02 2          | 28/25         |                             |                       | 0.5-2 MOTTLED BROWN, ORANGE-BROWN SILT AND CLAY. TIGHT, DRY.   |                           |
| 2-5          | MW02 4          | 100/200       |                             |                       | 2-5 MOTTLED BROWN, ORANGE-BROWN, GREEN-GRAY SILT AND CLAY WITH FEW BLACK ORGANIC SPECKS. TIGHT, MOIST, WITH HYDROCARBON ODDR.  |                           |
| 5-11.5       | MW02 6          | 100/NH*       |                             | K, GRO, BTX, RFI-SCAN | 5-11.5 DARK GRAY HYDROCARBON-STAINED SILT AND CLAY. TIGHT, SOFT, WET TO MOIST. STRONG HYDROCARBON ODDR.<br>● WATER AT 11.5 FT. |                           |
| 11.5-12      | MW02 8          | 100/NH*       |                             |                       | 11.5-12 BROWN SAND, SOME GRAVEL AND SILT. WET, LOOSE, NO APPARENT ODDR.  |                           |
| 12-12.5      | MW02 10         | 200/NH*       |                             | K, GRO, BTX           | 12-12.5 GRAY, BROWN, ORANGE-BROWN SILT AND CLAY TIGHT, MOIST TO WET.   |                           |
| 12.5-18      | MW02 12         | 200/200       |                             |                       | 12.5-18 HOMOGENOUS GRAY SILT. FIRM, WET. -WITH A GRAVEL ISOLATE AT 15 FT.  |                           |
| 18-18.5      | MW02 14         | 10/14         |                             |                       | 18-18.5 NO SAMPLE<br>END OF BORING AT 18.5 FT.   |                           |
| 18-18.5      | MW02 16         | 20/11         |                             |                       |  |                           |
| 18-18.5      |                 |               |                             |                       |  |                           |

\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

DRILLER:

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.  
SHELBY TUBE FOR PERMEABILITY SAMPLES.

DATE OF COMPLETION: 06/22/92 MONITORING WELL  
06/27/92 SHELBY TUBE



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-02  
MW-02

DATE: 08/08/92

DWG NAME: 026MW-02

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM)<br>(INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS |
|--------------|-----------------|---------------|--------------------------------|---------------------|-------------------------------------|
|--------------|-----------------|---------------|--------------------------------|---------------------|-------------------------------------|

|    |     |      |  |             |  |
|----|-----|------|--|-------------|--|
| 0  | B03 | 5/5  |  |             | 0-17 BROWN SAND,SILT AND ORGANICS,SOME GRAVEL<br>17-4 BROWN TO DARK BROWN SILT,LITTLE CLAY.<br>TIGHT,DRY.                                      |
| 2  | B03 | 10/4 |  |             |  |
| 4  | B03 | 5/4  |  |             | 4-6 MOTTLED LIGHT-BROWN,GRAY,ORANGE-BROWN SILT<br>AND CLAY,WITH SOME BLACK ORGANIC SPECKS.<br>LOOSE,WET.                                       |
| 6  | B03 | 2/5  |  |             | 6-6.5 ORANGE-BROWN SILT AND GRAVEL. LOOSE,WET.<br>6.5-8 MOTTLED LIGHT-BROWN,GRAY,ORANGE-BROWN SILT<br>AND CLAY,WITH SOME BLACK ORGANIC SPECKS. |
| 8  | B03 | 2/4  |  | GRD,<br>BTX | 8-12 GRADING TO MOTTLED GRAY,ORANGE-BROWN SILT<br>WITH SOME BLACK ORGANIC SPECKS.  |
| 10 | B03 | 2/4  |  |             | ● WATER AT 10 FT.  |
| 12 |     |      |  |             | END OF BORING AT 12 FT.  |

|   |   |
|---|---|
| DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.<br>4161 RIDGEMOOR AVENUE<br>MEMPHIS, TN. 38118 | DRILLING AND SAMPLING METHOD:<br>3.25-INCH ID HOLLOW-STEM AUGERS,<br>2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER. |
|---|---|

|                              |  |
|------------------------------|--|
| DATE OF COMPLETION: 06/22/92 |  |
|------------------------------|--|

|  |             |
|--|-------------|
|  <p>ENVIRONMENTAL ASSESSMENT<br/>         UNDERGROUND STORAGE TANKS<br/>         AIRCRAFT FIREFIGHTING TRAINING FACILITY<br/>         NAS MEMPHIS, TN.</p> | BORING B-03 |
|--|-------------|

|                |                   |
|----------------|-------------------|
| DATE: 07/28/92 | DWG NAME: 026B-03 |
|----------------|-------------------|

# DESCRIPTION OF SUBSURFACE MATERIALS

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM)<br>(INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION  |
|--------------|-----------------|---------------|--------------------------------|---------------------|--|
|              |                 |               |                                |                     | GRAVEL ROAD BEDDING.   |
|              | B04<br>2        | 0/1           |                                |                     | 2-4 BROWN SILT, WITH MINOR BLACK ORGANIC SPECKS. TIGHT, DRY.   |
|              | B04<br>4        | 0/1           |                                |                     | 4-6 BROWN SILT AND CLAY, WITH MINOR BLACK ORGANIC SPECKS. TIGHT, DRY.  |
| 5            | B04<br>6        | 0/4           |                                |                     | 6-7 LIGHT GRAY SILT AND CLAY, MOTTLED WITH ORANGE-BROWN PATCHES. TIGHT, DRY.                                       |
|              | B04<br>8        | 6/40          | GRD,<br>BTX                    |                     | 7-10 DARK GRAY CLAY, MOTTLED WITH ORANGE-BROWN PATCHES. TIGHT, DRY TO MOIST.<br>-WITH HYDROCARBON ODOR AT 8-10 FT. |
| 10           | B04<br>10       | 5/5           | GRD,<br>BTX                    |                     | 10-11 DARK GRAY SILT AND CLAY, MOTTLED WITH ORANGE-BROWN PATCHES. TIGHT, MOIST, WITH HYDROCARBON ODOR.             |
|              | B04<br>12       | 2/4           | GRD,<br>BTX                    |                     | 11-16 LIGHT GRAY SILT AND CLAY, MOTTLED WITH ORANGE-BROWN PATCHES. TIGHT, MOIST TO WET NO APPARENT ODOR.           |
| 15           | B04<br>14       | 2/3           |                                |                     | ● WATER AT 14 FT.  |
|              | B04<br>16       | 1/2           |                                |                     | 16-19.5 MOTTLED GRAY, BROWN, ORANGE-BROWN SILT, SOME CLAY. TIGHT, WET.   |
| 20           | B04<br>18       | 3/2           |                                |                     | 19.5-20 GRAY UNIFORM SILT. FIRM, WET.<br>END OF BORING AT 20 FT.   |
| 25           |                 |               |                                |                     |  |
| 30           |                 |               |                                |                     |  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
3.25-INCH ID HOLLOW-STEM AUGERS,  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/22/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIREFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-04

DATE: 07/28/92

DWG NAME: 026B-04

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSTS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS  |
|--------------|-----------------|---------------|-----------------------------|---------------------|--|--|
| 0            | MW03 3/2        | 0             |                             |                     | 0-1 BROWN SAND,SILT AND ORGANICS,SOME GRAVEL. LOOSE,DRY.   | <p>CEMENT-BENTONITE GROUT</p> <p>2" DIAMETER SCHEDULE 40 PVC RISER</p> <p>BENTONITE SEAL FROM 5 TO 7 FT.</p> <p>10-20 SAND FROM 7 TO 19.5 FT.</p> <p>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 9 TO 19 FT.</p> <p>10.5 IN. DIAMETER BOREHOLE</p> |
| 2            | MW03 2/2        | 2             |                             |                     | 1-4 BROWN, ORANGE-BROWN SILT,SOME GRAVEL AND CLAY,BECOMING (AT 4 FT.) MOTTLED BROWN, ORANGE-BROWN SILT,LITTLE CLAY.            |  |
| 4            | MW03 1/2        | 4             |                             |                     | 4-7 GRAY-BROWN SILT,LITTLE CLAY,BECOMING (AT 4.5 FT.) GRAY SILT AND CLAY WITH ORANGE-BROWN MOTTILING AND BLACK ORGANIC SPECKS. |  |
| 6            | MW03 1/2        | 6             |                             |                     | 7-10 GRADING TO DARK-GRAY CLAY, LITTLE SILT, WITH ORANGE-BROWN MOTTLES AND BLACK ORGANIC SPECKS. VERY TIGHT,MOIST.             |  |
| 8            | MW03 1/2        | 8             |                             |                     | 10-12 LIGHT GRAY SILT AND CLAY WITH ORANGE-BROWN MOTTLES AND BLACK ORGANIC SPECKS. TIGHT,MOIST TO WET.                         |  |
| 10           | MW03 1/2        | 10            |                             | GRD, BTX            | ● WATER AT 12 FT.  |  |
| 12           | MW03 1/2        | 12            |                             |                     | 12-17 MOTTLED GRAY,BROWN,ORANGE-BROWN SILT AND CLAY,WITH BLACK ORGANIC SPECKS. SOFT,WET.                                       |  |
| 14           | MW03 1/3        | 14            |                             |                     | 17- 19 BECOMING MOTTLED LIGHT-GRAY, ORANGE-BROWN SILT,WITH SCATTERED BLACK ORGANIC SPECKS.                                     |  |
| 16           | MW03 1/4        | 16            |                             |                     | 19-19.5 NO SAMPLE<br>END OF BORING AT 19.5 FT.   |  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/23/92

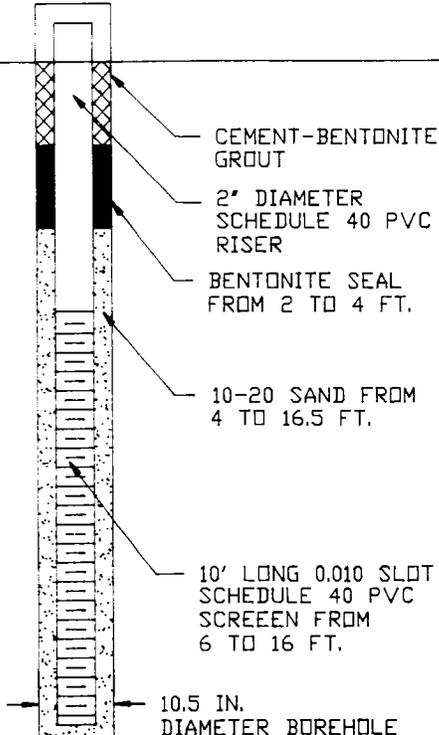


ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-05  
MW-03

DATE: 08/08/92

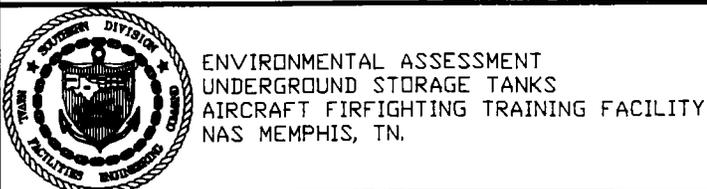
DWG NAME: 026MW-03

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS   |
|--------------|-----------------|---------------|----------------------------|---------------------|--|---|
| 0            | MW04 3/3        | 0             |                            |                     | 0-2 BROWN SAND, SILT AND ORGANICS; BECOMING (AT 1 FT.) BROWN, ORANGE SAND AND SILT, SOME GRAVEL. LOOSE TO TIGHT, DRY TO MOIST.   |  <p>CEMENT-BENTONITE GROUT</p> <p>2" DIAMETER SCHEDULE 40 PVC RISER</p> <p>BENTONITE SEAL FROM 2 TO 4 FT.</p> <p>10-20 SAND FROM 4 TO 16.5 FT.</p> <p>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 6 TO 16 FT.</p> <p>10.5 IN. DIAMETER BOREHOLE</p> |
| 2            | MW04 2/4        | 2             |                            |                     | 2-4 LAYERED BROWN, LIGHT-BROWN SILT, SOME CLAY, WITH MINOR ORANGE-BROWN MOTTLES AND BLACK ORGANIC SPECKS; BECOMING (AT 3 FT.) LIGHT-BROWN, ORANGE-BROWN SILT AND CLAY. TIGHT, MOIST. |   |
| 4            | MW04 2/4        | 4             |                            |                     | 4-6 BECOMING LIGHT-BROWN TO GRAY CLAY, WITH ORANGE-BROWN MOTTLED ZONES AND BLACK TO BROWN-DARK RED ORGANIC SPECKS.   |   |
| 6            | MW04 2/3        | 6             |                            |                     | 6-10 BECOMING LIGHT BROWN TO GRAY SILT AND CLAY, WITH ORANGE-BROWN MOTTLING AND DARK BROWN TO DARK RED ORGANIC NODULES.  |   |
| 8            | MW04 1/3        | 8             | GRD, BTX                   |                     | ● WATER AT 10 FT.  |   |
| 10           | MW04 1/2        | 10            |                            |                     | 10-15.5 BECOMING GRAY SILT, SOME CLAY, WITH ORANGE-BROWN MOTTLING AND DARK BROWN TO DARK RED ORGANIC NODULES. TIGHT, WET.  |   |
| 12           | MW04 1/3        | 12            |                            |                     | 15.5-16.5 BECOMING MOTTLED GRAY AND ORANGE-BROWN SILT AND CLAY. TIGHT, WET.  |   |
| 14           | MW04 1/3        | 14            |                            |                     | 16-16.5 NO SAMPLE<br>END OF BORING AT 16.5 FT.   |   |
| 15           |                 |               |                            |                     |  |   |
| 20           |                 |               |                            |                     |  |   |
| 25           |                 |               |                            |                     |  |   |
| 30           |                 |               |                            |                     |  |   |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS,  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/23/92



BORING B-06  
MW-04

DATE: 08/08/92

DWG NAME: 026MW-04

## DESCRIPTION OF SUBSURFACE MATERIALS

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER    | PID (PPM)<br>(INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION   |
|--------------|-----------------|------------------|--------------------------------|---------------------|---|
| 0            | 0               | B07 1000<br>700  |                                |                     | 0-0.5 BROWN AND GRAY-BLACK SILT AND ASH, LITTLE SAND. LOOSE, DRY, HYDROCARBON ODOR.   |
| 2            | 2               | B07 1000<br>1000 |                                | RFI-SCAN, GRD, BTX  | 0.5-3.5 BROWN TO GRAY-BROWN SILT, SOME CLAY, ORGANICS AND ROOTS; BECOMING (AT 2 FT.) MOTTLED GRAY-BROWN, ORANGE-BROWN SILT, SOME CLAY WITH BLACK TO DARK-RED ORGANIC SPECKS AND SOME ROOTS. TIGHT, DRY, HYDROCARBON ODOR. |
| 4            | 4               | B07 900<br>900   |                                |                     |   |
| 6            | 6               | B07 700<br>900   |                                |                     | 3.5-11 DARK GRAY-BROWN TO GRAY-GREEN-BROWN, HYDROCARBON STAINED SILT AND CLAY, WITH GRAY MOTTLED PATCHES. TIGHT, MOIST TO WET, HYDROCARBON ODOR.  |
| 8            | 8               | B07 300<br>NH*   |                                | GRD, BTX            |   |
| 10           | 10              | B07 5<br>10      |                                |                     | ● WATER AT 10 FT.   |
| 12           | 12              | B07 3<br>7       |                                |                     | 11-16 GRAY, DARK-GRAY SILT. FIRM, WET.  |
| 14           | 14              | B07 2<br>5       |                                |                     |   |
| 16           | 16              | B07 16           |                                |                     | END OF BORING AT 16 FT.   |
| 18           | 18              | B07 18           |                                |                     |   |

\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
3.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/23/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIREFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

### BORING B-07

DATE: 07/28/92 DWG NAME: 026B-07

# DESCRIPTION OF SUBSURFACE MATERIALS

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION   |
|--------------|-----------------|---------------|----------------------------|---------------------|---|
|              |                 | B08<br>0      | 20<br>30                   |                     | 0-0.5 COMPACTED SAND AND GRAVEL OVERLYING 1/2" THICK LAYER OF ASH.  |
|              |                 | B08<br>2      | 4<br>25                    |                     | 0.5-2 BROWN SILT AND CLAY. COMPACT, DRY TO MOIST. 2-5 MOTTLED BROWN, ORANGE-BROWN SILT, SOME CLAY, WITH DARK-BROWN, DARK-RED ORGANIC NODULES. |
| 5            |                 | B08<br>4      | 1000<br>1000               | RFI-SCAN, GRD, BTX  | 5-11 DARK GREEN-GRAY, HYDROCARBON STAINED SILT AND CLAY, WITH FAINT LIGHT-GRAY AND ORANGE-BROWN MOTTLING. TIGHT, MOIST, CHEMICAL ODOR.        |
|              |                 | B08<br>6      | 200<br>200                 |                     |   |
|              |                 | B08<br>8      | 600<br>800                 |                     |   |
| 10           |                 | B08<br>10     | 600<br>NH*                 | GRD, BTX, VOC       | ● WATER AT 11 FT.<br>11-12 GRAY, DARK-GRAY SILT. WET.<br>END OF BORING AT 12 FT.  |
| 15           |                 |               |                            |                     |   |
| 20           |                 |               |                            |                     |   |
| 25           |                 |               |                            |                     |   |
| 30           |                 |               |                            |                     |   |

\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
3.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/23/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

## BORING B-08

DATE: 07/28/92

DWG NAME: 026B-08

# DESCRIPTION OF SUBSURFACE MATERIALS

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM)<br>(INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION  |
|--------------|-----------------|---------------|--------------------------------|---------------------|--|
| 0            | 0               | B09           | 40/30                          |                     | 0-1 BROWN SILT AND ORGANICS, SOME GRAVEL, LITTLE SAND; BECOMING (AT 1 FT.) MOTTLED BROWN, ORANGE-BROWN SILT, SOME ORGANICS.  |
| 2            | 2               | B09           | 20/55                          |                     | 2-4 DARK GRAY CLAY WITH SUBDUED ORANGE-BROWN, LIGHT-GRAY MOTTLING. TIGHT, MOIST.   |
| 4            | 4               | B09           | 600/1100                       | RFI-SCAN, GRD, BTX  | 4-7 DARK GRAY CLAY, SOME SILT. TIGHT, MOIST, CHEMICAL ODDOR.   |
| 6            | 6               | B09           | 500/600                        |                     | 7-12 BECOMING MOTTLED LIGHT-GRAY AND ORANGE-BROWN SILT, SOME CLAY, WITH SCATTERED BLACK ORGANIC SPECKS. TIGHT, MOIST TO WET. |
| 8            | 8               | B09           | 20/20                          |                     |  |
| 10           | 10              | B09           | 6/2                            | GRD, BTX            | <p>● WATER AT 11 FT.</p> <p>END OF BORING AT 12 FT.</p>  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
3.25-INCH ID HOLLOW-STEM AUGERS,  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/24/92

## BORING B-09



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

DATE: 07/28/92

DWG NAME: 026B-09

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSIS    | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS |
|--------------|-----------------|---------------|-----------------------------|------------------------|--|---------------------------|
| 0            | MW05 1/4        | 0             |                             |                        | 0-2 DARK BROWN SILT AND ORGANICS.<br>2-6 DARK BROWN CLAY, WITH INTERSPERSED ORANGE-BROWN NODULES. VERY TIGHT TO MOIST. |                           |
| 2            | MW05 2/2        | 2             |                             |                        |  |                           |
| 4            | MW05 1/3        | 4             |                             |                        |  |                           |
| 6            | MW05 1/2        | 6             |                             |                        | 6-13 BECOMING MOTTLED BROWN-GRAY, ORANGE-BROWN SILT AND CLAY. TIGHT, MOIST TO WET.                                     |                           |
| 8            | MW05 1/2        | 8             |                             | RFI-SCAN, BTX GRD, BTX |  |                           |
| 10           | MW05 1/10       | 10            |                             | NH*                    | ● WATER AT 10 FT.  |                           |
| 12           | MW05 0/2        | 12            |                             |                        | 13-14.5 BECOMING DARK BROWN CLAY, LITTLE SILT, BECOMING DARK BROWN TO BLACK CLAY WITH ROOTS AND ORGANICS. VERY TIGHT.  |                           |
| 14           | MW05 1/1        | 14            |                             |                        | 14.5-16.5 NO SAMPLE<br>END OF BORING AT 16.5 FT.   |                           |
|              |                 |               |                             |                        | * NH-NO 15 MINUTE HEADSPACE ANALYSIS.  |                           |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/24/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-10  
MW-05

DATE: 08/08/92

DWG NAME: 026MW-05

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS   | WELL CONSTRUCTION DETAILS |
|--------------|-----------------|---------------|----------------------------|---------------------|---|---------------------------|
| 0            | MW06 1/3        | 0             |                            |                     | 0-2 BROWN SILT AND SAND, SOME GRAVEL AND ORGANICS. LOOSE, DRY.  |                           |
| 2            | MW06 1/5        | 2             |                            |                     | 2-3.5 BROWN-GRAY SILT AND CLAY, SOME ORGANICS AND ROOTS. TIGHT, MOIST.  |                           |
| 4            | MW06 200        | 4             | 400                        |                     | 3.5-7.5 BECOMING DARK GRAY, BLACK CLAY. PLIABLE TO HARD, MOIST TO WET TO MOIST. HYDROCARBON ODOR.                                 |                           |
| 6            | MW06 1500       | 6             | NH*                        | RFI-SCAN, GRD, BTX  | 7.5-10.5 BECOMING DULL GREEN-GRAY, HYDROCARBON STAINED SILT AND CLAY WITH ORANGE-BROWN MOTTLING AND MINOR DARK BROWN-RED NODULES. |                           |
| 8            | MW06 400        | 8             | 500                        |                     | 10.5-11 DARK BROWN-GRAY CLAY, LITTLE SILT. PLIABLE, MOIST.  |                           |
| 10           | MW06 3/7        | 10            |                            | GRD, BTX            | 11-20 MOTTLED LIGHT-BROWN-GRAY AND ORANGE-BROWN SILT, SOME CLAY, WITH BLACK ORGANIC PATCHES. WET.                                 |                           |
| 12           | MW06 3/1        | 12            |                            |                     | ● WATER AT 12 FT.   |                           |
| 14           | MW06 1/1        | 14            |                            |                     |   |                           |
| 16           | MW06 0/2        | 16            |                            |                     |   |                           |
| 18           | MW06 1/1        | 18            |                            |                     |   |                           |
| 20           |                 |               |                            |                     | 20-21.5 NO SAMPLE. END OF BORING AT 21.5 FT.  |                           |

\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/24/92

ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-11  
MW-06

DATE: 07/29/92      DWG NAME: 026MW-06

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM)<br>(INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS |
|--------------|-----------------|---------------|--------------------------------|---------------------|-------------------------------------|
|--------------|-----------------|---------------|--------------------------------|---------------------|-------------------------------------|

|    |           |            |             |                   |   |
|----|-----------|------------|-------------|-------------------|---|
| 5  | B12<br>0  | 50<br>NH*  |             |                   | 0-1 TAN-BROWN SAND AND GRAVEL, LOOSE, DRY.  |
|    | B12<br>2  | 200<br>NH* |             |                   | 1-2 DARK GREEN-GRAY SILT AND ASH, WITH A PIECE OF BLACK RUBBER-TAR-LIKE MATERIAL. TIGHT, DRY.                             |
|    | B12<br>4  | 500<br>650 | GRD,<br>BTX |                   | 2-11 DARK GRAY-GREEN SILT AND CLAY, WITH SUBDUED LIGHT-GRAY AND ORANGE-BROWN MOTTLING. HYDROCARBON STAINED. TIGHT, MOIST. |
|    | B12<br>6  | 300<br>700 |             |                   |   |
|    | B12<br>8  | 500<br>850 |             |                   |   |
| 10 | B12<br>10 | 500<br>750 | GRD,<br>BTX | ● WATER AT 11 FT. | 11-12 DARK GRAY-GREEN SILT  |
|    |           |            |             |                   | END OF BORING AT 12 FT.   |
| 15 |           |            |             |                   |   |
| 20 |           |            |             |                   |   |
| 25 |           |            |             |                   |   |
| 30 |           |            |             |                   |   |

\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

|   |   |
|---|---|
| DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.<br>4161 RIDGEMOOR AVENUE<br>MEMPHIS, TN. 38118 | DRILLING AND SAMPLING METHOD:<br>3.25-INCH ID HOLLOW-STEM AUGERS.<br>2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER. |
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| DATE OF COMPLETION: 06/24/92 |  |
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|  ENVIRONMENTAL ASSESSMENT<br>UNDERGROUND STORAGE TANKS<br>AIRCRAFT FIRFIGHTING TRAINING FACILITY<br>NAS MEMPHIS, TN. | BORING B-12 |
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| DATE: 07/28/92 | DWG NAME: 026B-12 |
|----------------|-------------------|

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS   | WELL CONSTRUCTION DETAILS  |
|--------------|-----------------|---------------|-----------------------------|---------------------|---|--|
| 0            | MW07 2/2        | 0             |                             |                     | 0-1 BROWN SILT AND ORGANICS, SOME CLAY AND ROOTS.   | <p>CEMENT-BENTONITE GROUT</p> <p>2" DIAMETER SCHEDULE 40 PVC RISER</p> <p>BENTONITE SEAL FROM 2 TO 4 FT.</p> <p>10-20 SAND FROM 4 TO 16.5 FT.</p> <p>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 6 TO 16 FT.</p> <p>10.5 IN. DIAMETER BOREHOLE</p> |
| 1-3          |                 |               |                             |                     | 1-3 DARK BROWN SILT AND CLAY WITH FAINT GRAY AND ORANGE-BROWN MOTTLING, AND BLACK ORGANIC SPECKS TO RUST-BROWN NODULES. TIGHT, MOIST. |  |
| 3-6          | MW07 250        | 2             | 700                         |                     | 3-6 BECOMING GRAY-GREEN HYDROCARBON STAINED CLAY, WITH SUBDUED ORANGE-BROWN MOTTLING AND RUST-BROWN NODULES.                          |  |
| 4            | MW07 850        | 4             |                             | GRD, BTX            | VERY TIGHT, MOIST, HYDROCARBON ODDR.  |  |
| 5            |                 |               |                             |                     |   |  |
| 6-9.5        | MW07 50         | 6             | 400                         | GRD, BTX            | 6-9.5 BECOMING DARK GREEN-GRAY SILT AND CLAY. TIGHT, MOIST.   |  |
| 9.5          | MW07 1/5        | 8             |                             | GRD, BTX            | 9.5 BECOMING DARK BROWN CLAY. WET, VERY PLIABLE.  |  |
| 10           | MW07 2/5        | 10            |                             |                     | ● WATER AT 9.5 FT.  |  |
| 10-16        | MW07 2/2        | 12            |                             |                     | 10-16 MOTTLED LIGHT-BROWN, GRAY, ORANGE-BROWN SILT, WITH DARK-BROWN, RED-BLACK NODULES. FIRM, WET.                                    |  |
| 14           | MW07 1/2        | 14            |                             |                     |   |  |
| 16-16.5      |                 |               |                             |                     | 16-16.5 NO SAMPLE. END OF BORING AT 16.5 FT.  |  |

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| DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.<br>4161 RIDGEMOOR AVENUE<br>MEMPHIS, TN. 38118 | DRILLING AND SAMPLING METHOD:<br>6.25-INCH ID HOLLOW-STEM AUGERS.<br>2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER. |
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| DATE OF COMPLETION: 06/25/92 |
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| <p>ENVIRONMENTAL ASSESSMENT<br/>UNDERGROUND STORAGE TANKS<br/>AIRCRAFT FIRFIGHTING TRAINING FACILITY<br/>NAS MEMPHIS, TN.</p> | BORING B-13<br>MW-07 |
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| DATE: 08/08/92 | DWG NAME: 026MW-07 |
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| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS   |
|--------------|-----------------|---------------|----------------------------|---------------------|--|---|
| 0            | MW08 1/0        | 0             |                            |                     | 0-0.5 BROWN SILT, ORGANICS AND ROOTS<br>0.5-2 MOTTLED LIGHT-BROWN-GRAY, ORANGE-BROWN SILT, SOME CLAY AND ROOTS. DRY. | <p>CEMENT-BENTONITE GROUT<br/>2" DIAMETER SCHEDULE 40 PVC RISER<br/>BENTONITE SEAL FROM 2 TO 4 FT.<br/>10-20 SAND FROM 4 TO 16.5 FT.<br/>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 6 TO 16 FT.<br/>10.5 IN. DIAMETER BOREHOLE</p> |
| 2            | MW08 1000       | 2             | 1100                       | GRD, BTX            | 2-10 DARK GREEN-GRAY SILT AND CLAY. HYDROCARBON-STAINED. TIGHT, MOIST TO WET. UNIDENTIFIED ODOR.                     |   |
| 4            | MW08 1000       | 4             | 1100                       | VOC                 |  |   |
| 5            | MW08 500        | 6             | 700                        |                     |  |   |
| 8            | MW08 10/8       | 8             |                            | GRD, BTX            | ● WATER AT 9-10 FT.  |   |
| 10           | MW08 7/0        | 10            |                            |                     | 10-13 BECOMING MOTTLED GRAY, ORANGE-BROWN SILT. FIRM, WET.<br>13 THIN HORIZON (3") OF BLACK SILT. PASTE-LIKE, WET.   |   |
| 12           | MW08 200        | 12            | 20                         | VOC                 | 13-15 MOTTLED GRAY, ORANGE-BROWN SILT; BECOMING RED-BROWN SILT WITH MINOR ORANGE-BROWN STREAKS.                      |   |
| 14           | MW08 3/16       | 14            |                            |                     | 15-16 UNIFORM GRAY SILT.<br>16-16.5 NO SAMPLE.<br>END OF BORING AT 16.5 FT.  |   |
| 15           |                 |               |                            |                     |  |   |
| 20           |                 |               |                            |                     |  |   |
| 25           |                 |               |                            |                     |  |   |
| 30           |                 |               |                            |                     |  |   |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/25/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-14  
MW-08

DATE: 08/08/92

DWG NAME: 026MW-08

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS |
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|

|    |           |              |               |  |  |
|----|-----------|--------------|---------------|--|--|
| 5  | B15<br>0  | 14<br>200    |               |  | 0-1? BROWN SILT AND ORGANICS.<br>1-7 DARK BROWN-BLACK SILT AND CLAY, HYDROCARBON STAINED. TIGHT, HARD.                   |
|    | B15<br>2  | 1000<br>1100 | RFI-<br>SCAN, |  |  |
|    | B15<br>4  | 800<br>1100  | GRD,<br>BTX   |  |  |
|    | B15<br>6  | 700<br>100   |               |  | 7-8 BECOMING GREEN-GRAY SILT, POSSIBLY HYDRO-CARBON STAINED. FIRM, MOIST.  |
|    | B15<br>8  | 10<br>10     | GRD,<br>BTX   |  | 8-11 BECOMING MOTTLED GRAY, ORANGE-BROWN SILT AND CLAY. FIRM, MOIST.   |
|    | B15<br>10 | 3<br>4       | GRD,<br>BTX   |  | ● WATER AT 11 FT.<br>11-11.5 DARK BROWN CLAY, SOME SILT.<br>11.5-12 GREEN-GRAY SILT AND CLAY.<br>END OF BORING AT 12 FT. |
| 15 |           |              |               |  |  |
| 20 |           |              |               |  |  |
| 25 |           |              |               |  |  |
| 30 |           |              |               |  |  |

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| DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.<br>4161 RIDGEMOOR AVENUE<br>MEMPHIS, TN. 38118 | DRILLING AND SAMPLING METHOD:<br>3.25-INCH ID HOLLOW-STEM AUGERS.<br>2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER. |
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| DATE OF COMPLETION: 06/25/92 |  |
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|  <p>ENVIRONMENTAL ASSESSMENT<br/>         UNDERGROUND STORAGE TANKS<br/>         AIRCRAFT FIREFIGHTING TRAINING FACILITY<br/>         NAS MEMPHIS, TN.</p> | <h2 style="margin: 0;">BORING B-15</h2> |
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| DATE: 07/28/92 | DWG NAME: 026B-15 |
|----------------|-------------------|

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS |
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|

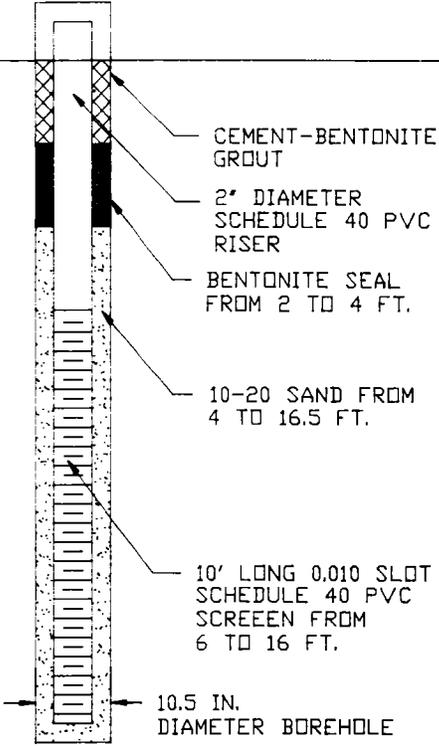
|    |  |           |     |             |  |
|----|--|-----------|-----|-------------|--|
| 5  |  | B16<br>0  | 1/1 |             | 0-1 BROWN,ORANGE-BROWN SILT,ORGANICS AND ROOTS.<br>1-4 DARK BROWN ORGANIC-RICH SILT AND CLAY;<br>BECOMING (AT 2 FT.) DARK BROWN-BLACK<br>ORGANIC-RICH CLAY. TIGHT TO VERY TIGHT,DRY. |
|    |  | B16<br>2  | 1/0 |             |  |
|    |  | B16<br>4  | 1/1 |             | 4-6 BECOMING MOTTLED GRAY-GREEN,GRAY-BROWN,<br>DARK-BROWN SILT AND CLAY.   |
|    |  | B16<br>6  | 1/2 |             | 6-7.5 BECOMING GREEN-GRAY SILT,LITTLE CLAY.<br>FIRM,WET.   |
|    |  | B16<br>8  | 1/1 |             | 7.5-10 BECOMING LIGHT-BROWN,GRAY-BROWN SILT AND<br>CLAY. TIGHT,MOIST.  |
|    |  | B16<br>10 | 1/1 | GRD,<br>BTX | 10-12 BECOMING MOTTLED GRAY,ORANGE-BROWN SILT,<br>SOME CLAY. TIGHT,MOIST.<br>● WATER AT 11 FT.<br>END OF BORING AT 12 FT.  |
| 15 |  |           |     |             |  |
| 20 |  |           |     |             |  |
| 25 |  |           |     |             |  |
| 30 |  |           |     |             |  |

|   |   |
|---|---|
| DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.<br>4161 RIDGEMOOR AVENUE<br>MEMPHIS, TN. 38118 | DRILLING AND SAMPLING METHOD:<br>3.25-INCH ID HOLLOW-STEM AUGERS.<br>2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER. |
|---|---|

|                              |  |
|------------------------------|--|
| DATE OF COMPLETION: 06/25/92 |  |
|------------------------------|--|

|  |   |
|--|---|
|  <p>ENVIRONMENTAL ASSESSMENT<br/>         UNDERGROUND STORAGE TANKS<br/>         AIRCRAFT FIRFIGHTING TRAINING FACILITY<br/>         NAS MEMPHIS, TN.</p> | <h2 style="margin: 0;">BORING B-16</h2> |
|--|---|

|                |                   |
|----------------|-------------------|
| DATE: 07/28/92 | DWG NAME: 026B-16 |
|----------------|-------------------|

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.)<br>LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS  |
|--------------|-----------------|---------------|--|--|--|
| 0            | MW09 0/0        | 0             |  | 0-1.5 BROWN SILT,CLAY,ORGANICS AND ROOTS; BECOMING MOTTLED BROWN,ORANGE-BROWN SILT, CLAY AND ROOTS.                  |  |
| 2            | MW09 0/0        | 2             |  | 1.5-4 BECOMING DARK BROWN CLAY,TURNING DARK BROWN-BLACK ORGANIC-RICH CLAY WITH SOME ROOTS,TIGHT,MOIST.               |  |
| 4            | MW09 0/0        | 4             |  | 4-6 BECOMING GRAY SILT AND CLAY WITH FAINT ORANGE-BROWN INTERBEDS. TIGHT,MOIST.                                      |  |
| 6            | MW09 0/0        | 6             |  | 6-10 MOTTLED GRAY-BROWN,BLUE-GRAY SILT AND CLAY. BECOMING (AT 8 FT.) MOTTLED LIGHT-BROWN AND BLUE-GRAY. TIGHT,MOIST. |  |
| 8            | MW09 0/0        | 8             | GRD, BTX   |  |  |
| 10           | MW09 0/0        | 10            |  | ● WATER AT 9.5 FT.<br>10-12 GRAY-BROWN SILT.   |  |
| 12           | MW09 0/0        | 12            |  | 12-16 MOTTLED GRAY,ORANGE-BROWN SILT,WITH MINOR BLACK TO DARK-RED NODULES OR PATCHES. FIRM,WET.                      |  |
| 14           | MW09 0/0        | 14            |  | 16-16.5 NO SAMPLE<br>END OF BORING AT 16.5 FT.   |  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/26/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-17  
MW-09

DATE: 08/08/92      DWG NAME: 026MW-09

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN.) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS  | WELL CONSTRUCTION DETAILS  |
|--------------|-----------------|---------------|-----------------------------|---------------------|--|--|
| 0            | MW10 0/0        |               |                             |                     | 0-0.5 BROWN SILT, CLAY AND ORGANICS  | <p>CEMENT-BENTONITE GROUT</p> <p>2" DIAMETER SCHEDULE 40 PVC RISER</p> <p>BENTONITE SEAL FROM 3 TO 5 FT.</p> <p>10-20 SAND FROM 5 TO 17.5 FT.</p> <p>10' LONG 0.010 SLOT SCHEDULE 40 PVC SCREEN FROM 7 TO 17 FT.</p> <p>10.5 IN. DIAMETER BOREHOLE</p> |
| 0.5-2        | MW10 12/600     | GRD, BTX      |                             |                     | 0.5-2 MOTTLED BROWN, GRAY-BROWN, ORANGE-BROWN SILT AND CLAY WITH MINOR BLACK ORGANIC NODULES. FIRM, MOIST.       |  |
| 2-4          | MW10 14/600     |               |                             |                     | 2-4 BECOMING DARK GRAY CLAY, TIGHT, MOIST, HYDROCARBON ODOR.   |  |
| 4-6          |                 |               |                             |                     | 4-6 BECOMING DARK-GREEN-GRAY, HYDROCARBON STAINED SILT AND CLAY, TIGHT, MOIST, HYDROCARBON ODOR.                 |  |
| 6-8          | MW10 1/5        | GRD, BTX      |                             |                     | 6-8 GREEN-GRAY SILT AND CLAY.  |  |
| 8-10         | MW10 1/0        |               |                             |                     | 8-10 MOTTLED GREEN-GRAY ORANGE-BROWN SILT AND CLAY.  |  |
| 10-12        | MW10 1/0        | GRD, BTX      |                             |                     | 10-12 BECOMING GREEN-GRAY SILT. FIRM, MOIST.   |  |
| 12-16        | MW10 1/1        |               |                             |                     | ● WATER AT 12 FT.<br>12-16 MOTTLED GRAY-BROWN, ORANGE-BROWN SILT WITH BLACK TO RED NODULES OR PATCHES FIRM, WET. |  |
| 16-17.5      | MW10 1/1        |               |                             |                     | 16-17.5 NO SAMPLE.<br>END OF BORING AT 17.5 FT.  |  |

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS.  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/26/92



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIRFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

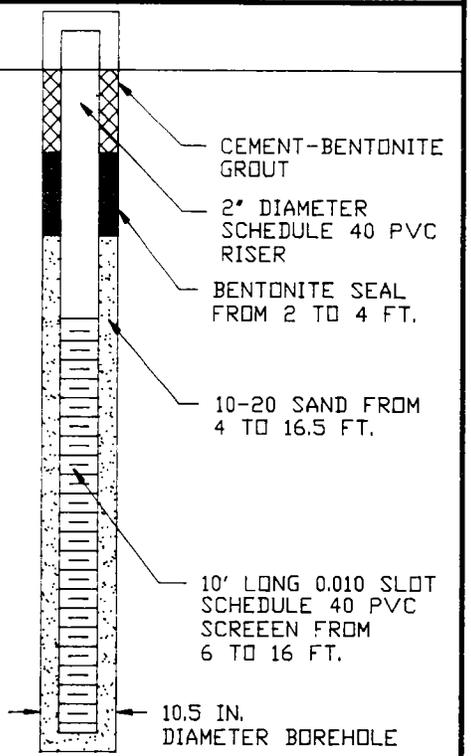
BORING B-18  
MW-10

DATE: 07/29/92

DWG NAME: 026MW-10

| DEPTH (FEET) | SAMPLE INTERVAL | SAMPLE NUMBER | PID (PPM) (INITIAL/15 MIN) | LABORATORY ANALYSIS | DESCRIPTION OF SUBSURFACE MATERIALS | WELL CONSTRUCTION DETAILS |
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|---------------------------|
|--------------|-----------------|---------------|----------------------------|---------------------|-------------------------------------|---------------------------|

|    |            |             |  |                                   |  |
|----|------------|-------------|--|-----------------------------------|--|
|    | MW11<br>0  | 13<br>10    |  |                                   | 0-1 SILT AND ORGANICS, SOME CLAY.<br>1-2 INTERLAYERED BROWN, GRAY-BROWN, ORANGE-BROWN SILT AND CLAY, MINOR GRAVEL. TIGHT, MOIST. |
|    | MW11<br>2  | 300<br>500  |  |                                   | 2-9 BECOMING DARK GREEN-GRAY, HYDROCARBON-STAINED SILT AND CLAY. TIGHT, MOIST, HYDROCARBON ODOR.                                 |
| 5  | MW11<br>4  | 1300<br>NH* |  | K<br>GRD,<br>BTX,<br>RFI-<br>SCAN | ● PERCHED WATER AT 7 FT.<br>-WITH FAINT GRAY, ORANGE-BROWN MOTTLING FROM 7 TO 10 FT.   |
|    | MW11<br>6  | 500<br>1100 |  |                                   | 9-11 MOTTLED GRAY, ORANGE-BROWN SILT. FIRM, MOIST.   |
| 10 | MW11<br>8  | 150<br>300  |  |                                   | 11 THIN (3' THICK) HORIZON OF ORANGE-BROWN SILT AND CLAY. EXTREMELY TIGHT AND COMPACT, DRY.                                      |
|    | MW11<br>10 | 20<br>80    |  | K,<br>GRD,<br>BTX                 | ● WATER AT ~ 11.5 FT.  |
|    | MW11<br>12 | 1<br>1      |  |                                   | 11-16 GRAY UNIFORM SILT. FIRM, WET.  |
|    | MW11<br>14 | 0<br>0      |  |                                   | 16-16.5 NO SAMPLE.<br>END OF BORING AT 16.5 FT.  |



\* NH-NO 15 MINUTE HEADSPACE ANALYSIS.

DRILLER: PROFESSIONAL SERVICE INDUSTRIES, INC.  
4161 RIDGEMOOR AVENUE  
MEMPHIS, TN. 38118

DRILLING AND SAMPLING METHOD:  
6.25-INCH ID HOLLOW-STEM AUGERS,  
2 FT. LONG, 2 IN. OD SPLIT BARREL SAMPLER.

DATE OF COMPLETION: 06/26/92-MONITORING WELL  
06/27/92-SHELBY TUBE



ENVIRONMENTAL ASSESSMENT  
UNDERGROUND STORAGE TANKS  
AIRCRAFT FIREFIGHTING TRAINING FACILITY  
NAS MEMPHIS, TN.

BORING B-19  
MW-11

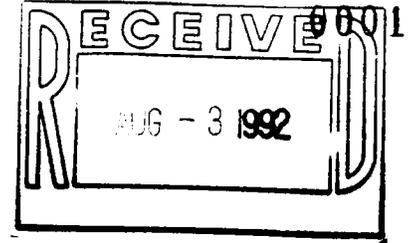
DATE: 08/08/92      DWG NAME: 026MW-11

**APPENDIX C**

**LABORATORY ANALYTICAL DATA**



**ANALYTICAL  
SERVICES**



**CERTIFICATE OF ANALYSIS**

EnSafe/Allen & Hoshall  
 P.O. Box 341315  
 5724 Summer Trees Drive  
 Memphis, TN 38134  
 Attn: Lawson Anderson

July 27, 1992

Job Number: ENFA 51648

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

|                       |               |
|-----------------------|---------------|
| Client Project ID:    | NAS Memphis   |
| Date Received by Lab: | 06/24/92      |
| Number of Samples:    | Thirteen (13) |
| Sample Type:          | Soil          |

**I. Introduction**

On 06/24/92, thirteen (13) soil samples arrived at the ITAS-Knoxville, Tennessee, laboratory from EnSafe/Allen & Hoshall in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

**II. Analytical Results/Methodology**

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes, (BTX), and total low boiling petroleum hydrocarbons as gasoline-range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020, and Tennessee modified method 8015.

Reviewed and Approved:

Alyce R. Moore  
 Laboratory Manager

American Council of Independent Laboratories  
 International Association of Environmental Testing Laboratories  
 American Association for Laboratory Accreditation

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

---

### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and low boiling hydrocarbons as gasoline-range organics by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) using a DB-624 column on a Varian 3400 GC. Confirmation runs were performed using a 3% SP-1500 column on a Varian 3700 GC. Matrix spike/matrix spike duplicate analyses were performed using sample MW-01-9. The recoveries were low for the matrix spikes. Since the blank spike was in control, which ran before the matrix spikes, it is believed the low recoveries were due to matrix interferences. Xylenes showed a 38% relative standard deviation, which was also due to matrix effects.

Sample MW-02-10 was quantitated from the confirmation run for xylenes.

Surrogates were outside QC limits on samples B-04-08, B-07-02, B-07-8, B-08-10, MW-01-9 MS, and B-08-4 on the FID detector due to matrix effects since the alternate surrogate was in control on the other detector. Sample MW-02-6 was outside QC limits due to hydrocarbon contamination in the matrix. The gasoline-range organic linearity was based on a four-point linearity versus a five-point linearity due to instrument contamination. The linearity was considered acceptable because the percent standard deviation was 17%.

Control limits have not been established due to a lack of data points.

A five-point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 25%, the response of the analyte was assumed to be linear for that detector and the average Rf was used for quantification. If the RSD exceeded 25%, a five-point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within 25% of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 3 ppm for soils, but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates. No other problems were encountered.

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-01-9      |
| Lab Sample ID:   | <u>K4819</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 06/30/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Results in mg/kg (ppm)

Client Sample ID: MW-01-09  
 Lab Sample ID: K4819, K4820 MS, K4821 MSD

| <u>Compound</u> | <u>MS Conc.<br/>Spike Added</u> | <u>MSD Conc.<br/>Spike Added</u> | <u>Sample Result</u> | <u>Conc.<br/>MS</u> | <u>%<br/>Rec.</u> | <u>Conc.<br/>MSD</u> | <u>%<br/>Rec.</u> | <u>RPD</u> |
|-----------------|---------------------------------|----------------------------------|----------------------|---------------------|-------------------|----------------------|-------------------|------------|
| benzene         | 1.0                             | 1.0                              | 0.1 U                | 0.5                 | 50                | 0.6                  | 60                | 18         |
| toluene         | 1.0                             | 1.0                              | 0.1 U                | 0.5                 | 50                | 0.6                  | 60                | 18         |
| xylenes (total) | 2.9                             | 2.9                              | 0.1 U                | 1.5                 | 52                | 2.0                  | 69                | 28         |

Date of Extraction: 06/30/92  
 Date of Analysis: 06/30/92

RPD - Relative percent difference  
 U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | MW-02-06           |
| Lab Sample ID:   | <u>K4822</u>       |
| benzene  | 4.2 +              |
| toluene  | 1.6 +              |
| xylenes (total)  | 54 +               |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 640 D <sub>1</sub> |
| Date of Extraction:  | 06/30/92           |
| Date of Analysis:  | 07/01 and 07/03/92 |

+ - Analyte presence was confirmed on a secondary column.  
 D<sub>1</sub> - Analyzed at a 1:750 dilution on 07/03/92.

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

## BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-02-10     |
| Lab Sample ID:   | <u>K4823</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U**      |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | 16           |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 06/30/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

\*\* - Analyte did not confirm and was quantitated from confirmation column.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-03-8       |
| Lab Sample ID:   | <u>K4824</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

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## BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-04-12      |
| Lab Sample ID:   | <u>K4825</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

0009  
**IT ANALYTICAL SERVICES**  
**5815 MIDDLEBROOK PIKE**  
**KNOXVILLE, TN**

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-04-10      |
| Lab Sample ID:   | <u>K4826</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

0010  
 IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | B-04-08            |
| Lab Sample ID:   | <u>K4827</u>       |
| benzene  | 1.3 U*             |
| toluene  | 1.3 U*             |
| xylenes (total)  | 6.7 +              |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 210 D <sub>1</sub> |
| Date of Extraction:  | 07/03/92           |
| Date of Analysis:  | 07/03/92           |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- \* - Detection limit is higher than normal due to sample matrix interferences.
- + - Analyte presence was confirmed on a secondary column.
- D<sub>1</sub> - Analyzed at a 1:500 dilution on 07/02/92.

Ensafe/Allen & Hoshall  
July 27, 1992

0011  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-03-10     |
| Lab Sample ID:   | <u>K4828</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U         |
| Date of Extraction:  | 07/02/92     |
| Date of Analysis:  | 07/02/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-04-8      |
| Lab Sample ID:   | <u>K4829</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | B-07-2             |
| Lab Sample ID:   | <u>K4830</u>       |
| benzene  | 2.5 +              |
| toluene  | 4.5 +              |
| xylenes (total)  | 61 +               |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 230 D <sub>1</sub> |
| Date of Extraction:  | 06/30/92           |
| Date of Analysis:  | 07/01/92           |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte presence was confirmed on a secondary column.
- D<sub>1</sub> - Quantitation taken from a 1:500 dilution run on 07/02/92.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-07-8       |
| Lab Sample ID:   | <u>K4831</u> |
| benzene  | 2.8 +        |
| toluene  | 2.4 +        |
| xylenes (total)  | 7.7 +        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 320          |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte presence was confirmed on a secondary column.

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

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## BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-08-4       |
| Lab Sample ID:   | <u>K4832</u> |
| benzene  | 0.1 U        |
| toluene  | 0.5 +        |
| xylenes (total)  | 2.2 +        |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | 300          |
| Date of Extraction:  | 07/02/92     |
| Date of Analysis:  | 07/02/92     |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.  
+ - Analyte presence was confirmed on a secondary column.

Ensafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51648

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-08-10      |
| Lab Sample ID:   | <u>K4833</u> |
| benzene  | 1.3 U*       |
| toluene  | 1.3 +        |
| xylenes (total)  | 2.4 +        |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 140          |
| Date of Extraction:  | 07/02/92     |
| Date of Analysis:  | 07/02/92     |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- \* - Detection limit is higher than normal due to sample matrix interferences.
- + - Analyte presence was confirmed on a secondary column.





**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

CLIENT AS - Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER N0026-C0113 FAX NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |                |  |  | REMARKS  |
|-------------------|-------------------|----------------|--|--|--|
|                   | GREO (TDEC)       | BTX (SO3)/8028 |  |  |  |
| 1                 | X                 | X              |  |  | 5°C (OK) from<br>6/24/92<br>B-08-8 WAS<br>LABELLED AS<br>B-08-10 ON<br>SAMPLE BOTTLE |
| 1                 | X                 | X              |  |  |  |
| 1                 | X                 | X              |  |  |  |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | GREO (TDEC) | BTX (SO3)/8028 |  |  |  |  |  |  |  |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|-------------|----------------|--|--|--|--|--|--|--|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |             |                |  |  |  |  |  |  |  |
| B-07-8              | 6/23/92 | 15:30 | 501/9rb     | 4 oz. jar              | 4°C          | —        | 1                 | X           | X              |  |  |  |  |  |  |  |
| B-08-4              |         | 16:30 |             |                        |              |          | 1                 | X           | X              |  |  |  |  |  |  |  |
| B-08-8              |         | 16:30 |             |                        |              |          | 1                 | X           | X              |  |  |  |  |  |  |  |

|  |  |   |   |   |                          |   |                          |
|--|--|---|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY: _____<br>SIGNATURE _____<br>PRINTED <u>Sean Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipment</u> | DATE <u>6/23/92</u><br>TIME <u>20:30</u> | RECEIVED BY: _____<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/24/92</u><br>TIME <u>0815</u> | RELINQUISHED BY: _____<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY: _____<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|---|---|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: FedEx COMMENTS: \_\_\_\_\_  
 SHIPMENT NO. 2495013743  
 SPECIAL INSTRUCTION: \_\_\_\_\_

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHAL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

CLIENT NAS-Memphis  
 ADDRESS Millington TN  
 PROJECT NAME/NUMBER N0026-C0113  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
 TELEPHONE NO. (901) 372-7962  
 FAX NO. (901) 372-2454  
 SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |      |     |             | REMARKS              |
|-------------------|-------------------|------|-----|-------------|----------------------|
|                   | GRO               | TPEC | BTX | (5030/8030) |                      |
| 1                 | X                 | X    |     |             | 5°C (OK per 6/24/92) |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |
| 1                 | X                 | X    |     |             |                      |

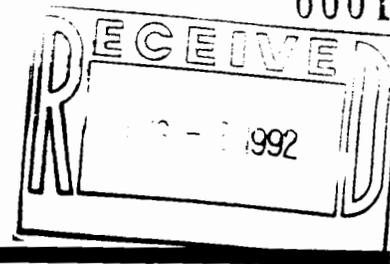
| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | GRO | TPEC | BTX | (5030/8030) | REMARKS              |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|-----|------|-----|-------------|----------------------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |     |      |     |             |                      |
| MW-01-9             | 6/22/92 | 09:00 | Soil grab   | 4 oz jar               | 4°C          | —        | 1                 | X   | X    |     |             | 5°C (OK per 6/24/92) |
| MW-02-6             |         | 11:30 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| MW-02-10            |         | 11:30 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| B-03-8              |         | 15:00 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| B-04-12             |         | 17:00 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| B-04-10             |         | 17:00 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| B-04-8              |         | 17:00 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| MW-03-10            | 6/23/92 | 10:30 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| MW-04-8             |         | 13:30 |             |                        |              |          | 1                 | X   | X    |     |             |                      |
| B-07-2              |         | 15:30 |             |                        |              |          | 1                 | X   | X    |     |             |                      |

|  |  |  |   |   |                          |   |                          |
|--|--|--|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipment</u> | DATE <u>6/23/92</u><br>TIME <u>20:30</u> | RECEIVED RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/24/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|--|---|---|--------------------------|---|--------------------------|

|  |                                   |  |
|--|-----------------------------------|--|
| METHOD OF SHIPMENT: <u>FedEx</u><br>SHIPMENT NO. <u>2495013743</u><br>SPECIAL INSTRUCTION: _____ | COMMENTS: _____<br>_____<br>_____ | AFTER ANALYSIS, SAMPLES ARE TO BE:<br><input type="checkbox"/> DISPOSED OF (ADDITIONAL FEE)<br><input type="checkbox"/> STORED (90 DAYS MAX)<br><input type="checkbox"/> STORED OVER 90 DAYS (ADDITIONAL FEE)<br><input type="checkbox"/> RETURNED TO CUSTOMER |
|--|-----------------------------------|--|



# ANALYTICAL SERVICES



## CERTIFICATE OF ANALYSIS

Ensafe/Allen & Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

July 27, 1992

Job Number: ENFA 51668

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

|                       |                |
|-----------------------|----------------|
| Client Project ID:    | NAS Memphis    |
| Date Received by Lab: | 06/26/92       |
| Number of Samples:    | Seventeen (17) |
| Sample Type:          | Soil           |

### I. Introduction

On 06/26/92, seventeen (17) soil samples arrived at the ITAS-Knoxville, Tennessee laboratory from Ensafe, Allen and Hoshall in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes (BTX) and total low boiling petroleum hydrocarbons as gasoline range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020 and Tennessee modified method 8015.

Reviewed and Approved:

*Alyce R. Moore*  
Alyce R. Moore  
Laboratory Manager

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51668

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### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and total low boiling petroleum hydrocarbons as gasoline range organics (GRO) by gas chromatography with a photoionization detection (PID)/flame ionization detection (FID) using a 3% SP-1500 column on a Varian 3700 GC. Confirmation runs were performed using a DB-624 column on a Varian 3400 GC. Matrix spike/matrix spike duplicate analyses were performed using sample B-9-09 with acceptable results.

Sample B-09-4 was reported with an elevated detection limit for toluene from the confirmation run. Samples B-12-4 and B-12-10 were reported with an elevated detection limit for benzene due to matrix effects. The surrogates were outside QC limits on samples MW-07-8 and B-16-10 on the FID detector, but were within range on the PID detector. Samples MW-07-6, MW-05-8, and MW-06-6 were outside QC limits due to elevated hydrocarbon content in the matrix. Sample B-15-2 was confirmed for benzene on 07/04/92. The initial check standard for this run failed for benzene with a 7% low recovery. The response factor was updated, and the same value was obtained for B-15-2 as determined by the primary analysis.

Control limits have not been established due to a lack of data points for the gasoline range organic method.

A five-point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 25%, the response of the analyte was assumed to be linear for that detector and the average Rf was used for quantification. If the RSD exceeded 25%, a five-point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within 25% of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 3 ppm for soils, but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates. No other problems were encountered.

/Allen & Hoshall  
7, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | B-12-4             |
| Lab Sample ID:   | <u>K4985</u>       |
| benzene  | 0.5 U *            |
| toluene  | 0.7 †              |
| xylenes (total)  | 3.4 †              |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 230 D <sub>1</sub> |
| Date of Extraction:  | 06/30/92           |
| Date of Analysis:  | 07/01/92           |

Compound was analyzed for but not detected. The number is the detection limit for the sample.  
Analyte confirmed by second column analysis.  
Detection limit higher than normal due to sample matrix interference.  
Quantitation taken from a 1:500 dilution run on 07/04/92.

e/Allen & Hoshall  
7, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

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**BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS**

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | B-12-10            |
| Lab Sample ID:   | <u>K4986</u>       |
| benzene  | 0.5 U *            |
| toluene  | 5.2 †              |
| xylenes (total)  | 33 †               |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 960 D <sub>2</sub> |
| Date of Extraction:  | 06/30/92           |
| Date of Analysis:  | 07/01/92           |

Compound was analyzed for but not detected. The number is the detection limit for the sample.

Analyte confirmed by second column analysis.

Detection limit higher than normal due to sample matrix interference.

Quantitation taken from a 1:1,500 dilution run on 07/03/92.

Facility ID #: 9-791683

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

ject ID: NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                     |
|--|---------------------|
| Client Sample ID:  | B-15-2              |
| Lab Sample ID:   | <u>K4987</u>        |
| benzene  | 0.6 †               |
| toluene  | 0.4 †D <sub>1</sub> |
| xylenes (total)  | 33 †                |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 950 D <sub>2</sub>  |
| Date of Extraction:  | 06/30/92            |
| Date of Analysis:  | 07/01/92            |

ound was analyzed for but not detected. The number is the detection limit for the sample.  
te confirmed by second column analysis.  
tation taken from a 1:500 dilution run on 07/04/92.  
tation taken from a 1:1,500 dilution run on 07/03/92.

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Facility ID #: 9-791683

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5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

ject ID: NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-15-8       |
| Lab Sample ID:   | <u>K4988</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

ound was analyzed for but not detected. The number is the detection limit for the sample.

Facility ID #: 9-791683

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-15-10      |
| Lab Sample ID:   | <u>K4989</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

Compound was analyzed for but not detected. The number is the detection limit for the sample.

Facility ID #: 9-791683

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-07-8      |
| Lab Sample ID:   | <u>K4990</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylene (total)   | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

ound was analyzed for but not detected. The number is the detection limit for the sample.

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Facility ID #: 9-791683

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | B-16-10      |
| Lab Sample ID:   | <u>K4991</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 10 U         |
| Date of Extraction:  | 06/30/92     |
| Date of Analysis:  | 07/01/92     |

ound was analyzed for but not detected. The number is the detection limit for the sample.

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y 27, 1992IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

## BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-07-6      |
| Lab Sample ID:   | <u>K4992</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.2 †        |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 10 U         |
| Date of Extraction:  | 07/07/92     |
| Date of Analysis:  | 07/07/92     |

Compound was analyzed for but not detected. The number is the detection limit for the sample.  
Analyte confirmed by second column analysis.

Facility ID #: 9-791683

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

NAS Memphis

Job Number: ENFA 51668

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-07-4      |
| Lab Sample ID:   | <u>K4993</u> |
| benzene  | 0.5 †        |
| toluene  | 0.8 †        |
| xylenes (total)  | 17 †         |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 230          |
| Date of Extraction:  | 07/01/92     |
| Date of Analysis:  | 07/01/92     |

confirmed by second column analysis.

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Facility ID #: 9-791683

afe/Allen & Hoshall  
27, 1992

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-05-8      |
| Lab Sample ID:   | <u>K4994</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylene (total)   | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 10 U         |
| Date of Extraction:  | 07/07/92     |
| Date of Analysis:  | 07/07/92     |

Compound was analyzed for but not detected. The number is the detection limit for the sample.

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-6-10      |
| Lab Sample ID:   | <u>K4995</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 10 U         |
| Date of Extraction:  | 07/01/92     |
| Date of Analysis:  | 07/01/92     |

- Compound was analyzed for but not detected. The number is the detection limit for the sample.

Project ID: NAS Memphis

Job Number: ENFA 51668

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-6-8       |
| Lab Sample ID:   | <u>K4996</u> |
| benzene  | 0.1 U        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.4 †        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 21           |
| Date of Extraction:  | 07/01/92     |
| Date of Analysis:  | 07/01/92     |

- Compound was analyzed for but not detected. The number is the detection limit for the sample.
- Analyte confirmed by second column analysis.

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27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Project ID: NAS Memphis

Job Number: ENFA 51668

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-06-6      |
| Lab Sample ID:   | <u>K4997</u> |
| benzene  | 0.1 U        |
| toluene  | 0.2 †        |
| xylene (total)   | 5.4 †        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 170          |

|                     |                    |
|---------------------|--------------------|
| Date of Extraction: | 07/03 and 07/07/92 |
| Date of Analysis:   | 07/04 and 07/07/92 |

Compound was analyzed for but not detected. The number is the detection limit for the sample. Analyte confirmed by second column analysis.

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                      |
|--|----------------------|
| Client Sample ID:  | MW-08-2              |
| Lab Sample ID:   | <u>K4998</u>         |
| benzene  | 11 † D <sub>2</sub>  |
| toluene  | 40 † D <sub>2</sub>  |
| xylenes (total)  | 83 †                 |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 3,300 D <sub>2</sub> |

|                     |                    |
|---------------------|--------------------|
| Date of Extraction: | 07/03 and 07/07/92 |
| Date of Analysis:   | 07/04 and 07/07/92 |

Compound was analyzed for but not detected. The number is the detection limit for the sample. Analyte confirmed by second column analysis.

Quantitation taken from a 1:1,000 dilution run on 07/04/92.

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |              |
|--|--------------|
| Client Sample ID:  | MW-08-8      |
| Lab Sample ID:   | <u>K4999</u> |
| benzene  | 0.1 †        |
| toluene  | 0.1 U        |
| xylenes (total)  | 0.1 U        |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 10 U         |
| Date of Extraction:  | 07/03/92     |
| Date of Analysis:  | 07/04/92     |

Compound was analyzed for but not detected. The number is the detection limit for the sample. Analyte confirmed by second column analysis.

Ensafe/Allen & Hoshall  
July 27, 1992

Client Project ID: NAS Memphis

Job Number: ENFA 51668

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | B-09-4             |
| Lab Sample ID:   | <u>K5000</u>       |
| benzene  | 0.1 U              |
| toluene  | 0.5 U-*            |
| xylenes (total)  | 9.1 †              |
| total low boiling petroleum hydrocarbons, as compared to gasoline range organics | 130 D <sub>1</sub> |

|                     |                    |
|---------------------|--------------------|
| Date of Extraction: | 07/01 and 07/03/92 |
| Date of Analysis:   | 07/02 and 07/04/92 |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- † - Analyte confirmed by second column analysis.
- - Analyte did not confirm by second column analysis.
- D<sub>1</sub> - Quantitation taken from a 1:1,000 dilution run on 07/08/92.
- \* - Detection limit higher than normal due to sample matrix interference.

Facility ID #: 9-791683

0019

Ensafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51668

---

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |               |
|--|---------------|
| Client Sample ID:  | B-09-9        |
| Lab Sample ID:   | <u>TT0001</u> |
| benzene  | 0.1 U         |
| toluene  | 0.1 U         |
| xylenes (total)  | 0.1 U         |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 10 U          |
| Date of Extraction:  | 07/06/92      |
| Date of Analysis:  | 07/06/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Facility ID #: 9-791683

Ensafe/Allen & Hoshall  
July 27, 1992

0020  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51668

---

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |               |
|--|---------------|
| Client Sample ID:  | B-09-9        |
| Lab Sample ID:   | <u>TT0001</u> |
| benzene  | 0.1 U         |
| toluene  | 0.1 U         |
| xylenes (total)  | 0.1 U         |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline range organics | 10 U          |
| Date of Extraction:  | 07/06/92      |
| Date of Analysis:  | 07/06/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



0222

Facility ID #: 9-791683



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 2  
N0026-C0117

CLIENT NAS - Memphis  
 ADDRESS Millington TN  
 PROJECT NAME/NUMBER N0026-C0117  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
 TELEPHONE NO. (901) 372-7462  
 FAX NO. (901) 372-2454  
 SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |      |                 | REMARKS   |
|-------------------|-------------------|------|-----------------|---|
|                   | GRC               | TDEC | BIX (50.0/80.0) |   |
| 1                 | X                 | X    |                 | Note: Please bill analyses on this COC (N0026-C0117) separately from accompanying C&C |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |
| 1                 | X                 | X    |                 |   |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |
| MW-05-8             | 6/24/92 | 11:00 | 501 grab    | 2 oz jar               | 4°C          | —        |
| MW-06-10            | ↓       | 15:00 | ↓           | 2 oz jar               | ↓            | ↓        |
| MW-06-8             | ↓       | 15:00 | ↓           | 2 oz jar               | ↓            | ↓        |
| MW-06-6             | ↓       | 15:00 | ↓           | ↓                      | ↓            | ↓        |
| MW-08-2             | 6/25/92 | 12:00 | ↓           | ↓                      | ↓            | ↓        |
| <del>MW-08-4</del>  |         |       |             |                        |              |          |
| MW-08-8             | 6/25/92 | 12:00 | ↓           | ↓                      | ↓            | ↓        |
| <del>MW-08-14</del> |         |       |             |                        |              |          |
| B-09-4              | 6/24/92 | 10:00 | ↓           | ↓                      | ↓            | ↓        |
| B-09-9              | ↓       | 10:00 | ↓           | ↓                      | ↓            | ↓        |

RELINQUISHED BY: [Signature]  
 SIGNATURE  
 PRINTED Scott Ryan  
 COMPANY EnSafe  
 REASON Shipment  
 DATE 6/25/92  
 TIME 20:00

RECEIVED BY: [Signature]  
 RELINQUISHED BY:  
 SIGNATURE  
 PRINTED TIM MATHIS  
 COMPANY ITMS-K  
 REASON SAMPLES  
 DATE 6/26/92  
 TIME 0815

RELINQUISHED BY:  
 SIGNATURE \_\_\_\_\_  
 PRINTED \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 REASON \_\_\_\_\_  
 DATE \_\_\_\_\_  
 TIME \_\_\_\_\_

RELINQUISHED BY:  
 SIGNATURE \_\_\_\_\_  
 PRINTED \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 REASON \_\_\_\_\_  
 DATE \_\_\_\_\_  
 TIME \_\_\_\_\_

METHOD OF SHIPMENT: FedEx  
 SHIPMENT NO. 2495013932  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 2°C (OK TOM 6/26/92)

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHAL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 2 OF 2  
N0026-CC117

CLIENT NAS - Memphis  
 ADDRESS Millington TN  
 PROJECT NAME/NUMBER N0026-CC117  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
 TELEPHONE NO. (901) 372-7962  
 FAX NO. (901) 372-2454  
 SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |                    |  |  | REMARKS                        |
|-------------------|-------------------|--------------------|--|--|--------------------------------|
|                   | GRC (TDEC)        | BTX (50.00/100.00) |  |  |                                |
| 1                 | X                 | X                  |  |  | 2°C (OK) <u>TRM</u><br>6/26/92 |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |
| 1                 | X                 | X                  |  |  |                                |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | GRC (TDEC) | BTX (50.00/100.00) |  |  |  |  |  |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|------------|--------------------|--|--|--|--|--|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |            |                    |  |  |  |  |  |
| B-12-4              | 6/24/92 | 17:00 | Soil/grab   | 2 oz jar               | 4°C          | —        | 1                 | X          | X                  |  |  |  |  |  |
| B-12-10             | ↓       | 17:00 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| B-15-2              | 6/25/92 | 14:30 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| B-15-8              |         | 14:30 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| B-15-10             |         | 14:30 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| <del>B-13-8</del>   |         |       |             |                        |              |          |                   |            |                    |  |  |  |  |  |
| MW-07-8             |         | 10:00 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| B-16-10             |         | 15:40 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| MW-07-6             |         | 10:00 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |
| MW-07-4             |         | 10:00 |             |                        |              |          | 1                 | X          | X                  |  |  |  |  |  |

|   |  |  |   |   |                          |   |                          |
|---|--|--|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipout</u> | DATE <u>6/25/92</u><br>TIME <u>20:00</u> | RECEIVED RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITMS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/26/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|---|--|--|---|---|--------------------------|---|--------------------------|

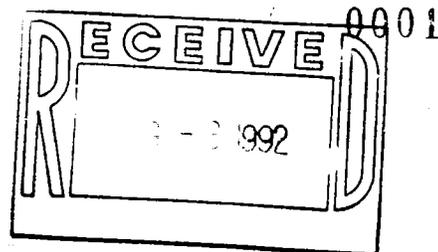
METHOD OF SHIPMENT: FedEx  
 SHIPMENT NO. 2495013732  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 2°C (OK) TRM 6/26/92

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



# ANALYTICAL SERVICES



## CERTIFICATE OF ANALYSIS

EnSafe/Allen & Hoshall  
P.O. Box 341315  
5724 Summer Trees Drive  
Memphis, TN 38134  
Attn: Lawson Anderson

July 27, 1992

Job Number: ENFA 51685

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

|                       |             |
|-----------------------|-------------|
| Client Project ID:    | NAS Memphis |
| Date Received by Lab: | 06/29/92    |
| Number of Samples:    | Six (6)     |
| Sample Type:          | Soil        |

### I. Introduction

On 06/29/92, six (6) soil samples arrived at the ITAS-Knoxville, Tennessee, laboratory from EnSafe/Allen & Hoshall in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes, (BTX), and total low boiling petroleum hydrocarbons as gasoline-range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020, and Tennessee modified method 8015.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

EnSafe/Allen & Hoshall  
July 27, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

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### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and low boiling petroleum hydrocarbons as gasoline-range organics by gas chromatography/photoionization and flame ionization detection using a 3% SP-1500 column on Varian 3700 GC. Confirmation runs were performed using a DB-624 column on a Varian 3400 GC. Associated QC samples were analyzed with ITAS project ENFA 51668, sample B-9-09. No major problems were encountered.

A five-point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 25%, the response of the analyte was assumed to be linear for that detector and the average Rf was used for quantification. If the RSD exceeded 25%, a five-point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within 25% of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 3 ppm for soils, but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |               |
|--|---------------|
| Client Sample ID:  | MW-09-8       |
| Lab Sample ID:   | <u>TT0156</u> |
| benzene  | 0.1 U         |
| toluene  | 0.1 U         |
| xylenes (total)  | 0.1 U         |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U          |
| Date of Extraction:  | 07/08/92      |
| Date of Analysis:  | 07/08/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                       |
|--|-----------------------|
| Client Sample ID:  | MW-10-2               |
| Lab Sample ID:   | <u>TT0157</u>         |
| benzene  | 0.2 U* D <sub>2</sub> |
| toluene  | 0.2 U* D <sub>2</sub> |
| xylenes (total)  | 11 +D <sub>1</sub>    |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 210 D <sub>1</sub>    |
| Date of Extraction:  | 07/08/92              |
| Date of Analysis:  | 07/08 and<br>07/09/92 |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte presence was confirmed on a secondary column.
- \* - Detection limit higher than normal due to sample matrix interference.
- D<sub>1</sub> - Quantitated from a 1:1,000 dilution on 07/08/92.
- D<sub>2</sub> - Quantitated from a 1:200 dilution on 07/09/92.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                    |
|--|--------------------|
| Client Sample ID:  | MW-10-6            |
| Lab Sample ID:   | <u>TT0158</u>      |
| benzene  | 0.1 U              |
| toluene  | 0.1 U              |
| xylenes (total)  | 0.1 U              |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U               |
| Date of Extraction:  | 07/08/92           |
| Date of Analysis:  | 07/08 and 07/09/92 |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |               |
|--|---------------|
| Client Sample ID:  | MW-10-10      |
| Lab Sample ID:   | <u>TT0159</u> |
| benzene  | 0.1 U         |
| toluene  | 0.1 U         |
| xylenes (total)  | 0.1 U         |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U          |
| Date of Extraction:  | 07/08/92      |
| Date of Analysis:  | 07/08/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                      |
|--|----------------------|
| Client Sample ID:  | MW-11-4              |
| Lab Sample ID:   | <u>TT0160</u>        |
| benzene  | 1.5 + D <sub>1</sub> |
| toluene  | 4.5 + D <sub>2</sub> |
| xylenes (total)  | 35 + D <sub>1</sub>  |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 500                  |
| Date of Extraction:  | 07/08/92             |
| Date of Analysis:  | 07/08 and 07/09/92   |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte presence was confirmed on a secondary column.
- D<sub>1</sub> - Quantitated from a 1:1,000 dilution on 07/08/92.
- D<sub>2</sub> - Quantitated from a 1:200 dilution on 07/09/92.

EnSafe/Allen & Hoshall  
 July 27, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51685

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

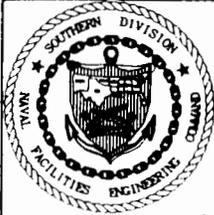
Results in mg/kg (ppm)

Sample Matrix: Soil

|  |                     |
|--|---------------------|
| Client Sample ID:  | MW-11-11 (11-11.3') |
| Lab Sample ID:   | <u>TT0161</u>       |
| benzene  | 0.1 U               |
| toluene  | 0.1 U               |
| xylenes (total)  | 0.1 U               |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 10 U                |
| Date of Extraction:  | 07/08/92            |
| Date of Analysis:  | 07/09/92            |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.





NAVY CLEAN  
ENSAFE/ALLEN & HOSHALL  
(901) 383-9115

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1  
N0026-C0117

CLIENT NAS-Memphis  
ADDRESS Millington TN  
PROJECT NAME/NUMBER N0026-C0117  
MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
TELEPHONE NO. (901) 372-7962  
FAX NO. (901) 372-2454  
SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |                 |  |  | REMARKS   |
|-------------------|-------------------|-----------------|--|--|---|
|                   | GRO (TDEC)        | BTX (5030/8020) |  |  |   |
| 1                 | X                 | X               |  |  | 2°C (OK TSM 6/29/92)  |
| 1                 | X                 | X               |  |  | Note: Please bill the two enclosed COC's to the specified separate Project #. |
| 1                 | X                 | X               |  |  |   |
| 1                 | X                 | X               |  |  |   |
| 1                 | X                 | X               |  |  |   |
| 1                 | X                 | X               |  |  |   |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |
| MW-09-8             | 6/26/92 | 8:30  | 301 grab    | 2 oz. jar              | 4°C          | —        |
| MW-10-2             | ↓       | 11:15 | ↓           | ↓                      | ↓            | ↓        |
| MW-10-6             | ↓       | 11:15 | ↓           | ↓                      | ↓            | ↓        |
| MW-10-10            | ↓       | 11:15 | ↓           | ↓                      | ↓            | ↓        |
| MW-11-4             | ↓       | 15:00 | ↓           | ↓                      | ↓            | ↓        |
| MW-11-11 (E3)       | ↓       | 15:00 | ↓           | ↓                      | ↓            | ↓        |

|  |  |   |                          |   |                          |
|--|--|---|--------------------------|---|--------------------------|
| RELINQUISHED BY: <u>[Signature]</u><br>SIGNATURE<br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>EnSafe</u><br>REASON <u>Shipment</u> | DATE <u>6/27/92</u><br>TIME <u>16:00</u> | RELINQUISHED BY: _____<br>SIGNATURE<br>PRINTED _____<br>COMPANY<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY: _____<br>SIGNATURE<br>PRINTED _____<br>COMPANY<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Fed Ex  
SHIPMENT NO. 2495013721  
SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: Rec'd by [Signature] ITAS 6-29-92  
2°C (OK TSM 6/29/92) 0830

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

FACILITY ID #: 9-791683



# ANALYTICAL SERVICES

001

## CERTIFICATE OF ANALYSIS

EnSafe/Allen and Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 2, 1992

Job Number: ENFA 51649

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |             |
|-----------------------|-------------|
| Client Project ID:    | NAS Memphis |
| Date Received by Lab: | 06/24/92    |
| Number of Samples:    | Three (3)   |
| Sample Type:          | Soil        |

### I. Introduction

On 06/24/92, three (3) soil samples arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen and Hoshall in Memphis, Tennessee, in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected, and soil samples are reported on a dry weight basis for CLP parameters.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

The samples were analyzed for organochlorine pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51649

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7471, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 9010.

## III. Quality Control

Our sample was labelled B-08-8 on the COC/RFA, but was labelled B-08-10 on the sample container. Lawson Anderson was notified on 06/24/92, and the sample was processed as B-08-10 per the bottle label.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs met with some problems related to the sample matrix. Surrogates and internal standards were outside QC limits in both low and medium level analyses; however, the medium level analyses had fewer problems. One tune, VBFB07013, was slightly errant: m/e 175 was 0.2% higher than allowed by protocol. The medium level analyses showed good agreement with the low level analyses and had fewer surrogate and internal standard anomalies. High levels of several target compounds such as xylenes, benzene and ethylbenzene were seen. Overall the analyses looked good considering the problems associated with the sample matrix. An MS/MSD was performed using sample B-08-10 with acceptable results.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample runs went well. A tenfold dilution was applied to sample MW-02-6 as the matrix adversely affected the internal standards and surrogates in more concentrated analyses. An MS/MSD was performed using sample B-08-4. One compound was slightly outside of acceptance limits, but this was not considered to have a negative effect on the data. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- E - Compound exceeded calibration range.
- D - Compound analyzed at secondary dilution.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51649

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

The samples were analyzed for organochlorine pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. Matrix spike/matrix spike duplicate analyses were performed using sample B-08-4 with acceptable results.

The samples and associated method blanks were treated to remove interferences using a mercury cleanup procedure.

Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established. A continuing standard was analyzed with every ten samples. This check standard was compared to the initial linearity using acceptance criteria of  $\pm 15\%$  difference. Samples with nondetected analytes were not reanalyzed if the continuing standard analytes showed increased sensitivity (i.e., greater than + 15% difference). No major problems were encountered.

The samples were digested on 07/07/92 for ICP and GFAA. The samples for mercury analysis were prepared just prior to analysis. The CVAA analysis for mercury was performed on 07/15/92; the GFAA analyses for arsenic, lead, selenium, and thallium were performed from 07/09 to 07/14/92; the remaining metals were analyzed by ICP on 07/16/92. All run QC was acceptable. A duplicate/spike pair was prepared using sample number B-08-4. Spike recovery (accuracy) results were within acceptance limits for all requested parameters by ICP, GFAA, and CVAA except for cadmium, chromium, silver, vanadium, and zinc by ICP analysis. All of these analytes were just slightly outside acceptance limits. Duplicate RPD (precision) results were within acceptance limits for all requested parameters by ICP, GFAA, and CVAA. The 1/5 serial dilution indicated a slight matrix interference for zinc. No other problems were encountered.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

Ensafe/Allen and Hoshall  
August 2, 1992

004  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51649

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III. Quality Control (continued)

"M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for cyanide by manual distillation of 5 g sample in 500 ml DI water followed by automated colorimetric determination using the LACHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). An MS/MSD was performed using sample B-08-4 with acceptable results. No major problems were encountered.



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1

CLIENT NAS-Memphis  
 ADDRESS Millington TN  
 PROJECT NAME/NUMBER N0026-C0113  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
 TELEPHONE NO. (901) 372-7962  
 FAX NO. (901) 372-2454  
 SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |             |                 |           | REMARKS |
|-------------------|-------------------|-----------|-------------|-----------------|-----------|---------|
|                   | BNA (CLP)         | CN (9010) | APPR Metals | Pest/PCB (8080) | VOC (CLP) |         |

| FIELD SAMPLE NUMBER  | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | BNA (CLP) | CN (9010) | APPR Metals | Pest/PCB (8080) | VOC (CLP) | REMARKS                               |
|--|---------|-------|-------------|------------------------|--------------|----------|-------------------|-----------|-----------|-------------|-----------------|-----------|---------------------------------------|
|  |         |       |             |                        | TEMP.        | CHEMICAL |                   |           |           |             |                 |           |                                       |
| MW-02-6  | 6/22/92 | 14:00 | Soil grab   | 4 oz jar               | 4°C          | —        | 1                 |           |           |             |                 | X         | 5°C (OK) TMM                          |
| MW-02-6  | ↓       | 11:30 | ↓           | ~16 oz brown jar       | ↓            | ↓        | 1                 | X         | X         | X           | X               |           | 6/24/92                               |
| B-08-4   | 6/23/92 | 16:30 | ↓           | 4 oz jar               | ↓            | ↓        | 1                 |           |           |             |                 | X         |                                       |
| B-08-4   | ↓       | 16:30 | ↓           | ~16 oz brown jar       | ↓            | ↓        | 1                 | X         | X         | X           | X               |           |                                       |
| B-08-B   | ↓       | 16:30 | ↓           | 4 oz jar               | ↓            | ↓        | 1                 |           |           |             |                 | X         | Labelled as B-08-10 on sample bottle. |
| Note: samples on this chain of custody should be billed separately from those on the accompanying COC. We will call with instructions. |         |       |             |                        |              |          |                   |           |           |             |                 |           |                                       |

|  |  |  |   |   |                          |   |                          |
|--|--|--|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipment</u> | DATE <u>6/23/92</u><br>TIME <u>20:30</u> | RECEIVED RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/24/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|--|---|---|--------------------------|---|--------------------------|

|  |                                   |  |
|--|-----------------------------------|--|
| METHOD OF SHIPMENT: <u>FedEx</u><br>SHIPMENT NO. <u>2495013743</u><br>SPECIAL INSTRUCTION: _____ | COMMENTS: _____<br>_____<br>_____ | AFTER ANALYSIS, SAMPLES ARE TO BE:<br><input type="checkbox"/> DISPOSED OF (ADDITIONAL FEE)<br><input type="checkbox"/> STORED (90 DAYS MAX)<br><input type="checkbox"/> STORED OVER 90 DAYS (ADDITIONAL FEE)<br><input type="checkbox"/> RETURNED TO CUSTOMER |
|--|-----------------------------------|--|

006

PROJECT CODE: ENFA 51649

SAMPLE RANGE: K4834-42

| Sample Number(s) | Relinquished by: | Received by: | Date/Time Out: | Reason for Change of Custody: | Relinquished by: | Received by: | Date/Time In: | Reason for Change of Custody: |
|------------------|------------------|--------------|----------------|-------------------------------|------------------|--------------|---------------|-------------------------------|
| K4834-38         | Jim Thrall       | Mark Potocik | 6/24/92 1045   | CLP VOA's                     | Steve Miller     | SJ Summers   | 7-2-92 2145   | Storage                       |
| K4837-42         | K Cedar          | (Signature)  | 6/25/92 0835   | CN                            | (Signature)      | S. Rain      | 6-25-92 1515  | Storage                       |
| K4839-42         | K Cedar          | K. Cedar     | 7/1/92 0900    | BNA (3/90)                    | (Signature)      | K. Cedar     | 7/1/92 1300   | "                             |
| K4839-42         | K Cedar          | (Signature)  | 7/6/92 915     | CN                            | (Signature)      | K Cedar      | 7/6/92 1337   | "                             |
| K4839-42         | SJ Summers       | (Signature)  | 7-6-92 1845    | ICP; GFAR; Hg                 | (Signature)      | K. Cedar     | 7/7/92 1720   | "                             |
| K4834-38         | (Signature)      | B.L. Wang    | 07-08-92 0910  | % Moisture                    | B.L. Wang        | K. Cedar     | 07-08-92 0920 | Storage                       |
| K4837-42         | Jim Thrall       | (Signature)  | 7/14/92 1540   | metals prep                   | (Signature)      | S. Rain      | 7-14-92 1615  | "                             |
| K4839-42         | K Cedar          | g. Swinier   | 7/20/92 0900   | pH                            | g. Swinier       | K. Cedar     | 7/20/92 1430  | "                             |
| Facility ID #:   |                  |              |                |                               |                  |              |               |                               |

| SAMPLE DISPOSITION RECORD |                           |              |                                     |
|---------------------------|---------------------------|--------------|-------------------------------------|
| Sample Number(s):         | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |

VOLATILE ORGANICS ANALYSIS DATA SHEET

B0810

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084

Matrix: (soil/water) SOIL Lab Sample ID: K4834

Sample wt/vol: 5.0 (g/mL) G Lab File ID: K4834

Level: (low/med) LOW Date Received: 06/24/92

% Moisture: not dec. 22 Date Analyzed: 07/01/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|------------|---------------------------------|--|---|
| 74-87-3    | -----Chloromethane              | 13   | U |
| 74-83-9    | -----Bromomethane               | 13   | U |
| 75-01-4    | -----Vinyl Chloride             | 13   | U |
| 75-00-3    | -----Chloroethane               | 13   | U |
| 75-09-2    | -----Methylene Chloride         | 18   | B |
| 67-64-1    | -----Acetone                    | 180  |   |
| 75-15-0    | -----Carbon Disulfide           | 13   | U |
| 75-35-4    | -----1,1-Dichloroethene         | 13   | U |
| 75-34-3    | -----1,1-Dichloroethane         | 13   | U |
| 540-59-0   | -----1,2-Dichloroethene (total) | 13   | U |
| 67-66-3    | -----Chloroform                 | 13   | U |
| 107-06-2   | -----1,2-Dichloroethane         | 13   | U |
| 78-93-3    | -----2-Butanone                 | 13   | U |
| 71-55-6    | -----1,1,1-Trichloroethane      | 13   | U |
| 56-23-5    | -----Carbon Tetrachloride       | 13   | U |
| 75-27-4    | -----Bromodichloromethane       | 13   | U |
| 78-87-5    | -----1,2-Dichloropropane        | 13   | U |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 13   | U |
| 79-01-6    | -----Trichloroethene            | 13   | U |
| 124-48-1   | -----Dibromochloromethane       | 13   | U |
| 79-00-5    | -----1,1,2-Trichloroethane      | 13   | U |
| 71-43-2    | -----Benzene                    | 140  |   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 13   | U |
| 75-25-2    | -----Bromoform                  | 13   | U |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 13   | U |
| 591-78-6   | -----2-Hexanone                 | 13   | U |
| 127-18-4   | -----Tetrachloroethene          | 13   | U |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 13   | U |
| 108-88-3   | -----Toluene                    | 13   | U |
| 108-90-7   | -----Chlorobenzene              | 13   | U |
| 100-41-4   | -----Ethylbenzene               | 440  | E |
| 100-42-5   | -----Styrene                    | 13   | U |
| 1330-20-7  | -----Xylenes (total)            | 630  | E |

*Positive*

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0810DL

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084  
 Matrix: (soil/water) SOIL Lab Sample ID: K4834  
 Sample wt/vol: 4.0 (g/mL) G Lab File ID: K4834D4  
 Level: (low/med) MED Date Received: 06/24/92  
 % Moisture: not dec. 22 Date Analyzed: 07/01/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

| CAS NO.    | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q   |
|------------|----------------------------|--|-----|
| 74-87-3    | Chloromethane              | 1600   | U   |
| 74-83-9    | Bromomethane               | 1600   | U   |
| 75-01-4    | Vinyl Chloride             | 1600   | U   |
| 75-00-3    | Chloroethane               | 1600   | U   |
| 75-09-2    | Methylene Chloride         | 720  | BDJ |
| 67-64-1    | Acetone                    | 2500   | D   |
| 75-15-0    | Carbon Disulfide           | 1600   | U   |
| 75-35-4    | 1,1-Dichloroethene         | 1600   | U   |
| 75-34-3    | 1,1-Dichloroethane         | 1600   | U   |
| 540-59-0   | 1,2-Dichloroethene (total) | 1600   | U   |
| 67-66-3    | Chloroform                 | 1600   | U   |
| 107-06-2   | 1,2-Dichloroethane         | 1600   | U   |
| 78-93-3    | 2-Butanone                 | 1600   | U   |
| 71-55-6    | 1,1,1-Trichloroethane      | 1600   | U   |
| 56-23-5    | Carbon Tetrachloride       | 1600   | U   |
| 75-27-4    | Bromodichloromethane       | 1600   | U   |
| 78-87-5    | 1,2-Dichloropropane        | 1600   | U   |
| 10061-01-5 | cis-1,3-Dichloropropene    | 1600   | U   |
| 79-01-6    | Trichloroethene            | 1600   | U   |
| 124-48-1   | Dibromochloromethane       | 1600   | U   |
| 79-00-5    | 1,1,2-Trichloroethane      | 1600   | U   |
| 71-43-2    | Benzene                    | 250  | DJ  |
| 10061-02-6 | trans-1,3-Dichloropropene  | 1600   | U   |
| 75-25-2    | Bromoform                  | 1600   | U   |
| 108-10-1   | 4-Methyl-2-Pentanone       | 1600   | U   |
| 591-78-6   | 2-Hexanone                 | 1600   | U   |
| 127-18-4   | Tetrachloroethene          | 1600   | U   |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 1600   | U   |
| 108-88-3   | Toluene                    | 1600   | U   |
| 108-90-7   | Chlorobenzene              | 1600   | U   |
| 100-41-4   | Ethylbenzene               | 2600   | D   |
| 100-42-5   | Styrene                    | 1600   | U   |
| 1330-20-7  | Xylenes (total)            | 5000   | D   |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B084

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084

Matrix: (soil/water) SOIL Lab Sample ID: K4838

Sample wt/vol: 4.0 (g/mL) G Lab File ID: K4838R

Level: (low/med) MED Date Received: 06/24/92

% Moisture: not dec. 19 Date Analyzed: 07/02/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

|            |                                 |      |   |
|------------|---------------------------------|------|---|
| 74-87-3    | -----Chloromethane              | 1500 | U |
| 74-83-9    | -----Bromomethane               | 1500 | U |
| 75-01-4    | -----Vinyl Chloride             | 1500 | U |
| 75-00-3    | -----Chloroethane               | 1500 | U |
| 75-09-2    | -----Methylene Chloride         | 1500 | U |
| 67-64-1    | -----Acetone                    | 1500 | U |
| 75-15-0    | -----Carbon Disulfide           | 1500 | U |
| 75-35-4    | -----1,1-Dichloroethene         | 1500 | U |
| 75-34-3    | -----1,1-Dichloroethane         | 1500 | U |
| 540-59-0   | -----1,2-Dichloroethene (total) | 1500 | U |
| 67-66-3    | -----Chloroform                 | 1500 | U |
| 107-06-2   | -----1,2-Dichloroethane         | 1500 | U |
| 78-93-3    | -----2-Butanone                 | 1500 | U |
| 71-55-6    | -----1,1,1-Trichloroethane      | 1500 | U |
| 56-23-5    | -----Carbon Tetrachloride       | 1500 | U |
| 75-27-4    | -----Bromodichloromethane       | 1500 | U |
| 78-87-5    | -----1,2-Dichloropropane        | 1500 | U |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 1500 | U |
| 79-01-6    | -----Trichloroethene            | 1500 | U |
| 124-48-1   | -----Dibromochloromethane       | 1500 | U |
| 79-00-5    | -----1,1,2-Trichloroethane      | 1500 | U |
| 71-43-2    | -----Benzene                    | 1500 | U |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 1500 | U |
| 75-25-2    | -----Bromoform                  | 1500 | U |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 1500 | U |
| 591-78-6   | -----2-Hexanone                 | 1500 | U |
| 127-18-4   | -----Tetrachloroethene          | 1500 | U |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 1500 | U |
| 108-88-3   | -----Toluene                    | 1500 | U |
| 108-90-7   | -----Chlorobenzene              | 1500 | U |
| 100-41-4   | -----Ethylbenzene               | 2400 |   |
| 100-42-5   | -----Styrene                    | 1500 | U |
| 1330-20-7  | -----Xylenes (total)            | 1700 |   |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B084 Rf

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084

Matrix: (soil/water) SOIL Lab Sample ID: K4838

Sample wt/vol: 4.0 (g/mL) G Lab File ID: K4838R2

Level: (low/med) MED Date Received: 06/24/92

% Moisture: not dec. 19 Date Analyzed: 07/02/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

*R<sub>2</sub> 1/2/92*

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

|            |                                 |      |    |
|------------|---------------------------------|------|----|
| 74-87-3    | -----Chloromethane              | 1500 | U  |
| 74-83-9    | -----Bromomethane               | 1500 | U  |
| 75-01-4    | -----Vinyl Chloride             | 1500 | U  |
| 75-00-3    | -----Chloroethane               | 1500 | U  |
| 75-09-2    | -----Methylene Chloride         | 320  | BJ |
| 67-64-1    | -----Acetone                    | 1800 |    |
| 75-15-0    | -----Carbon Disulfide           | 1500 | U  |
| 75-35-4    | -----1,1-Dichloroethene         | 1500 | U  |
| 75-34-3    | -----1,1-Dichloroethane         | 1500 | U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 1500 | U  |
| 67-66-3    | -----Chloroform                 | 1500 | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 1500 | U  |
| 78-93-3    | -----2-Butanone                 | 1500 | U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 1500 | U  |
| 56-23-5    | -----Carbon Tetrachloride       | 1500 | U  |
| 75-27-4    | -----Bromodichloromethane       | 1500 | U  |
| 78-87-5    | -----1,2-Dichloropropane        | 1500 | U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 1500 | U  |
| 79-01-6    | -----Trichloroethene            | 1500 | U  |
| 124-48-1   | -----Dibromochloromethane       | 1500 | U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 1500 | U  |
| 71-43-2    | -----Benzene                    | 1500 | U  |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 1500 | U  |
| 75-25-2    | -----Bromoform                  | 1500 | U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 1500 | U  |
| 591-78-6   | -----2-Hexanone                 | 1500 | U  |
| 127-18-4   | -----Tetrachloroethene          | 1500 | U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 1500 | U  |
| 108-88-3   | -----Toluene                    | 1500 | U  |
| 108-90-7   | -----Chlorobenzene              | 1500 | U  |
| 100-41-4   | -----Ethylbenzene               | 730  | J  |
| 100-42-5   | -----Styrene                    | 1500 | U  |
| 1330-20-7  | -----Xylenes (total)            | 1300 | J  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW026

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084  
 Matrix: (soil/water) SOIL Lab Sample ID: K4837  
 Sample wt/vol: 1.0 (g/mL) G Lab File ID: K4837D  
 Level: (low/med) LOW Date Received: 06/24/92  
 % Moisture: not dec. 21 Date Analyzed: 07/01/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|            |                            |       |   |
|------------|----------------------------|-------|---|
| 74-87-3    | Chloromethane              | 63    | U |
| 74-83-9    | Bromomethane               | 63    | U |
| 75-01-4    | Vinyl Chloride             | 63    | U |
| 75-00-3    | Chloroethane               | 63    | U |
| 75-09-2    | Methylene Chloride         | 32    | U |
| 67-64-1    | Acetone                    | 63    | U |
| 75-15-0    | Carbon Disulfide           | 32    | U |
| 75-35-4    | 1,1-Dichloroethene         | 32    | U |
| 75-34-3    | 1,1-Dichloroethane         | 32    | U |
| 540-59-0   | 1,2-Dichloroethene (total) | 32    | U |
| 67-66-3    | Chloroform                 | 32    | U |
| 107-06-2   | 1,2-Dichloroethane         | 32    | U |
| 78-93-3    | 2-Butanone                 | 63    | U |
| 71-55-6    | 1,1,1-Trichloroethane      | 32    | U |
| 56-23-5    | Carbon Tetrachloride       | 32    | U |
| 75-27-4    | Bromodichloromethane       | 32    | U |
| 78-87-5    | 1,2-Dichloropropane        | 32    | U |
| 10061-01-5 | cis-1,3-Dichloropropene    | 32    | U |
| 79-01-6    | Trichloroethene            | 32    | U |
| 124-48-1   | Dibromochloromethane       | 32    | U |
| 79-00-5    | 1,1,2-Trichloroethane      | 32    | U |
| 71-43-2    | Benzene                    | 3000  | E |
| 10061-02-6 | trans-1,3-Dichloropropene  | 32    | U |
| 75-25-2    | Bromoform                  | 32    | U |
| 108-10-1   | 4-Methyl-2-Pentanone       | 63    | U |
| 591-78-6   | 2-Hexanone                 | 63    | U |
| 127-18-4   | Tetrachloroethene          | 32    | U |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 32    | U |
| 108-88-3   | Toluene                    | 1700  | E |
| 108-90-7   | Chlorobenzene              | 32    | U |
| 100-41-4   | Ethylbenzene               | 8200  | E |
| 100-42-5   | Styrene                    | 32    | U |
| 1330-20-7  | Xylenes (total)            | 26000 | E |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW026DL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B084  
 Matrix: (soil/water) SOIL Lab Sample ID: K4837  
 Sample wt/vol: 4.0 (g/mL) G Lab File ID: K4837D3  
 Level: (low/med) MED Date Received: 06/24/92  
 % Moisture: not dec. 21 Date Analyzed: 07/02/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 20.0(uL)

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) UG/KG | Q  |
|------------|---------------------------------|---|----|
| 74-87-3    | -----Chloromethane              | 7900  | U  |
| 74-83-9    | -----Bromomethane               | 7900  | U  |
| 75-01-4    | -----Vinyl Chloride             | 7900  | U  |
| 75-00-3    | -----Chloroethane               | 7900  | U  |
| 75-09-2    | -----Methylene Chloride         | 7900  | U  |
| 67-64-1    | -----Acetone                    | 7900  | U  |
| 75-15-0    | -----Carbon Disulfide           | 7900  | U  |
| 75-35-4    | -----1,1-Dichloroethene         | 7900  | U  |
| 75-34-3    | -----1,1-Dichloroethane         | 7900  | U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 7900  | U  |
| 67-66-3    | -----Chloroform                 | 7900  | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 7900  | U  |
| 78-93-3    | -----2-Butanone                 | 7900  | U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 7900  | U  |
| 56-23-5    | -----Carbon Tetrachloride       | 7900  | U  |
| 75-27-4    | -----Bromodichloromethane       | 7900  | U  |
| 78-87-5    | -----1,2-Dichloropropane        | 7900  | U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 7900  | U  |
| 79-01-6    | -----Trichloroethene            | 7900  | U  |
| 124-48-1   | -----Dibromochloromethane       | 7900  | U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 7900  | U  |
| 71-43-2    | -----Benzene                    | 4800  | DJ |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 7900  | U  |
| 75-25-2    | -----Bromoform                  | 7900  | U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 7900  | U  |
| 591-78-6   | -----2-Hexanone                 | 7900  | U  |
| 127-18-4   | -----Tetrachloroethene          | 7900  | U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 7900  | U  |
| 108-88-3   | -----Toluene                    | 3300  | DJ |
| 108-90-7   | -----Chlorobenzene              | 7900  | U  |
| 100-41-4   | -----Ethylbenzene               | 19000   | D  |
| 100-42-5   | -----Styrene                    | 7900  | U  |
| 1330-20-7  | -----Xylenes (total)            | 97000   | D  |

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B084

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B0810

Matrix: (soil/water) SOIL Lab Sample ID: K4839

Sample wt/vol: 30.2 (g/mL) G Lab File ID: K4839

Level: (low/med) LOW Date Received: 06/24/92

% Moisture: 19 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/15/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

CAS NO. COMPOUND

|               |                              |      |   |
|---------------|------------------------------|------|---|
| 108-95-2----- | Phenol                       | 400  | U |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 400  | U |
| 95-57-8-----  | 2-Chlorophenol               | 400  | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 400  | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 400  | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 400  | U |
| 95-48-7-----  | 2-Methylphenol               | 400  | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 400  | U |
| 106-44-5----- | 4-Methylphenol               | 400  | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 400  | U |
| 67-72-1-----  | Hexachloroethane             | 400  | U |
| 98-95-3-----  | Nitrobenzene                 | 400  | U |
| 78-59-1-----  | Isophorone                   | 400  | U |
| 88-75-5-----  | 2-Nitrophenol                | 400  | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 400  | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 400  | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 400  | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 400  | U |
| 91-20-3-----  | Naphthalene                  | 320  | J |
| 106-47-8----- | 4-Chloroaniline              | 400  | U |
| 87-68-3-----  | Hexachlorobutadiene          | 400  | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 400  | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 2500 |   |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 400  | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 400  | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 980  | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 400  | U |
| 88-74-4-----  | 2-Nitroaniline               | 980  | U |
| 131-11-3----- | Dimethyl Phthalate           | 400  | U |
| 208-96-8----- | Acenaphthylene               | 400  | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 400  | U |
| 99-09-2-----  | 3-Nitroaniline               | 980  | U |
| 83-32-9-----  | Acenaphthene                 | 41   | J |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B084

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B0810

Matrix: (soil/water) SOIL Lab Sample ID: K4839

Sample wt/vol: 30.2 (g/mL) G Lab File ID: K4839

Level: (low/med) LOW Date Received: 06/24/92

% Moisture: 19 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/15/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.   | COMPOUND                    | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|-----------|-----------------------------|--|---|
| 51-28-5   | 2,4-Dinitrophenol           | 980  | U |
| 100-02-7  | 4-Nitrophenol               | 980  | U |
| 132-64-9  | Dibenzofuran                | 400  | U |
| 121-14-2  | 2,4-Dinitrotoluene          | 400  | U |
| 84-66-2   | Diethylphthalate            | 400  | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether  | 400  | U |
| 86-73-7   | Fluorene                    | 400  | U |
| 100-01-6  | 4-Nitroaniline              | 980  | U |
| 534-52-1  | 4,6-Dinitro-2-Methylphenol  | 980  | U |
| 86-30-6   | N-Nitrosodiphenylamine (1)  | 400  | U |
| 101-55-3  | 4-Bromophenyl-phenylether   | 400  | U |
| 118-74-1  | Hexachlorobenzene           | 400  | U |
| 87-86-5   | Pentachlorophenol           | 980  | U |
| 85-01-8   | Phenanthrene                | 400  | U |
| 120-12-7  | Anthracene                  | 400  | U |
| 86-74-8   | Carbazole                   | 400  | U |
| 84-74-2   | Di-n-Butylphthalate         | 400  | U |
| 206-44-0  | Fluoranthene                | 400  | U |
| 129-00-0  | Pyrene                      | 400  | U |
| 85-68-7   | Butylbenzylphthalate        | 400  | U |
| 91-94-1   | 3,3'-Dichlorobenzidine      | 400  | U |
| 56-55-3   | Benzo(a)Anthracene          | 400  | U |
| 218-01-9  | Chrysene                    | 400  | U |
| 117-81-7  | bis(2-Ethylhexyl) Phthalate | 820  |   |
| 117-84-0  | Di-n-Octyl Phthalate        | 400  | U |
| 205-99-2  | Benzo(b) Fluoranthene       | 400  | U |
| 207-08-9  | Benzo(k) Fluoranthene       | 400  | U |
| 50-32-8   | Benzo(a) Pyrene             | 400  | U |
| 193-39-5  | Indeno(1,2,3-cd) Pyrene     | 400  | U |
| 53-70-3   | Dibenz(a,h)Anthracene       | 400  | U |
| 191-24-2  | Benzo(g,h,i) Perylene       | 400  | U |

(1) - Cannot be separated from Diphenylamine

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW026

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B0810

Matrix: (soil/water) SOIL Lab Sample ID: K4842

Sample wt/vol: 30.0 (g/mL) G Lab File ID: K4842D

Level: (low/med) LOW Date Received: 06/24/92

% Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------|------------------------------|--|---|
| 108-95-2 | Phenol                       | 4200   | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 4200   | U |
| 95-57-8  | 2-Chlorophenol               | 4200   | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 4200   | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 4200   | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 4200   | U |
| 95-48-7  | 2-Methylphenol               | 4200   | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 4200   | U |
| 106-44-5 | 4-Methylphenol               | 4200   | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 4200   | U |
| 67-72-1  | Hexachloroethane             | 4200   | U |
| 98-95-3  | Nitrobenzene                 | 4200   | U |
| 78-59-1  | Isophorone                   | 4200   | U |
| 88-75-5  | 2-Nitrophenol                | 4200   | U |
| 105-67-9 | 2,4-Dimethylphenol           | 4200   | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 4200   | U |
| 120-83-2 | 2,4-Dichlorophenol           | 4200   | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 4200   | U |
| 91-20-3  | Naphthalene                  | 3000   | J |
| 106-47-8 | 4-Chloroaniline              | 4200   | U |
| 87-68-3  | Hexachlorobutadiene          | 4200   | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 4200   | U |
| 91-57-6  | 2-Methylnaphthalene          | 3900   | J |
| 77-47-4  | Hexachlorocyclopentadiene    | 4200   | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 4200   | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 10000  | U |
| 91-58-7  | 2-Chloronaphthalene          | 4200   | U |
| 88-74-4  | 2-Nitroaniline               | 10000  | U |
| 131-11-3 | Dimethyl Phthalate           | 4200   | U |
| 208-96-8 | Acenaphthylene               | 4200   | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 4200   | U |
| 99-09-2  | 3-Nitroaniline               | 10000  | U |
| 83-32-9  | Acenaphthene                 | 4200   | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW026

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B0810  
 Matrix: (soil/water) SOIL Lab Sample ID: K4842  
 Sample wt/vol: 30.0 (g/mL) G Lab File ID: K4842D  
 Level: (low/med) LOW Date Received: 06/24/92  
 % Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 10.0  
 GPC Cleanup: (Y/N) Y pH: 7.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

| CAS NO.   | COMPOUND                    | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|-----------|-----------------------------|--|---|
| 51-28-5   | 2,4-Dinitrophenol           | 10000  | U |
| 100-02-7  | 4-Nitrophenol               | 10000  | U |
| 132-64-9  | Dibenzofuran                | 4200   | U |
| 121-14-2  | 2,4-Dinitrotoluene          | 4200   | U |
| 84-66-2   | Diethylphthalate            | 4200   | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether  | 4200   | U |
| 86-73-7   | Fluorene                    | 4200   | U |
| 100-01-6  | 4-Nitroaniline              | 10000  | U |
| 534-52-1  | 4,6-Dinitro-2-Methylphenol  | 10000  | U |
| 86-30-6   | N-Nitrosodiphenylamine (1)  | 4200   | U |
| 101-55-3  | 4-Bromophenyl-phenylether   | 4200   | U |
| 118-74-1  | Hexachlorobenzene           | 4200   | U |
| 87-86-5   | Pentachlorophenol           | 10000  | U |
| 85-01-8   | Phenanthrene                | 1800   | J |
| 120-12-7  | Anthracene                  | 4200   | U |
| 86-74-8   | Carbazole                   | 4200   | U |
| 84-74-2   | Di-n-Butylphthalate         | 4200   | U |
| 206-44-0  | Fluoranthene                | 1400   | J |
| 129-00-0  | Pyrene                      | 1100   | J |
| 85-68-7   | Butylbenzylphthalate        | 4200   | U |
| 91-94-1   | 3,3'-Dichlorobenzidine      | 4200   | U |
| 56-55-3   | Benzo(a)Anthracene          | 4200   | U |
| 218-01-9  | Chrysene                    | 4200   | U |
| 117-81-7  | bis(2-Ethylhexyl) Phthalate | 4200   | U |
| 117-84-0  | Di-n-Octyl Phthalate        | 4200   | U |
| 205-99-2  | Benzo(b) Fluoranthene       | 4200   | U |
| 207-08-9  | Benzo(k) Fluoranthene       | 4200   | U |
| 50-32-8   | Benzo(a) Pyrene             | 4200   | U |
| 193-39-5  | Indeno(1,2,3-cd) Pyrene     | 4200   | U |
| 53-70-3   | Dibenz(a,h)Anthracene       | 4200   | U |
| 191-24-2  | Benzo(g,h,i) Perylene       | 4200   | U |

(1) - Cannot be separated from Diphenylamine

Ensafe/Allen and Hoshall  
August 2, 1992

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51649

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g}/\text{kg}$  (ppb)

Sample Matrix: Soil

Client Sample ID: B-08-4

Lab Sample ID: K4839

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 400 U                | 4,4'-DDT              | 400 U                |
| $\beta$ -BHC       | 400 U                | endrin aldehyde       | 800 U                |
| $\delta$ -BHC      | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| $\gamma$ -BHC      | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92

Date of Analysis: 07/05/92

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51649

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Soil

Client Sample ID: MW-02-6

Lab Sample ID: K4842

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 400 U                | 4,4'-DDT              | 400 U                |
| β-BHC              | 400 U                | endrin aldehyde       | 800 U                |
| δ-BHC              | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| γ-BHC              | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92

Date of Analysis: 07/05/92

1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B-08-4

Lab Name: ITAS\_KNOXVILLE Contract: NAS-MEMPHI

Lab Code: ITSTU Case No.: 51649 SAS No.: SDG No.: B-08-4

Matrix (soil/water): SOIL Lab Sample ID: K4839

Level (low/med): LOW Date Received: 06/24/92

% Solids: 80.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q  | M  |
|-----------|-----------|---------------|---|----|----|
| 7429-90-5 | Aluminum  |               |   |    | NR |
| 7440-36-0 | Antimony  | 0.50          | U |    | F  |
| 7440-38-2 | Arsenic   | 12.9          |   |    | F  |
| 7440-39-3 | Barium    | 173           |   |    | P  |
| 7440-41-7 | Beryllium | 1.2           |   |    | P  |
| 7440-43-9 | Cadmium   | 0.96          |   | N  | P  |
| 7440-70-2 | Calcium   |               |   |    | NR |
| 7440-47-3 | Chromium  | 16.3          |   | N  | P  |
| 7440-48-4 | Cobalt    | 14.0          |   |    | P  |
| 7440-50-8 | Copper    | 21.1          |   |    | P  |
| 7439-89-6 | Iron      |               |   |    | NR |
| 7439-92-1 | Lead      | 12.5          |   |    | F  |
| 7439-95-4 | Magnesium |               |   |    | NR |
| 7439-96-5 | Manganese |               |   |    | NR |
| 7439-97-6 | Mercury   | 0.03          |   |    | CV |
| 7440-02-0 | Nickel    | 19.5          |   |    | P  |
| 7440-09-7 | Potassium |               |   |    | NR |
| 7782-49-2 | Selenium  | 0.25          | U | W  | F  |
| 7440-22-4 | Silver    | 0.62          | U | N  | P  |
| 7440-23-5 | Sodium    |               |   |    | NR |
| 7440-28-0 | Thallium  | 0.26          | B | W  | F  |
| 7440-62-2 | Vanadium  | 34.7          |   | N  | P  |
| 7440-66-6 | Zinc      | 72.0          |   | EN | P  |
|           | Cyanide   |               |   |    | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:



1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-02-6

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: NAS-MEMPHI  
 Lab Code: ITSTU\_ Case No.: 51649 SAS No.: \_\_\_\_\_ SDG No.: B-08-4  
 Matrix (soil/water): SOIL\_ Lab Sample ID: K4842\_\_\_\_\_  
 Level (low/med): LOW\_ Date Received: 06/24/92  
 % Solids: \_82.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q  | M  |
|-----------|-----------|---------------|---|----|----|
| 7429-90-5 | Aluminum  |               | - |    | NR |
| 7440-36-0 | Antimony  | 0.48          | U |    | F  |
| 7440-38-2 | Arsenic   | 10.5          |   |    | F  |
| 7440-39-3 | Barium    | 153           |   |    | P  |
| 7440-41-7 | Beryllium | 0.73          |   |    | P  |
| 7440-43-9 | Cadmium   | 0.60          | U | N  | P  |
| 7440-70-2 | Calcium   |               |   |    | NR |
| 7440-47-3 | Chromium  | 14.6          |   | N  | P  |
| 7440-48-4 | Cobalt    | 7.0           |   |    | P  |
| 7440-50-8 | Copper    | 15.1          |   |    | P  |
| 7439-89-6 | Iron      |               |   |    | NR |
| 7439-92-1 | Lead      | 9.1           |   |    | F  |
| 7439-95-4 | Magnesium |               |   |    | NR |
| 7439-96-5 | Manganese |               |   |    | NR |
| 7439-97-6 | Mercury   | 0.03          |   |    | CV |
| 7440-02-0 | Nickel    | 17.4          |   |    | P  |
| 7440-09-7 | Potassium |               |   |    | NR |
| 7782-49-2 | Selenium  | 0.24          | U | W  | F  |
| 7440-22-4 | Silver    | 0.60          | U | N  | P  |
| 7440-23-5 | Sodium    |               |   |    | NR |
| 7440-28-0 | Thallium  | 0.27          | B |    | F  |
| 7440-62-2 | Vanadium  | 27.5          |   | N  | P  |
| 7440-66-6 | Zinc      | 55.2          |   | EN | P  |
|           | Cyanide   |               |   |    | NR |

Color Before: BROWN \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: COARSE  
 Color After: YELLOW \_\_\_\_\_ Clarity After: CLEAR \_\_\_\_\_ Artifacts: \_\_\_\_\_  
 Comments:

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Ensafe/Allen and Hoshall  
 August 2, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51649

TOTAL CYANIDE ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P3981                | 1 U           |
| B-08-4                  | K4839                | 1 U           |
| MW-02-6                 | K4842                | 1 U           |

Date of Analysis: 07/07/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



# ANALYTICAL SERVICES

0001

## CERTIFICATE OF ANALYSIS

EnSafe/Allen and Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 2, 1992

Job Number: ENFA 51669

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |             |
|-----------------------|-------------|
| Client Project ID:    | NAS Memphis |
| Date Received by Lab: | 06/26/92    |
| Number of Samples:    | Ten (10)    |
| Sample Type:          | Soil        |

### I. Introduction

On 06/26/92, ten (10) soil samples arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen and Hoshall in Memphis, Tennessee, in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected, and soil samples are reported on a dry weight basis for CLP parameters.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

The samples were analyzed for organochlorine pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

A handwritten signature in cursive script, reading 'Alyce R. Moore', written over a horizontal line.

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7471, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 9010.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on two Finnigan OWA GC/MS/DS units. The sample runs generally went well; however, some problems due to matrix were encountered. For example, alternate ions had to be used in the quantification of several surrogates due to sample interference. Sample MW-06-6 had one surrogate outside QC limits, but a dilution of the sample for xylenes had all compliant surrogates.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample runs went well although several samples were diluted to reduce sample matrix interferences. Moderate to high levels of 2-methylnaphthalene were seen in some samples. Sample B-07-2 was diluted twentyfold resulting in a 2-methylnaphthalene value below the detection limit, but the sample matrix would not allow for a more concentrated analysis. Associated QC samples were analyzed with ITAS project ENFA 51649 sample B-08-10 for volatiles and B-08-4 for semivolatiles. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- E - Compound exceeded calibration range.
- D - Compound analyzed at secondary dilution.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

The samples were analyzed for organochlorine pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-4. The samples and associated method blank were treated to remove interferences using a mercury cleanup procedure.

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51669

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established. A continuing standard was analyzed with every ten samples. This check standard was compared to the initial linearity using acceptance criteria of  $\pm 15\%$  difference. Samples with nondetected analytes were not reanalyzed if the continuing standard analytes showed increased sensitivity (i.e., greater than + 15% difference). No major problems were encountered.

The samples were digested on 07/07/92 for ICP and GFAA. The samples for mercury analysis were prepared just prior to analysis. The CVAA analysis for mercury was performed on 07/15/92; the GFAA analyses for arsenic, lead, selenium, and thallium were performed on 07/08 to 07/14/92; the remaining metals were analyzed by ICP on 07/16/92. All run QC was acceptable. Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-4. No problems were encountered.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51669

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for cyanide by manual distillation of 5 g sample in 500 ml DI water followed by automated colorimetric determination using the LACHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-4, with acceptable results. No major problems were encountered.

0005

Facility ID #: 9-791683



**NAVY CLEAN  
ENSAFE/ALLEN & HOSHAL**  
(901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 2

N0026-CC118

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER N0026-CC118 FAX NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) A.M.

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |        |                |           | REMARKS |
|-------------------|-------------------|-----------|--------|----------------|-----------|---------|
|                   | BNA (CLP)         | CN (9010) | APP 18 | PSY/TOB (E080) | VOC (CLP) |         |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | BNA (CLP) | CN (9010) | APP 18 | PSY/TOB (E080) | VOC (CLP) | REMARKS   |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|-----------|-----------|--------|----------------|-----------|---|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |           |           |        |                |           |   |
| MW-05-6 (6-10')     | 6/24/92 | 11:00 | Scil 926    | 500ml brown bottle     | 4°C          | —        | 1                 | X         | X         | X      | X              |           | 2°C (OK from 6/26/92)<br>Note: Please bill this COC (N0026-CC118) separately from accompanying COC. |
| MW-05-8             |         | 11:00 |             | 2oz. jar               | 4°C          | —        | 1                 |           |           |        | X              |           |   |
| MW-06-4 (4-8')      |         | 15:00 |             | 500ml brown bottle     |              |          | 1                 | X         | X         | X      | X              |           |   |
| MW-06-6             |         | 15:00 |             | 2oz jar                |              |          | 1                 |           |           |        | X              |           |   |
| MW-08-4             | 6/25/92 | 12:00 |             | 2oz jar                |              |          | 1                 |           |           |        | X              |           |   |
| MW-08-14            |         | 12:00 |             | 2oz jar                |              |          | 1                 |           |           |        | X              |           |   |
| B-07-2              |         | 16:30 |             | 500ml brown bottle     |              |          | 1                 | X         | X         | X      | X              |           |   |
| B-09-4              | 6/24/92 | 10:00 |             | 2oz jar                |              |          | 1                 |           |           |        | X              |           |   |
| B-09-4              | 6/24/92 | 17:30 |             | 500ml brown bottle     |              |          | 1                 | X         | X         | X      | X              |           |   |

|   |   |  |   |   |                          |   |                          |
|---|---|--|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>A.M.</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>EnSafe</u><br>REASON <u>Shipment</u> | DATE <u>6/25/92</u><br>TIME <u>2:00</u> | RECEIVED BY:<br>SIGNATURE <u>Tim Mathis</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITMS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/26/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|---|---|--|---|---|--------------------------|---|--------------------------|

|   |  |  |
|---|--|--|
| METHOD OF SHIPMENT: <u>Fed Ex</u><br>SHIPMENT NO. <u>2495013732</u><br>SPECIAL INSTRUCTION: _____ | COMMENTS: <u>2°C (OK from 6/26/92)</u> | AFTER ANALYSIS, SAMPLES ARE TO BE:<br><input type="checkbox"/> DISPOSED OF (ADDITIONAL FEE)<br><input type="checkbox"/> STORED (90 DAYS MAX)<br><input type="checkbox"/> STORED OVER 90 DAYS (ADDITIONAL FEE)<br><input type="checkbox"/> RETURNED TO CUSTOMER |
|---|--|--|

ENFA 5166

0006

Facility ID #: 9-791683



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 2 OF 2  
NOC 26-C0118

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER NOC26-C0118 FAX NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |              |               |           | REMARKS              |
|-------------------|-------------------|-----------|--------------|---------------|-----------|----------------------|
|                   | BVA (CLP)         | CN (9010) | APP B Metals | PSY/PCB (ECC) | VOC (CLP) |                      |
| 1                 |                   |           |              |               | X         | 2°C (OK TAM 6/26/92) |
| 1                 | X                 | X         | X            | X             |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |
|                   |                   |           |              |               |           |                      |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | BVA (CLP) | CN (9010) | APP B Metals | PSY/PCB (ECC) | VOC (CLP) | REMARKS              |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|-----------|-----------|--------------|---------------|-----------|----------------------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |           |           |              |               |           |                      |
| B-15-2              | 6/25/92 | 14:30 | Self grab   | 2 oz jar               | 4°C          | —        | 1                 |           |           |              |               | X         | 2°C (OK TAM 6/26/92) |
| B-15-2 (2-6')       | ↓       | 14:30 | ↓           | 500 ml bottle          | ↓            | ↓        | 1                 | X         | X         | X            | X             |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |              |               |           |                      |

|  |  |  |   |   |                          |   |                          |
|--|--|--|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipment</u> | DATE <u>6/25/92</u><br>TIME <u>20:00</u> | RECEIVED RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>6/26/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|--|---|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Fed Ex SHIPMENT NO. 2495013732 SPECIAL INSTRUCTION: \_\_\_\_\_  
 COMMENTS: 2°C (OK TAM 6/26/92)  
 AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

ENFA 51.7

0007

PROJECT CODE: ENFA 51669

SAMPLE RANGE: TT0004-14

Page 1 of 1

| Sample Number(s)       | Relinquished by:  | Received by:       | Date/Time Out:  | Reason for Change of Custody: | Relinquished by: | Received by: | Date/Time In:   | Reason for Change of Custody: |
|------------------------|-------------------|--------------------|-----------------|-------------------------------|------------------|--------------|-----------------|-------------------------------|
| TT0004-09              | <i>Jim Math</i>   | <i>John</i>        | 6/26/92<br>1115 | CLP VOAs                      |                  |              |                 |                               |
| TT 0010-14             | K. Cedar          | <i>K.S. Fild</i>   | 7/1/92<br>0900  | BJA (9090)                    | <i>2-1</i>       | K. Cedar     | 7/1/92<br>1500  | STORAGE                       |
| TT 0010-14             | K. Cedar          | <i>C. Fild</i>     | 7/6/92<br>0915  | CW                            | <i>(H)</i>       | K. Cedar     | 7/6/92<br>1337  | "                             |
| TT 0010-14             | <i>Sa Summers</i> | <i>John</i>        | 7-6-92<br>1845  | ICP: GFHA; Hg                 | <i>John</i>      | K. Cedar     | 7/7/92<br>1720  | "                             |
| TT0010-14              | <i>Jim Math</i>   | <i>John</i>        | 7/14/92<br>1540 | Metals prep                   | <i>John</i>      | <i>John</i>  | 7-14-92<br>1615 | "                             |
| TT0010-14<br>TT0155    | K. Cedar          | <i>J. Levenson</i> | 7/20/92<br>0800 | PH.                           | <i>John</i>      | K. Cedar     | 7/20/92<br>1430 | "                             |
| Facility ID #: 9-79168 |                   |                    |                 |                               |                  |              |                 |                               |

| SAMPLE DISPOSITION RECORD |                           |              |                                     |
|---------------------------|---------------------------|--------------|-------------------------------------|
| Sample Number(s):         | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.:

MW084

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0006  
 Sample wt/vol: 4.0 (g/mL) G Lab File ID: TT0006DR  
 Level: (low/med) MED Date Received: 06/26/92  
 % Moisture: not dec. 22 Date Analyzed: 07/07/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|------------|---------------------------------|--|---|
| 74-87-3    | -----Chloromethane              | 1600   | U |
| 74-83-9    | -----Bromomethane               | 1600   | U |
| 75-01-4    | -----Vinyl Chloride             | 1600   | U |
| 75-00-3    | -----Chloroethane               | 1600   | U |
| 75-09-2    | -----Methylene Chloride         | 1600   | U |
| 67-64-1    | -----Acetone                    | 1600   | U |
| 75-15-0    | -----Carbon Disulfide           | 1600   | U |
| 75-35-4    | -----1,1-Dichloroethene         | 1600   | U |
| 75-34-3    | -----1,1-Dichloroethane         | 1600   | U |
| 540-59-0   | -----1,2-Dichloroethene (total) | 1600   | U |
| 67-66-3    | -----Chloroform                 | 1600   | U |
| 107-06-2   | -----1,2-Dichloroethane         | 1600   | U |
| 78-93-3    | -----2-Butanone                 | 1600   | U |
| 71-55-6    | -----1,1,1-Trichloroethane      | 1600   | U |
| 56-23-5    | -----Carbon Tetrachloride       | 1600   | U |
| 75-27-4    | -----Bromodichloromethane       | 1600   | U |
| 78-87-5    | -----1,2-Dichloropropane        | 1600   | U |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 1600   | U |
| 79-01-6    | -----Trichloroethene            | 1600   | U |
| 124-48-1   | -----Dibromochloromethane       | 1600   | U |
| 79-00-5    | -----1,1,2-Trichloroethane      | 1600   | U |
| 71-43-2    | -----Benzene                    | 2500   |   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 1600   | U |
| 75-25-2    | -----Bromoform                  | 1600   | U |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 1600   | U |
| 591-78-6   | -----2-Hexanone                 | 1600   | U |
| 127-18-4   | -----Tetrachloroethene          | 1600   | U |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 1600   | U |
| 108-88-3   | -----Toluene                    | 1600   | U |
| 108-90-7   | -----Chlorobenzene              | 1600   | U |
| 100-41-4   | -----Ethylbenzene               | 4600   |   |
| 100-42-5   | -----Styrene                    | 1600   | U |
| 1330-20-7  | -----Xylenes (total)            | 21000  |   |

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW0814

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0007  
 Sample wt/vol: 2.5 (g/mL) G Lab File ID: TT0007R2  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: not dec. 24 Date Analyzed: 07/07/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|            |                            |    |    |
|------------|----------------------------|----|----|
| 74-87-3    | Chloromethane              | 26 | U  |
| 74-83-9    | Bromomethane               | 26 | U  |
| 75-01-4    | Vinyl Chloride             | 26 | U  |
| 75-00-3    | Chloroethane               | 26 | U  |
| 75-09-2    | Methylene Chloride         | 12 | BJ |
| 67-64-1    | Acetone                    | 53 | B  |
| 75-15-0    | Carbon Disulfide           | 26 | U  |
| 75-35-4    | 1,1-Dichloroethene         | 26 | U  |
| 75-34-3    | 1,1-Dichloroethane         | 26 | U  |
| 540-59-0   | 1,2-Dichloroethene (total) | 26 | U  |
| 67-66-3    | Chloroform                 | 26 | U  |
| 107-06-2   | 1,2-Dichloroethane         | 26 | U  |
| 78-93-3    | 2-Butanone                 | 26 | U  |
| 71-55-6    | 1,1,1-Trichloroethane      | 26 | U  |
| 56-23-5    | Carbon Tetrachloride       | 26 | U  |
| 75-27-4    | Bromodichloromethane       | 26 | U  |
| 78-87-5    | 1,2-Dichloropropane        | 26 | U  |
| 10061-01-5 | cis-1,3-Dichloropropene    | 26 | U  |
| 79-01-6    | Trichloroethene            | 26 | U  |
| 124-48-1   | Dibromochloromethane       | 26 | U  |
| 79-00-5    | 1,1,2-Trichloroethane      | 26 | U  |
| 71-43-2    | Benzene                    | 26 | U  |
| 10061-02-6 | trans-1,3-Dichloropropene  | 26 | U  |
| 75-25-2    | Bromoform                  | 26 | U  |
| 108-10-1   | 4-Methyl-2-Pentanone       | 26 | U  |
| 591-78-6   | 2-Hexanone                 | 26 | U  |
| 127-18-4   | Tetrachloroethene          | 26 | U  |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 26 | U  |
| 108-88-3   | Toluene                    | 26 | U  |
| 108-90-7   | Chlorobenzene              | 26 | U  |
| 100-41-4   | Ethylbenzene               | 26 | U  |
| 100-42-5   | Styrene                    | 26 | U  |
| 1330-20-7  | Xylenes (total)            | 26 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW066DL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0005  
 Sample wt/vol: 4.0 (g/mL) G Lab File ID: TT0005D  
 Level: (low/med) MED Date Received: 06/26/92  
 % Moisture: not dec. 24 Date Analyzed: 07/07/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L <sup>JES</sup> <sub>7-2-92</sub> Q

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) | <u>UG/L</u> <sup>JES</sup> <sub>7-2-92</sub> <u>Q</u> |
|------------|---------------------------------|---|---|
| 74-87-3    | -----Chloromethane              | 1600                                    | U   |
| 74-83-9    | -----Bromomethane               | 1600                                    | U   |
| 75-01-4    | -----Vinyl Chloride             | 1600                                    | U   |
| 75-00-3    | -----Chloroethane               | 1600                                    | U   |
| 75-09-2    | -----Methylene Chloride         | 290                                     | BDJ   |
| 67-64-1    | -----Acetone                    | 1600                                    | U   |
| 75-15-0    | -----Carbon Disulfide           | 1600                                    | U   |
| 75-35-4    | -----1,1-Dichloroethene         | 1600                                    | U   |
| 75-34-3    | -----1,1-Dichloroethane         | 1600                                    | U   |
| 540-59-0   | -----1,2-Dichloroethene (total) | 1600                                    | U   |
| 67-66-3    | -----Chloroform                 | 1600                                    | U   |
| 107-06-2   | -----1,2-Dichloroethane         | 1600                                    | U   |
| 78-93-3    | -----2-Butanone                 | 1600                                    | U   |
| 71-55-6    | -----1,1,1-Trichloroethane      | 1600                                    | U   |
| 56-23-5    | -----Carbon Tetrachloride       | 1600                                    | U   |
| 75-27-4    | -----Bromodichloromethane       | 1600                                    | U   |
| 78-87-5    | -----1,2-Dichloropropane        | 1600                                    | U   |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 1600                                    | U   |
| 79-01-6    | -----Trichloroethene            | 1600                                    | U   |
| 124-48-1   | -----Dibromochloromethane       | 1600                                    | U   |
| 79-00-5    | -----1,1,2-Trichloroethane      | 1600                                    | U   |
| 71-43-2    | -----Benzene                    | 1600                                    | U   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 1600                                    | U   |
| 75-25-2    | -----Bromoform                  | 1600                                    | U   |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 1600                                    | U   |
| 591-78-6   | -----2-Hexanone                 | 1600                                    | U   |
| 127-18-4   | -----Tetrachloroethene          | 1600                                    | U   |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 1600                                    | U   |
| 108-88-3   | -----Toluene                    | 1600                                    | U   |
| 108-90-7   | -----Chlcrobenzene              | 1600                                    | U   |
| 100-41-4   | -----Ethylbenzene               | 920                                     | DJ  |
| 100-42-5   | -----Styrene                    | 1600                                    | U   |
| 1330-20-7  | -----Xylenes (total)            | 5600                                    | D   |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW066

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0005  
 Sample wt/vol: 5.0 (g/mL) G Lab File ID: TT0005  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: not dec. 24 Date Analyzed: 07/02/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|            |                                 |     |    |
|------------|---------------------------------|-----|----|
| 74-87-3    | -----Chloromethane              | 13  | U  |
| 74-83-9    | -----Bromomethane               | 13  | U  |
| 75-01-4    | -----Vinyl Chloride             | 13  | U  |
| 75-00-3    | -----Chloroethane               | 13  | U  |
| 75-09-2    | -----Methylene Chloride         | 8   | BJ |
| 67-64-1    | -----Acetone                    | 17  | B  |
| 75-15-0    | -----Carbon Disulfide           | 13  | U  |
| 75-35-4    | -----1,1-Dichloroethene         | 13  | U  |
| 75-34-3    | -----1,1-Dichloroethane         | 13  | U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 13  | U  |
| 67-66-3    | -----Chloroform                 | 13  | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 13  | U  |
| 78-93-3    | -----2-Butanone                 | 13  | U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 13  | U  |
| 56-23-5    | -----Carbon Tetrachloride       | 13  | U  |
| 75-27-4    | -----Bromodichloromethane       | 13  | U  |
| 78-87-5    | -----1,2-Dichloropropane        | 13  | U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 13  | U  |
| 79-01-6    | -----Trichloroethene            | 13  | U  |
| 124-48-1   | -----Dibromochloromethane       | 13  | U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 13  | U  |
| 71-43-2    | -----Benzene                    | 3   | J  |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 13  | U  |
| 75-25-2    | -----Bromoform                  | 13  | U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 13  | U  |
| 591-78-6   | -----2-Hexanone                 | 13  | U  |
| 127-18-4   | -----Tetrachloroethene          | 13  | U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 13  | U  |
| 108-88-3   | -----Toluene                    | 13  | U  |
| 108-90-7   | -----Chlorobenzene              | 13  | U  |
| 100-41-4   | -----Ethylbenzene               | 62  |    |
| 100-42-5   | -----Styrene                    | 13  | U  |
| 1330-20-7  | -----Xylenes (total)            | 380 | E  |

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW058

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0004  
 Sample wt/vol: 5.0 (g/mL) G Lab File ID: TT0004  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: not dec. 21 Date Analyzed: 07/02/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|            |                                 |     |    |
|------------|---------------------------------|-----|----|
| 74-87-3    | -----Chloromethane              | 13  | U  |
| 74-83-9    | -----Bromomethane               | 13  | U  |
| 75-01-4    | -----Vinyl Chloride             | 13  | U  |
| 75-00-3    | -----Chloroethane               | 13  | U  |
| 75-09-2    | -----Methylene Chloride         | 6   | BJ |
| 67-64-1    | -----Acetone                    | 120 | B  |
| 75-15-0    | -----Carbon Disulfide           | 13  | U  |
| 75-35-4    | -----1,1-Dichloroethene         | 13  | U  |
| 75-34-3    | -----1,1-Dichloroethane         | 13  | U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 13  | U  |
| 67-66-3    | -----Chloroform                 | 13  | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 13  | U  |
| 78-93-3    | -----2-Butanone                 | 13  | U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 13  | U  |
| 56-23-5    | -----Carbon Tetrachloride       | 13  | U  |
| 75-27-4    | -----Bromodichloromethane       | 13  | U  |
| 78-87-5    | -----1,2-Dichloropropane        | 13  | U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 13  | U  |
| 79-01-6    | -----Trichloroethene            | 13  | U  |
| 124-48-1   | -----Dibromochloromethane       | 13  | U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 13  | U  |
| 71-43-2    | -----Benzene                    | 13  | U  |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 13  | U  |
| 75-25-2    | -----Bromoform                  | 13  | U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 13  | U  |
| 591-78-6   | -----2-Hexanone                 | 13  | U  |
| 127-18-4   | -----Tetrachloroethene          | 13  | U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 13  | U  |
| 108-88-3   | -----Toluene                    | 13  | U  |
| 108-90-7   | -----Chlorobenzene              | 13  | U  |
| 100-41-4   | -----Ethylbenzene               | 13  | U  |
| 100-42-5   | -----Styrene                    | 13  | U  |
| 1330-20-7  | -----Xylenes (total)            | 13  | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B094

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0008  
 Sample wt/vol: 4.0 (g/mL) G Lab File ID: TT0008R  
 Level: (low/med) MED Date Received: 06/26/92  
 % Moisture: not dec. 20 Date Analyzed: 07/07/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

| CAS NO.    | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q            |
|------------|----------------------------|--|--------------|
| 74-87-3    | Chloromethane              | 1600   | U            |
| 74-83-9    | Bromomethane               | 1600   | U            |
| 75-01-4    | Vinyl Chloride             | 1600   | U            |
| 75-00-3    | Chloroethane               | 1600   | U            |
| 75-09-2    | Methylene Chloride         | 400  | BJ           |
| 67-64-1    | Acetone                    | 15000  |              |
| 75-15-0    | Carbon Disulfide           | 1600   | U            |
| 75-35-4    | 1,1-Dichloroethene         | 1600   | U            |
| 75-34-3    | 1,1-Dichloroethane         | 1600   | U            |
| 540-59-0   | 1,2-Dichloroethene (total) | 1600   | U            |
| 67-66-3    | Chloroform                 | 1600   | U            |
| 107-06-2   | 1,2-Dichloroethane         | 1600   | U            |
| 78-93-3    | 2-Butanone                 | 1600   | U            |
| 71-55-6    | 1,1,1-Trichloroethane      | 1600   | U            |
| 56-23-5    | Carbon Tetrachloride       | 1600   | U            |
| 75-27-4    | Bromodichloromethane       | 1600   | U            |
| 78-87-5    | 1,2-Dichloropropane        | 1600   | U            |
| 10061-01-5 | cis-1,3-Dichloropropene    | 1600   | U            |
| 79-01-6    | Trichloroethene            | 1600   | U            |
| 124-48-1   | Dibromochloromethane       | 1600   | U            |
| 79-00-5    | 1,1,2-Trichloroethane      | 1600   | U            |
| 71-43-2    | Benzene                    | 1600   | U            |
| 10061-02-6 | trans-1,3-Dichloropropene  | 1600   | U            |
| 75-25-2    | Bromoform                  | 1600   | U            |
| 108-10-1   | 4-Methyl-2-Pentanone       | 1600   | U            |
| 591-78-6   | 2-Hexanone                 | 1600   | U            |
| 127-18-4   | Tetrachloroethene          | 1600   | U            |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 1600   | U            |
| 108-88-3   | Toluene                    | 1600   | U            |
| 108-90-7   | Chlorobenzene              | 1600   | U            |
| 100-41-4   | Ethylbenzene               | 1600   | U            |
| 100-42-5   | Styrene                    | 1600   | U            |
| 1330-20-7  | Xylenes (total)            | 1500   | <del>U</del> |

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1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B152

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B072

Matrix: (soil/water) SOIL Lab Sample ID: TT0009

Sample wt/vol: 1.0 (g/mL) G Lab File ID: TT0009

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: not dec. 20 Date Analyzed: 07/07/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

| CAS NO.    | COMPOUND                        | Q     |
|------------|---------------------------------|-------|
| 74-87-3    | -----Chloromethane              | 62 U  |
| 74-83-9    | -----Bromomethane               | 62 U  |
| 75-01-4    | -----Vinyl Chloride             | 62 U  |
| 75-00-3    | -----Chloroethane               | 62 U  |
| 75-09-2    | -----Methylene Chloride         | 120 B |
| 67-64-1    | -----Acetone                    | 270 B |
| 75-15-0    | -----Carbon Disulfide           | 62 U  |
| 75-35-4    | -----1,1-Dichloroethene         | 62 U  |
| 75-34-3    | -----1,1-Dichloroethane         | 62 U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 62 U  |
| 67-66-3    | -----Chloroform                 | 62 U  |
| 107-06-2   | -----1,2-Dichloroethane         | 62 U  |
| 78-93-3    | -----2-Butanone                 | 62 U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 62 U  |
| 56-23-5    | -----Carbon Tetrachloride       | 62 U  |
| 75-27-4    | -----Bromodichloromethane       | 62 U  |
| 78-87-5    | -----1,2-Dichloropropane        | 62 U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 62 U  |
| 79-01-6    | -----Trichloroethene            | 62 U  |
| 124-48-1   | -----Dibromochloromethane       | 62 U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 62 U  |
| 71-43-2    | -----Benzene                    | 110   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 62 U  |
| 75-25-2    | -----Bromoform                  | 62 U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 62 U  |
| 591-78-6   | -----2-Hexanone                 | 62 U  |
| 127-18-4   | -----Tetrachloroethene          | 62 U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 62 U  |
| 108-88-3   | -----Toluene                    | 62 U  |
| 108-90-7   | -----Chlorobenzene              | 62 U  |
| 100-41-4   | -----Ethylbenzene               | 110   |
| 100-42-5   | -----Styrene                    | 62 U  |
| 1330-20-7  | -----Xylenes (total)            | 62 U  |

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B072

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094

Matrix: (soil/water) SOIL Lab Sample ID: TT0012

Sample wt/vol: 30.3 (g/mL) G Lab File ID: TT0012D

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: 20 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 1.3

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS | Q |
|----------|------------------------------|---------------------|---|
| 108-95-2 | Phenol                       | 8200                | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 8200                | U |
| 95-57-8  | 2-Chlorophenol               | 8200                | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 8200                | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 8200                | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 8200                | U |
| 95-48-7  | 2-Methylphenol               | 8200                | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 8200                | U |
| 106-44-5 | 4-Methylphenol               | 8200                | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 8200                | U |
| 67-72-1  | Hexachloroethane             | 8200                | U |
| 98-95-3  | Nitrobenzene                 | 8200                | U |
| 78-59-1  | Isophorone                   | 8200                | U |
| 88-75-5  | 2-Nitrophenol                | 8200                | U |
| 105-67-9 | 2,4-Dimethylphenol           | 8200                | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 8200                | U |
| 120-83-2 | 2,4-Dichlorophenol           | 8200                | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 8200                | U |
| 91-20-3  | Naphthalene                  | 3200                | J |
| 106-47-8 | 4-Chloroaniline              | 8200                | U |
| 87-68-3  | Hexachlorobutadiene          | 8200                | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 8200                | U |
| 91-57-6  | 2-Methylnaphthalene          | 2000                | J |
| 77-47-4  | Hexachlorocyclopentadiene    | 8200                | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 8200                | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 20000               | U |
| 91-58-7  | 2-Chloronaphthalene          | 8200                | U |
| 88-74-4  | 2-Nitroaniline               | 20000               | U |
| 131-11-3 | Dimethyl Phthalate           | 8200                | U |
| 208-96-8 | Acenaphthylene               | 8200                | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 8200                | U |
| 99-09-2  | 3-Nitroaniline               | 20000               | U |
| 83-32-9  | Acenaphthene                 | 8200                | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B072

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094

Matrix: (soil/water) SOIL Lab Sample ID: TT0012

Sample wt/vol: 30.3 (g/mL) G Lab File ID: TT0012D

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: 20 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 7.3

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.        | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------------|----------------------------|--|---|
| 51-28-5-----   | 2,4-Dinitrophenol          | 20000  | U |
| 100-02-7-----  | 4-Nitrophenol              | 20000  | U |
| 132-64-9-----  | Dibenzofuran               | 8200   | U |
| 121-14-2-----  | 2,4-Dinitrotoluene         | 8200   | U |
| 84-66-2-----   | Diethylphthalate           | 8200   | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether | 8200   | U |
| 86-73-7-----   | Fluorene                   | 8200   | U |
| 100-01-6-----  | 4-Nitroaniline             | 20000  | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol | 20000  | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1) | 8200   | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether  | 8200   | U |
| 118-74-1-----  | Hexachlorobenzene          | 8200   | U |
| 87-86-5-----   | Pentachlorophenol          | 20000  | U |
| 85-01-8-----   | Phenanthrene               | 8200   | U |
| 120-12-7-----  | Anthracene                 | 8200   | U |
| 86-74-8-----   | Carbazole                  | 8200   | U |
| 84-74-2-----   | Di-n-Butylphthalate        | 8200   | U |
| 206-44-0-----  | Fluoranthene               | 8200   | U |
| 129-00-0-----  | Pyrene                     | 8200   | U |
| 85-68-7-----   | Butylbenzylphthalate       | 8200   | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine     | 8200   | U |
| 56-55-3-----   | Benzo(a)Anthracene         | 8200   | U |
| 218-01-9-----  | Chrysene                   | 8200   | U |
| 117-81-7-----  | bis(2-Ethylhexyl)Phthalate | 2000   | J |
| 117-84-0-----  | Di-n-Octyl Phthalate       | 8200   | U |
| 205-99-2-----  | Benzo(b)Fluoranthene       | 8200   | U |
| 207-08-9-----  | Benzo(k)Fluoranthene       | 8200   | U |
| 50-32-8-----   | Benzo(a)Pyrene             | 8200   | U |
| 193-39-5-----  | Indeno(1,2,3-cd)Pyrene     | 8200   | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene      | 8200   | U |
| 191-24-2-----  | Benzo(g,h,i)Perylene       | 8200   | U |

(1) - Cannot be separated from Diphenylamine

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B094

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0013  
 Sample wt/vol: 30.1 (g/mL) G Lab File ID: TT0013D  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: 22 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 5.0  
 GPC Cleanup: (Y/N) Y pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------|------------------------------|--|---|
| 108-95-2 | Phenol                       | 2100   | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 2100   | U |
| 95-57-8  | 2-Chlorophenol               | 2100   | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 2100   | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 2100   | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 2100   | U |
| 95-48-7  | 2-Methylphenol               | 2100   | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 2100   | U |
| 106-44-5 | 4-Methylphenol               | 2100   | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 2100   | U |
| 67-72-1  | Hexachloroethane             | 2100   | U |
| 98-95-3  | Nitrobenzene                 | 2100   | U |
| 78-59-1  | Isophorone                   | 2100   | U |
| 88-75-5  | 2-Nitrophenol                | 2100   | U |
| 105-67-9 | 2,4-Dimethylphenol           | 2100   | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 2100   | U |
| 120-83-2 | 2,4-Dichlorophenol           | 2100   | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 2100   | U |
| 91-20-3  | Naphthalene                  | 530  | J |
| 106-47-8 | 4-Chloroaniline              | 2100   | U |
| 87-68-3  | Hexachlorobutadiene          | 2100   | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 2100   | U |
| 91-57-6  | 2-Methylnaphthalene          | 3000   |   |
| 77-47-4  | Hexachlorocyclopentadiene    | 2100   | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 2100   | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 5100   | U |
| 91-58-7  | 2-Chloronaphthalene          | 2100   | U |
| 88-74-4  | 2-Nitroaniline               | 5100   | U |
| 131-11-3 | Dimethyl Phthalate           | 2100   | U |
| 208-96-8 | Acenaphthylene               | 2100   | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 2100   | U |
| 99-09-2  | 3-Nitroaniline               | 5100   | U |
| 83-32-9  | Acenaphthene                 | 2100   | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B094

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0013  
 Sample wt/vol: 30.1 (g/mL) G Lab File ID: TT0013D  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: 22 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 5.0  
 GPC Cleanup: (Y/N) Y pH: 7.0

| CAS NO.        | COMPOUND                    | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------------|-----------------------------|--|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 5100   | U |
| 100-02-7-----  | 4-Nitrophenol               | 5100   | U |
| 132-64-9-----  | Dibenzofuran                | 2100   | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 2100   | U |
| 84-66-2-----   | Diethylphthalate            | 2100   | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 2100   | U |
| 86-73-7-----   | Fluorene                    | 2100   | U |
| 100-01-6-----  | 4-Nitroaniline              | 5100   | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 5100   | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 2100   | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 2100   | U |
| 118-74-1-----  | Hexachlorobenzene           | 2100   | U |
| 87-86-5-----   | Pentachlorophenol           | 5100   | U |
| 85-01-8-----   | Phenanthrene                | 2100   | U |
| 120-12-7-----  | Anthracene                  | 2100   | U |
| 86-74-8-----   | Carbazole                   | 2100   | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 2100   | U |
| 206-44-0-----  | Fluoranthene                | 2100   | U |
| 129-00-0-----  | Pyrene                      | 2100   | U |
| 85-68-7-----   | Butylbenzylphthalate        | 2100   | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 2100   | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 2100   | U |
| 218-01-9-----  | Chrysene                    | 2100   | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 320  | J |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 2100   | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 2100   | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 2100   | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 2100   | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 2100   | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene       | 2100   | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 2100   | U |

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B152

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0014  
 Sample wt/vol: 30.2 (g/mL) G Lab File ID: TT0014D  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: 19 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 20.0  
 GPC Cleanup: (Y/N) Y pH: 8.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------|------------------------------|--|---|
| 108-95-2 | Phenol                       | 8100   | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 8100   | U |
| 95-57-8  | 2-Chlorophenol               | 8100   | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 8100   | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 8100   | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 8100   | U |
| 95-48-7  | 2-Methylphenol               | 8100   | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 8100   | U |
| 106-44-5 | 4-Methylphenol               | 8100   | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 8100   | U |
| 67-72-1  | Hexachloroethane             | 8100   | U |
| 98-95-3  | Nitrobenzene                 | 8100   | U |
| 78-59-1  | Isophorone                   | 8100   | U |
| 88-75-5  | 2-Nitrophenol                | 8100   | U |
| 105-67-9 | 2,4-Dimethylphenol           | 8100   | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 8100   | U |
| 120-83-2 | 2,4-Dichlorophenol           | 8100   | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 8100   | U |
| 91-20-3  | Naphthalene                  | 6300   | J |
| 106-47-8 | 4-Chloroaniline              | 8100   | U |
| 87-68-3  | Hexachlorobutadiene          | 8100   | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 8100   | U |
| 91-57-6  | 2-Methylnaphthalene          | 24000  |   |
| 77-47-4  | Hexachlorocyclopentadiene    | 8100   | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 8100   | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 20000  | U |
| 91-58-7  | 2-Chloronaphthalene          | 8100   | U |
| 88-74-4  | 2-Nitroaniline               | 20000  | U |
| 131-11-3 | Dimethyl Phthalate           | 8100   | U |
| 208-96-8 | Acenaphthylene               | 8100   | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 8100   | U |
| 99-09-2  | 3-Nitroaniline               | 20000  | U |
| 83-32-9  | Acenaphthene                 | 8100   | U |

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

B152

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094

Matrix: (soil/water) SOIL Lab Sample ID: TT0014

Sample wt/vol: 30.2 (g/mL) G Lab File ID: TT0014D

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: 19 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 8.1

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

CAS NO. COMPOUND

|                |                            |       |   |
|----------------|----------------------------|-------|---|
| 51-28-5-----   | 2,4-Dinitrophenol          | 20000 | U |
| 100-02-7-----  | 4-Nitrophenol              | 20000 | U |
| 132-64-9-----  | Dibenzofuran               | 8100  | U |
| 121-14-2-----  | 2,4-Dinitrotoluene         | 8100  | U |
| 84-66-2-----   | Diethylphthalate           | 8100  | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether | 8100  | U |
| 86-73-7-----   | Fluorene                   | 8100  | U |
| 100-01-6-----  | 4-Nitroaniline             | 20000 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol | 20000 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1) | 8100  | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether  | 8100  | U |
| 118-74-1-----  | Hexachlorobenzene          | 8100  | U |
| 87-86-5-----   | Pentachlorophenol          | 20000 | U |
| 85-01-8-----   | Phenanthrene               | 8100  | U |
| 120-12-7-----  | Anthracene                 | 8100  | U |
| 86-74-8-----   | Carbazole                  | 8100  | U |
| 84-74-2-----   | Di-n-Butylphthalate        | 8100  | U |
| 206-44-0-----  | Fluoranthene               | 8100  | U |
| 129-00-0-----  | Pyrene                     | 8100  | U |
| 85-68-7-----   | Butylbenzylphthalate       | 8100  | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine     | 8100  | U |
| 56-55-3-----   | Benzo(a)Anthracene         | 8100  | U |
| 218-01-9-----  | Chrysene                   | 8100  | U |
| 117-81-7-----  | bis(2-Ethylhexyl)Phthalate | 8100  | U |
| 117-84-0-----  | Di-n-Octyl Phthalate       | 8100  | U |
| 205-99-2-----  | Benzo(b)Fluoranthene       | 8100  | U |
| 207-08-9-----  | Benzo(k)Fluoranthene       | 8100  | U |
| 50-32-8-----   | Benzo(a)Pyrene             | 8100  | U |
| 193-39-5-----  | Indeno(1,2,3-cd)Pyrene     | 8100  | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene      | 8100  | U |
| 191-24-2-----  | Benzo(g,h,i)Perylene       | 8100  | U |

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW056

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0010  
 Sample wt/vol: 30.1 (g/mL) G Lab File ID: TT0010  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: 22 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/17/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 1.3

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS: | Q |
|----------|------------------------------|----------------------|---|
| 108-95-2 | Phenol                       | 420                  | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 420                  | U |
| 95-57-8  | 2-Chlorophenol               | 420                  | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 420                  | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 420                  | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 420                  | U |
| 95-48-7  | 2-Methylphenol               | 420                  | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 420                  | U |
| 106-44-5 | 4-Methylphenol               | 420                  | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 420                  | U |
| 67-72-1  | Hexachloroethane             | 420                  | U |
| 98-95-3  | Nitrobenzene                 | 420                  | U |
| 78-59-1  | Isophorone                   | 420                  | U |
| 88-75-5  | 2-Nitrophenol                | 420                  | U |
| 105-67-9 | 2,4-Dimethylphenol           | 420                  | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 420                  | U |
| 120-83-2 | 2,4-Dichlorophenol           | 420                  | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 420                  | U |
| 91-20-3  | Naphthalene                  | 420                  | U |
| 106-47-8 | 4-Chloroaniline              | 420                  | U |
| 87-68-3  | Hexachlorobutadiene          | 420                  | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 420                  | U |
| 91-57-6  | 2-Methylnaphthalene          | 420                  | U |
| 77-47-4  | Hexachlorocyclopentadiene    | 420                  | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 420                  | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 1000                 | U |
| 91-58-7  | 2-Chloronaphthalene          | 420                  | U |
| 88-74-4  | 2-Nitroaniline               | 1000                 | U |
| 131-11-3 | Dimethyl Phthalate           | 420                  | U |
| 208-96-8 | Acenaphthylene               | 420                  | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 420                  | U |
| 99-09-2  | 3-Nitroaniline               | 1000                 | U |
| 83-32-9  | Acenaphthene                 | 420                  | U |

1C

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW056

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094

Matrix: (soil/water) SOIL Lab Sample ID: TT0010

Sample wt/vol: 30.1 (g/mL) G Lab File ID: TT0010

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: 22 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/17/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.   | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|-----------|----------------------------|--|---|
| 51-28-5   | 2,4-Dinitrophenol          | 1000   | U |
| 100-02-7  | 4-Nitrophenol              | 1000   | U |
| 132-64-9  | Dibenzofuran               | 420  | U |
| 121-14-2  | 2,4-Dinitrotoluene         | 420  | U |
| 84-66-2   | Diethylphthalate           | 420  | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 420  | U |
| 86-73-7   | Fluorene                   | 420  | U |
| 100-01-6  | 4-Nitroaniline             | 1000   | U |
| 534-52-1  | 4,6-Dinitro-2-Methylphenol | 1000   | U |
| 86-30-6   | N-Nitrosodiphenylamine (1) | 420  | U |
| 101-55-3  | 4-Bromophenyl-phenylether  | 420  | U |
| 118-74-1  | Hexachlorobenzene          | 420  | U |
| 87-86-5   | Pentachlorophenol          | 1000   | U |
| 85-01-8   | Phenanthrene               | 420  | U |
| 120-12-7  | Anthracene                 | 420  | U |
| 86-74-8   | Carbazole                  | 420  | U |
| 84-74-2   | Di-n-Butylphthalate        | 420  | U |
| 206-44-0  | Fluoranthene               | 420  | U |
| 129-00-0  | Pyrene                     | 420  | U |
| 85-68-7   | Butylbenzylphthalate       | 420  | U |
| 91-94-1   | 3,3'-Dichlorobenzidine     | 420  | U |
| 56-55-3   | Benzo(a)Anthracene         | 420  | U |
| 218-01-9  | Chrysene                   | 420  | U |
| 117-81-7  | bis(2-Ethylhexyl)Phthalate | 370  | J |
| 117-84-0  | Di-n-Octyl Phthalate       | 420  | U |
| 205-99-2  | Benzo(b)Fluoranthene       | 420  | U |
| 207-08-9  | Benzo(k)Fluoranthene       | 420  | U |
| 50-32-8   | Benzo(a)Pyrene             | 420  | U |
| 193-39-5  | Indeno(1,2,3-cd)Pyrene     | 420  | U |
| 53-70-3   | Dibenz(a,h)Anthracene      | 420  | U |
| 191-24-2  | Benzo(g,h,i)Perylene       | 420  | U |

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW064

b Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094

Matrix: (soil/water) SOIL Lab Sample ID: TT0011

Sample wt/vol: 30.0 (g/mL) G Lab File ID: TT0011

Level: (low/med) LOW Date Received: 06/26/92

% Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/17/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.5

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------|------------------------------|--|---|
| 108-95-2 | Phenol                       | 420  | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 420  | U |
| 95-57-8  | 2-Chlorophenol               | 420  | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 420  | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 420  | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 420  | U |
| 95-48-7  | 2-Methylphenol               | 420  | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 420  | U |
| 106-44-5 | 4-Methylphenol               | 420  | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 420  | U |
| 67-72-1  | Hexachloroethane             | 420  | U |
| 98-95-3  | Nitrobenzene                 | 420  | U |
| 78-59-1  | Isophorone                   | 420  | U |
| 88-75-5  | 2-Nitrophenol                | 420  | U |
| 105-67-9 | 2,4-Dimethylphenol           | 420  | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 420  | U |
| 120-83-2 | 2,4-Dichlorophenol           | 420  | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 420  | U |
| 91-20-3  | Naphthalene                  | 280  | J |
| 106-47-8 | 4-Chloroaniline              | 420  | U |
| 87-68-3  | Hexachlorobutadiene          | 420  | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 420  | U |
| 91-57-6  | 2-Methylnaphthalene          | 100  | J |
| 77-47-4  | Hexachlorocyclopentadiene    | 420  | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 420  | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 1000   | U |
| 91-58-7  | 2-Chloronaphthalene          | 420  | U |
| 88-74-4  | 2-Nitroaniline               | 1000   | U |
| 131-11-3 | Dimethyl Phthalate           | 420  | U |
| 208-96-8 | Acenaphthylene               | 420  | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 420  | U |
| 99-09-2  | 3-Nitroaniline               | 1000   | U |
| 83-32-9  | Acenaphthene                 | 420  | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW064

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B094  
 Matrix: (soil/water) SOIL Lab Sample ID: TT0011  
 Sample wt/vol: 30.0 (g/mL) G Lab File ID: TT0011  
 Level: (low/med) LOW Date Received: 06/26/92  
 % Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/17/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 7.5

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

|                |                             |      |   |
|----------------|-----------------------------|------|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 1000 | U |
| 100-02-7-----  | 4-Nitrophenol               | 1000 | U |
| 132-64-9-----  | Dibenzofuran                | 420  | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 420  | U |
| 84-66-2-----   | Diethylphthalate            | 420  | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 420  | U |
| 86-73-7-----   | Fluorene                    | 420  | U |
| 100-01-6-----  | 4-Nitroaniline              | 1000 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 1000 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 420  | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 420  | U |
| 118-74-1-----  | Hexachlorobenzene           | 420  | U |
| 87-86-5-----   | Pentachlorophenol           | 1000 | U |
| 85-01-8-----   | Phenanthrene                | 420  | U |
| 120-12-7-----  | Anthracene                  | 420  | U |
| 86-74-8-----   | Carbazole                   | 420  | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 420  | U |
| 206-44-0-----  | Fluoranthene                | 420  | U |
| 129-00-0-----  | Pyrene                      | 420  | U |
| 85-68-7-----   | Butylbenzylphthalate        | 420  | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 420  | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 420  | U |
| 218-01-9-----  | Chrysene                    | 420  | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 180  | J |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 420  | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 420  | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 420  | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 420  | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 420  | U |
| 53-70-3-----   | Dibenz(a,h) Anthracene      | 420  | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 420  | U |

(1) - Cannot be separated from Diphenylamine

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Soil

Client Sample ID: MW-05-6 (6-10')

Lab Sample ID: TT0010

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 400 U                | 4,4'-DDT              | 400 U                |
| β-BHC              | 400 U                | endrin aldehyde       | 800 U                |
| δ-BHC              | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| γ-BHC              | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92  
Date of Analysis: 07/05/92

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g}/\text{kg}$  (ppb)

Sample Matrix: Soil

Client Sample ID: MW-06-4 (4-8')

Lab Sample ID: TT0011

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 400 U                | 4,4'-DDT              | 400 U                |
| $\beta$ -BHC       | 400 U                | endrin aldehyde       | 800 U                |
| $\delta$ -BHC      | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| $\gamma$ -BHC      | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92

Date of Analysis: 07/05/92

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Soil

Client Sample ID: B-07-2  
Lab Sample ID: TT0012

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 400 U                | 4,4'-DDT              | 400 U                |
| β-BHC              | 400 U                | endrin aldehyde       | 800 U                |
| δ-BHC              | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| γ-BHC              | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92  
Date of Analysis: 07/05/92

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g}/\text{kg}$  (ppb)

Sample Matrix: Soil

Client Sample ID: B-09-4  
Lab Sample ID: TT0013

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 400 U                | 4,4'-DDT              | 400 U                |
| $\beta$ -BHC       | 400 U                | endrin aldehyde       | 800 U                |
| $\delta$ -BHC      | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| $\gamma$ -BHC      | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92  
Date of Analysis: 07/05/92

Ensafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Soil

Client Sample ID: B-15-2 (2-6')

Lab Sample ID: TT0014

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 400 U                | 4,4'-DDT              | 400 U                |
| β-BHC              | 400 U                | endrin aldehyde       | 800 U                |
| δ-BHC              | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| γ-BHC              | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92

Date of Analysis: 07/05/92

1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-05-6

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: NAS-MEMPHI \_\_\_\_\_  
 Lab Code: ITSTU\_ Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B-08-4  
 Matrix (soil/water): SOIL\_ Lab Sample ID: TT0010\_\_\_\_\_  
 Level (low/med): LOW\_ Date Received: 06/26/92  
 % Solids: 78.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 0.51          | U |   | F  |
| 7440-38-2 | Arsenic   | 14.7          |   |   | F  |
| 7440-39-3 | Barium    | 312           |   |   | P  |
| 7440-41-7 | Beryllium | 0.74          |   |   | P  |
| 7440-43-9 | Cadmium   | 0.64          | U | N | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 16.5          |   | N | P  |
| 7440-48-4 | Cobalt    | 14.5          |   |   | P  |
| 7440-50-8 | Copper    | 12.7          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 11.7          |   |   | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.04          |   |   | CV |
| 7440-02-0 | Nickel    | 27.0          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 0.26          | U | W | F  |
| 7440-22-4 | Silver    | 0.64          | U | N | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 0.27          | B |   | F  |
| 7440-62-2 | Vanadium  | 34.5          |   | N | P  |
| 7440-66-6 | Zinc      | 67.6          |   | N | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: COARSE

Color After: YELLOW \_\_\_\_\_ Clarity After: CLEAR \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-06-4

Lab Name: ITAS\_KNOXVILLE Contract: NAS-MEMPHI

Lab Code: ITSTU Case No.: 51669 SAS No.: SDG No.: B-08-4

Matrix (soil/water): SOIL Lab Sample ID: TT0011

Level (low/med): LOW Date Received: 06/26/92

% Solids: 79.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 0.51          | U | W | F  |
| 7440-38-2 | Arsenic   | 2.5           |   |   | F  |
| 7440-39-3 | Barium    | 272           |   |   | P  |
| 7440-41-7 | Beryllium | 0.77          |   |   | P  |
| 7440-43-9 | Cadmium   | 0.96          |   | N | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 15.3          |   | N | P  |
| 7440-48-4 | Cobalt    | 10.7          |   |   | P  |
| 7440-50-8 | Copper    | 10.2          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 10.2          |   |   | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.04          |   |   | CV |
| 7440-02-0 | Nickel    | 14.4          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 0.26          | B | W | F  |
| 7440-22-4 | Silver    | 0.63          | U | N | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 0.25          | U |   | F  |
| 7440-62-2 | Vanadium  | 25.9          |   | N | P  |
| 7440-66-6 | Zinc      | 58.2          |   | N | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:



1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B-07-4

2  
H  
LW

Lab Name: ITAS\_KNOXVILLE Contract: NAS-MEMPHI

Lab Code: ITSTU Case No.: 51669 SAS No.: SDG No.: B-08-4

Matrix (soil/water): SOIL Lab Sample ID: TT0012

Level (low/med): LOW Date Received: 06/26/92

% Solids: 79.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 0.50          | U |   | F  |
| 7440-38-2 | Arsenic   | 12.0          |   |   | F  |
| 7440-39-3 | Barium    | 151           |   |   | P  |
| 7440-41-7 | Beryllium | 0.72          |   |   | P  |
| 7440-43-9 | Cadmium   | 0.63          | U | N | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 17.3          |   | N | P  |
| 7440-48-4 | Cobalt    | 10.6          |   |   | P  |
| 7440-50-8 | Copper    | 17.4          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 14.1          |   |   | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.03          |   |   | CV |
| 7440-02-0 | Nickel    | 14.4          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 0.25          | U | W | F  |
| 7440-22-4 | Silver    | 0.63          | U | N | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 0.28          | B |   | F  |
| 7440-62-2 | Vanadium  | 36.4          |   | N | P  |
| 7440-66-6 | Zinc      | 63.5          |   | N | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

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1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B-09-4

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: NAS-MEMPHI \_\_\_\_\_  
 Lab Code: ITSTU\_ Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B-08-4  
 Matrix (soil/water): SOIL\_ Lab Sample ID: TT0013 \_\_\_\_\_  
 Level (low/med): LOW\_ Date Received: 06/26/92  
 % Solids: 79.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               | - |   | NR |
| 7440-36-0 | Antimony  | 0.50          | U |   | F  |
| 7440-38-2 | Arsenic   | 7.2           | - |   | F  |
| 7440-39-3 | Barium    | 151           | - |   | P  |
| 7440-41-7 | Beryllium | 0.77          | - |   | P  |
| 7440-43-9 | Cadmium   | 0.63          | U | N | P  |
| 7440-70-2 | Calcium   |               | - |   | NR |
| 7440-47-3 | Chromium  | 13.4          | - | N | P  |
| 7440-48-4 | Cobalt    | 9.2           | - |   | P  |
| 7440-50-8 | Copper    | 10.8          | - |   | P  |
| 7439-89-6 | Iron      |               | - |   | NR |
| 7439-92-1 | Lead      | 14.2          | - |   | F  |
| 7439-95-4 | Magnesium |               | - |   | NR |
| 7439-96-5 | Manganese |               | - |   | NR |
| 7439-97-6 | Mercury   | 0.03          | - |   | CV |
| 7440-02-0 | Nickel    | 13.0          | - |   | P  |
| 7440-09-7 | Potassium |               | - |   | NR |
| 7782-49-2 | Selenium  | 0.25          | U | W | F  |
| 7440-22-4 | Silver    | 0.63          | U | N | P  |
| 7440-23-5 | Sodium    |               | - |   | NR |
| 7440-28-0 | Thallium  | 0.25          | U |   | F  |
| 7440-62-2 | Vanadium  | 36.5          | - | N | P  |
| 7440-66-6 | Zinc      | 41.9          | - | N | P  |
|           | Cyanide   |               | - |   | NR |

Color Before: BROWN \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: COARSE  
 Color After: YELLOW \_\_\_\_\_ Clarity After: CLEAR \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B-15-2

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: NAS-MEMPHI  
 Lab Code: ITSTU\_ Case No.: 51669 SAS No.: \_\_\_\_\_ SDG No.: B-08-4  
 Matrix (soil/water): SOIL\_ Lab Sample ID: TT0014\_\_\_\_\_  
 Level (low/med): LOW\_ Date Received: 06/26/92  
 % Solids: \_79.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 0.50          | U |   | F  |
| 7440-38-2 | Arsenic   | 1.5           |   |   | F  |
| 7440-39-3 | Barium    | 183           |   |   | P  |
| 7440-41-7 | Beryllium | 0.80          |   |   | P  |
| 7440-43-9 | Cadmium   | 0.63          | U | N | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 12.1          |   | N | P  |
| 7440-48-4 | Cobalt    | 2.5           | U |   | P  |
| 7440-50-8 | Copper    | 7.2           |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 10.4          |   |   | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.04          |   |   | CV |
| 7440-02-0 | Nickel    | 11.9          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 0.31          | B | W | F  |
| 7440-22-4 | Silver    | 0.63          | U | N | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 0.25          | U |   | F  |
| 7440-62-2 | Vanadium  | 16.1          |   | N | P  |
| 7440-66-6 | Zinc      | 49.6          |   | N | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: COARSE  
 Color After: YELLOW \_\_\_\_\_ Clarity After: CLEAR \_\_\_\_\_ Artifacts: \_\_\_\_\_  
 Comments:



Ensafe/Allen and Hoshall  
 August 2, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51669

TOTAL CYANIDE ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P3981                | 1 U           |
| MW-05-6 (6-10')         | TT0010               | 1 U           |
| MW-06-4 (4-8')          | TT0011               | 1 U           |
| B-07-2                  | TT0012               | 1 U           |
| B-09-4                  | TT0013               | 1 U           |
| B-15-2 (2-6')           | TT0014               | 1 U           |

Date of Analysis: 07/07/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



# ANALYTICAL SERVICES

0001

## CERTIFICATE OF ANALYSIS

EnSafe/Allen and Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 2, 1992

Job Number: ENFA 51684

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |             |
|-----------------------|-------------|
| Client Project ID:    | NAS Memphis |
| Date Received by Lab: | 06/29/92    |
| Number of Samples:    | Two (2)     |
| Sample Type:          | Soil        |

### I. Introduction

On 06/29/92, two (2) soil samples arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen and Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected, and soil samples are reported on a dry weight basis for CLP parameters.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

The samples were analyzed for organochlorine pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

EnSafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51684

Client Project ID: NAS Memphis

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7471, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 9010.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS-500 GC/MS/DS. The sample runs generally went well although some problems were encountered due to matrix. Alternate ions were employed in the undiluted medium level analysis of MW-11-4 to quantify 4-bromofluorobenzene and toluene-d8 due to interference from the sample matrix. A twentyfold dilution of a medium level analysis was required to quantify xylenes, and at this level alternate ions for surrogate quantification was not necessary. Overall QC and analysis look good.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample runs went well; however, a tenfold dilution was necessary to avoid sample matrix interference. Target compounds were seen at this level above the quantification limit. Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-10 for volatiles and B-08-4 for semivolatiles. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- E - Compound exceeded calibration range.
- D - Compound analyzed at secondary dilution.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

The samples were analyzed for organochlorine pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-4. The samples and associated method blank were treated to remove interferences using mercury cleanup procedures.

EnSafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51684

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established. A continuing standard was analyzed with every ten samples. This check standard was compared to the initial linearity using acceptance criteria of  $\pm 15\%$  difference. Samples with nondetected analytes were not reanalyzed if the continuing standard analytes showed increased sensitivity (i.e., greater than + 15% difference). No major problems were encountered.

The samples were digested on 07/07/92 for ICP and GFAA. The samples for mercury analysis were prepared just prior to analysis. The CVAA analysis for mercury was performed on 07/16/92; the GFAA analyses for arsenic, lead, selenium, and thallium were performed from 07/09 to 07/14/92; the remaining metals were analyzed by ICP on 07/16/92. All run QC was acceptable. Associated QC samples were analyzed with ITAS project ENFA 51649, sample B-08-4. The 1/5 serial dilution indicated a matrix interference for zinc. No other problems were encountered.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

EnSafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51684

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for cyanide by manual distillation of 5 g sample in 500 ml DI water followed by automated colorimetric determination using the LACHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). Associated QC samples were analyzed with ITAS project ENFA 51649 sample B-08-4. No major problems were encountered.

0005

Facility ID #: 9-791683



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1  
N0026-C0118

CLIENT NAS-Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER N0026-C0118 FAX NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |               |                 |           | REMARKS              |
|-------------------|-------------------|-----------|---------------|-----------------|-----------|----------------------|
|                   | BNA (CLP)         | CN (9010) | APP IX metals | Pest/PCB (8080) | VOC (CLP) |                      |
| 1                 | X                 | X         | X             | X               |           | 2°C (OK Jan 6/29/92) |
| 1                 |                   |           |               | X               |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |
|                   |                   |           |               |                 |           |                      |

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | BNA (CLP) | CN (9010) | APP IX metals | Pest/PCB (8080) | VOC (CLP) | REMARKS              |
|---------------------|---------|-------|-------------|------------------------|--------------|----------|-------------------|-----------|-----------|---------------|-----------------|-----------|----------------------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL |                   |           |           |               |                 |           |                      |
| MW-11-3(3-7')       | 6/26/92 | 15:00 | soil grab   | 500ml brown bottle     | 4°C          | —        | 1                 | X         | X         | X             | X               |           | 2°C (OK Jan 6/29/92) |
| MW-11-4             | ↓       | ↓     | ↓           | 2 oz jar               | ↓            | ↓        | 1                 |           |           |               | X               |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |
|                     |         |       |             |                        |              |          |                   |           |           |               |                 |           |                      |

| RELINQUISHED BY:             | DATE       | RELINQUISHED BY: | DATE       | RELINQUISHED BY: | DATE       |
|------------------------------|------------|------------------|------------|------------------|------------|
| SIGNATURE <u>[Signature]</u> | 6/27/92    | SIGNATURE _____  | _____      | SIGNATURE _____  | _____      |
| PRINTED <u>Scott Ryduy</u>   | _____      | PRINTED _____    | _____      | PRINTED _____    | _____      |
| COMPANY <u>Ensafe</u>        | TIME 16:00 | COMPANY _____    | TIME _____ | COMPANY _____    | TIME _____ |
| REASON <u>Shipment</u>       | _____      | REASON _____     | _____      | REASON _____     | _____      |

METHOD OF SHIPMENT: FedEx  
 SHIPMENT NO. 2495013721  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: Rec'd by J. Hamer, ITAS 6-29-92 0830  
2°C (OK Jan 6/29/92)

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

9006

PROJECT CODE: ENFA 51684

SAMPLE RANGE: TT0154-55

Page 1 of 1

| Sample Number(s)       | Relinquished by:   | Received by:       | Date/Time Out:  | Reason for Change of Custody: | Relinquished by:   | Received by:       | Date/Time In:   | Reason for Change of Custody: |
|------------------------|--------------------|--------------------|-----------------|-------------------------------|--------------------|--------------------|-----------------|-------------------------------|
| TT0154                 | <i>[Signature]</i> | <i>[Signature]</i> | 6-29-92<br>1415 | VDA analysis                  |                    |                    |                 |                               |
| TT0155                 | K. Cedar           | <i>[Signature]</i> | 7/1/92<br>0800  | PEST/PCB (80%)                | <i>[Signature]</i> | K. Cedar           | 7/1/92<br>1500  | STORAGE                       |
| TT0155                 | K. Cedar           | <i>[Signature]</i> | 7/6/92<br>915   | CN-                           | <i>[Signature]</i> | K. Cedar           | 7/6/92<br>1339  | "                             |
| TT0155                 | S. Sumner          | <i>[Signature]</i> | 7-6-92          | ICP; GFAA; Hg                 | <i>[Signature]</i> | K. Cedar           | 7/7/92<br>1220  | "                             |
| TT0155                 | <i>[Signature]</i> | <i>[Signature]</i> | 7/14/92<br>1540 | metals prep.                  | <i>[Signature]</i> | <i>[Signature]</i> | 7-14-92<br>1615 | "                             |
| TT0155                 | K. Cedar           | <i>[Signature]</i> | 7/20/92<br>0800 | pH                            | <i>[Signature]</i> | K. Cedar           | 7/20/92<br>1430 | "                             |
| Facility ID #: 9-79168 |                    |                    |                 |                               |                    |                    |                 |                               |

| SAMPLE DISPOSITION RECORD |                           |              |                                     |
|---------------------------|---------------------------|--------------|-------------------------------------|
| Sample Number(s):         | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW114

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51684 SAS No.: \_\_\_\_\_ SDG No.: MW113

Matrix: (soil/water) SOIL Lab Sample ID: TT0154

Sample wt/vol: 4.0 (g/mL) G Lab File ID: TT0154D

Level: (low/med) MED Date Received: 06/29/92

% Moisture: not dec. 21 Date Analyzed: 07/13/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|                 |                            |        |   |
|-----------------|----------------------------|--------|---|
| 74-87-3-----    | Chloromethane              | 1600   | U |
| 74-83-9-----    | Bromomethane               | 1600   | U |
| 75-01-4-----    | Vinyl Chloride             | 1600   | U |
| 75-00-3-----    | Chloroethane               | 1600   | U |
| 75-09-2-----    | Methylene Chloride         | 690    | J |
| 67-64-1-----    | Acetone                    | 1600   | U |
| 75-15-0-----    | Carbon Disulfide           | 1600   | U |
| 75-35-4-----    | 1,1-Dichloroethene         | 1600   | U |
| 75-34-3-----    | 1,1-Dichloroethane         | 1600   | U |
| 540-59-0-----   | 1,2-Dichloroethene (total) | 1600   | U |
| 67-66-3-----    | Chloroform                 | 1600   | U |
| 107-06-2-----   | 1,2-Dichloroethane         | 1600   | U |
| 78-93-3-----    | 2-Butanone                 | 1600   | U |
| 71-55-6-----    | 1,1,1-Trichloroethane      | 1600   | U |
| 56-23-5-----    | Carbon Tetrachloride       | 1600   | U |
| 75-27-4-----    | Bromodichloromethane       | 1600   | U |
| 78-87-5-----    | 1,2-Dichloropropane        | 1600   | U |
| 10061-01-5----- | cis-1,3-Dichloropropene    | 1600   | U |
| 79-01-6-----    | Trichloroethene            | 1600   | U |
| 124-48-1-----   | Dibromochloromethane       | 1600   | U |
| 79-00-5-----    | 1,1,2-Trichloroethane      | 1600   | U |
| 71-43-2-----    | Benzene                    | 6500   |   |
| 10061-02-6----- | trans-1,3-Dichloropropene  | 1600   | U |
| 75-25-2-----    | Bromoform                  | 1600   | U |
| 108-10-1-----   | 4-Methyl-2-Pentanone       | 1600   | U |
| 591-78-6-----   | 2-Hexanone                 | 1600   | U |
| 127-18-4-----   | Tetrachloroethene          | 1600   | U |
| 79-34-5-----    | 1,1,2,2-Tetrachloroethane  | 1600   | U |
| 108-88-3-----   | Toluene                    | 1600   | U |
| 108-90-7-----   | Chlorobenzene              | 1600   | U |
| 100-41-4-----   | Ethylbenzene               | 20000  |   |
| 100-42-5-----   | Styrene                    | 1600   | U |
| 1330-20-7-----  | Xylenes (total)            | 120000 | E |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW114DL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51684 SAS No.: \_\_\_\_\_ SDG No.: MW113

Matrix: (soil/water) SOIL Lab Sample ID: TT0154

Sample wt/vol: 4.0 (g/mL) G Lab File ID: TT0154D2

Level: (low/med) MED Date Received: 06/29/92

% Moisture: not dec. 21 Date Analyzed: 07/13/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 20.0(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO. COMPOUND Q

|            |                                 |       |    |
|------------|---------------------------------|-------|----|
| 74-87-3    | -----Chloromethane              | 7900  | U  |
| 74-83-9    | -----Bromomethane               | 7900  | U  |
| 75-01-4    | -----Vinyl Chloride             | 7900  | U  |
| 75-00-3    | -----Chloroethane               | 7900  | U  |
| 75-09-2    | -----Methylene Chloride         | 5200  | DJ |
| 67-64-1    | -----Acetone                    | 7900  | U  |
| 75-15-0    | -----Carbon Disulfide           | 7900  | U  |
| 75-35-4    | -----1,1-Dichloroethene         | 7900  | U  |
| 75-34-3    | -----1,1-Dichloroethane         | 7900  | U  |
| 540-59-0   | -----1,2-Dichloroethene (total) | 7900  | U  |
| 67-66-3    | -----Chloroform                 | 7900  | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 7900  | U  |
| 78-93-3    | -----2-Butanone                 | 7900  | U  |
| 71-55-6    | -----1,1,1-Trichloroethane      | 7900  | U  |
| 56-23-5    | -----Carbon Tetrachloride       | 7900  | U  |
| 75-27-4    | -----Bromodichloromethane       | 7900  | U  |
| 78-87-5    | -----1,2-Dichloropropane        | 7900  | U  |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 7900  | U  |
| 79-01-6    | -----Trichloroethene            | 7900  | U  |
| 124-48-1   | -----Dibromochloromethane       | 7900  | U  |
| 79-00-5    | -----1,1,2-Trichloroethane      | 7900  | U  |
| 71-43-2    | -----Benzene                    | 6800  | DJ |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 7900  | U  |
| 75-25-2    | -----Bromoform                  | 7900  | U  |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 7900  | U  |
| 591-78-6   | -----2-Hexanone                 | 7900  | U  |
| 127-18-4   | -----Tetrachloroethene          | 7900  | U  |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 7900  | U  |
| 108-88-3   | -----Toluene                    | 7900  | U  |
| 108-90-7   | -----Chlorobenzene              | 7900  | U  |
| 100-41-4   | -----Ethylbenzene               | 17000 | D  |
| 100-42-5   | -----Styrene                    | 7900  | U  |
| 1330-20-7  | -----Xylenes (total)            | 75000 | D  |

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW113

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51684 SAS No.: \_\_\_\_\_ SDG No.: MW113

Matrix: (soil/water) SOIL Lab Sample ID: TT0155

Sample wt/vol: 30.9 (g/mL) G Lab File ID: TT0155D

Level: (low/med) LOW Date Received: 06/29/92

% Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4 <sup>low</sup> <sub>7/18/92</sub>

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

CAS NO. COMPCUND

|   |       |   |
|---|-------|---|
| 108-95-2-----Phenol                       | 4100  | U |
| 111-44-4-----bis(2-Chloroethyl) Ether     | 4100  | U |
| 95-57-8-----2-Chlorophenol                | 4100  | U |
| 541-73-1-----1,3-Dichlorobenzene          | 4100  | U |
| 106-46-7-----1,4-Dichlorobenzene          | 4100  | U |
| 95-50-1-----1,2-Dichlorobenzene           | 4100  | U |
| 95-48-7-----2-Methylphenol                | 4100  | U |
| 108-60-1-----2,2'-oxybis(1-Chloropropane) | 4100  | U |
| 106-44-5-----4-Methylphenol               | 4100  | U |
| 621-64-7-----N-Nitroso-Di-n-Propylamine   | 4100  | U |
| 67-72-1-----Hexachloroethane              | 4100  | U |
| 98-95-3-----Nitrobenzene                  | 4100  | U |
| 78-59-1-----Isophorone                    | 4100  | U |
| 88-75-5-----2-Nitrophenol                 | 4100  | U |
| 105-67-9-----2,4-Dimethylphenol           | 4100  | U |
| 111-91-1-----bis(2-Chloroethoxy)Methane   | 4100  | U |
| 120-83-2-----2,4-Dichlorophenol           | 4100  | U |
| 120-82-1-----1,2,4-Trichlorobenzene       | 4100  | U |
| 91-20-3-----Naphthalene                   | 4100  | U |
| 106-47-8-----4-Chloroaniline              | 4100  | U |
| 87-68-3-----Hexachlorobutadiene           | 4100  | U |
| 59-50-7-----4-Chloro-3-Methylphenol       | 4100  | U |
| 91-57-6-----2-Methylnaphthalene           | 18000 | U |
| 77-47-4-----Hexachlorocyclopentadiene     | 4100  | U |
| 88-06-2-----2,4,6-Trichlorophenol         | 4100  | U |
| 95-95-4-----2,4,5-Trichlorophenol         | 9800  | U |
| 91-58-7-----2-Chloronaphthalene           | 4100  | U |
| 88-74-4-----2-Nitroaniline                | 9800  | U |
| 131-11-3-----Dimethyl Phthalate           | 4100  | U |
| 208-96-8-----Acenaphthylene               | 4100  | U |
| 606-20-2-----2,6-Dinitrotoluene           | 4100  | U |
| 99-09-2-----3-Nitroaniline                | 9800  | U |
| 83-32-9-----Acenaphthene                  | 440   | J |

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW113

b Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51684 SAS No.: \_\_\_\_\_ SDG No.: MW113

Matrix: (soil/water) SOIL Lab Sample ID: TT0155

Sample wt/vol: 30.9 (g/mL) G Lab File ID: TT0155D

Level: (low/med) LOW Date Received: 06/29/92

% Moisture: 21 decanted: (Y/N) N Date Extracted: 07/01/92

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4 <sup>RM</sup> <sub>7/27/92</sub>

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

| CAS NO.        | COMPGUND                    | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/KG</u> | Q |
|----------------|-----------------------------|--|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 9800   | U |
| 100-02-7-----  | 4-Nitrophenol               | 9800   | U |
| 132-64-9-----  | Dibenzofuran                | 4100   | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 4100   | U |
| 84-66-2-----   | Diethylphthalate            | 4100   | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 4100   | U |
| 86-73-7-----   | Fluorene                    | 4100   | U |
| 100-01-6-----  | 4-Nitroaniline              | 9800   | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 9800   | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 4100   | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 4100   | U |
| 118-74-1-----  | Hexachlorobenzene           | 4100   | U |
| 87-86-5-----   | Pentachlorophenol           | 9800   | U |
| 85-01-8-----   | Phenanthrene                | 4100   | U |
| 120-12-7-----  | Anthracene                  | 4100   | U |
| 86-74-8-----   | Carbazole                   | 4100   | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 4100   | U |
| 206-44-0-----  | Fluoranthene                | 4100   | U |
| 129-00-0-----  | Pyrene                      | 4100   | U |
| 85-68-7-----   | Butylbenzylphthalate        | 4100   | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 4100   | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 4100   | U |
| 218-01-9-----  | Chrysene                    | 4100   | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 420  | J |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 4100   | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 4100   | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 4100   | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 4100   | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 4100   | U |
| 53-70-3-----   | Dibenz(a,h) Anthracene      | 4100   | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 4100   | U |

(1) - Cannot be separated from Diphenylamine

EnSafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51684

ORGANOCHLORINE PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g}/\text{kg}$  (ppb)

Sample Matrix: Soil

Client Sample ID: MW-11-3 (3-7')

Lab Sample ID: TT0155

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 400 U                | 4,4'-DDT              | 400 U                |
| $\beta$ -BHC       | 400 U                | endrin aldehyde       | 800 U                |
| $\delta$ -BHC      | 400 U                | endosulfan sulfate    | 400 U                |
| heptachlor         | 400 U                | methoxychlor          | 800 U                |
| $\gamma$ -BHC      | 400 U                | chlordane (technical) | 800 U                |
| aldrin             | 400 U                | toxaphene             | 800 U                |
| heptachlor epoxide | 400 U                | PCB-(Aroclor)-1221    | 800 U                |
| endosulfan I       | 400 U                | PCB-(Aroclor)-1016    | 800 U                |
| 4,4'-DDE           | 400 U                | PCB-(Aroclor)-1232    | 800 U                |
| dieldrin           | 400 U                | PCB-(Aroclor)-1242    | 800 U                |
| endrin             | 400 U                | PCB-(Aroclor)-1248    | 800 U                |
| 4,4'-DDD           | 400 U                | PCB-(Aroclor)-1254    | 800 U                |
| endosulfan II      | 400 U                | PCB-(Aroclor)-1260    | 800 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/01/92  
Date of Analysis: 07/05/92

1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-11-3

Lab Name: ITAS\_KNOXVILLE Contract: NAS-MEMPHI

Lab Code: ITSTU Case No.: 51684 SAS No.: SDG No.: B-08-4

Matrix (soil/water): SOIL Lab Sample ID: TT0155

Level (low/med): LOW Date Received: 06/29/92

% Solids: 78.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               | - |   | NR |
| 7440-36-0 | Antimony  | 0.51          | U |   | F  |
| 7440-38-2 | Arsenic   | 11.3          |   |   | F  |
| 7440-39-3 | Barium    | 201           |   |   | P  |
| 7440-41-7 | Beryllium | 0.75          |   |   | P  |
| 7440-43-9 | Cadmium   | 0.64          | U |   | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 16.4          |   |   | P  |
| 7440-48-4 | Cobalt    | 8.2           |   |   | P  |
| 7440-50-8 | Copper    | 17.9          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 10.4          |   |   | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.04          |   |   | CV |
| 7440-02-0 | Nickel    | 21.4          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 0.25          | U | W | F  |
| 7440-22-4 | Silver    | 0.64          | U |   | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 0.29          | B |   | F  |
| 7440-62-2 | Vanadium  | 33.0          |   |   | P  |
| 7440-66-6 | Zinc      | 67.5          |   | E | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:



EnSafe/Allen and Hoshall  
August 2, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51684

TOTAL CYANIDE ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P3981                | 1 U           |
| MW-11-3 (3-7')          | TT0155               | 1 U           |

Date of Analysis: 07/07/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

---

**CERTIFICATE OF ANALYSIS**

---

EnSafe/Allen & Hoshall  
5724 Summer Trees Drive  
Memphis, TN 38134  
Attn: Lawson Anderson

August 4, 1992

Job Number: ENFA 51766

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

Client Project ID: NAS Memphis  
Date Received by Lab: 07/09/92  
Number of Samples: Four (4)  
Sample Type: Water

**I. Introduction**

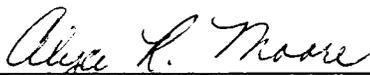
On 07/09/92, four (4) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from EnSafe/Allen & Hoshall in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

**II. Analytical Results/Methodology**

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes (BTX), and total low boiling petroleum hydrocarbons as gasoline-range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020, and Tennessee modified method 8015.

Reviewed and Approved:



Alyce R. Moore  
Laboratory Manager

EnSafe/Allen & Hoshall  
August 4, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51766

Client Project ID: NAS Memphis

---

### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and low boiling petroleum hydrocarbons as gasoline range organics by gas chromatography/photoionization and flame ionization detection using a 3% SP-1500 column on Varian 3700 GC. Method blank surrogate control limits have not been established due to a lack of data points for the GRO method. No major problems were encountered.

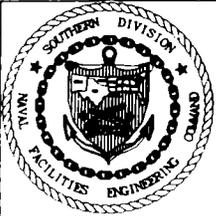
A five-point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 25%, the response of the analyte was assumed to be linear for that detector and the average Rf was used for quantification. If the RSD exceeded 25%, a five-point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within a 25% limit for GRO of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 30 ppm for waters, but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates.

Facility ID #: 9-791683

003



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHAL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1  
N0026-C0117

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER AFFTF/ FAX NO. (901) 372-2454  
N0026-C0117 SAMPLERS: (SIGNATURE) [Signature]  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

| NO. OF CONTAINERS | ANALYSIS REQUIRED |      |     |  | REMARKS   |
|-------------------|-------------------|------|-----|--|---|
|                   | GRO               | TDEC | BTX |  |   |
| 3                 | X                 | X    |     |  | 3°C (OK) <del>7/9/92</del><br>Please Bill<br>this CoC<br>separate from<br>accompanying<br>CoC |
| 3                 | X                 | X    |     |  |   |
| 3                 | X                 | X    |     |  |   |
| 3                 | X                 | X    |     |  |   |

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          |
|---------------------|--------|-------|-------------|------------------------|--------------|----------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL |
| FB-Tap              | 7/8/92 | 13:00 | water       | 40 mL vials            | 4°C          | HCl      |
| FB-DI               |        | 13:30 |             |                        |              |          |
| FB-DI/OF            |        | 14:10 |             |                        |              |          |
| ER                  |        | 16:30 |             |                        |              |          |

|  |                        |  |                       |                                 |              |                                 |              |
|--|------------------------|--|-----------------------|---------------------------------|--------------|---------------------------------|--------------|
| RELINQUISHED BY SIGNATURE <u>[Signature]</u> | DATE <u>7/8/92</u>     | RELINQUISHED BY SIGNATURE <u>[Signature]</u> | DATE <u>7/9/92</u>    | RELINQUISHED BY SIGNATURE _____ | DATE _____   | RELINQUISHED BY SIGNATURE _____ | DATE _____   |
| PRINTED <u>Scott Ryan</u>                    | TIME _____             | PRINTED <u>TIM MATHIS</u>                    | TIME _____            | PRINTED _____                   | TIME _____   | PRINTED _____                   | TIME _____   |
| COMPANY <u>EnSafe</u>                        | REASON <u>Shipment</u> | COMPANY <u>ITAS-K</u>                        | REASON <u>SAMPLES</u> | COMPANY _____                   | REASON _____ | COMPANY _____                   | REASON _____ |

|                                   |                                  |   |
|-----------------------------------|----------------------------------|---|
| METHOD OF SHIPMENT: <u>Fed Ex</u> | COMMENTS: <u>3°C (OK) 7/9/92</u> | AFTER ANALYSIS, SAMPLES ARE TO BE:                            |
| SHIPMENT NO. <u>3495013603</u>    |                                  | <input type="checkbox"/> DISPOSED OF (ADDITIONAL FEE)         |
| SPECIAL INSTRUCTION: _____        |                                  | <input type="checkbox"/> STORED (90 DAYS MAX)                 |
|                                   |                                  | <input type="checkbox"/> STORED OVER 90 DAYS (ADDITIONAL FEE) |
|                                   |                                  | <input type="checkbox"/> RETURNED TO CUSTOMER                 |

ENFA 51766



EnSafe/Allen & Hoshall  
August 4, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51766

BTX/TOTAL LOW BOILING HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | FB-Tap        |
| Lab Sample ID:   | <u>TT0986</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylene (total)   | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/21/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 August 4, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51766

BTX/TOTAL LOW BOILING HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | FB-D1         |
| Lab Sample ID:   | <u>TT0987</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/21/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 August 4, 1992

007  
 IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51766

BTX/TOTAL LOW BOILING HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | FB-D1/OF      |
| Lab Sample ID:   | <u>TT0988</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/21/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
August 4, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51766

BTX/TOTAL LOW BOILING HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | ER            |
| Lab Sample ID:   | <u>TT0989</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/21/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

CERTIFICATE OF ANALYSIS

---

EnSafe/Allen & Hoshall  
5724 Summer Trees Drive  
Memphis, TN 38134  
Attn: Lawson Anderson

August 4, 1992

Job Number: ENFA 51776

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

Client Project ID: NAS Memphis  
Date Received by Lab: 07/10/92  
Number of Samples: Six (6)  
Sample Type: Water

---

**I. Introduction**

On 07/10/92, six (6) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from EnSafe/Allen & Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

**II. Analytical Results/Methodology**

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes (BTX), and total low boiling petroleum hydrocarbons as gasoline-range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020, and Tennessee modified method 8015.

Reviewed and Approved:



Alyce R. Moore  
Laboratory Manager

---

EnSafe/Allen & Hoshall  
August 4, 1992

Facility ID #: 9-791683

02  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51776

Client Project ID: NAS Memphis

---

### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and low boiling petroleum hydrocarbons as gasoline range organics by gas chromatography/photoionization and flame ionization detection using a 3% SP-1500 column on a Varian 3700 GC. Matrix spike/matrix spike duplicate analyses were performed using sample MW-06 with acceptable results. Control limits for method blanks have not been established due to a lack of data points for GRO method. No major problems were encountered.

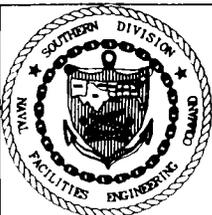
A five-point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 25%, the response of the analyte was assumed to be linear for that detector and the average Rf was used for quantification. If the RSD exceeded 25%, a five-point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within 25% of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 30 ppb for waters, but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates.

Facility ID #: 9-791683

03



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1  
 10026-0017

CLIENT NAC Memphis  
 ADDRESS Millington TN  
 PROJECT NAME/NUMBER APFTE/N0026-0017  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_

PROJECT MANAGER Lawson Anderson  
 TELEPHONE NO. 901 372 7962  
 FAX NO. 901 372 2454  
 SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |     |  |  | REMARKS   |
|-------------------|-------------------|-----|--|--|---|
|                   | GRO (TDEC)        | BIX |  |  |   |
| 3                 | X                 | X   |  |  | Please Bill this CoC separately from accompanying CoC |
| 3                 | X                 | X   |  |  |   |
| 3                 | X                 | X   |  |  |   |
| 3                 | X                 | X   |  |  |   |
| 3                 | X                 | X   |  |  |   |
| 3                 | X                 | X   |  |  |   |

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          |
|---------------------|--------|-------|-------------|------------------------|--------------|----------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL |
| MW-09               | 7/9/92 | 14:55 | wicker      | 40ml vials             | 4°C          | HCl      |
| MW-03               |        | 15:50 |             |                        |              |          |
| MW-04               |        | 16:35 |             |                        |              |          |
| MW-01               |        | 17:16 |             |                        |              |          |
| MW-05               |        | 18:40 |             |                        |              |          |
| MW-06               |        | 18:25 |             |                        |              |          |

|  |   |   |   |   |                          |   |                          |
|--|---|---|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>EnSafe</u><br>REASON <u>Shipment</u> | DATE <u>7/9/92</u><br>TIME <u>20:00</u> | RELINQUISHED BY: <u>Rec'd By:</u><br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>S Harris</u><br>COMPANY <u>ITAS</u><br>REASON _____ | DATE <u>7/10/92</u><br>TIME <u>0830</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|---|---|---|---|--------------------------|---|--------------------------|

|   |  |  |
|---|--|--|
| METHOD OF SHIPMENT: <u>Fed Ex</u><br>SHIPMENT NO. <u>2495013695</u><br>SPECIAL INSTRUCTION: _____ | COMMENTS: <u>5¢ No cust. tape</u><br><u>Rec'd OK 8/2/7-10-92</u><br><u>rec'd 9 vials of MW-6</u> | AFTER ANALYSIS, SAMPLES ARE TO BE:<br><input type="checkbox"/> DISPOSED OF (ADDITIONAL FEE)<br><input type="checkbox"/> STORED (90 DAYS MAX)<br><input type="checkbox"/> STORED OVER 90 DAYS (ADDITIONAL FEE)<br><input type="checkbox"/> RETURNED TO CUSTOMER |
|---|--|--|

ENFA 51776



EnSafe/Allen & Hoshall  
 August 4, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-01         |
| Lab Sample ID:   | <u>TT1066</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/22/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 August 4, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-03         |
| Lab Sample ID:   | <u>TT1067</u> |
| benzene  | 1 U           |
| toluene  | 1 +           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/22/92      |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Confirmed on secondary column on 07/23/92.

EnSafe/Allen & Hoshall  
 August 4, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-04         |
| Lab Sample ID:   | <u>TT1068</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/22/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Facility ID #: 9-791683

EnSafe/Allen & Hoshall  
August 4, 1992

00 0 8  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

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BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-05         |
| Lab Sample ID:   | <u>TT1069</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/22/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
 August 4, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-06         |
| Lab Sample ID:   | <u>TT1070</u> |
| benzene  | 2 +           |
| toluene  | 1 U           |
| xylenes (total)  | 9 +           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/22/92      |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Confirmed on secondary column on 07/23/92.

EnSafe/Allen & Hoshall  
 August 4, 1992

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 IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51776

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

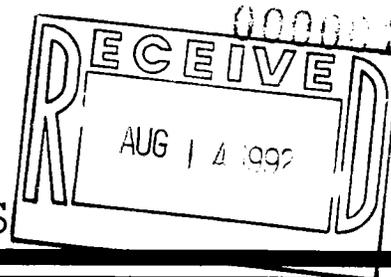
Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-09         |
| Lab Sample ID:   | <u>TT1073</u> |
|  |               |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylenes (total)  | 1 U           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
|  |               |
| Date of Analysis:  | 07/22/92      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



# ANALYTICAL SERVICES



## CERTIFICATE OF ANALYSIS

EnSafe/Allen & Hoshall  
5724 Summer Trees Drive  
Memphis, TN 38134  
Attn: Lawson Anderson

August 13, 1992

Job Number: ENFA 51804

P.O. Number: N0026-C0117

This is the Certificate of Analysis for the following samples:

Client Project ID: NAS Memphis  
Date Received by Lab: 07/11/92  
Number of Samples: Six (6)  
Sample Type: Water

### I. Introduction

On 07/11/92, six (6) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from EnSafe/Allen & Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for benzene, toluene, xylenes (BTX), and total low boiling petroleum hydrocarbons as gasoline-range organics (GRO) by gas chromatography/photoionization and flame ionization detection (GC/PID/FID) in series based on EPA SW-846 3rd edition, method 8020, and Tennessee modified method 8015.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

EnSafe/Allen & Hoshall  
August 13, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51804

Client Project ID: NAS Memphis

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### III. Quality Control

The samples were analyzed for benzene, toluene, xylenes, and low boiling petroleum hydrocarbons as gasoline range organics by gas chromatography/photoionization and flame ionization detection using a 3% SP-1500 column on a Varian 3700 GC. Confirmation runs were performed using a DB-624 column on a Varian 3400 GC. Associated QC samples were analyzed with ITAS project ENFA 51776, sample MW-06. Sample MW-11 and MW-11D were reported with an elevated detection limit for toluene at 2.5 ppb from the confirmation run as the toluene did not confirm and was run at a dilution. Sample MW-8 was estimated for benzene since the benzene calibration was outside acceptable calibration ranges, but the value was obtained within holding times. The sample was reanalyzed three days past holding time on 07/27/92 with similar results. Control limits have not been established for method blanks due to recent changes in the surrogate due to the gasoline range organic method. No other problems were encountered.

A five point linearity was run; if the relative standard deviation (RSD) of the response factor (Rf) was less than 20%, the response of the analyte was assumed to be linear for that detector, and the average Rf was used for quantification. If the RSD exceeded 20%, a five point curve was plotted by computer.

A daily standard check was analyzed. If the response for all analytes was within 15% of the working calibration curve, the daily response factor or the original curve was used for sample quantification. Continuing calibration standards were analyzed after every ten samples.

The surrogate was spiked into the samples at a concentration of 30 ppb for waters but entered into the computer as 100 ppm. This modification allowed the results for each surrogate to be reported in percent, not ppm, as the header indicates.

000003

Facility ID #: 9-791683

# CHAIN OF CUSTODY RECORD

**ENVSAFE**<sup>®</sup>  
 Environmental and Safety Designs, Inc.  
 P. O. BOX 341315 MEMPHIS TN 38184-1315  
 (901) 372-7882

PAGE 1 of 1

| CLIENT NAME                        |         |       | Name/Number        |             |  | # of Containers  | SAMPLE ANALYSIS (x) |                               |       |            |              |     |        |           |           |        |              |          |         | F - filtered P - preserved |     |   |
|------------------------------------|---------|-------|--------------------|-------------|--|------------------|---------------------|-------------------------------|-------|------------|--------------|-----|--------|-----------|-----------|--------|--------------|----------|---------|----------------------------|-----|---|
| COLLECTED BY                       |         |       | comp               | grab        | well                                   |                  | pH, Sp. Cond        | TOC                           | TOX   | Cl, F, SO4 | NITRATES     | VOC | METALS | PESTICIDE | HERBICIDE | PHENOL | ACID/B/N Exl | COLIFORM | CYANIDE | GRD (DEG)                  | BTX | REMARKS   |
| SAMPLE ID                          | DATE    | TIME  |                    |             |  |                  |                     |                               |       |            |              |     |        |           |           |        |              |          |         |                            |     |   |
| NAS Memphis                        |         |       | AFFTF / N0026-0017 |             |  |                  |                     |                               |       |            |              |     |        |           |           |        |              |          |         |                            |     |   |
| S Ryan J Stedman                   |         |       |                    |             |  |                  |                     |                               |       |            |              |     |        |           |           |        |              |          |         |                            |     |   |
| MW-10                              | 7/10/92 | 13:00 |                    |             | X                                      | 3                |                     |                               |       |            |              |     |        |           |           |        |              |          |         | X                          | X   | Preserved<br>4°C, HCl   |
| MW-07                              | 7/10/92 | 13:40 |                    |             | X                                      | 3                |                     |                               |       |            |              |     |        |           |           |        |              |          |         | X                          | X   | " "   |
| MW-08                              | 7/10/92 | 14:30 |                    |             | X                                      | 3                |                     |                               |       |            |              |     |        |           |           |        |              |          |         | X                          | X   | " "   |
| MW-02                              | 7/10/92 | 15:30 |                    |             | X                                      | 3                |                     |                               |       |            |              |     |        |           |           |        |              |          |         | X                          | X   | " "   |
| MW-11                              | 7/10/92 | 16:40 |                    |             | X                                      | 3                |                     |                               |       |            |              |     |        |           |           |        |              |          |         | X                          | X   | " "   |
|                                    |         |       |                    |             |  |                  |                     |                               |       |            |              |     |        |           |           |        |              |          |         |                            |     | Please bill<br>this CoC<br>separate from<br>accompanying<br>CoC |
| Relinquished by: <i>Scott Ryan</i> |         |       | Date: 7/10/92      | Time: 18:00 | Received by:                           | Relinquished by: |                     |                               | Date: | Time:      | Received by: |     |        |           |           |        |              |          |         |                            |     |   |
| Relinquished by:                   |         |       | Date:              | Time:       | Received by lab by: <i>Karin Cedar</i> | Date: 7/11/92    | Time: 09:30         | Remarks: 6°C (OR TAM 7/14/92) |       |            |              |     |        |           |           |        |              |          |         |                            |     |   |

ENFA 51804



EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |                      |
|--|----------------------|
| Client Sample ID:  | MW-02                |
| Lab Sample ID:   | <u>TT1427</u>        |
| benzene  | 350 +                |
| toluene  | 51 +                 |
| xylene (total)   | 460 +                |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 1,200 D <sub>1</sub> |

Date of Analysis: 07/23 and 07/24/92

- D<sub>1</sub> - Quantitated from an original run on 07/23/92.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte confirmed on secondary column.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-07         |
| Lab Sample ID:   | <u>TT1428</u> |
| benzene  | 5 +           |
| toluene  | 1 U-          |
| xylene (total)   | 8 +           |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/24/92      |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte confirmed on secondary column.
- - Analyte did not confirm on secondary column, value quantitated from confirmation analysis.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |                         |
|--|-------------------------|
| Client Sample ID:  | MW-08                   |
| Lab Sample ID:   | <u>TT1429</u>           |
| benzene  | 1,100 AD <sub>2</sub> + |
| toluene  | 9 +                     |
| xylenes (total)  | 150 +D <sub>2</sub>     |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 2,600 D <sub>2</sub>    |
| Date of Analysis:  | 07/23/92                |

- D<sub>2</sub> - Quantitated from a 1:5 dilution run on 07/24/92.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte confirmed on secondary column.
- A - Quantitated out of linear range but analyzed within holding times.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |               |
|--|---------------|
| Client Sample ID:  | MW-10         |
| Lab Sample ID:   | <u>TT1430</u> |
| benzene  | 1 U           |
| toluene  | 1 U           |
| xylene (total)   | 1 U-          |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U         |
| Date of Analysis:  | 07/24/92      |

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- - Analyte did not confirm on secondary column, value quantitated from confirmation analysis.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |                      |
|--|----------------------|
| Client Sample ID:  | MW-11                |
| Lab Sample ID:   | <u>TT1431</u>        |
| benzene  | 130 D <sub>2</sub> + |
| toluene  | 2.5 U*-              |
| xylenes (total)  | 45 +                 |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 420                  |
| Date of Analysis:  | 07/23 and 07/24/92   |

- D<sub>2</sub> - Quantitated from a 1:5 dilution on 07/24/92.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte confirmed on secondary column.
- - Analyte did not confirm, value quantitated from confirmation analysis.
- \* - Detection limit is higher than normal due to sample matrix interferences.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: MW-11D  
 Lab Sample ID: TT1432

|  |      |                  |
|--|------|------------------|
| benzene  | 250  | D <sub>1</sub> + |
| toluene  | 2.5* | U*-              |
| xylene (total)   | 66   | +                |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 540  |                  |

Date of Analysis: 07/23 and 07/24/92

- D<sub>1</sub> - Quantitated from a 1:10 dilution on 07/24/92.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- + - Analyte confirmed on secondary column.
- - Analyte did not confirm, value quantitated from confirmation analysis.
- \* - Detection limit is higher than normal due to sample matrix interferences.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

|  |              |
|--|--------------|
| Client Sample ID:  | Method Blank |
| Lab Sample ID:   | <u>B2282</u> |
| benzene  | 1 U          |
| toluene  | 1 U          |
| xylenes (total)  | 1 U          |
| total low boiling petroleum hydrocarbons, as compared to gasoline-range organics | 100 U        |
| Date of Analysis:  | 07/23/92     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

This method blank applies to the following samples: MW-02, MW-08, MW-11, and MW-11D.

EnSafe/Allen & Hoshall  
August 13, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

**BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS**

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

| Client Sample ID;<br>Lab Sample ID:  | Method Blank<br><u>B2291</u> |
|--|------------------------------|
| benzene  | 1 U                          |
| toluene  | 1 U                          |
| xylenes (total)  | 1 U                          |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | 100 U                        |
| Date of Analysis:  | 07/24/92                     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

This method blank applies to the following samples: MW-02, MW-07, MW-08, MW-10, MW-11, and MW-11D.

EnSafe/Allen & Hoshall  
 August 13, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

BTX/TOTAL LOW BOILING PETROLEUM HYDROCARBONS ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

| Client Sample ID:<br>Lab Sample ID:  | Method Blank<br><u>B2292</u> |
|--|------------------------------|
| benzene  | 1 U                          |
| toluene  | 1 U                          |
| xylenes (total)  | 1 U                          |
| total low boiling petroleum<br>hydrocarbons, as compared to<br>gasoline-range organics | - -                          |
| Date of Analysis:  | 07/27/92                     |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

This method blank applies to the following sample: MW-08.

EnSafe/Allen & Hoshall  
August 13, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51804

WATER SURROGATE PERCENT RECOVERY SUMMARY

BTX/GASOLINE RANGE ORGANICS

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>αα-Trifluorotoluene (PID)</u><br><u>(74-130%)*</u> | <u>αα-Trifluorotoluene (FID)</u><br><u>(46-183%)*</u> |
|-------------------------|----------------------|---|---|
| MW-02                   | TT1427               | -   | 94  |
| MW-07                   | TT1428               | 93  | 89  |
| MW-08                   | TT1429               | 101   | -   |
| MW-10                   | TT1430               | 92  | 87  |
| MW-11                   | TT1431               | 97  | 89  |
| MW-11D                  | TT1432               | 99  | 89  |
| MW-02 (1:10)            | TT1427               | 99  | -   |
| MW-11D (1:10)           | TT1432               | 92  | -   |
| MW-08 (1:5)             | TT1429               | 92  | 97  |
| MW-11 (1:5)             | TT1431               | 89  | -   |
| MW-08 (1:50)            | TT1429               | 89  | -   |
| Method Blank            | B2282                | 101   | 88  |
| Method Blank            | B2291                | 101   | 97  |
| Method Blank            | B2292                | 101   | -   |

PID = Quantitated from the photoionization detector.

FID = Quantitated from the flame ionization detector.

\* - Values in parentheses represent required QC limits.



# ANALYTICAL SERVICES

002

## CERTIFICATE OF ANALYSIS

EnSafe/Allen and Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 18, 1992

Job Number: ENFA 51759

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |   |
|-----------------------|---|
| Client Project ID:    | NAS Memphis                             |
| Date Received by Lab: | 07/09/92                                |
| Number of Samples:    | Four (4)                                |
| Sample Type:          | Water - three (3), Trip blank - one (1) |

### I. Introduction

On 07/09/92, three (3) water samples and one (1) trip blank arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen and Hoshall in Memphis, Tennessee, in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLMO1 Statement of Work.

The samples were analyzed for pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7471, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 9010.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on two Finnigan OWA GC/MS/DS units. The sample analyses went well. 1,1,2,2-Tetrachloroethane exhibited a low response in the initial calibration performed on 07/22/92. The affected samples were FDBIOF and TB1. This target was not detected in either sample, and the data were minimally impacted. Overall the analyses and QC looked good.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample analyses went well. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- E - Compound exceeded calibration range.
- D - Compound analyzed at secondary dilution.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

The samples were analyzed for organochlorine pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. The samples and associated method blank were treated to remove interferences using mercury cleanup procedures.

Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established. Surrogates were not added to the samples during extraction since they are not requested by the method; however, a blank spike was performed with acceptable results. The blank spike recoveries were used for control chart purposes. A slightly elevated detection limit was reported for Aroclor 1221 in sample FB-TAP due to matrix interferences. No other problems were encountered.

EnSafe/Allen and Hoshall  
August 18, 1992

004  
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51759

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

The samples were digested on 07/17/92 for ICP and GFAA. The samples for mercury analysis were prepared just prior to analysis. The CVAA analysis for mercury was performed on 07/24/92; the GFAA analyses for arsenic, antimony, lead, selenium, and thallium were performed from 07/21 to 07/27/92; the remaining metals were analyzed by ICP on 08/12/92. All run QC was acceptable. No problems were encountered.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "O" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

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### III. Quality Control (continued)

#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for cyanide by manual distillation of 5 g sample in 500 ml DI water followed by automated colorimetric determination using the LACHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). No major problems were encountered.



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

CLIENT NAS Memphis, AFFTE PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER N0026-CC118 FAX NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) AFFTE SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |               |             |           | REMARKS         |
|-------------------|-------------------|-----------|---------------|-------------|-----------|-----------------|
|                   | BNA (CLP)         | CN (9010) | APP IX metals | Pb/PbB/BCEC | VOC (CLP) |                 |
| 3                 |                   |           |               | X           |           | 5°C (OK) 7/9/92 |
| 1                 | X                 |           |               |             |           | 7/9/92          |
| 1                 | X                 |           |               |             |           |                 |
| 1                 |                   | X         |               |             |           |                 |
| 1                 |                   |           | X             |             |           |                 |
| 3                 |                   |           |               | X           |           |                 |
| 1                 | X                 |           |               |             |           |                 |
| 1                 | X                 |           |               |             |           |                 |
| 1                 |                   | X         |               |             |           |                 |
| 1                 |                   |           | X             |             |           |                 |

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  |
|---------------------|--------|-------|-------------|------------------------|--------------|------------------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL         |
| FB-Tap              | 7/8/92 | 13:00 | water       | 40 ml vials            | 4°C          | HCl              |
| FB-Tap              |        |       |             | 1 l brown bottle       | 4°C          | —                |
| FB-Tap              |        |       |             | 1 l plastic bottle     | 4°C          | NaOH             |
| FB-Tap              |        |       |             | 500 ml plastic bot.    | 4°C          | HNO <sub>3</sub> |
| FB-Tap              |        |       |             | 1 l brown bottle       | 4°C          | —                |
| FB-DI               |        | 13:30 |             | 40 ml vials            | 4°C          | HCl              |
| FB-DI               |        |       |             | 1 l br. bottle         | 4°C          | —                |
| FB-DI               |        |       |             | 1 l plastic bottle     | 4°C          | NaOH             |
| FB-DI               |        |       |             | 500 ml plastic bot.    | 4°C          | HNO <sub>3</sub> |
| FB-DI               |        |       |             | 1 l br. bottle         | 4°C          | —                |

| RELINQUISHED BY:             | DATE              | RECEIVED BY:                 | DATE             | RELINQUISHED BY: | DATE | RELINQUISHED BY: | DATE       |
|------------------------------|-------------------|------------------------------|------------------|------------------|------|------------------|------------|
| SIGNATURE <u>[Signature]</u> | 7/8/92            | SIGNATURE <u>[Signature]</u> | 7/9/92           | SIGNATURE _____  |      | SIGNATURE _____  |            |
| PRINTED <u>Scott Rymer</u>   |                   | PRINTED <u>TIM MATHIS</u>    |                  | PRINTED _____    |      | PRINTED _____    |            |
| COMPANY <u>Ensafe</u>        |                   | COMPANY <u>ITHS-K</u>        |                  | COMPANY _____    |      | COMPANY _____    |            |
| REASON <u>Sp. print</u>      | TIME <u>19:00</u> | REASON <u>SAMPLES</u>        | TIME <u>0830</u> | REASON _____     |      | REASON _____     | TIME _____ |

METHOD OF SHIPMENT: Fed Ex  
 SHIPMENT NO. 244501371C  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 5°C (OK) 7/9/92

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 2 OF 2  
NO026 0018

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7462  
 PROJECT NAME/NUMBER AFFTF/NO026 0018 FAX. NO. (901) 372-2434  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  | NO. OF CONTAINERS | ANALYSIS REQUIRED |          |       |                |           | REMARKS |              |
|---------------------|--------|-------|-------------|------------------------|--------------|------------------|-------------------|-------------------|----------|-------|----------------|-----------|---------|--------------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL         |                   | BNA (CLP)         | LN (YOC) | APP B | Pest/PUB (MOB) | VOC (CLP) |         |              |
| FB-DI/CF            | 7/8/92 | 14 10 | water       | 40 ml vials            | 4°C          | HCl              | 3                 |                   |          |       |                | X         |         | 5°C (OK) 4AM |
| FB-DI/CF            |        | 14 10 |             | 1 l bi bottle          | 4°C          | —                | 1                 | X                 |          |       |                |           |         | 7/9/92       |
| FB-DI/CF            |        | 14 10 |             | 1 l plastic bottle     | 4°C          | NaOH             | 1                 | X                 |          |       |                |           |         |              |
| FB-DI/OF            |        | 14 10 |             | 500 ml plastic botl.   | 4°C          | HNO <sub>3</sub> | 1                 |                   | X        |       |                |           |         |              |
| FB-DI/OF            |        | 14 10 |             | 1 l brown bottle       | 4°C          | —                | 1                 |                   |          | X     |                |           |         |              |
| TB-1                |        |       |             | 40 ml vials            | 4°C          | HCl              | 2                 |                   |          |       | X              |           |         | Trip Blank   |

|  |   |   |  |   |                          |   |                          |
|--|---|---|--|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>ENSA</u><br>REASON <u>Shipment</u> | DATE <u>7/8/92</u><br>TIME <u>19:00</u> | RECEIVED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>7/9/92</u><br>TIME <u>0830</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|---|---|--|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Fed Ex  
 SHIPMENT NO. 2495013710  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 5°C (OK) 4AM 7/9/92

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

009

PROJECT CODE: ENFA 51759

SAMPLE RANGE: TT0950-65

| Sample Number(s)        | Relinquished by: | Received by: | Date/Time Out:          | Reason for Change of Custody: | Relinquished by: | Received by: | Date/Time In:   | Reason for Change of Custody: |
|-------------------------|------------------|--------------|-------------------------|-------------------------------|------------------|--------------|-----------------|-------------------------------|
| TT0950-53               | S. Han           | B.C. O'Leary | 7-9-92<br>1345          | VOA analysis "                | B.C. O'Leary     | K. Cedar     | 8/11/92<br>1500 | STORAGE                       |
| TT0960-02               | K. Cedar         | D. Brown     | 7/13/92<br>0900         | PCB (5040)                    | Z ~ 7            | K. Cedar     | 7/13/92<br>1500 | STORAGE                       |
| TT0903-05               | K. Cedar         | K. F. Lee    | 7/13/92<br>1500         | BNA (3/90)                    | Z ~ 7            | K. Cedar     | 7/17/92<br>0830 | "                             |
| TT0957-59               | K. Cedar         | M. Robinson  | 7/16/92<br>0500         | CN                            | M. Robinson      | S. Han       | 7-16-92<br>1600 | storage                       |
| TT0954-56               | A. Summer        | J. Reynolds  | 7-16-92 <sup>1500</sup> | ICP; GFAP; Hg                 | J. Reynolds      | K. Cedar     | 7/17/92<br>1440 | "                             |
| Facility ID #: 9-791683 |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |
|                         |                  |              |                         |                               |                  |              |                 |                               |

SAMPLE DISPOSITION RECORD

| Sample Number(s): | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|-------------------|---------------------------|--------------|-------------------------------------|
|                   |                           |              |                                     |
|                   |                           |              |                                     |
|                   |                           |              |                                     |
|                   |                           |              |                                     |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBTAP

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0950  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0950  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/17/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

| CAS NO.    | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q  |
|------------|----------------------------|---|----|
| 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         | 1   | BJ |
| 67-64-1    | Acetone                    | 20  | B  |
| 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                 | 11  |    |
| 107-06-2   | 1,2-Dichloroethane         | 10  | U  |
| 78-93-3    | 2-Butanone                 | 10  | U  |
| 71-55-6    | 1,1,1-Trichloroethane      | 10  | U  |
| 56-23-5    | Carbon Tetrachloride       | 10  | U  |
| 75-27-4    | Bromodichloromethane       | 12  |    |
| 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       | 13  |    |
| 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                  | 9   | J  |
| 108-10-1   | 4-Methyl-2-Pentanone       | 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                    | 10  | U  |
| 108-90-7   | Chlorobenzene              | 10  | U  |
| 100-41-4   | Ethylbenzene               | 10  | U  |
| 100-42-5   | Styrene                    | 10  | U  |
| 1330-20-7  | Xylenes (total)            | 10  | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBDI

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0951  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0951  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/17/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                                 |    |    |
|------------|---------------------------------|----|----|
| 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         | 1  | BJ |
| 67-64-1    | -----Acetone                    | 10 | 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | -----Chlorobenzene              | 10 | U  |
| 100-41-4   | -----Ethylbenzene               | 10 | U  |
| 100-42-5   | -----Styrene                    | 10 | U  |
| 1330-20-7  | -----Xylenes (total)            | 10 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBDIOF

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0952  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0952  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/22/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                                 |    |    |
|------------|---------------------------------|----|----|
| 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         | 2  | BJ |
| 67-64-1    | -----Acetone                    | 8  | J  |
| 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                 | 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       | 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                    | 1  | J  |
| 108-90-7   | -----Chlorobenzene              | 10 | U  |
| 100-41-4   | -----Ethylbenzene               | 10 | U  |
| 100-42-5   | -----Styrene                    | 10 | U  |
| 1330-20-7  | -----Xylenes (total)            | 10 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB1

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0953  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0953  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/22/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

|            |                                 |    |    |
|------------|---------------------------------|----|----|
| 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         | 2  | BJ |
| 67-64-1    | -----Acetone                    | 10 | 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | -----Chlorobenzene              | 10 | U  |
| 100-41-4   | -----Ethylbenzene               | 10 | U  |
| 100-42-5   | -----Styrene                    | 10 | U  |
| 1330-20-7  | -----Xylenes (total)            | 10 | U  |

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBTAP

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0963  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0963  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 10 | U |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy) Methane  | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 10 | U |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 10 | U |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 10 | U |

Facility ID #: 9-791683

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBTAP

Lab Name: ITAS-KNOXVILLE Contract:
Lab Code: ITSTU Case No.: 51759 SAS No.: SDG No.: FBFI
Matrix: (soil/water) WATER Lab Sample ID: TT0963
Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0963
Level: (low/med) LOW Date Received: 07/09/92
% Moisture: decanted: (Y/N) Date Extracted: 07/15/92
Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92
Injection Volume: 2.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

Table with 3 columns: CAS NO., COMPOUND, and UG/L. Lists various chemical compounds and their corresponding CAS numbers and concentrations.

(1) - Cannot be separated from Diphenylamine

Facility ID #: 9-791683

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

|      |
|------|
| FBDI |
|------|

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI

Matrix: (soil/water) WATER Lab Sample ID: TT0964

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0964

Level: (low/med) LOW Date Received: 07/09/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L      Q

| CAS NO.       | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q |
|---------------|------------------------------|---|---|
| 108-95-2----- | Phenol                       | 10  | U |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10  | U |
| 95-57-8-----  | 2-Chlorophenol               | 10  | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10  | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10  | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10  | U |
| 95-48-7-----  | 2-Methylphenol               | 10  | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10  | U |
| 106-44-5----- | 4-Methylphenol               | 10  | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10  | U |
| 67-72-1-----  | Hexachloroethane             | 10  | U |
| 98-95-3-----  | Nitrobenzene                 | 10  | U |
| 78-59-1-----  | Isophorone                   | 10  | U |
| 88-75-5-----  | 2-Nitrophenol                | 10  | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10  | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10  | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10  | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10  | U |
| 91-20-3-----  | Naphthalene                  | 10  | U |
| 106-47-8----- | 4-Chloroaniline              | 10  | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10  | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10  | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 10  | U |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10  | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10  | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25  | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10  | U |
| 88-74-4-----  | 2-Nitroaniline               | 25  | U |
| 131-11-3----- | Dimethyl Phthalate           | 10  | U |
| 208-96-8----- | Acenaphthylene               | 10  | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10  | U |
| 99-09-2-----  | 3-Nitroaniline               | 25  | U |
| 83-32-9-----  | Acenaphthene                 | 10  | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBDI

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0964  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0964  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

| CAS NO.   | COMPOUND                   | CONCENTRATION UNITS: | Q |
|-----------|----------------------------|----------------------|---|
| 51-28-5   | 2,4-Dinitrophenol          | 25                   | U |
| 100-02-7  | 4-Nitrophenol              | 25                   | U |
| 132-64-9  | Dibenzofuran               | 10                   | U |
| 121-14-2  | 2,4-Dinitrotoluene         | 10                   | U |
| 84-66-2   | Diethylphthalate           | 10                   | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10                   | U |
| 86-73-7   | Fluorene                   | 10                   | U |
| 100-01-6  | 4-Nitroaniline             | 25                   | U |
| 534-52-1  | 4,6-Dinitro-2-Methylphenol | 25                   | U |
| 86-30-6   | N-Nitrosodiphenylamine (1) | 10                   | U |
| 101-55-3  | 4-Bromophenyl-phenylether  | 10                   | U |
| 118-74-1  | Hexachlorobenzene          | 10                   | U |
| 87-86-5   | Pentachlorophenol          | 25                   | U |
| 85-01-8   | Phenanthrene               | 10                   | U |
| 120-12-7  | Anthracene                 | 10                   | U |
| 86-74-8   | Carbazole                  | 10                   | U |
| 84-74-2   | Di-n-Butylphthalate        | 10                   | U |
| 206-44-0  | Fluoranthene               | 10                   | U |
| 129-00-0  | Pyrene                     | 10                   | U |
| 85-68-7   | Butylbenzylphthalate       | 2                    | J |
| 91-94-1   | 3,3'-Dichlorobenzidine     | 10                   | U |
| 56-55-3   | Benzo(a)Anthracene         | 10                   | U |
| 218-01-9  | Chrysene                   | 10                   | U |
| 117-81-7  | bis(2-Ethylhexyl)Phthalate | 10                   | U |
| 117-84-0  | Di-n-Octyl Phthalate       | 10                   | U |
| 205-99-2  | Benzo(b)Fluoranthene       | 10                   | U |
| 207-08-9  | Benzo(k)Fluoranthene       | 10                   | U |
| 50-32-8   | Benzo(a)Pyrene             | 10                   | U |
| 193-39-5  | Indeno(1,2,3-cd)Pyrene     | 10                   | U |
| 53-70-3   | Dibenz(a,h)Anthracene      | 10                   | U |
| 191-24-2  | Benzo(g,h,i)Perylene       | 10                   | U |

(1) - Cannot be separated from Diphenylamine

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBDI/OF

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0965  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0965  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

| CAS NO.  | COMPOUND                     | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q |
|----------|------------------------------|---|---|
| 108-95-2 | Phenol                       | 10  | U |
| 111-44-4 | bis(2-Chloroethyl) Ether     | 10  | U |
| 95-57-8  | 2-Chlorophenol               | 10  | U |
| 541-73-1 | 1,3-Dichlorobenzene          | 10  | U |
| 106-46-7 | 1,4-Dichlorobenzene          | 10  | U |
| 95-50-1  | 1,2-Dichlorobenzene          | 10  | U |
| 95-48-7  | 2-Methylphenol               | 10  | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 10  | U |
| 106-44-5 | 4-Methylphenol               | 10  | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine   | 10  | U |
| 67-72-1  | Hexachloroethane             | 10  | U |
| 98-95-3  | Nitrobenzene                 | 10  | U |
| 78-59-1  | Isophorone                   | 10  | U |
| 88-75-5  | 2-Nitrophenol                | 10  | U |
| 105-67-9 | 2,4-Dimethylphenol           | 10  | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane   | 10  | U |
| 120-83-2 | 2,4-Dichlorophenol           | 10  | U |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 10  | U |
| 91-20-3  | Naphthalene                  | 10  | U |
| 106-47-8 | 4-Chloroaniline              | 10  | U |
| 87-68-3  | Hexachlorobutadiene          | 10  | U |
| 59-50-7  | 4-Chloro-3-Methylphenol      | 10  | U |
| 91-57-6  | 2-Methylnaphthalene          | 10  | U |
| 77-47-4  | Hexachlorocyclopentadiene    | 10  | U |
| 88-06-2  | 2,4,6-Trichlorophenol        | 10  | U |
| 95-95-4  | 2,4,5-Trichlorophenol        | 25  | U |
| 91-58-7  | 2-Chloronaphthalene          | 10  | U |
| 88-74-4  | 2-Nitroaniline               | 25  | U |
| 131-11-3 | Dimethyl Phthalate           | 10  | U |
| 208-96-8 | Acenaphthylene               | 10  | U |
| 606-20-2 | 2,6-Dinitrotoluene           | 10  | U |
| 99-09-2  | 3-Nitroaniline               | 25  | U |
| 83-32-9  | Acenaphthene                 | 10  | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FBDI/OF

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51759 SAS No.: \_\_\_\_\_ SDG No.: FBDI  
 Matrix: (soil/water) WATER Lab Sample ID: TT0965  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0965  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/19/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|                |                             |    |   |
|----------------|-----------------------------|----|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 25 | U |
| 100-02-7-----  | 4-Nitrophenol               | 25 | U |
| 132-64-9-----  | Dibenzofuran                | 10 | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 10 | U |
| 84-66-2-----   | Diethylphthalate            | 10 | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 10 | U |
| 86-73-7-----   | Fluorene                    | 10 | U |
| 100-01-6-----  | 4-Nitroaniline              | 25 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 25 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 10 | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 10 | U |
| 118-74-1-----  | Hexachlorobenzene           | 10 | U |
| 87-86-5-----   | Pentachlorophenol           | 25 | U |
| 85-01-8-----   | Phenanthrene                | 10 | U |
| 120-12-7-----  | Anthracene                  | 10 | U |
| 86-74-8-----   | Carbazole                   | 10 | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 10 | U |
| 206-44-0-----  | Fluoranthene                | 10 | U |
| 129-00-0-----  | Pyrene                      | 10 | U |
| 85-68-7-----   | Butylbenzylphthalate        | 10 | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 10 | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 10 | U |
| 218-01-9-----  | Chrysene                    | 10 | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 10 | U |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 10 | U |
| 205-99-2-----  | Benzo(b)Fluoranthene        | 10 | U |
| 207-08-9-----  | Benzo(k)Fluoranthene        | 10 | U |
| 50-32-8-----   | Benzo(a)Pyrene              | 10 | U |
| 193-39-5-----  | Indeno(1,2,3-cd)Pyrene      | 10 | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene       | 10 | U |
| 191-24-2-----  | Benzo(g,h,i)Perylene        | 10 | U |

(1) - Cannot be separated from Diphenylamine

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: FB-TAP  
Lab Sample ID: TT0960

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 2.8 U*               |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

\* - Elevated reporting limit due to matrix interference.

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
Date of Analysis: 07/17/92

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: FB-DI  
Lab Sample ID: TT0961

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
Date of Analysis: 07/17/92

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: FB-DI/OF  
Lab Sample ID: TT0962

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
Date of Analysis: 07/17/92

EnSafe/Allen and Hoshall  
 August 18, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank  
 Lab Sample ID: BLH1012

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
 Date of Analysis: 07/17/92

Facility ID #: 9-791683

384

EnSafe/Allen and Hoshall  
August 18, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51759

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TOTAL CYANIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P4017                | 0.01 U        |
| FB-TAP                  | TT0957               | 0.01 U        |
| FB-DI                   | TT0958               | 0.04          |
| FB-DI/OF                | TT0959               | 0.01 U        |

Date of Analysis: 07/16/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

**CERTIFICATE OF ANALYSIS**

EnSafe/Allen & Hoshall  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 21, 1992

Job Number: ENFA 51765

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |   |
|-----------------------|---|
| Client Project ID:    | NAS Memphis                             |
| Date Received by Lab: | 07/09/92                                |
| Number of Samples:    | Two (2)                                 |
| Sample Type:          | Rinsate - one (1), Trip Blank - one (1) |

**I. Introduction**

On 07/09/92, one (1) rinsate and one (1) trip blank arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen and Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

**II. Analytical Results/Methodology**

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA OLM01 Statement of Work.

The samples were analyzed for pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51765

Client Project ID: NAS Memphis

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7470, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 335.2.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS-500 GC/MS/DS. The sample runs went well. The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample runs went well. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- E - Compound exceeded calibration range.
- D - Compound analyzed at secondary dilution.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

The samples were analyzed for pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. The sample and associated method blank were treated to remove interferences using mercury cleanup procedures. The appropriate surrogates were not added to these samples; however, a blank spike was analyzed with acceptable results. The data were unaffected. No other problems were encountered.

The samples were digested on 07/17/92 for ICP and for GFAA. The samples were prepared just prior to analysis for mercury by CVAA on 07/27/92. The GFAA analyses for arsenic, antimony, lead, selenium, and thallium were performed from 07/21 through 07/27/92; the remaining metals were analyzed by ICP on 08/12/92. All run QC was acceptable. No problems were encountered.

Data were reported with qualifiers as follows:

### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51765

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The sample was analyzed for cyanide by manual distillation followed by automated colorimetric determination using the LCHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). No problems were encountered.

PROJECT CODE: ENFA 51765

SAMPLE RANGE: TI 0980-85

Page 1 of 1

| Sample Number(s)      | Relinquished by: | Received by:  | Date/Time Out:  | Reason for Change of Custody: | Relinquished by: | Received by: | Date/Time In:   | Reason for Change of Custody: |
|-----------------------|------------------|---------------|-----------------|-------------------------------|------------------|--------------|-----------------|-------------------------------|
| <del>TI 0980-81</del> |                  |               | 7-9-92<br>1530  | STX/GRU                       |                  |              |                 |                               |
| TI 0980-81            | S.H.             | Rohlf         | 7-9-92<br>1535  | VDA analysis                  | B.C. Ulan        | K. Cedar     | 8/11/92<br>1500 | STORAGE                       |
| TI 0984               | K. Cedar         | D. B. Hot     | 7/13/92<br>0900 | PCB (5050)                    | Z ~ 7            | K. Cedar     | 7/13/92<br>1500 | STORAGE                       |
| TI 0985               | K. Cedar         | K. Fee        | 7/13/92<br>1500 | BNA (340)                     | Z ~ 7            | K. Cedar     | 7/17/92<br>0830 | "                             |
| TI 0983               | K. Cedar         | H. Lewinson   | 7/16/92<br>0800 | CN                            | H. Lewinson      | S.H.         | 7-16-92<br>1600 | Storage                       |
| TI 0982               | A. Summers       | J.D. Reynolds | 7-16-92<br>1800 | ICP; GFAA; Hg                 | J. B. White      | K. Cedar     | 7/17/92<br>1440 | "                             |
| Facility ID #:        |                  |               |                 |                               |                  |              |                 |                               |

| SAMPLE DISPOSITION RECORD |                           |              |                                     |
|---------------------------|---------------------------|--------------|-------------------------------------|
| Sample Number(s):         | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1  
N0026-00118

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. (901) 372-7962  
 PROJECT NAME/NUMBER AFFTE/N0026-00118 FAX. NO. (401) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |               |              |           | REMARKS  |
|-------------------|-------------------|-----------|---------------|--------------|-----------|--|
|                   | BNA (CLP)         | CN (9010) | APP IX metals | Pb/Cd (8080) | VOC (CLP) |  |
| 3                 |                   |           |               | X            |           | 3°C (OK) <del>4°C</del> 7/9/92<br>Please Bill this C.C. separate from accompanying COC |
| 1                 | X                 |           |               |              |           |  |
| 1                 |                   | X         |               |              |           |  |
| 1                 |                   |           | X             |              |           |  |
| 1                 |                   |           |               | X            |           |  |
| 2                 |                   |           |               | X            |           | Trip Blank   |

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  |
|---------------------|--------|-------|-------------|------------------------|--------------|------------------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL         |
| ER                  | 7/8/92 | 16:30 | water       | 40ml vials             | 4°C          | HCl              |
| ER                  |        |       |             | 1L br. bottle          | 4°C          | —                |
| ER                  |        |       |             | 1L plastic btl.        | 4°C          | NaOH             |
| ER                  |        |       |             | 500ml plastic btl.     | 4°C          | HNO <sub>3</sub> |
| ER                  |        |       |             | 1L br. bottle          | 4°C          | HCl              |
| TB-2                | 7/8/92 |       |             |                        | 4°C          | HCl              |

| RELINQUISHED BY:             | DATE              | RECEIVED BY:                 | DATE             | RELINQUISHED BY: | DATE | RELINQUISHED BY: | DATE       |
|------------------------------|-------------------|------------------------------|------------------|------------------|------|------------------|------------|
| SIGNATURE <u>[Signature]</u> | 7/8/92            | SIGNATURE <u>[Signature]</u> | 7/9/92           | SIGNATURE _____  |      | SIGNATURE _____  |            |
| PRINTED <u>Scott Ryan</u>    |                   | PRINTED <u>TIM MATHIS</u>    |                  | PRINTED _____    |      | PRINTED _____    |            |
| COMPANY <u>Ensafe</u>        |                   | COMPANY <u>ITMS-K</u>        |                  | COMPANY _____    |      | COMPANY _____    |            |
| REASON <u>Shipment</u>       | TIME <u>19:00</u> | REASON <u>SAMPLES</u>        | TIME <u>0830</u> | REASON _____     |      | REASON _____     | TIME _____ |

METHOD OF SHIPMENT: Fed Ex SHIPMENT NO. 2495013603 SPECIAL INSTRUCTION: \_\_\_\_\_  
 COMMENTS: 3°C (OK) ~~4°C~~ 7/9/92  
 AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

ER

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51765 SAS No.: \_\_\_\_\_ SDG No.: ER  
 Matrix: (soil/water) WATER Lab Sample ID: TT0980  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0980  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/17/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/L Q

|            |                            |    |    |
|------------|----------------------------|----|----|
| 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         | 3  | BJ |
| 67-64-1    | Acetone                    | 10 | 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | Chlorobenzene              | 10 | U  |
| 100-41-4   | Ethylbenzene               | 10 | U  |
| 100-42-5   | Styrene                    | 10 | U  |
| 1330-20-7  | Xylenes (total)            | 10 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB2

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51765 SAS No.: \_\_\_\_\_ SDG No.: ER  
 Matrix: (soil/water) WATER Lab Sample ID: TT0981  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT0981  
 Level: (low/med) LOW Date Received: 07/09/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/17/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|            |                            |    |    |
|------------|----------------------------|----|----|
| 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         | 1  | BJ |
| 67-64-1    | Acetone                    | 10 | 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | Chlorobenzene              | 10 | U  |
| 100-41-4   | Ethylbenzene               | 10 | U  |
| 100-42-5   | Styrene                    | 10 | U  |
| 1330-20-7  | Xylenes (total)            | 10 | U  |

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

ER

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51765 SAS No.: \_\_\_\_\_ SDG No.: ER

Matrix: (soil/water) WATER Lab Sample ID: TT0985

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0985

Level: (low/med) LOW Date Received: 07/09/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 10 | U |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy) Methane  | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 10 | U |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 10 | U |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 10 | U |

Facility ID #: 9-791683

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ER

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51765 SAS No.: \_\_\_\_\_ SDG No.: ER

Matrix: (soil/water) WATER Lab Sample ID: TT0985

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT0985

Level: (low/med) LOW Date Received: 07/09/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|                |                             |    |   |
|----------------|-----------------------------|----|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 25 | U |
| 100-02-7-----  | 4-Nitrophenol               | 25 | U |
| 132-64-9-----  | Dibenzofuran                | 10 | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 10 | U |
| 84-66-2-----   | Diethylphthalate            | 10 | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 10 | U |
| 86-73-7-----   | Fluorene                    | 10 | U |
| 100-01-6-----  | 4-Nitroaniline              | 25 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 25 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 10 | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 10 | U |
| 118-74-1-----  | Hexachlorobenzene           | 10 | U |
| 87-86-5-----   | Perchlorophenol             | 25 | U |
| 85-01-8-----   | Phenanthrene                | 10 | U |
| 120-12-7-----  | Anthracene                  | 10 | U |
| 86-74-8-----   | Carbazole                   | 10 | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 10 | U |
| 206-44-0-----  | Fluoranthene                | 10 | U |
| 129-00-0-----  | Pyrene                      | 10 | U |
| 85-68-7-----   | Butylbenzylphthalate        | 10 | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 10 | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 10 | U |
| 218-01-9-----  | Chrysene                    | 10 | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 10 | U |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 10 | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 10 | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 10 | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 10 | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 10 | U |
| 53-70-3-----   | Dibenz(a,h) Anthracene      | 10 | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 10 | U |

(1) - Cannot be separated from Diphenylamine

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51765

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: BLH1013

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

Date of Extraction: 07/13/92

Date of Analysis: 07/17/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51765

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: ER  
Lab Sample ID: TT0984

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1.0 U                |

Date of Extraction: 07/13/92  
Date of Analysis: 07/17/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

ER

Lab Name: ITAS\_KNOXVILLE Contract: MEMPHIS

Lab Code: ITSTU Case No.: 51765 SAS No.: SDG No.: ER

Matrix (soil/water): WATER Lab Sample ID: TT0982

Level (low/med): LOW Date Received: 07/09/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               | - |   | NR |
| 7440-36-0 | Antimony  | 4.0           | U | W | F  |
| 7440-38-2 | Arsenic   | 2.0           | U |   | F  |
| 7440-39-3 | Barium    | 2.0           | U |   | P  |
| 7440-41-7 | Beryllium | 1.0           | U |   | P  |
| 7440-43-9 | Cadmium   | 5.0           | U |   | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 10.0          | U |   | P  |
| 7440-48-4 | Cobalt    | 20.0          | U |   | P  |
| 7440-50-8 | Copper    | 10.0          | U |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 2.0           | U | W | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.20          | U |   | CV |
| 7440-02-0 | Nickel    | 20.0          | U |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 2.0           | U |   | F  |
| 7440-22-4 | Silver    | 5.0           | U |   | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 2.0           | U |   | F  |
| 7440-62-2 | Vanadium  | 10.0          | U |   | P  |
| 7440-66-6 | Zinc      | 27.3          |   |   | P  |
|           | Tin       | 30.0          | U |   | P  |

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

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Facility ID #: 9-791683

338

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51765

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TOTAL CYANIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P4017                | 0.01 U        |
| ER                      | TT0983               | 0.01 U        |

Date of Analysis: 07/16/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



# ANALYTICAL SERVICES

002

## CERTIFICATE OF ANALYSIS

EnSafe/Allen & Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 21, 1992

Job Number: ENFA 51777

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |                                       |
|-----------------------|---------------------------------------|
| Client Project ID:    | NAS Memphis                           |
| Date Received by Lab: | 07/10/92                              |
| Number of Samples:    | Four (4)                              |
| Sample Type:          | Water - two (2), Trip Blank - two (2) |

### I. Introduction

On 07/10/92, two (2) water samples and two (2) trip blanks arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen & Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

The samples were analyzed for pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51777

Client Project ID: NAS Chase Field

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## **II. Analytical Results/Methodology (continued)**

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7470, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 335.2.

## **III. Quality Control**

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample analyses went well overall and method QC looked good. A matrix spike/matrix spike duplicate was performed on sample MW-06 with acceptable results. There were no problems seen in final data review.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample analyses went well. Sample MW-06 exhibited high background contamination and two acid surrogate recoveries were low. Two other extractions of the same sample, MW-06 MS and MW-06 MSD, were compliant; therefore, the data were deemed unaffected. The low acid surrogate in the original extraction may have been due to a slight matrix effect, judging from the appearance of the sample and chromatogram. Overall the analyses and method QC looked good. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.

E - Compound exceeded calibration range.

D - Compound analyzed at secondary dilution.

J - Compound detected but below quantitation limit; value estimated.

B - Compound found in method blank.

The samples were analyzed for pesticides/PCBs using an SP2250/2401 column on a Varian 3740 GC. Matrix spike/matrix spike duplicate analyses were performed using sample MW-06 with acceptable results. The samples and associated method blank were treated to remove interferences using a mercury cleanup procedure. Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established. Dieldrin and DDT (MW-06 MS) and endrin (MW-06 MSD) were three standards that exceeded the 15% acceptable criteria. The original sample had no positive analytes; therefore, the recovery values were not affected. Surrogates were not added to these samples. However, a blank spike was performed with acceptable results. No other problems were encountered.

EnSafe/Allen & Hoshall  
August 21, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51777

Client Project ID: NAS Chase Field

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### III. Quality Control (continued)

The samples were digested on 07/17/92 for ICP and for GFAA. The samples were prepared just prior to CVAA analysis for mercury on 07/27/92. The GFAA analyses for arsenic, antimony, lead, selenium and thallium were performed from 07/21/92 through 07/27/92; the remaining metals were analyzed by ICP on 08/12/92. All run QC was acceptable. A duplicate/spike pair was prepared using sample MW-06. Spike recovery (accuracy) results were acceptable for all parameters except for arsenic and lead by GFAA. Failed post-digestion spikes for these elements showed a matrix interference for arsenic and lead. Duplicate RPD (precision) results were acceptable for all parameters. No other problems were encountered.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 2

NG026-CC118

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. 901 372 7462  
 PROJECT NAME/NUMBER AFET/NG026 CC118 FAX NO. 901 372 2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |          |               |                |           | REMARKS              |
|-------------------|-------------------|----------|---------------|----------------|-----------|----------------------|
|                   | BNA (CLP)         | CN (EOL) | APP II metals | Pest/PCP (EOL) | VOC (CLP) |                      |
| 3                 |                   |          |               | X              |           | 5°C (OK 4PM 7/10/92) |
| 1                 | X                 |          |               |                |           |                      |
| 1                 |                   | X        |               |                |           |                      |
| 1                 |                   |          | X             |                |           |                      |
| 3                 |                   |          |               | X              |           |                      |
| 1                 | X                 |          |               |                |           |                      |
| 1                 |                   | X        |               |                |           |                      |
| 1                 |                   |          | X             |                |           |                      |
| 1                 |                   |          |               | X              |           |                      |
| 1                 |                   |          |               |                |           |                      |

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  |
|---------------------|--------|-------|-------------|------------------------|--------------|------------------|
|                     |        |       |             |                        | TEMP.        | CHEMICAL         |
| MW-05               | 7/9/92 | 13:40 | Water       | 40ml vials             | 4°C          | HCl              |
| MW-05               |        |       |             | 1 l br. bottle         | 4°C          | -                |
| MW-05               |        |       |             | 1 l plastic btl.       | 4°C          | NaOH             |
| MW-05               |        |       |             | 500 ml plastic btl     | 4°C          | HNO <sub>3</sub> |
| MW-05               |        |       |             | 1 l br. bottle         | 4°C          | -                |
| MW-06               |        | 18:25 |             | 40ml vials             | 4°C          | HCl              |
| MW-06               |        |       |             | 1 l br. bottle         | 4°C          | -                |
| MW-06               |        |       |             | 1 l plastic btl.       | 4°C          | NaOH             |
| MW-06               |        |       |             | 500 ml plastic btl.    | 4°C          | HNO <sub>3</sub> |
| MW-06               |        |       |             | 1 l br. bottle         | 4°C          | -                |

| RELINQUISHED BY:              | DATE               | RELINQUISHED BY:              | DATE              | RELINQUISHED BY: | DATE | RELINQUISHED BY: | DATE        |
|-------------------------------|--------------------|-------------------------------|-------------------|------------------|------|------------------|-------------|
| SIGNATURE: <u>[Signature]</u> | 7/9/92             | SIGNATURE: <u>[Signature]</u> | 7/9/92            | SIGNATURE: _____ |      | SIGNATURE: _____ |             |
| PRINTED: <u>Scott Ryan</u>    |                    | PRINTED: <u>S Harris</u>      |                   | PRINTED: _____   |      | PRINTED: _____   |             |
| COMPANY: <u>EnSafe</u>        |                    | COMPANY: <u>ITAS</u>          |                   | COMPANY: _____   |      | COMPANY: _____   |             |
| REASON: <u>Shipment</u>       | TIME: <u>20:00</u> | REASON: _____                 | TIME: <u>0830</u> | REASON: _____    |      | REASON: _____    | TIME: _____ |

METHOD OF SHIPMENT: Fed Ex COMMENTS: 5°C - Cust. tape intact AFTER ANALYSIS, SAMPLES ARE TO BE:  
 SHIPMENT NO. 2495013706 (OK 4PM 7/10/92)  
 SPECIAL INSTRUCTION: \_\_\_\_\_  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 2 OF 2  
N0026-C0118

CLIENT NAS Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. 901 372 7962  
 PROJECT NAME/NUMBER AFFTF/N0026-C0118 FAX. NO. 901 372-2434  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| FIELD SAMPLE NUMBER | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  | NO. OF CONTAINERS | ANALYSIS REQUIRED |           |              |               |           | REMARKS      |     |
|---------------------|--------|-------|-------------|------------------------|--------------|------------------|-------------------|-------------------|-----------|--------------|---------------|-----------|--------------|-----|
|                     |        |       |             |                        | TEMP.        | CHEMICAL         |                   | BNA (CLP)         | CN (9010) | APP B metals | Pb/PbB (E08C) | VOC (CLP) |              |     |
| MW-06 MS            | 7/9/92 | 18:25 | water       | 40 ml vials            | 4°C          | HCl              | 3                 |                   |           |              |               | X         | Matrix Spike |     |
| MW-06 MS            |        |       |             | 1 l br bottle          | 4°C          | —                | 1                 | X                 |           |              |               |           |              | " " |
| MW-06 MS            |        |       |             | 1 l plastic btl.       | 4°C          | NaOH             | 1                 |                   | X         |              |               |           |              | " " |
| MW-06 MS            |        |       |             | 500 ml plastic btl.    | 4°C          | HNO <sub>3</sub> | 1                 |                   | X         |              |               |           |              | " " |
| MW-06 MS            |        |       |             | 1 l br. bottle         | 4°C          | —                | 1                 |                   |           | X            |               |           |              | " " |
| TB-3                | 7/9/92 |       |             | 40 ml vials            | 4°C          | HCl              | 2                 |                   |           |              | X             |           | Trip Blank   |     |

|  |   |   |   |   |                          |   |                          |
|--|---|---|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Sieff Ryan</u><br>COMPANY <u>Ensafe</u><br>REASON <u>Shipment</u> | DATE <u>7/9/92</u><br>TIME <u>20:00</u> | RELINQUISHED BY: <u>Rec'd By:</u><br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>S Harris</u><br>COMPANY <u>ITAS</u><br>REASON _____ | DATE <u>7/10/92</u><br>TIME <u>0830</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|---|---|---|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Fed Ex COMMENTS: 5°C - Cust, temp intact  
 SHIPMENT NO. 2495013706 (OK 7/10/92)  
 SPECIAL INSTRUCTION: \_\_\_\_\_  
 AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

CLIENT NAS- Memphis PROJECT MANAGER Louise Anderson  
 ADDRESS Millington, TN TELEPHONE NO. (901) 372-7462  
 PROJECT NAME/NUMBER AEFTF/N0026-C0118 FAX. NO. (901) 372-2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |           |               |                 |           | REMARKS                |
|-------------------|-------------------|-----------|---------------|-----------------|-----------|------------------------|
|                   | BNA (CLP)         | CN (T010) | APP DE Metals | Pest/PCO (P050) | VOC (CLP) |                        |
| 3                 |                   |           | X             |                 |           | Matrix Spike Duplicate |
| 1                 | X                 |           |               |                 |           | ↓                      |
| 1                 |                   | X         |               |                 |           |                        |
| 1                 |                   |           | X             |                 |           |                        |
| 1                 |                   |           |               | X               |           |                        |
| 3                 |                   |           |               |                 |           |                        |
| 2                 |                   |           |               | X               |           | Trip Blank             |

| FIELD SAMPLE NUMBER     | DATE   | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION   |                |              |   |   |   |   |  |            |
|-------------------------|--------|-------|-------------|------------------------|----------------|----------------|--------------|---|---|---|---|--|------------|
|                         |        |       |             |                        | TEMP.          | CHEMICAL       |              |   |   |   |   |  |            |
| MW-06 MSD               | 7/9/92 | 18:25 | water       | 40ml vials             | 4°C            | HCl            | 3            |   |   |   |   |  |            |
| MW-06 MSD               |        |       |             | 1 l brown bottle       | 4°C            | -              | 1            | X |   |   |   |  |            |
| MW-06 MSD               |        |       |             | 1 l plastic bottle     | 4°C            | NaOH           | 1            |   | X |   |   |  |            |
| MW-06 MSD               |        |       |             | 500ml plastic bottle   | 4°C            | HNO3           | 1            |   |   | X |   |  |            |
| MW-06 MSD               |        |       |             | 1 l brown bottle       | 4°C            | -              | 1            |   |   |   | X |  |            |
| <del>SS MW-06 MSD</del> |        |       |             | <del>40ml vials</del>  | <del>4°C</del> | <del>HCl</del> | <del>3</del> |   |   |   |   |  |            |
| TB-4                    | 7/9/92 | -     | water       | 40ml vials             | 4°C            | HCl            | 2            |   |   |   | X |  | Trip Blank |

| RELINQUISHED BY:             | DATE   | RELINQUISHED BY: Rec'd By    | DATE    | RELINQUISHED BY: | DATE | RELINQUISHED BY: | DATE |
|------------------------------|--------|------------------------------|---------|------------------|------|------------------|------|
| SIGNATURE <u>[Signature]</u> |        | SIGNATURE <u>[Signature]</u> | 7/10/92 | SIGNATURE _____  |      | SIGNATURE _____  |      |
| PRINTED <u>John Stedman</u>  | 7/9/92 | PRINTED <u>S Harris</u>      | 7/10/92 | PRINTED _____    |      | PRINTED _____    |      |
| COMPANY <u>EnSite</u>        | TIME   | COMPANY <u>ITAS</u>          | TIME    | COMPANY _____    |      | COMPANY _____    |      |
| REASON <u>Shipment</u>       | 20:00  | REASON _____                 | 0830    | REASON _____     |      | REASON _____     |      |

METHOD OF SHIPMENT: Fed Ex COMMENTS: 5°C - NO cust. tape AFTER ANALYSIS, SAMPLES ARE TO BE:  
 SHIPMENT NO. 249503695 (OK TAM 7/10/92)  
 SPECIAL INSTRUCTION: \_\_\_\_\_  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

PROJECT CODE: ENFA 51777

SAMPLE RANGE: TI1074-95

| Sample Number (s)       | Relinquished by: | Received by:        | Date/Time Out:  | Reason for Change of Custody: | Relinquished by: | Received by: | Date/Time In:   | Reason for Change of Custody: |
|-------------------------|------------------|---------------------|-----------------|-------------------------------|------------------|--------------|-----------------|-------------------------------|
| TI1074-79               | Jim Mathis       | Richard [Signature] | 7/10/92<br>1530 | CLP VOAs                      | B.C. Chaves      | K. Cedar     | 8/11/92<br>1500 | STORAGE                       |
| TI1084-91               | K. Cedar         | D. Boren            | 7/13/92<br>0900 | PCB(8040)                     | [Signature]      | K. Cedar     | 7/14/92<br>0920 | STORAGE                       |
| TI1092-85               | K. Cedar         | V. Fee              | 7/13/92<br>1500 | BWA(3/90) <sup>3</sup>        | ???              | K. Cedar     | 7/17/92<br>0930 | "                             |
| TI1080-93               | K. Cedar         | P. Levinson         | 7/16/92<br>0900 | CN                            | G. Bowman        | S. Han       | 7-16-92<br>1600 | Storage                       |
| TI1084-87               | La Summers       | J. Bignall          | 7-16-92<br>1800 | ICP; GFAA; Hg                 | [Signature]      | K. Cedar     | 7/17/92<br>1040 | "                             |
| Facility ID #: 9-791683 |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |
|                         |                  |                     |                 |                               |                  |              |                 |                               |

| SAMPLE DISPOSITION RECORD |                           |              |                                     |
|---------------------------|---------------------------|--------------|-------------------------------------|
| Sample Number(s):         | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |
|                           |                           |              |                                     |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW05

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1074  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1074  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/15/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: \_\_\_\_\_ 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                                 |    |    |
|------------|---------------------------------|----|----|
| 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         | 1  | BJ |
| 67-64-1    | -----Acetone                    | 12 | B  |
| 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) | 5  | J  |
| 67-66-3    | -----Chloroform                 | 10 | U  |
| 107-06-2   | -----1,2-Dichloroethane         | 10 | U  |
| 78-93-3    | -----2-Butanone                 | 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       | 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                    | 10 | U  |
| 108-90-7   | -----Chlorobenzene              | 10 | U  |
| 100-41-4   | -----Ethylbenzene               | 10 | U  |
| 100-42-5   | -----Styrene                    | 10 | U  |
| 1330-20-7  | -----Xylenes (total)            | 10 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW06

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1075  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1075  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/15/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

| CAS NO.    | COMPOUND                   | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q |
|------------|----------------------------|---|---|
| 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                    | 15  | B |
| 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                 | 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                    | 2   | J |
| 10061-02-6 | trans-1,3-Dichloropropene  | 10  | U |
| 75-25-2    | Bromoform                  | 10  | U |
| 108-10-1   | 4-Methyl-2-Pentanone       | 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                    | 10  | U |
| 108-90-7   | Chlorobenzene              | 10  | U |
| 100-41-4   | Ethylbenzene               | 9   | J |
| 100-42-5   | Styrene                    | 10  | U |
| 1330-20-7  | Xylenes (total)            | 10  | U |

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05

Matrix Spike - EPA Sample No.: MW06

| COMPOUND           | SPIKE ADDED (ug/L) | SAMPLE CONCENTRATION (ug/L) | MS CONCENTRATION (ug/L) | MS % REC # | QC LIMITS REC. |
|--------------------|--------------------|-----------------------------|-------------------------|------------|----------------|
| 1,1-Dichloroethene | 50.0               | 0                           | 59.6                    | 119        | 61-145         |
| Trichloroethene    | 50.0               | 0                           | 54.4                    | 109        | 71-120         |
| Benzene            | 50.0               | 2.06                        | 54.1                    | 104        | 76-127         |
| Toluene            | 50.0               | 0                           | 50.5                    | 101        | 76-125         |
| Chlorobenzene      | 50.0               | 0                           | 49.9                    | 100        | 75-130         |

| COMPOUND           | SPIKE ADDED (ug/L) | MSD CONCENTRATION (ug/L) | MSD % REC # | % RPD # | QC LIMITS RPD | REC.   |
|--------------------|--------------------|--------------------------|-------------|---------|---------------|--------|
| 1,1-Dichloroethene | 50.0               | 53.8                     | 108         | 10      | 14            | 61-145 |
| Trichloroethene    | 50.0               | 52.2                     | 104         | 5       | 14            | 71-120 |
| Benzene            | 50.0               | 51.5                     | 99          | 5       | 11            | 76-127 |
| Toluene            | 50.0               | 47.9                     | 96          | 5       | 13            | 76-125 |
| Chlorobenzene      | 50.0               | 48.6                     | 97          | 3       | 13            | 75-130 |

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS: CLP, 51777, MW05, MW06, LOW, WATER, TT1075, VOA, EPA,  
OWA3:DB-624/0.53, VS07152, VBFB0715, VB0715, TT1076, TT1077, UNDILUTE

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

TB3

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1078  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1078  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/15/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                            |    |    |
|------------|----------------------------|----|----|
| 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         | 2  | BJ |
| 67-64-1    | Acetone                    | 12 | B  |
| 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | Chlorobenzene              | 10 | U  |
| 100-41-4   | Ethylbenzene               | 10 | U  |
| 100-42-5   | Styrene                    | 10 | U  |
| 1330-20-7  | Xylenes (total)            | 10 | U  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB4

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1079  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1079  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/15/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                            |    |    |
|------------|----------------------------|----|----|
| 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         | 2  | BJ |
| 67-64-1    | Acetone                    | 10 | B  |
| 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                 | 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       | 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                    | 10 | U  |
| 108-90-7   | Chlorobenzene              | 10 | U  |
| 100-41-4   | Ethylbenzene               | 10 | U  |
| 100-42-5   | Styrene                    | 10 | U  |
| 1330-20-7  | Xylenes (total)            | 10 | U  |

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW05

Site Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1092  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT1092  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 10 | U |
| 111-44-4----- | bis(2-Chloroethyl)Ether      | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 1  | J |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 10 | U |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 10 | U |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 10 | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW05

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1092  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT1092  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|                |                             |    |   |
|----------------|-----------------------------|----|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 25 | U |
| 100-02-7-----  | 4-Nitrophenol               | 25 | U |
| 132-64-9-----  | Dibenzofuran                | 10 | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 10 | U |
| 84-66-2-----   | Diethylphthalate            | 10 | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 10 | U |
| 86-73-7-----   | Fluorene                    | 10 | U |
| 100-01-6-----  | 4-Nitroaniline              | 25 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 25 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 10 | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 10 | U |
| 118-74-1-----  | Hexachlorobenzene           | 10 | U |
| 87-86-5-----   | Pentachlorophenol           | 25 | U |
| 85-01-8-----   | Phenanthrene                | 10 | U |
| 120-12-7-----  | Anthracene                  | 10 | U |
| 86-74-8-----   | Carbazole                   | 10 | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 10 | U |
| 206-44-0-----  | Fluoranthene                | 10 | U |
| 129-00-0-----  | Pyrene                      | 10 | U |
| 85-68-7-----   | Butylbenzylphthalate        | 10 | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 10 | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 10 | U |
| 218-01-9-----  | Chrysene                    | 10 | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 10 | U |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 10 | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 10 | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 10 | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 10 | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 10 | U |
| 53-70-3-----   | Dibenz(a,h) Anthracene      | 10 | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 10 | U |

(1) - Cannot be separated from Diphenylamine

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW06

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1093  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT1093  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 10 | U |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 7  | J |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 10 | U |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 10 | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW06

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51777 SAS No.: \_\_\_\_\_ SDG No.: MW05  
 Matrix: (soil/water) WATER Lab Sample ID: TT1093  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT1093  
 Level: (low/med) LOW Date Received: 07/10/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 07/15/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/18/92  
 Injection Volume: 2.0(uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

| CAS NO.        | COMPOUND                    | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q |
|----------------|-----------------------------|---|---|
| 51-28-5-----   | 2,4-Dinitrophenol           | 25  | U |
| 100-02-7-----  | 4-Nitrophenol               | 25  | U |
| 132-64-9-----  | Dibenzofuran                | 10  | U |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 10  | U |
| 84-66-2-----   | Diethylphthalate            | 10  | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 10  | U |
| 86-73-7-----   | Fluorene                    | 10  | U |
| 100-01-6-----  | 4-Nitroaniline              | 25  | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 25  | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 10  | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 10  | U |
| 118-74-1-----  | Hexachlorobenzene           | 10  | U |
| 87-86-5-----   | Pentachlorophenol           | 25  | U |
| 85-01-8-----   | Phenanthrene                | 10  | U |
| 120-12-7-----  | Anthracene                  | 10  | U |
| 86-74-8-----   | Carbazole                   | 10  | U |
| 84-74-2-----   | Di-n-Butylphthalate         | 7   | J |
| 206-44-0-----  | Fluoranthene                | 10  | U |
| 129-00-0-----  | Pyrene                      | 10  | U |
| 85-68-7-----   | Butylbenzylphthalate        | 10  | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 10  | U |
| 56-55-3-----   | Benzo(a)Anthracene          | 10  | U |
| 218-01-9-----  | Chrysene                    | 10  | U |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 2   | J |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 10  | U |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 10  | U |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 10  | U |
| 50-32-8-----   | Benzo(a) Pyrene             | 10  | U |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 10  | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene       | 10  | U |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 10  | U |

(1) - Cannot be separated from Diphenylamine

EnSafe/Allen & Hoshall  
 August 21, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Chase Field

Job Number: ENFA 51777

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: BLH1014

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                |                       |                      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
 Date of Analysis: 07/17/92

EnSafe/Allen & Hoshall  
 August 21, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Chase Field

Job Number: ENFA 51777

PESTICIDES AND PCBs ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MW-05  
 Lab Sample ID: TT1088

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| β-BHC              | 0.5 U                | endrin aldehyde       | 1.0 U                |
| δ-BHC              | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| γ-BHC              | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1.0 U                |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                |                       |                      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 07/13/92  
 Date of Analysis: 07/17/92

EnSafe/Allen & Hoshall  
August 21, 1992

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Chase Field

Job Number: ENFA 51777

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: MW-06  
Lab Sample ID: TT1089

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 1.3 U*               | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1.0 U                |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1.0 U                |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1.0 U                |
| aldrin             | 0.5 U                | toxaphene             | 1.0 U                |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 2.0 U*               |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1.0 U                |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1.0 U                |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1.0 U                |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1.0 U                |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1.0 U                |
| endosulfan II      | 0.5 U                |                       |                      |

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

\* - Elevated reporting limit due to matrix interference.

Date of Extraction: 07/13/92

Date of Analysis: 07/17/92 and 08/05/92

EnSafe/Allen & Hoshall  
 August 21, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Chase Field

Job Number: ENFA 51777

CYANIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Result</u> |
|-------------------------|----------------------|---------------|
| Method Blank            | P4017                | 0.01 U        |
| MW-05                   | TT1080               | 0.04          |
| MW-06                   | TT1081               | 0.09          |

Date of Analysis: 07/16/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

CERTIFICATE OF ANALYSIS

EnSafe/Allen & Hoshall  
Memphis Facility  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 22, 1992

Job Number: ENFA 51803

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

Client Project ID: NAS Memphis  
Date Received by Lab: 07/11/92  
Number of Samples: Five (5)  
Sample Type: Water - three (3), Trip Blank - two (2)

**I. Introduction**

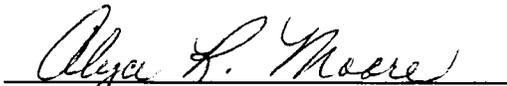
On 07/11/92, three (3) water samples and two (2) trip blanks arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen & Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

**II. Analytical Results/Methodology**

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for Target Compound List (TCL) volatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

Reviewed and Approved:



Alyce R. Moore  
Laboratory Manager

EnSafe/Allen & Hoshall  
August 22, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51803

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## II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7470, 7041, 7060, 7421, 7740, 7841 and 6010.

The samples were analyzed for total cyanide based on EPA method 9010.

## III. Quality Control

The samples for semivolatiles and pesticides/PCBs were not extracted within sample holding time. The client was notified and the samples were resubmitted under job number ENFA 52006.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS-500 GC/MS/DS. The sample analyses went well. The response for 1,1,2,2-tetrachloroethane was slightly low in the initial and continuing calibrations at 0.494 and 0.432, respectively, with a limit of 0.500. This had no negative impact on the data. Benzene was detected in samples MW-08, MW-11 and MW-11D at levels requiring dilutions. Overall, the analyses and method QC looked good. Associated QC samples were analyzed with ITAS project ENFA 51777, sample MW-06. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- E - Compound exceeded calibration range of instrument.
- D - Compound analyzed at a secondary dilution factor.
- J - Indicates an estimated value less than the detection limit.
- B - Analyte was found in the blank as well as the sample.
- S - Spiked compound.

The samples were digested on 07/17/92 for ICP and for GFAA. The samples were prepared just prior to analysis for mercury by CVAA on 08/03/92. The GFAA analyses for arsenic, antimony, lead, selenium and thallium were performed from 07/21/92 through 07/27/92; the remaining metals were analyzed by ICP on 08/12/92. All run QC was acceptable. Associated QC samples were analyzed with ITAS project ENFA 51777, sample MW-06. No problems were encountered.

EnSafe/Allen & Hoshall  
August 22, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 51803

Client Project ID: NAS Memphis

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### III. Quality Control (continued)

Data were reported with qualifiers as follows:

#### "C" Qualifiers

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- B - Value greater than instrument detection limit, but less than contract required quantitation limit.

#### "Q" Qualifiers

- \* - Duplicate analysis outside control limits.
- N - Spiked sample recovery outside control limits.
- W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
- S - The reported value was determined by method of standard additions.

#### "M" Qualifiers

- P - Analysis performed by ICP.
- V - Analysis performed by CVAA.
- F - Analysis performed by GFAA.
- C - Cyanide analysis by manual distillation/colorimetric determination.

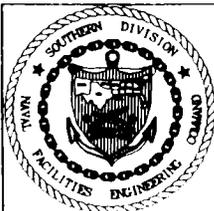
#### Miscellaneous

- D - Duplicate.
- S - Spike.
- NR - Not required.
- G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
- X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for cyanide by manual distillation followed by automated colorimetric determination using the LACHAT QuikChem automated flow injection analyzer (QuikChem Method No. 10-204-00-2-B). Associated QC samples were analyzed with ITAS project ENFA 51777, sample MW-06. No problems were encountered.

000007

Facility ID #: 9-791683



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHAL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 2

CLIENT NAS - Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. 901 372 7962  
 PROJECT NAME/NUMBER AF-1F/N0026-CC118 FAX. NO. 901 372 2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  | NO. OF CONTAINERS | ANALYSIS REQUIRED |           |               |                |           | REMARKS                            |
|---------------------|---------|-------|-------------|------------------------|--------------|------------------|-------------------|-------------------|-----------|---------------|----------------|-----------|------------------------------------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL         |                   | BNA (CLP)         | CN (9010) | APP IX METALS | PER/PCB (8000) | VOC (CLP) |                                    |
| MW-08               | 7/10/92 | 14:30 | water       | 40 ml vials            | 4°C          | HCl              | 2                 |                   |           |               |                | X         | 4°C<br>and *<br>TB-5<br>Trip Blank |
| MW-08               |         | 14:30 |             | 1 l br. bottle         | 4°C          | —                | 1                 | X                 |           |               |                |           |                                    |
| MW-08               |         | 14:30 |             | 1 l plastic bottle     | 4°C          | NaOH             | 1                 |                   | X         |               |                |           |                                    |
| MW-08               |         | 14:30 |             | 500 ml plastic btl.    | 4°C          | HNO <sub>3</sub> | 1                 |                   | X         |               |                |           |                                    |
| MW-08               |         | 14:30 |             | 1 l br. bottle         | 4°C          | —                | 1                 |                   |           | X             |                |           |                                    |
| MW-11               | 7/10/92 | 16:40 | water       | 40 ml vials            | 4°C          | HCl              | 3                 |                   |           |               | X              |           |                                    |
| MW-11               |         | 16:40 |             | 1 l br. bottle         | 4°C          | —                | 1                 | X                 |           |               |                |           |                                    |
| MW-11               |         | 16:40 |             | 1 l plastic bottle     | 4°C          | NaOH             |                   |                   | X         |               |                |           |                                    |
| MW-11               |         | 16:40 |             | 500 ml plastic btl.    | 4°C          | HNO <sub>3</sub> |                   |                   | X         |               |                |           |                                    |
| MW-11               |         | 16:40 |             | 1 l br. bottle         | 4°C          | —                |                   |                   |           | X             |                |           |                                    |

|                                     |                         |                                     |                                 |                        |               |
|-------------------------------------|-------------------------|-------------------------------------|---------------------------------|------------------------|---------------|
| RELINQUISHED BY: <u>[Signature]</u> | DATE: <u>7/10/92</u>    | RELINQUISHED BY: <u>Kevin Cedar</u> | DATE: <u>7/14/92</u>            | RELINQUISHED BY: _____ | DATE: _____   |
| SIGNATURE _____                     | TIME: <u>18:00</u>      | SIGNATURE _____                     | TIME: <u>0830</u>               | SIGNATURE _____        | TIME: _____   |
| PRINTED: <u>Scott Ryan</u>          | REASON: <u>Shipment</u> | PRINTED: <u>KEVIN CEDAR</u>         | REASON: <u>SAMPLE RECEIVING</u> | PRINTED: _____         | REASON: _____ |
| COMPANY: <u>Ensafe</u>              |                         | COMPANY: <u>ITAS-K</u>              |                                 | COMPANY: _____         |               |
| REASON: _____                       |                         | REASON: _____                       |                                 | REASON: _____          |               |

METHOD OF SHIPMENT: Fed Ex  
 SHIPMENT NO. 2495013625  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 4°C (OK TAM 7/14/92)

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

ENFA 51803

000003

Facility ID #: 9-791683



**NAVY CLEAN**  
**ENSAFE/ALLEN & HOSHALL**  
 (901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1  
2 OF 2  
 N0026-C0118

CLIENT NAS - Memphis PROJECT MANAGER Lawson Anderson  
 ADDRESS Millington TN TELEPHONE NO. 901 372 7962  
 PROJECT NAME/NUMBER AFFTE/N0026-C0118 FAX. NO. 901 372 2454  
 MEDIA STATUS: (A, B, OR C) \_\_\_\_\_ SAMPLERS: (SIGNATURE) [Signature]

| FIELD SAMPLE NUMBER | DATE    | TIME  | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |                  | NO. OF CONTAINERS | ANALYSIS REQUIRED |           |             |                |           | REMARKS    |
|---------------------|---------|-------|-------------|------------------------|--------------|------------------|-------------------|-------------------|-----------|-------------|----------------|-----------|------------|
|                     |         |       |             |                        | TEMP.        | CHEMICAL         |                   | BVA (CLP)         | CN (9010) | APPX metals | Pest/PCB (808) | VOC (CLP) |            |
| MW-11 D             | 7/10/92 | 16:40 | water       | 40ml vials             | 4°C          | HCl              | 3                 |                   |           |             | X              |           | 6°C        |
| MW-11 D             |         | 16:40 |             | 1l br. bottle          | 4°C          | —                | 1                 | X                 |           |             |                |           |            |
| MW-11 D             |         | 16:40 |             | 1l plastic btl.        | 4°C          | NaOH             | 1                 | X                 |           |             |                |           |            |
| MW-11 D             |         | 16:40 |             | 500 ml plastic btl.    | 4°C          | HNO <sub>3</sub> | 1                 |                   | X         |             |                |           |            |
| MW-11 D             |         | 16:40 |             | 1l br. bottle          | 4°C          | —                | 1                 |                   |           | X           |                |           |            |
| TB-6                | 7/10/92 | —     |             | 40ml vials             | 4°C          | HCl              | 2                 |                   |           |             | X              |           | Trip Blank |

|  |  |   |   |   |                          |   |                          |
|--|--|---|---|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>EnSafe</u><br>REASON <u>Shipment</u> | DATE <u>7/10/92</u><br>TIME <u>18:00</u> | RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>KEVIN CEDAR</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLE RECEIVING</u> | DATE <u>7/11/92</u><br>TIME <u>0830</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|--|--|---|---|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Fed Ex  
 SHIPMENT NO. 2495013614  
 SPECIAL INSTRUCTION: \_\_\_\_\_

COMMENTS: 6°C (OK TFM 7/14/92)

AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

ENFA 518C

09006

PROJECT CODE: ENFA 51803

SAMPLE RANGE: TT1410-26

| Sample Number (s) | Relinquished by:  | Received by:      | Date/Time Out:          | Reason for Change of Custody: | Relinquished by:  | Received by:    | Date/Time In:   | Reason for Change of Custody: |
|-------------------|-------------------|-------------------|-------------------------|-------------------------------|-------------------|-----------------|-----------------|-------------------------------|
| TT1410-14         | <i>Jim Mills</i>  | <i>J. Murrain</i> | 7/14/92<br>1455         | CLP VOAs                      | <i>B.C. Chams</i> | <i>K. Cedar</i> | 8/11/92<br>1500 | STORAGE                       |
| TT1419-20         | <i>K. Cedar</i>   | <i>H. Levins</i>  | 7/16/92<br>0600         | CN                            | <i>Levins</i>     | <i>S. Han</i>   | 7-16-92<br>1600 | storage                       |
| TT1415-17         | <i>S. Summers</i> | <i>J. Byrnes</i>  | 7-16-92 <sup>1800</sup> | ICP: G.FAA-119                | <i>J. Byrnes</i>  | <i>K. Cedar</i> | 7/17/92<br>1440 | "                             |
| TT 1421-26        | <i>K. Cedar</i>   | <i>D. Brown</i>   | 8/5/92                  | TCL ENR<br>DEET               | <i>D. Brown</i>   | <i>K. Cedar</i> | 8/6/92<br>0900  | "                             |
| Facility ID #:    |                   |                   |                         |                               |                   |                 |                 |                               |
| 9-791688          |                   |                   |                         |                               |                   |                 |                 |                               |

SAMPLE DISPOSITION RECORD

| Sample Number(s): | Disposed by Initial/Date: | Drum Number: | Returned to Client by Initial/Date: |
|-------------------|---------------------------|--------------|-------------------------------------|
|                   |                           |              |                                     |
|                   |                           |              |                                     |
|                   |                           |              |                                     |
|                   |                           |              |                                     |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW08

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08

Matrix: (soil/water) WATER Lab Sample ID: TT1410

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1410

Level: (low/med) LOW Date Received: 07/11/92

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                                 |      |   |
|------------|---------------------------------|------|---|
| 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                    | 10   | 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                 | 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                    | 1300 | E |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 10   | U |
| 75-25-2    | -----Bromoform                  | 10   | U |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 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                    | 10   | U |
| 108-90-7   | -----Chlorobenzene              | 10   | U |
| 100-41-4   | -----Ethylbenzene               | 14   |   |
| 100-42-5   | -----Styrene                    | 10   | U |
| 1330-20-7  | -----Xylenes (total)            | 100  |   |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW08DL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1410  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1410DL  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 10.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q   |
|------------|---------------------------------|---|-----|
| 74-87-3    | -----Chloromethane              | 100   | U   |
| 74-83-9    | -----Bromomethane               | 100   | U   |
| 75-01-4    | -----Vinyl Chloride             | 100   | U   |
| 75-00-3    | -----Chloroethane               | 100   | U   |
| 75-09-2    | -----Methylene Chloride         | 24  | BJD |
| 67-64-1    | -----Acetone                    | 100   | U   |
| 75-15-0    | -----Carbon Disulfide           | 100   | U   |
| 75-35-4    | -----1,1-Dichloroethene         | 100   | U   |
| 75-34-3    | -----1,1-Dichloroethane         | 100   | U   |
| 540-59-0   | -----1,2-Dichloroethene (total) | 100   | U   |
| 67-66-3    | -----Chloroform                 | 100   | U   |
| 107-06-2   | -----1,2-Dichloroethane         | 100   | U   |
| 78-93-3    | -----2-Butanone                 | 100   | U   |
| 71-55-6    | -----1,1,1-Trichloroethane      | 100   | U   |
| 56-23-5    | -----Carbon Tetrachloride       | 100   | U   |
| 75-27-4    | -----Bromodichloromethane       | 100   | U   |
| 78-87-5    | -----1,2-Dichloropropane        | 100   | U   |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 100   | U   |
| 79-01-6    | -----Trichloroethene            | 100   | U   |
| 124-48-1   | -----Dibromochloromethane       | 100   | U   |
| 79-00-5    | -----1,1,2-Trichloroethane      | 100   | U   |
| 71-43-2    | -----Benzene                    | 1100  | D   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 100   | U   |
| 75-25-2    | -----Bromoform                  | 100   | U   |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 100   | U   |
| 591-78-6   | -----2-Hexanone                 | 100   | U   |
| 127-18-4   | -----Tetrachloroethene          | 100   | U   |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 100   | U   |
| 108-88-3   | -----Toluene                    | 100   | U   |
| 108-90-7   | -----Chlorobenzene              | 100   | U   |
| 100-41-4   | -----Ethylbenzene               | 15  | JD  |
| 100-42-5   | -----Styrene                    | 100   | U   |
| 1330-20-7  | -----Xylenes (total)            | 86  | JD  |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW11

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1411  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1411  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_(uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

|            |                            |     |    |
|------------|----------------------------|-----|----|
| 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         | 1   | BJ |
| 67-64-1    | Acetone                    | 10  | 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                 | 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                    | 280 | E  |
| 10061-02-6 | trans-1,3-Dichloropropene  | 10  | U  |
| 75-25-2    | Bromoform                  | 10  | U  |
| 108-10-1   | 4-Methyl-2-Pentanone       | 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                    | 1   | J  |
| 108-90-7   | Chlorobenzene              | 10  | U  |
| 100-41-4   | Ethylbenzene               | 13  |    |
| 100-42-5   | Styrene                    | 10  | U  |
| 1330-20-7  | Xylenes (total)            | 83  |    |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11DL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08

Matrix: (soil/water) WATER Lab Sample ID: TT1411

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1411DL

Level: (low/med) LOW Date Received: 07/11/92

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 2.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                            |     |     |
|------------|----------------------------|-----|-----|
| 74-87-3    | Chloromethane              | 20  | U   |
| 74-83-9    | Bromomethane               | 20  | U   |
| 75-01-4    | Vinyl Chloride             | 20  | U   |
| 75-00-3    | Chloroethane               | 20  | U   |
| 75-09-2    | Methylene Chloride         | 5   | BDJ |
| 67-64-1    | Acetone                    | 20  | U   |
| 75-15-0    | Carbon Disulfide           | 20  | U   |
| 75-35-4    | 1,1-Dichloroethene         | 20  | U   |
| 75-34-3    | 1,1-Dichloroethane         | 20  | U   |
| 540-59-0   | 1,2-Dichloroethene (total) | 20  | U   |
| 67-66-3    | Chloroform                 | 20  | U   |
| 107-06-2   | 1,2-Dichloroethane         | 20  | U   |
| 78-93-3    | 2-Butanone                 | 20  | U   |
| 71-55-6    | 1,1,1-Trichloroethane      | 20  | U   |
| 56-23-5    | Carbon Tetrachloride       | 20  | U   |
| 75-27-4    | Bromodichloromethane       | 20  | U   |
| 78-87-5    | 1,2-Dichloropropane        | 20  | U   |
| 10061-01-5 | cis-1,3-Dichloropropene    | 20  | U   |
| 79-01-6    | Trichloroethene            | 20  | U   |
| 124-48-1   | Dibromochloromethane       | 20  | U   |
| 79-00-5    | 1,1,2-Trichloroethane      | 20  | U   |
| 71-43-2    | Benzene                    | 230 | D   |
| 10061-02-6 | trans-1,3-Dichloropropene  | 20  | U   |
| 75-25-2    | Bromoform                  | 20  | U   |
| 108-10-1   | 4-Methyl-2-Pentanone       | 20  | U   |
| 591-78-6   | 2-Hexanone                 | 20  | U   |
| 127-18-4   | Tetrachloroethene          | 20  | U   |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 20  | U   |
| 108-88-3   | Toluene                    | 20  | U   |
| 108-90-7   | Chlorobenzene              | 20  | U   |
| 100-41-4   | Ethylbenzene               | 11  | DJ  |
| 100-42-5   | Styrene                    | 20  | U   |
| 1330-20-7  | Xylenes (total)            | 63  | D   |

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11D

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1412  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1412  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

|                 |                            |     |    |
|-----------------|----------------------------|-----|----|
| 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         | 2   | BJ |
| 67-64-1-----    | Acetone                    | 10  | 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                 | 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                    | 210 | E  |
| 10061-02-6----- | trans-1,3-Dichloropropene  | 10  | U  |
| 75-25-2-----    | Bromoform                  | 10  | U  |
| 108-10-1-----   | 4-Methyl-2-Pentanone       | 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                    | 1   | J  |
| 108-90-7-----   | Chlorobenzene              | 10  | U  |
| 100-41-4-----   | Ethylbenzene               | 10  |    |
| 100-42-5-----   | Styrene                    | 10  | U  |
| 1330-20-7-----  | Xylenes (total)            | 60  |    |

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11DDL

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1412  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1412DL  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 2.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|            |                                 |     |     |
|------------|---------------------------------|-----|-----|
| 74-87-3    | -----Chloromethane              | 20  | U   |
| 74-83-9    | -----Bromomethane               | 20  | U   |
| 75-01-4    | -----Vinyl Chloride             | 20  | U   |
| 75-00-3    | -----Chloroethane               | 20  | U   |
| 75-09-2    | -----Methylene Chloride         | 5   | BDJ |
| 67-64-1    | -----Acetone                    | 20  | U   |
| 75-15-0    | -----Carbon Disulfide           | 20  | U   |
| 75-35-4    | -----1,1-Dichloroethene         | 20  | U   |
| 75-34-3    | -----1,1-Dichloroethane         | 20  | U   |
| 540-59-0   | -----1,2-Dichloroethene (total) | 20  | U   |
| 67-66-3    | -----Chloroform                 | 20  | U   |
| 107-06-2   | -----1,2-Dichloroethane         | 20  | U   |
| 78-93-3    | -----2-Butanone                 | 20  | U   |
| 71-55-6    | -----1,1,1-Trichloroethane      | 20  | U   |
| 56-23-5    | -----Carbon Tetrachloride       | 20  | U   |
| 75-27-4    | -----Bromodichloromethane       | 20  | U   |
| 78-87-5    | -----1,2-Dichloropropane        | 20  | U   |
| 10061-01-5 | -----cis-1,3-Dichloropropene    | 20  | U   |
| 79-01-6    | -----Trichloroethene            | 20  | U   |
| 124-48-1   | -----Dibromochloromethane       | 20  | U   |
| 79-00-5    | -----1,1,2-Trichloroethane      | 20  | U   |
| 71-43-2    | -----Benzene                    | 180 | D   |
| 10061-02-6 | -----trans-1,3-Dichloropropene  | 20  | U   |
| 75-25-2    | -----Bromoform                  | 20  | U   |
| 108-10-1   | -----4-Methyl-2-Pentanone       | 20  | U   |
| 591-78-6   | -----2-Hexanone                 | 20  | U   |
| 127-18-4   | -----Tetrachloroethene          | 20  | U   |
| 79-34-5    | -----1,1,2,2-Tetrachloroethane  | 20  | U   |
| 108-88-3   | -----Toluene                    | 20  | U   |
| 108-90-7   | -----Chlorobenzene              | 20  | U   |
| 100-41-4   | -----Ethylbenzene               | 9   | DJ  |
| 100-42-5   | -----Styrene                    | 20  | U   |
| 1330-20-7  | -----Xylenes (total)            | 50  | D   |

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIPBLANK

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1413  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1413  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

|                 |                            |    |    |
|-----------------|----------------------------|----|----|
| 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         | 3  | BJ |
| 67-64-1-----    | Acetone                    | 10 | 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                 | 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       | 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                    | 10 | U  |
| 108-90-7-----   | Chlorobenzene              | 10 | U  |
| 100-41-4-----   | Ethylbenzene               | 10 | U  |
| 100-42-5-----   | Styrene                    | 10 | U  |
| 1330-20-7-----  | Xylenes (total)            | 10 | U  |

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB6

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT1414  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: TT1414  
 Level: (low/med) LOW Date Received: 07/11/92  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/23/92  
 GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | Q  |
|------------|---------------------------------|---|----|
| 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         | 3   | BJ |
| 67-64-1    | -----Acetone                    | 10  | 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                 | 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       | 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                    | 10  | U  |
| 108-90-7   | -----Chlorobenzene              | 10  | U  |
| 100-41-4   | -----Ethylbenzene               | 10  | U  |
| 100-42-5   | -----Styrene                    | 10  | U  |
| 1330-20-7  | -----Xylenes (total)            | 10  | U  |

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 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-08

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: MEMPHIS \_\_\_\_\_  
 Lab Code: ITSTU \_\_\_\_\_ Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW-05 \_\_\_\_\_  
 Matrix (soil/water): WATER Lab Sample ID: TT1415 \_\_\_\_\_  
 Level (low/med): LOW \_\_\_\_\_ Date Received: 07/11/92  
 % Solids: \_\_\_\_\_0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 4.0           | U | W | F  |
| 7440-38-2 | Arsenic   | 82.5          |   | S | F  |
| 7440-39-3 | Barium    | 583           |   |   | P  |
| 7440-41-7 | Beryllium | 3.8           | B |   | P  |
| 7440-43-9 | Cadmium   | 14.4          |   |   | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 70.0          |   |   | P  |
| 7440-48-4 | Cobalt    | 46.8          | B |   | P  |
| 7440-50-8 | Copper    | 68.2          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 26.7          |   | S | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.20          | U |   | CV |
| 7440-02-0 | Nickel    | 98.8          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 4.0           | U | W | F  |
| 7440-22-4 | Silver    | 14.7          |   |   | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 2.0           | U | W | F  |
| 7440-62-2 | Vanadium  | 81.4          |   |   | P  |
| 7440-66-6 | Zinc      | 134           |   |   | P  |
|           | Tin       | 514           |   |   | P  |

Color Before: COLORLESS Clarity Before: CLEAR\_ Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR\_ Artifacts: \_\_\_\_\_

Comments:

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 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-11

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: MEMPHIS \_\_\_\_\_  
 Lab Code: ITSTU\_ Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW-05\_  
 Matrix (soil/water): WATER Lab Sample ID: TT1416 \_\_\_\_\_  
 Level (low/med): LOW \_\_\_\_\_ Date Received: 07/11/92  
 % Solids: \_\_\_\_\_ 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 4.0           | U | W | F  |
| 7440-38-2 | Arsenic   | 26.2          |   | S | F  |
| 7440-39-3 | Barium    | 355           |   |   | P  |
| 7440-41-7 | Beryllium | 2.3           | B |   | P  |
| 7440-43-9 | Cadmium   | 11.3          |   |   | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 57.6          |   |   | P  |
| 7440-48-4 | Cobalt    | 29.3          | B |   | P  |
| 7440-50-8 | Copper    | 44.1          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 9.9           |   | S | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.20          | U |   | CV |
| 7440-02-0 | Nickel    | 56.0          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 4.0           | U | W | F  |
| 7440-22-4 | Silver    | 12.6          |   |   | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 2.0           | U | W | F  |
| 7440-62-2 | Vanadium  | 53.1          |   |   | P  |
| 7440-66-6 | Zinc      | 92.8          |   |   | P  |
|           | Tin       | 344           |   |   | P  |

Color Before: COLORLESS Clarity Before: CLEAR\_ Texture: \_\_\_\_\_  
 Color After: COLORLESS Clarity After: CLEAR\_ Artifacts: \_\_\_\_\_  
 Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1  
 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-11D

Lab Name: ITAS\_KNOXVILLE \_\_\_\_\_ Contract: MEMPHIS \_\_\_\_\_  
 Lab Code: ITSTU\_ Case No.: 51803 SAS No.: \_\_\_\_\_ SDG No.: MW-05\_  
 Matrix (soil/water): WATER Lab Sample ID: TT1417 \_\_\_\_\_  
 Level (low/med): LOW \_\_\_\_\_ Date Received: 07/11/92  
 % Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  |               |   |   | NR |
| 7440-36-0 | Antimony  | 4.0           | U | W | F  |
| 7440-38-2 | Arsenic   | 25.2          |   | S | F  |
| 7440-39-3 | Barium    | 355           |   |   | P  |
| 7440-41-7 | Beryllium | 2.8           | B |   | P  |
| 7440-43-9 | Cadmium   | 10.3          |   |   | P  |
| 7440-70-2 | Calcium   |               |   |   | NR |
| 7440-47-3 | Chromium  | 59.4          |   |   | P  |
| 7440-48-4 | Cobalt    | 30.6          | B |   | P  |
| 7440-50-8 | Copper    | 39.1          |   |   | P  |
| 7439-89-6 | Iron      |               |   |   | NR |
| 7439-92-1 | Lead      | 17.4          |   | + | F  |
| 7439-95-4 | Magnesium |               |   |   | NR |
| 7439-96-5 | Manganese |               |   |   | NR |
| 7439-97-6 | Mercury   | 0.20          | U |   | CV |
| 7440-02-0 | Nickel    | 53.8          |   |   | P  |
| 7440-09-7 | Potassium |               |   |   | NR |
| 7782-49-2 | Selenium  | 2.0           | U | W | F  |
| 7440-22-4 | Silver    | 12.6          |   |   | P  |
| 7440-23-5 | Sodium    |               |   |   | NR |
| 7440-28-0 | Thallium  | 2.0           | U | W | F  |
| 7440-62-2 | Vanadium  | 53.9          |   |   | P  |
| 7440-66-6 | Zinc      | 95.1          |   |   | P  |
|           | Tin       | 365           |   |   | P  |

Color Before: COLORLESS Clarity Before: CLEAR\_ Texture: \_\_\_\_\_  
 Color After: COLORLESS Clarity After: CLEAR\_ Artifacts: \_\_\_\_\_  
 Comments:

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EnSafe/Allen & Hoshall  
 August 22, 1992

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 51803

CYANIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Results</u> |
|-------------------------|----------------------|----------------|
| Method Blank            | P4017                | 0.01 U         |
| MW-08                   | TT1418               | 0.07           |
| MW-11                   | TT1419               | 0.02           |
| MW-11D                  | TT1420               | 0.05           |

Date of Analysis: 07/16/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

EnSafe/Allen & Hoshall  
5724 Summer Trees Drive  
Memphis, Tennessee 38134  
Attn: Lawson Anderson

August 24, 1992

Job Number: ENFA 52006

P.O. Number: N0026-C0118

This is the Certificate of Analysis for the following samples:

|                       |             |
|-----------------------|-------------|
| Client Project ID:    | NAS Memphis |
| Date Received by Lab: | 08/07/92    |
| Number of Samples:    | Three (3)   |
| Sample Type:          | Water       |

### I. Introduction

On 08/07/92, three (3) water samples arrived at the ITAS-Knoxville, Tennessee laboratory from EnSafe, Allen & Hoshall in Memphis, Tennessee in support of the NAS Memphis project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for Target Compound List (TCL) semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01 Statement of Work.

The samples were analyzed for pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 2nd edition, method 8080.

Reviewed and Approved:

Alyce R. Moore  
Laboratory Manager

EnSafe/Allen & Hoshall  
August 24, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN  
Job Number: ENFA 52006

Client Project ID: NAS Memphis

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### III. Quality Control

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS-XL GC/MS/DS. The sample analyses went well. An insufficient amount of sample was submitted for QC analysis. There were no problems seen in final data review.

Data were reported with qualifiers as follows:

- U - Compound analyzed for but not detected; value given is quantitation limit.
- J - Compound detected but below quantitation limit; value estimated.
- B - Compound found in method blank.
- S - Spiked compound.

The samples were analyzed for pesticides and PCBs using an SP2250/2401 column on a Varian 3740 GC. Confirmation analyses were performed using a 3% OV-1 column on a Varian 3740 GC. The samples, associated method blank, and spiked blank were treated to remove interferences using a mercury cleanup procedure. Due to increased instrument sensitivity, some of the initial standards exceeded the 15% criteria when compared to the original linearity curves. Since none of these analytes were detected in the samples, new linearity curves were not established for these analytes. Alpha-BHC was identified in sample MW-11 and MW-11D based on primary column analysis. The extracts were further analyzed on a 3% OV-1 column, and Alpha-BHC was confirmed. Due to matrix interferences both samples were reported with elevated reporting limits for several compounds. An insufficient amount of sample was submitted for QC analysis; however, a spiked blank was analyzed with acceptable results. No other problems were encountered.

00005



**NAVY CLEAN  
ENSAFE/ALLEN & HOSHALL**  
(901) 383-9115

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1

CLIENT NAS Memphis PROJECT MANAGER LAWSON ANDERSON  
 ADDRESS Millington, TN TELEPHONE NO. 901-383-9115  
 PROJECT NAME/NUMBER NAS-N0026CE119 FAX. NO. \_\_\_\_\_  
 MEDIA STATUS: (A, B, OR C) AFFE SAMPLERS: (SIGNATURE) [Signature]

| NO. OF CONTAINERS | ANALYSIS REQUIRED |             |  |  | REMARKS       |
|-------------------|-------------------|-------------|--|--|---------------|
|                   | BVA-CLP           | PRST/RS-CLP |  |  |               |
| 4                 | ✓                 | ✓           |  |  | 2°C OK 8/6/92 |
| 4                 | ✓                 | ✓           |  |  | 8-7-92        |
| 4                 | ✓                 | ✓           |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |
|                   |                   |             |  |  |               |

| FIELD SAMPLE NUMBER | DATE   | TIME | SAMPLE TYPE | TYPE/SIZE OF CONTAINER | PRESERVATION |          | NO. OF CONTAINERS | BVA-CLP | PRST/RS-CLP |  |  |  |  |
|---------------------|--------|------|-------------|------------------------|--------------|----------|-------------------|---------|-------------|--|--|--|--|
|                     |        |      |             |                        | TEMP.        | CHEMICAL |                   |         |             |  |  |  |  |
| MW-08               | 8/6/92 |      | Water       | 500ml jars             | 4°C          | —        | 4                 | ✓       | ✓           |  |  |  |  |
| MW-11               | 8/6/92 |      | Water       | 500ml jars             | 4°C          | —        | 4                 | ✓       | ✓           |  |  |  |  |
| MW-11 D             | 8/6/92 |      | Water       | 500ml jars             | 4°C          | —        | 4                 | ✓       | ✓           |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |
|                     |        |      |             |                        |              |          |                   |         |             |  |  |  |  |

|   |   |   |  |   |                          |   |                          |
|---|---|---|--|---|--------------------------|---|--------------------------|
| RELINQUISHED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>Scott Ryan</u><br>COMPANY <u>E/ATA</u><br>REASON <u>Ship to lab.</u> | DATE <u>8/6/92</u><br>TIME <u>18:30</u> | RECEIVED BY:<br>SIGNATURE <u>[Signature]</u><br>PRINTED <u>TIM MATHIS</u><br>COMPANY <u>ITAS-K</u><br>REASON <u>SAMPLES</u> | DATE <u>8/7/92</u><br>TIME <u>0815</u> | RELINQUISHED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ | RECEIVED BY:<br>SIGNATURE _____<br>PRINTED _____<br>COMPANY _____<br>REASON _____ | DATE _____<br>TIME _____ |
|---|---|---|--|---|--------------------------|---|--------------------------|

METHOD OF SHIPMENT: Overnight-Fed Ex COMMENTS: \_\_\_\_\_  
 SHIPMENT NO. \_\_\_\_\_  
 SPECIAL INSTRUCTION: \_\_\_\_\_  
 AFTER ANALYSIS, SAMPLES ARE TO BE:  
 DISPOSED OF (ADDITIONAL FEE)  
 STORED (90 DAYS MAX)  
 STORED OVER 90 DAYS (ADDITIONAL FEE)  
 RETURNED TO CUSTOMER

ENFA 52006

Facility ID #: 9-791683



1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW08

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08

Matrix: (soil/water) WATER Lab Sample ID: TT2959

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2959

Level: (low/med) LOW Date Received: 08/07/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 26 |   |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 17 |   |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 9  | J |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 10 | U |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW08

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08

Matrix: (soil/water) WATER Lab Sample ID: TT2959

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2959

Level: (low/med) LOW Date Received: 08/07/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|                |                            |    |    |
|----------------|----------------------------|----|----|
| 51-28-5-----   | 2,4-Dinitrophenol          | 25 | U  |
| 100-02-7-----  | 4-Nitrophenol              | 25 | U  |
| 132-64-9-----  | Dibenzofuran               | 10 | U  |
| 121-14-2-----  | 2,4-Dinitrotoluene         | 10 | U  |
| 84-66-2-----   | Diethylphthalate           | 10 | U  |
| 7005-72-3----- | 4-Chlorophenyl-phenylether | 10 | U  |
| 86-73-7-----   | Fluorene                   | 10 | U  |
| 100-01-6-----  | 4-Nitroaniline             | 25 | U  |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol | 25 | U  |
| 86-30-6-----   | N-Nitrosodiphenylamine (1) | 10 | U  |
| 101-55-3-----  | 4-Bromophenyl-phenylether  | 10 | U  |
| 118-74-1-----  | Hexachlorobenzene          | 10 | U  |
| 87-86-5-----   | Pentachlorophenol          | 25 | U  |
| 85-01-8-----   | Phenanthrene               | 10 | U  |
| 120-12-7-----  | Anthracene                 | 10 | U  |
| 86-74-8-----   | Carbazole                  | 10 | U  |
| 84-74-2-----   | Di-n-Butylphthalate        | 14 |    |
| 206-44-0-----  | Fluoranthene               | 10 | U  |
| 129-00-0-----  | Pyrene                     | 10 | U  |
| 85-68-7-----   | Butylbenzylphthalate       | 10 | U  |
| 91-94-1-----   | 3,3'-Dichlorobenzidine     | 10 | U  |
| 56-55-3-----   | Benzo(a)Anthracene         | 10 | U  |
| 218-01-9-----  | Chrysene                   | 10 | U  |
| 117-81-7-----  | bis(2-Ethylhexyl)Phthalate | 2  | BJ |
| 117-84-0-----  | Di-n-Octyl Phthalate       | 10 | U  |
| 205-99-2-----  | Benzo(b)Fluoranthene       | 10 | U  |
| 207-08-9-----  | Benzo(k)Fluoranthene       | 10 | U  |
| 50-32-8-----   | Benzo(a)Pyrene             | 10 | U  |
| 193-39-5-----  | Indeno(1,2,3-cd)Pyrene     | 10 | U  |
| 53-70-3-----   | Dibenz(a,h)Anthracene      | 10 | U  |
| 191-24-2-----  | Benzo(g,h,i)Perylene       | 10 | U  |

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW11

b Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT2960  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2960  
 Level: (low/med) LOW Date Received: 08/07/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 12 |   |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 28 |   |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 21 |   |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 1  | J |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 000012

MW11

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT2960  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2960  
 Level: (low/med) LOW Date Received: 08/07/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|                |                             |    |    |
|----------------|-----------------------------|----|----|
| 51-28-5-----   | 2,4-Dinitrophenol           | 25 | U  |
| 100-02-7-----  | 4-Nitrophenol               | 25 | U  |
| 132-64-9-----  | Dibenzofuran                | 10 | U  |
| 121-14-2-----  | 2,4-Dinitrotoluene          | 10 | U  |
| 84-66-2-----   | Diethylphthalate            | 10 | U  |
| 7005-72-3----- | 4-Chlorophenyl-phenylether  | 10 | U  |
| 86-73-7-----   | Fluorene                    | 10 | U  |
| 100-01-6-----  | 4-Nitroaniline              | 25 | U  |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol  | 25 | U  |
| 86-30-6-----   | N-Nitrosodiphenylamine (1)  | 10 | U  |
| 101-55-3-----  | 4-Bromophenyl-phenylether   | 10 | U  |
| 118-74-1-----  | Hexachlorobenzene           | 10 | U  |
| 87-86-5-----   | Pentachlorophenol           | 25 | U  |
| 85-01-8-----   | Phenanthrene                | 10 | U  |
| 120-12-7-----  | Anthracene                  | 10 | U  |
| 86-74-8-----   | Carbazole                   | 10 | U  |
| 84-74-2-----   | Di-n-Butylphthalate         | 2  | J  |
| 206-44-0-----  | Fluoranthene                | 10 | U  |
| 129-00-0-----  | Pyrene                      | 10 | U  |
| 85-68-7-----   | Butylbenzylphthalate        | 10 | U  |
| 91-94-1-----   | 3,3'-Dichlorobenzidine      | 10 | U  |
| 56-55-3-----   | Benzo(a)Anthracene          | 10 | U  |
| 218-01-9-----  | Chrysene                    | 10 | U  |
| 117-81-7-----  | bis(2-Ethylhexyl) Phthalate | 1  | BJ |
| 117-84-0-----  | Di-n-Octyl Phthalate        | 10 | U  |
| 205-99-2-----  | Benzo(b) Fluoranthene       | 10 | U  |
| 207-08-9-----  | Benzo(k) Fluoranthene       | 10 | U  |
| 50-32-8-----   | Benzo(a) Pyrene             | 10 | U  |
| 193-39-5-----  | Indeno(1,2,3-cd) Pyrene     | 10 | U  |
| 53-70-3-----   | Dibenz(a,h) Anthracene      | 10 | U  |
| 191-24-2-----  | Benzo(g,h,i) Perylene       | 10 | U  |

(1) - Cannot be separated from Diphenylamine

Facility ID #: 9-791683

1B

EPA SAMPLE NO.

## SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

MW11D

o Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08

Matrix: (soil/water) WATER Lab Sample ID: TT2961

Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2961

Level: (low/med) LOW Date Received: 08/07/92

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

Q

|               |                              |    |   |
|---------------|------------------------------|----|---|
| 108-95-2----- | Phenol                       | 78 |   |
| 111-44-4----- | bis(2-Chloroethyl) Ether     | 10 | U |
| 95-57-8-----  | 2-Chlorophenol               | 10 | U |
| 541-73-1----- | 1,3-Dichlorobenzene          | 10 | U |
| 106-46-7----- | 1,4-Dichlorobenzene          | 10 | U |
| 95-50-1-----  | 1,2-Dichlorobenzene          | 10 | U |
| 95-48-7-----  | 2-Methylphenol               | 10 | U |
| 108-60-1----- | 2,2'-oxybis(1-Chloropropane) | 10 | U |
| 106-44-5----- | 4-Methylphenol               | 10 | U |
| 621-64-7----- | N-Nitroso-Di-n-Propylamine   | 10 | U |
| 67-72-1-----  | Hexachloroethane             | 10 | U |
| 98-95-3-----  | Nitrobenzene                 | 10 | U |
| 78-59-1-----  | Isophorone                   | 10 | U |
| 88-75-5-----  | 2-Nitrophenol                | 10 | U |
| 105-67-9----- | 2,4-Dimethylphenol           | 10 | U |
| 111-91-1----- | bis(2-Chloroethoxy)Methane   | 10 | U |
| 120-83-2----- | 2,4-Dichlorophenol           | 10 | U |
| 120-82-1----- | 1,2,4-Trichlorobenzene       | 10 | U |
| 91-20-3-----  | Naphthalene                  | 23 |   |
| 106-47-8----- | 4-Chloroaniline              | 10 | U |
| 87-68-3-----  | Hexachlorobutadiene          | 10 | U |
| 59-50-7-----  | 4-Chloro-3-Methylphenol      | 10 | U |
| 91-57-6-----  | 2-Methylnaphthalene          | 14 |   |
| 77-47-4-----  | Hexachlorocyclopentadiene    | 10 | U |
| 88-06-2-----  | 2,4,6-Trichlorophenol        | 10 | U |
| 95-95-4-----  | 2,4,5-Trichlorophenol        | 25 | U |
| 91-58-7-----  | 2-Chloronaphthalene          | 10 | U |
| 88-74-4-----  | 2-Nitroaniline               | 25 | U |
| 131-11-3----- | Dimethyl Phthalate           | 10 | U |
| 208-96-8----- | Acenaphthylene               | 10 | U |
| 606-20-2----- | 2,6-Dinitrotoluene           | 10 | U |
| 99-09-2-----  | 3-Nitroaniline               | 25 | U |
| 83-32-9-----  | Acenaphthene                 | 1  | J |

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11D

Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 52006 SAS No.: \_\_\_\_\_ SDG No.: MW08  
 Matrix: (soil/water) WATER Lab Sample ID: TT2961  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: TT2961  
 Level: (low/med) LOW Date Received: 08/07/92  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/10/92  
 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/12/92  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

|                |                            |    |   |
|----------------|----------------------------|----|---|
| 51-28-5-----   | 2,4-Dinitrophenol          | 25 | U |
| 100-02-7-----  | 4-Nitrophenol              | 25 | U |
| 132-64-9-----  | Dibenzofuran               | 10 | U |
| 121-14-2-----  | 2,4-Dinitrotoluene         | 10 | U |
| 84-66-2-----   | Diethylphthalate           | 10 | U |
| 7005-72-3----- | 4-Chlorophenyl-phenylether | 10 | U |
| 86-73-7-----   | Fluorene                   | 10 | U |
| 100-01-6-----  | 4-Nitroaniline             | 25 | U |
| 534-52-1-----  | 4,6-Dinitro-2-Methylphenol | 25 | U |
| 86-30-6-----   | N-Nitrosodiphenylamine (1) | 10 | U |
| 101-55-3-----  | 4-Bromophenyl-phenylether  | 10 | U |
| 118-74-1-----  | Hexachlorobenzene          | 10 | U |
| 87-86-5-----   | Pentachlorophenol          | 25 | U |
| 85-01-8-----   | Phenanthrene               | 10 | U |
| 120-12-7-----  | Anthracene                 | 10 | U |
| 86-74-8-----   | Carbazole                  | 10 | U |
| 84-74-2-----   | Di-n-Butylphthalate        | 2  | J |
| 206-44-0-----  | Fluoranthene               | 10 | U |
| 129-00-0-----  | Pyrene                     | 10 | U |
| 85-68-7-----   | Butylbenzylphthalate       | 10 | U |
| 91-94-1-----   | 3,3'-Dichlorobenzidine     | 10 | U |
| 56-55-3-----   | Benzo(a)Anthracene         | 10 | U |
| 218-01-9-----  | Chrysene                   | 10 | U |
| 117-81-7-----  | bis(2-Ethylhexyl)Phthalate | 10 | U |
| 117-84-0-----  | Di-n-Octyl Phthalate       | 10 | U |
| 205-99-2-----  | Benzo(b)Fluoranthene       | 10 | U |
| 207-08-9-----  | Benzo(k)Fluoranthene       | 10 | U |
| 50-32-8-----   | Benzo(a)Pyrene             | 10 | U |
| 193-39-5-----  | Indeno(1,2,3-cd)Pyrene     | 10 | U |
| 53-70-3-----   | Dibenz(a,h)Anthracene      | 10 | U |
| 191-24-2-----  | Benzo(g,h,i)Perylene       | 10 | U |

(1) - Cannot be separated from Diphenylamine

EnSafe/Allen & Hoshall  
August 24, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 52006

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: MW-08

Lab Sample ID: TT2956

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 0.5 U                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 0.5 U                | endrin aldehyde       | 1 U                  |
| $\delta$ -BHC      | 0.5 U                | endosulfan sulfate    | 0.5 U                |
| heptachlor         | 0.5 U                | methoxychlor          | 1 U                  |
| $\gamma$ -BHC      | 0.5 U                | chlordane (technical) | 1 U                  |
| aldrin             | 0.5 U                | toxaphene             | 1 U                  |
| heptachlor epoxide | 0.5 U                | PCB-(Aroclor)-1221    | 1 U                  |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 1 U                  |
| 4,4'-DDE           | 0.5 U                | PCB-(Aroclor)-1232    | 1 U                  |
| dieldrin           | 0.5 U                | PCB-(Aroclor)-1242    | 1 U                  |
| endrin             | 0.5 U                | PCB-(Aroclor)-1248    | 1 U                  |
| 4,4'-DDD           | 0.5 U                | PCB-(Aroclor)-1254    | 1 U                  |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 1 U                  |

Date of Extraction: 08/10/92

Date of Analysis: 08/13/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

EnSafe/Allen & Hoshall  
August 24, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 52006

PESTICIDES AND PCBs ANALYSIS

Results in  $\mu\text{g/liter}$  (ppb)

Sample Matrix: Water

Client Sample ID: MW-11  
Lab Sample ID: TT2957

| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| $\alpha$ -BHC      | 2.6 C                | 4,4'-DDT              | 0.5 U                |
| $\beta$ -BHC       | 3.7 U NC             | endrin aldehyde       | 1 U                  |
| $\delta$ -BHC      | 4.0 U NC             | endosulfan sulfate    | 2.6 U NC             |
| heptachlor         | 4.6 U *              | methoxychlor          | 1 U                  |
| $\gamma$ -BHC      | 5.3 U NC             | chlordane (technical) | 2 U *                |
| aldrin             | 0.5 U                | toxaphene             | 1 U                  |
| heptachlor epoxide | 4.8 U *              | PCB-(Aroclor)-1221    | 12 U *               |
| endosulfan I       | 1.5 U NC             | PCB-(Aroclor)-1016    | 300 U *              |
| 4,4'-DDE           | 2.8 U *              | PCB-(Aroclor)-1232    | 300 U *              |
| dieldrin           | 1.7 U *              | PCB-(Aroclor)-1242    | 300 U *              |
| endrin             | 1.2 U *              | PCB-(Aroclor)-1248    | 300 U *              |
| 4,4'-DDD           | 2.3 U NC             | PCB-(Aroclor)-1254    | 6 U *                |
| endosulfan II      | 1.2 U *              | PCB-(Aroclor)-1260    | 1 U *                |

- C - Confirmed.
- NC - Not Confirmed.
- \* - Elevated detection limit due to matrix interference.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 08/10/92  
Date of Analysis: 08/13 and 08/18/92

EnSafe/Allen & Hoshall  
August 24, 1992

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: NAS Memphis

Job Number: ENFA 52006

PESTICIDES AND PCBs ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MW-11D

Lab Sample ID: TT2958

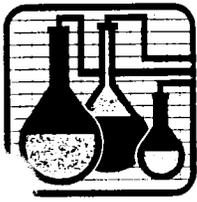
| <u>Compound</u>    | <u>Concentration</u> | <u>Compound</u>       | <u>Concentration</u> |
|--------------------|----------------------|-----------------------|----------------------|
| α-BHC              | 2.5 C                | 4,4'-DDT              | 0.7 U *              |
| β-BHC              | 3.6 U NC             | endrin aldehyde       | 1 U                  |
| δ-BHC              | 3.9 U NC             | endosulfan sulfate    | 2.9 U NC             |
| heptachlor         | 4.3 U *              | methoxychlor          | 1 U                  |
| γ-BHC              | 4.9 U NC             | chlordane (technical) | 2 U *                |
| aldrin             | 0.5 U                | toxaphene             | 2 U *                |
| heptachlor epoxide | 4.4 U *              | PCB-(Aroclor)-1221    | 20 U *               |
| endosulfan I       | 0.5 U                | PCB-(Aroclor)-1016    | 290 U *              |
| 4,4'-DDE           | 2.5 U *              | PCB-(Aroclor)-1232    | 290 U *              |
| dieldrin           | 1.4 U *              | PCB-(Aroclor)-1242    | 290 U *              |
| endrin             | 4.5 U *              | PCB-(Aroclor)-1248    | 290 U *              |
| 4,4'-DDD           | 0.9 U NC             | PCB-(Aroclor)-1254    | 5 U *                |
| endosulfan II      | 0.5 U                | PCB-(Aroclor)-1260    | 3 U *                |

- C - Confirmed.
- NC - Not Confirmed.
- \* - Elevated detection limit due to matrix interference.
- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Extraction: 08/10/92  
Date of Analysis: 08/13 and 08/18/92

Facility ID #: 9-791683

ANALYSES FOR PRIMARY AND SECONDARY DRINKING WATER STANDARDS



SPECIALIZED ASSAYS  
ENVIRONMENTAL

300 12th Avenue South  
Nashville, Tennessee 37203

|                  |           |          |
|------------------|-----------|----------|
| Sample           | Accession |          |
| MW-05            | 92 836815 |          |
| Collection Date  | Time      | Received |
| 07/27/92         | 00:00     | 07/28/92 |
| Referring Client | Client ID | Reported |
| SCOTT RYAN       |           | 07/31/92 |

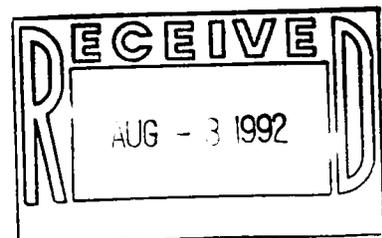
| Test                       | Result | Units       | Reference Limits |
|----------------------------|--------|-------------|------------------|
| <b>PRIMARY STANDARDS</b>   |        |             |                  |
| ARSENIC                    | 0.007  | PPM         |                  |
| BARIUM                     | 0.75   | PPM         |                  |
| CADMIUM                    | <0.001 | PPM         |                  |
| CHROMIUM, TOTAL            | 0.050  | PPM         |                  |
| FLUORIDE, ELECTRODE        | 0.33   | PPM         |                  |
| LEAD                       | 0.028  | PPM         |                  |
| MERCURY                    | <0.001 | PPM         |                  |
| NITROGEN, NITRATE          | <0.10  | PPM         |                  |
| SELENIUM                   | <0.005 | PPM         |                  |
| SILVER                     | <0.005 | PPM         |                  |
| <b>SECONDARY STANDARDS</b> |        |             |                  |
| TOTAL HARDNESS             | 318    | MG/L CaCO3  |                  |
| CHLORIDE                   | 5.3    | PPM         |                  |
| COLOR                      | 5      | PT-CO UNITS |                  |
| COPPER                     | 0.12   | PPM         |                  |
| DETERGENTS (MBAS)          | 0.22   | PPM         |                  |
| IRON                       | 70.8   | PPM         |                  |
| MANGANESE                  | 2.09   | PPM         |                  |
| ODOR                       | 0      | T.O.N. UNIT |                  |
| PH                         | 6.8    | PH UNITS    |                  |
| SODIUM                     | 15.0   | PPM         |                  |
| SULFATE                    | 18     | PPM         |                  |
| SOLIDS, DISSOLVED          | 403    | PPM         |                  |
| ZINC                       | 0.31   | PPM         |                  |
| TURBIDITY                  | 6.6    | N.T. UNITS  |                  |

Facility ID #: 9-791683

ENSAFE

5724 SUMMER TREES DR.  
MEMPHIS TN 38134

4937



Facility ID #: 9-791683

PERMEABILITY TEST RESULTS

PERMEABILITY TESTS RESULTS

Procedure: Sample was placed in triaxial wall chamber and subjected to a confining pressure. Sample was saturated using back pressure. A differential pressure was applied across the sample and the flow was monitored until flow into the sample equaled flow out of the sample. Permeability was calculated using Darcy's Law.

Sample No.: 2 5-7 Date Sampled: \_\_\_\_\_

Sample Location: EnSafe

Height of Sample: 5.50 in. Dia. of Sample: 2.80 in.

Initial Weight of Sample: 1013 g. Initial Moisture Content: 28%

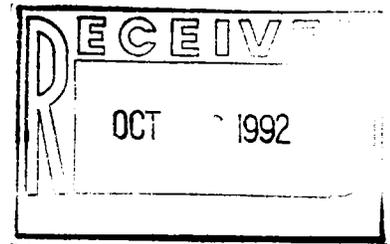
Confining Pressure: 23 psi Saturation Pressure: 20 psi

Bottom Pressure: 20 psi Top Pressure: 10 psi

| Elapsed Time (min.) | Flow In (cc) | Flow Out (cc) | Remarks                  |
|---------------------|--------------|---------------|--------------------------|
| 258                 | 2.70         | 2.70          | Dry Unit Weight = 89 pcf |
|                     |              |               |                          |
|                     |              |               |                          |
|                     |              |               |                          |
|                     |              |               |                          |

Permeability:  $8.4 \times 10^{-8}$  cm/sec.

Facility ID #: 9-791683



PERMEABILITY TESTS RESULTS

Procedure: Sample was placed in triaxial wall chamber and subjected to a confining pressure. Sample was saturated using back pressure. A differential pressure was applied across the sample and the flow was monitored until flow into the sample equaled flow out of the sample. Permeability was calculated using Darcy's Law.

Sample No.: 2 9.5-11.5 Date Sampled: \_\_\_\_\_  
Sample Location: EnSafe  
Height of Sample: 4.40 in. Dia. of Sample: 2.80 in.  
Initial Weight of Sample: 851 g. Initial Moisture Content: 30%  
Confining Pressure: 23 psi Saturation Pressure: 20 psi  
Bottom Pressure: 20 psi Top Pressure: 10 psi

| Elapsed Time (min.) | Flow In (cc) | Flow Out (cc) | Remarks                  |
|---------------------|--------------|---------------|--------------------------|
| 57                  | 6.50         | 6.50          | Dry Unit Weight = 92 pcf |
|                     |              |               |                          |
|                     |              |               |                          |
|                     |              |               |                          |
|                     |              |               |                          |

Permeability: 7.6 x 10<sup>-7</sup> cm/sec.

**PERMEABILITY TESTS RESULTS**

Procedure: Sample was placed in triaxial wall chamber and subjected to a confining pressure. Sample was saturated using back pressure. A differential pressure was applied across the sample and the flow was monitored until flow into the sample equaled flow out of the sample. Permeability was calculated using Darcy's Law.

Sample No.: 19 5-7 Date Sampled: \_\_\_\_\_

Sample Location: EnSafe

Height of Sample: 5.85 in. Dia. of Sample: 2.83 in.

Initial Weight of Sample: 1151 g. Initial Moisture Content: 14.5%

Confining Pressure: 23 psi Saturation Pressure: 20 psi

Bottom Pressure: 20 psi Top Pressure: 10 psi

| Elapsed Time (min.) | Flow In (cc) | Flow Out (cc) | Remarks                   |
|---------------------|--------------|---------------|---------------------------|
| 210                 | 1.55         | 1.55          | Dry Unit Weight = 104 pcf |
|                     |              |               |                           |
|                     |              |               |                           |
|                     |              |               |                           |
|                     |              |               |                           |

Permeability:  $6.3 \times 10^{-8}$  cm/sec.

PERMEABILITY TESTS RESULTS

Procedure: Sample was placed in triaxial wall chamber and subjected to a confining pressure. Sample was saturated using back pressure. A differential pressure was applied across the sample and the flow was monitored until flow into the sample equaled flow out of the sample. Permeability was calculated using Darcy's Law.

Sample No.: 19 9-11 Date Sampled: \_\_\_\_\_

Sample Location: EnSafe

Height of Sample: 5.45 in. Dia. of Sample: 2.80 in.

Initial Weight of Sample: 1120 g. Initial Moisture Content: 27%

Confining Pressure: 23 psi Saturation Pressure: 20 psi

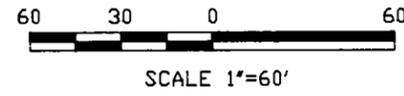
Bottom Pressure: 20 psi Top Pressure: 10 psi

| Elapsed Time (min.) | Flow In (cc) | Flow Out (cc) | Remarks                   |
|---------------------|--------------|---------------|---------------------------|
| 226                 | 1.50         | 1.50          | Dry Unit Weight = 100 pcf |
|                     |              |               |                           |
|                     |              |               |                           |
|                     |              |               |                           |
|                     |              |               |                           |

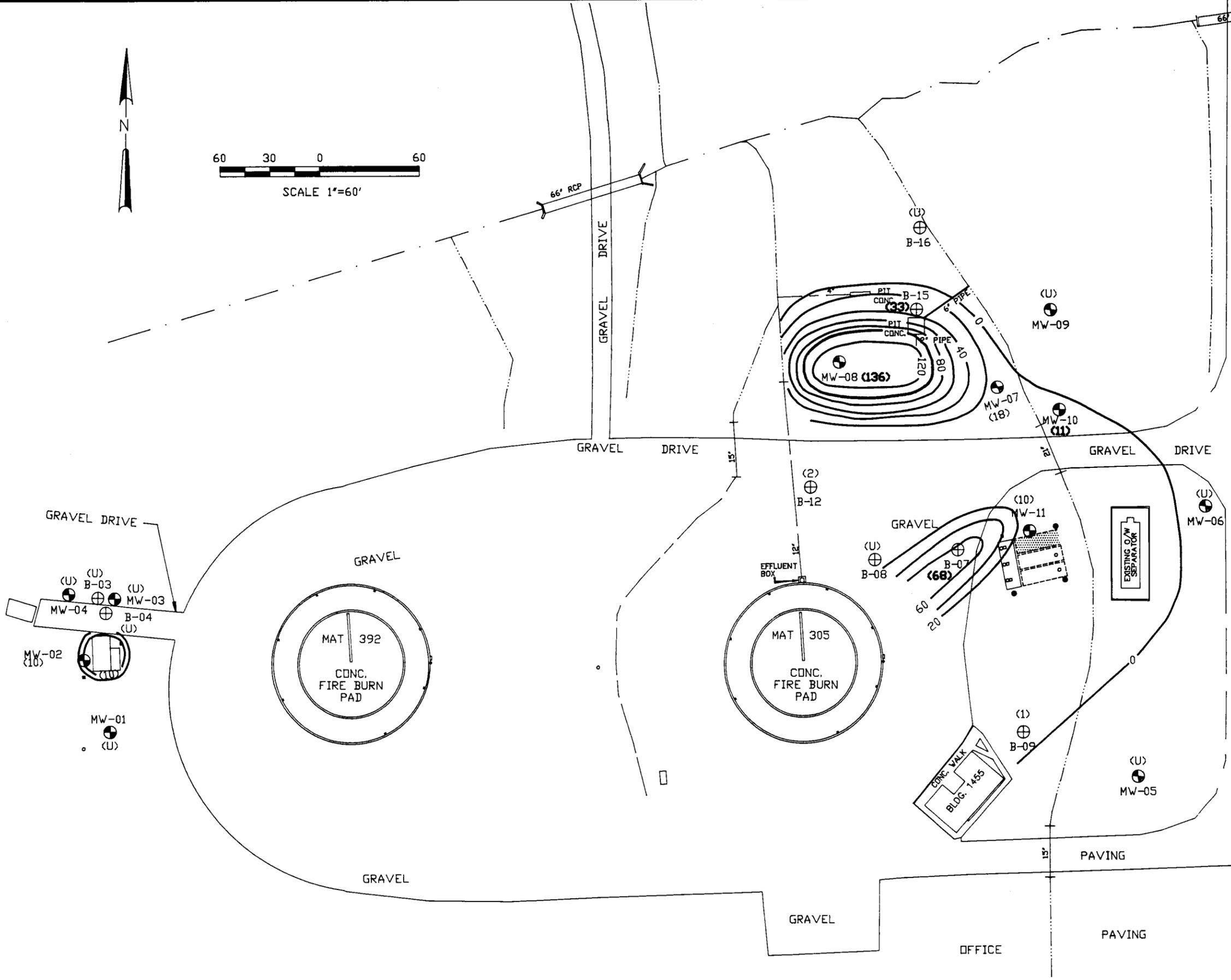
Permeability:  $5.5 \times 10^{-8}$  cm/sec.

**APPENDIX D**

**SOIL CONTAMINATION DISTRIBUTION MAPS**



- LEGEND
- CULVERT
  - - - DITCH LINE
  - - - STREAM LINE
  - o POLE
  - ⊕ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING



ACCESS ROAD NO. 2

ISOPLETH INTERVALS  
EAST 20 PPM WEST 10 PPM

CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

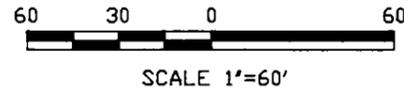
(U) - UNDETECTED READING



UST INVESTIGATION  
AFTTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

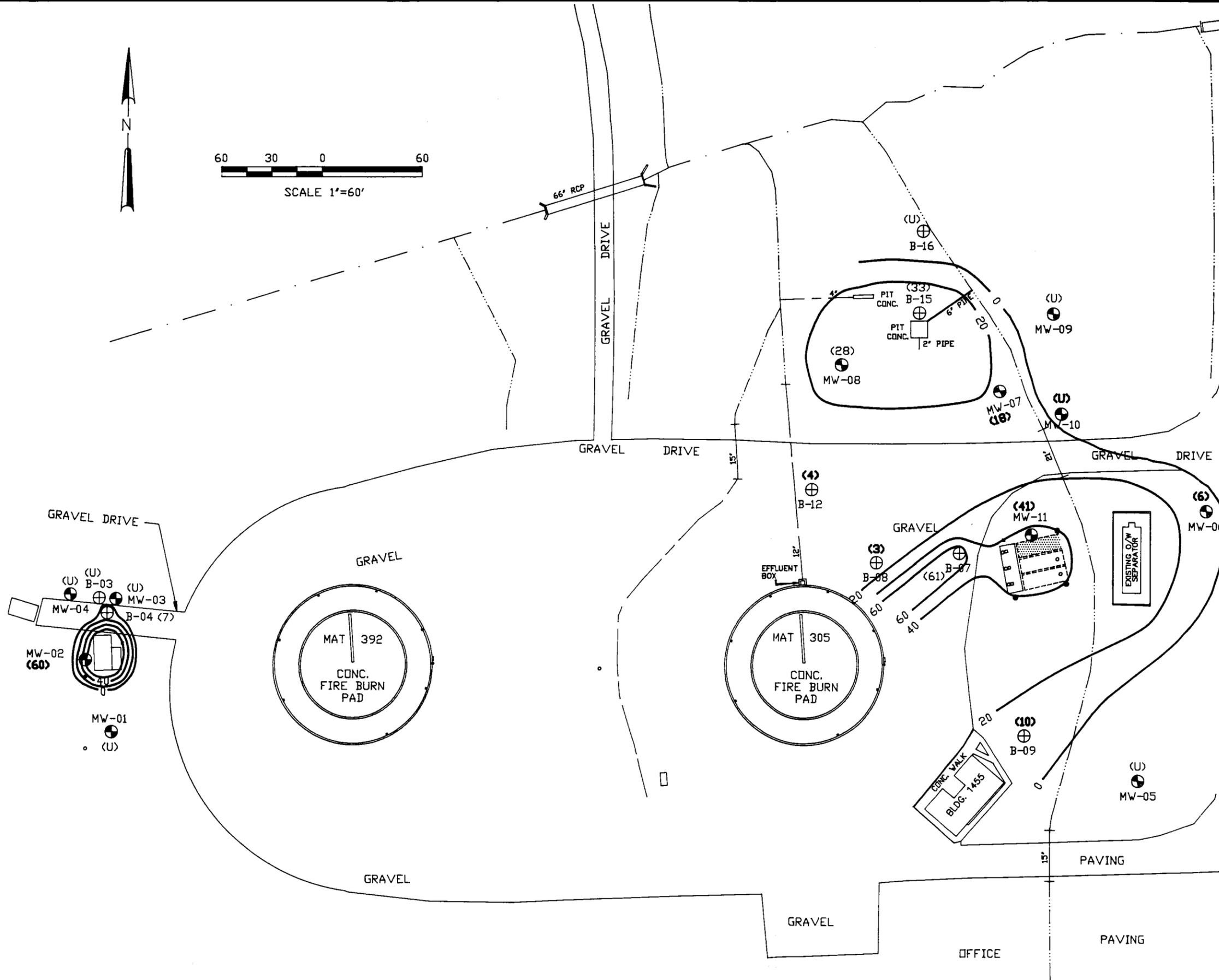
APPENDIX D-1  
CONCENTRATION DISTRIBUTION  
BTX IN SOIL  
0 TO 4 FEET

DATE: 09/08/92      DWG NAME: 026BASE4



LEGEND

- CULVERT
- - - DITCH LINE
- - - STREAM LINE
- o POLE
- ⊕ FIRE HYDRANT
- MANHOLE
- PRE-EXISTING DETECTION WELL
- ⊕ MONITORING WELL
- ⊕ BORING



ISOPLETH INTERVALS  
EAST 20 PPM WEST 20 PPM

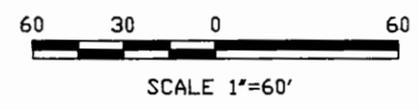
CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

(U) - UNDETECTED READING

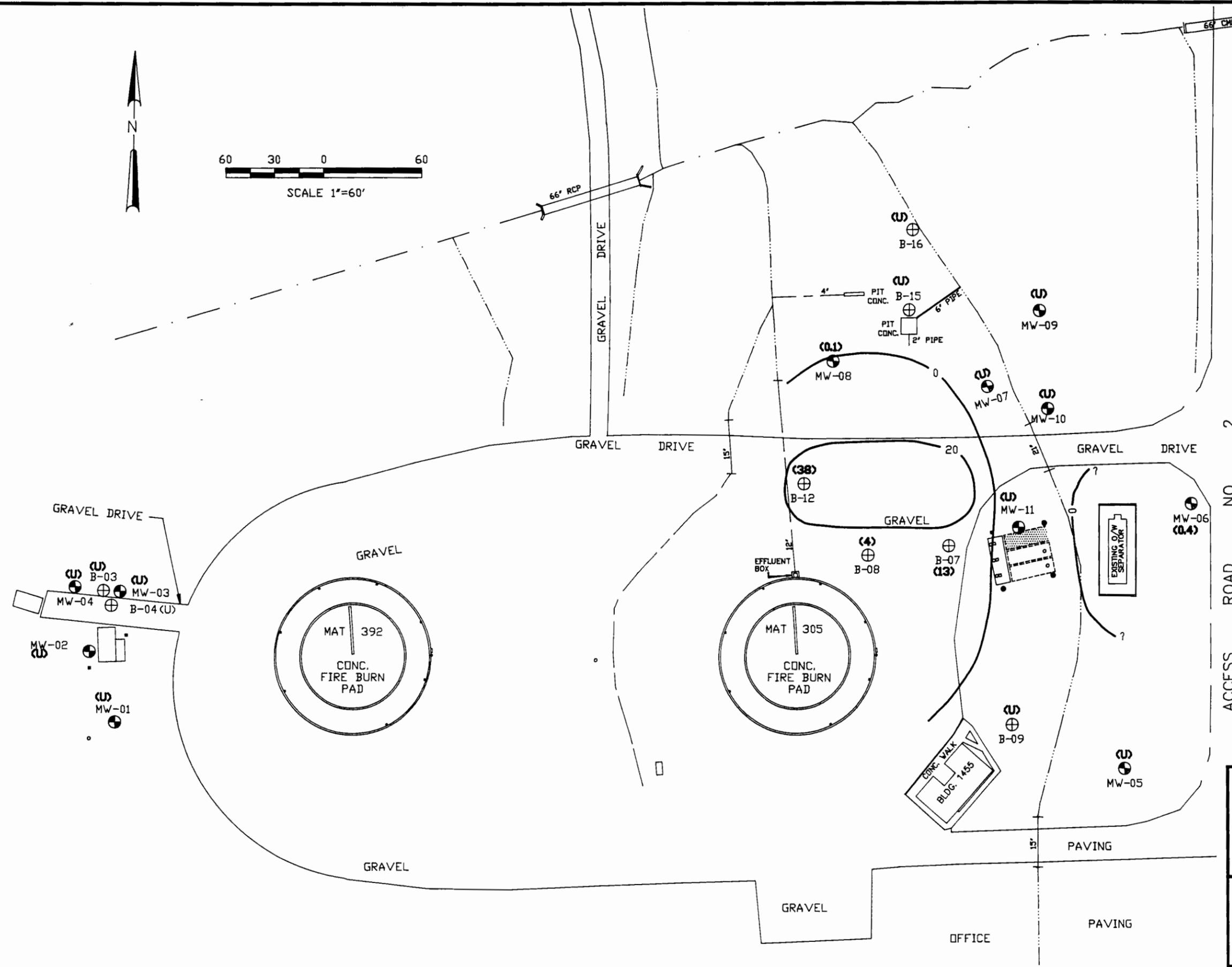


UST INVESTIGATION  
AFTTF USTs  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

APPENDIX D-2  
CONCENTRATION DISTRIBUTION  
BTX IN SOIL  
4 TO 8 FEET



- LEGEND
- CULVERT
  - - - DITCH LINE
  - - - STREAM LINE
  - o POLE
  - ⊕ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING



ACCESS ROAD NO. 2

ISOPLETH INTERVALS  
EAST 20 PPM WEST NONE

CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

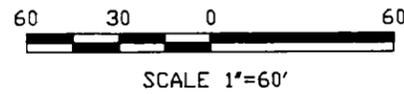
(U) - UNDETECTED READING



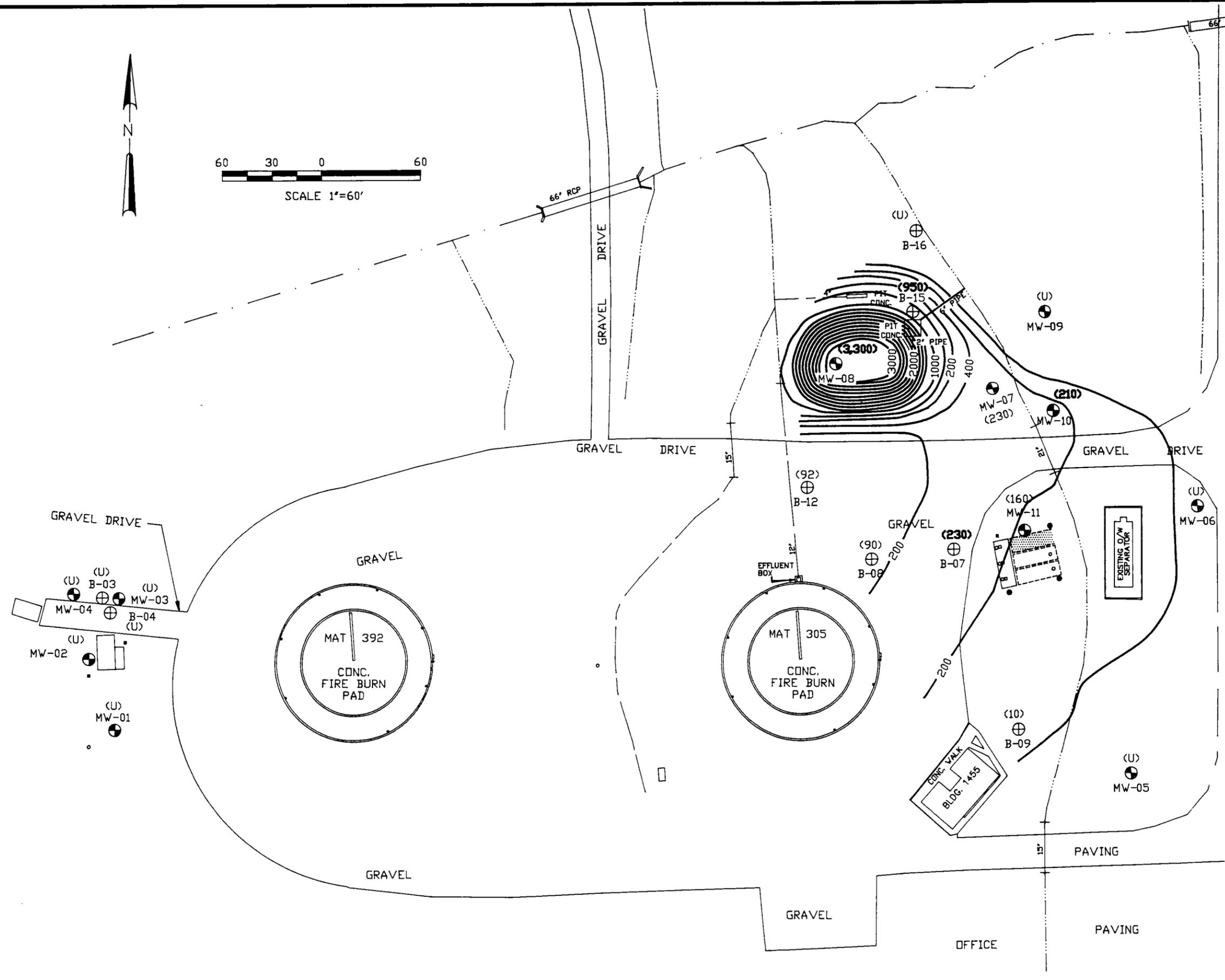
UST INVESTIGATION  
AFTF USTs  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

APPENDIX D-3  
CONCENTRATION DISTRIBUTION  
BTX IN SOIL  
8 TO 12 FEET

DATE: 09/08/92      DWG NAME: 026BASE4



- LEGEND
- CULVERT
  - - - - DITCH LINE
  - - - - STREAM LINE
  - o POLE
  - ⊗ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING



ISOPLETH INTERVALS  
EAST 200 PPM WEST NONE

CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

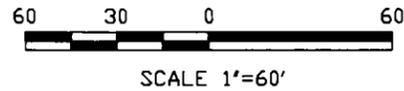
(U) - UNDETECTED READING



UST INVESTIGATION  
AFTTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

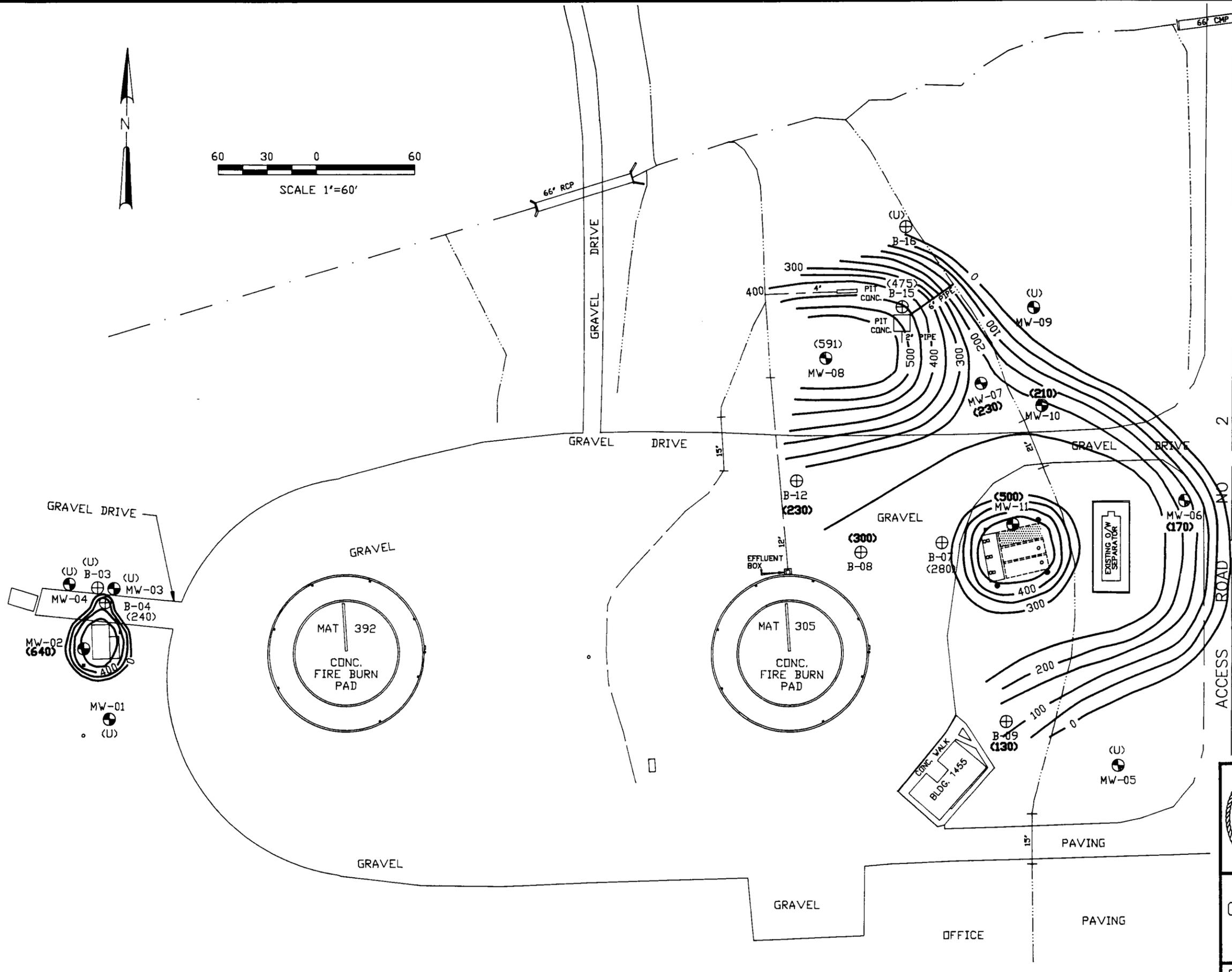
APPENDIX D-4  
CONCENTRATION DISTRIBUTION  
GRO IN SOIL  
0 TO 4 FEET

DATE: 09/08/92      DWG NAME: 026BASE4



LEGEND

- CULVERT
- - - - DITCH LINE
- . - . - . STREAM LINE
- o POLE
- ⊗ FIRE HYDRANT
- MANHOLE
- PRE-EXISTING DETECTION WELL
- ⊕ MONITORING WELL
- ⊕ BORING



ISOPLETH INTERVALS  
EAST 50 PPM WEST 200 PPM

CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

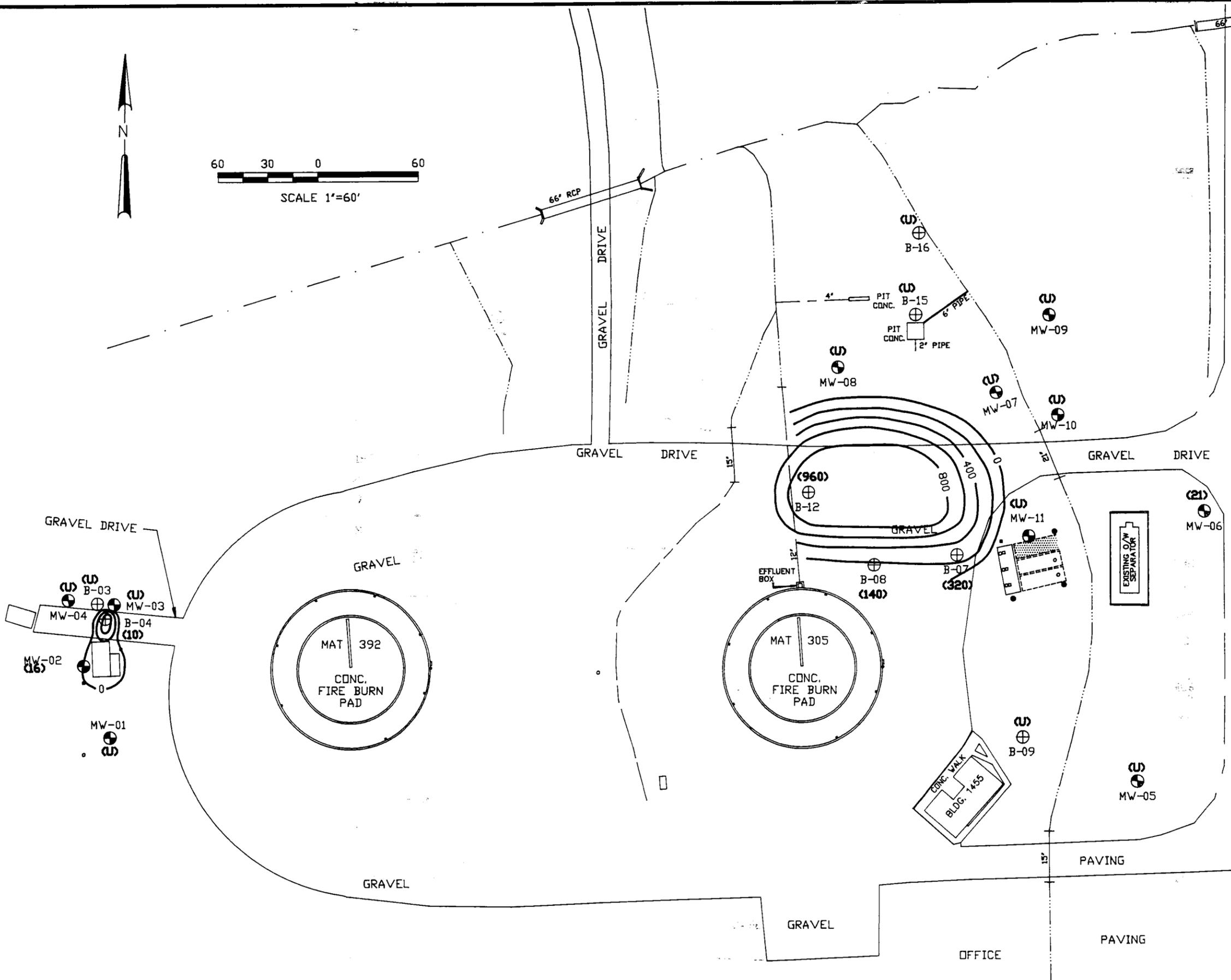
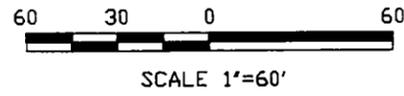
(U) - UNDETECTED READING



UST INVESTIGATION  
AFTTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

APPENDIX D-5  
CONCENTRATION DISTRIBUTION  
GRO IN SOIL  
4 TO 8 FEET

DATE: 09/08/92      DWG NAME: 026BASE4



- LEGEND
- CULVERT
  - - - - DITCH LINE
  - . - . - . STREAM LINE
  - o POLE
  - ⊗ FIRE HYDRANT
  - MANHOLE
  - PRE-EXISTING DETECTION WELL
  - ⊕ MONITORING WELL
  - ⊕ BORING

ISOPLETH INTERVALS  
EAST 200 PPM WEST 100 PPM

CONCENTRATIONS IN PARENTHESES  
ARE PRESENTED IN PPM. CONCENTRATIONS  
IN BOLD TYPE ARE LABORATORY ANALYTICAL  
RESULTS. CONCENTRATIONS IN LIGHT TYPE  
ARE ESTIMATED NUMBERS FROM PID READINGS.

(U) - UNDETECTED READING



UST INVESTIGATION  
AFTTF USTS  
NAS MEMPHIS  
MILLINGTON, TENNESSEE

APPENDIX D-6  
CONCENTRATION DISTRIBUTION  
GRO IN SOIL  
8 TO 12 FEET

DATE: 09/08/92      DWG NAME: 026BASE4