

WORK PLAN

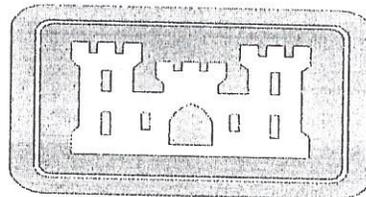
WORK PLAN

REMOVAL OF TWO USTs  
IN NATHAN HALE PARK  
AT THE FORMER NIKE CL-59 SITE,  
PARMA HEIGHTS, OHIO

Contract No. DACA 27-97-D-0006  
Delivery Order 0015

JULY 21, 2000

SUBMITTED TO:  
UNITED STATES ARMY CORPS OF ENGINEERS  
LOUISVILLE DISTRICT  
LOUISVILLE, KY



SUBMITTED BY:

**AmTech**  
Engineering, Inc.

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## **CONSTRUCTION WORK PLAN**

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NIKE CL-59 SITE IN PARMA HEIGHTS, OHIO**

**Indefinite Deliverables Contract No. DACA27-97-D-0006  
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**July 21, 2000**

**Prepared for:**

**Department of the Army  
U.S. Army Engineer District, Louisville  
Corps of Engineers  
Louisville, Kentucky**

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Appendix A	BUSTR Scoring
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## LIST OF ACRONYMS

ASTM	American Society for Testing Materials
BUSTR	Bureau of Underground Storage Tank Regulation
CGI	Combustible Gas Indicator
COR	Contracting Officer Representative
DOT	Department of Transportation
FID	Flame Ionization Detector
FST	Fuel Storage Tank
GFM	Government Furnished Material
HSP	Health and Safety Plan
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QC	Quality Control
SAP	Sampling and Analysis Plan
SFM	State Fire Marshall
QCPA	Quality Construction Plan Addendum
SOW	Statement of Work
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank
USTD	Underground Storage Tank Division

## CONSTRUCTION WORK PLAN

### 1.0 INTRODUCTION

Under an indefinite delivery contract with the Department of the Army, U.S. Army Corps of Engineers (USACE), Louisville, Kentucky District, AmTech Engineering Inc., has been issued a delivery order for two Underground Storage Tank (UST) removal at the former Nike CL-59 site in Parma Heights, Ohio. Two (2) tanks remain in the former control area, one (1) tank is located beneath the parking lot and the other beneath a soccer field. The parking lot tank is 2,000 gallons and was used to store gasoline fuel and the other tank is 1,000 gallon and was used for storing heating oil. The underground storage tank (UST) will be closed in accordance with the State of Ohio Bureau of Underground Storage Tank Regulations (BUSTR). After removal of the USTs, the sites will be backfilled and restored to existing condition.

### 1.1 Installation Description

The site was once the Control Area for the Nike CL-59 Missile Site. This area consisted of barracks, radars, and a vehicle fueling center. The tank beneath the asphalt was associated with the vehicle fueling station. According to the old drawings, this tank contained gasoline. The tank beneath the soccer field was associated with the radars.

**Location:** General location maps of the former Nike CL-59 site can be found in Figures 1-3. On May 2, 2000, the U.S. Army Corps of Engineers (USACE) used Ground Penetrating Radar (GPR) to locate the tank beneath the asphalt in the parking area. According to an old drawing of the former control area, the second tank was located in the area where a soccer field is currently located. The old drawing was used to estimate the location of the tank. This tank location can be found in Figure 4. The GPR did not locate the tank beneath the soccer field. This could be due to a number of factors. The soccer field is elevated approximately 3 feet

above grade. The material used to elevate this area is a clay material. With the increased elevation, the tank could easily be 6 feet beneath the surface. The GPR has a difficult time passing through clay materials which could have been the reason why it did not pick up the tank. Another possibility could be that the tank is no longer there.

USACE personnel surveyed the area and used this information to overlay on the old map that shows the location of the tanks. Figure 4 shows where the tank in the soccer field should be in relation to the measured distances from the baseball diamond fence and the sprinkler valve on the gravel road.

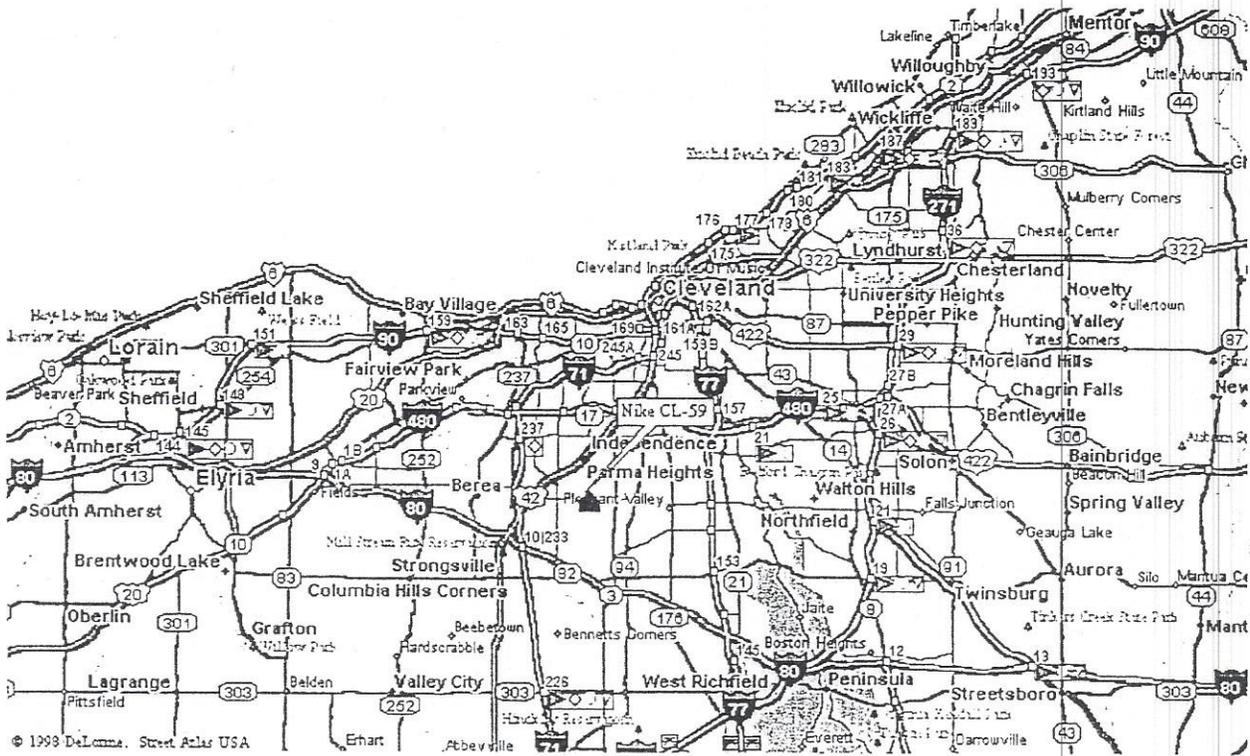


Figure 1 – General Location of Nike CL-59 – Parma Heights, Ohio.

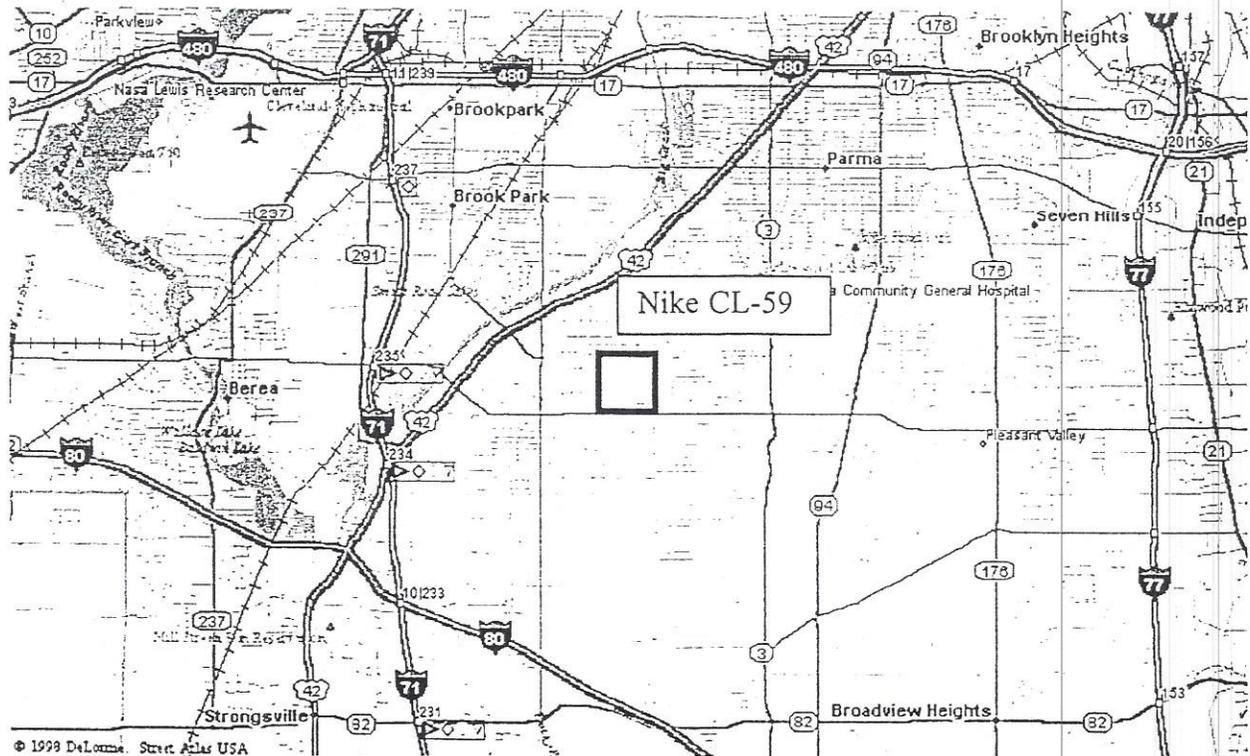


Figure 2 – General Location of Nike CL-59 – Parma Heights, Ohio.

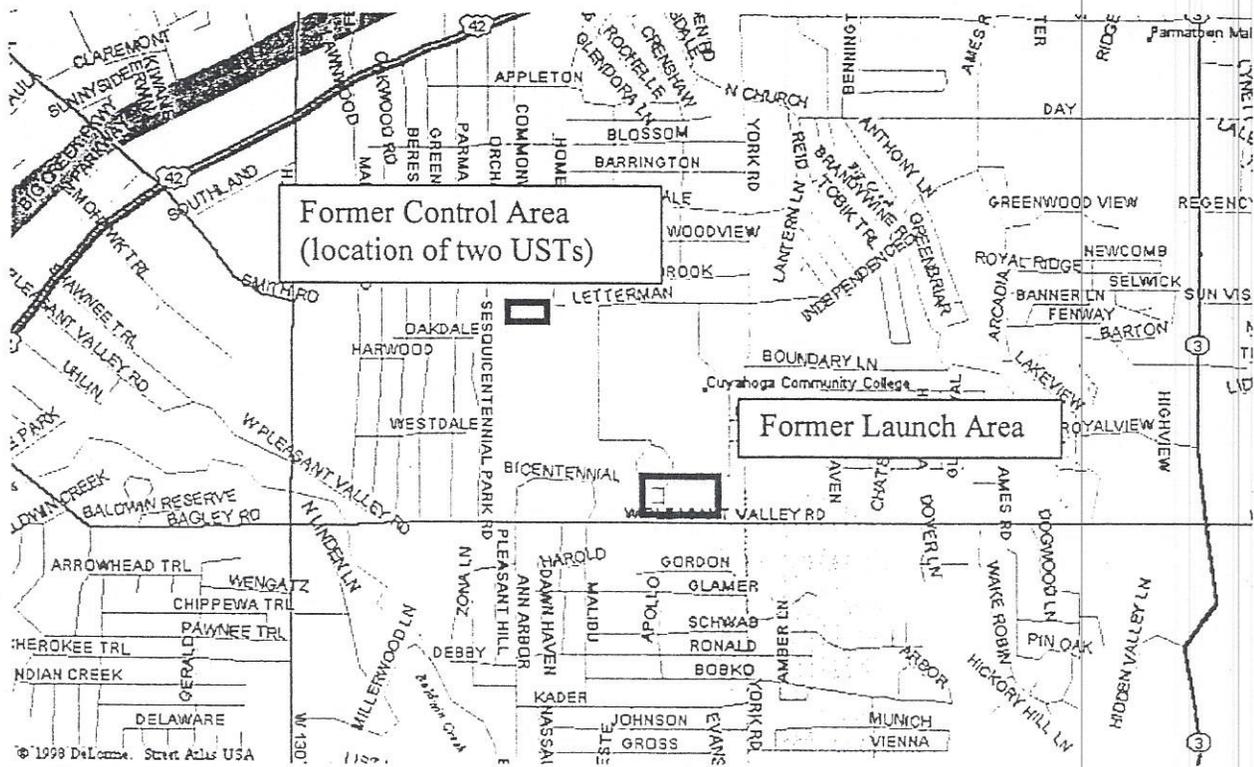


Figure 3 – Location of former Control Area and Launch Area – Nike CL-59 – Parma Heights, Ohio.

Figure 4

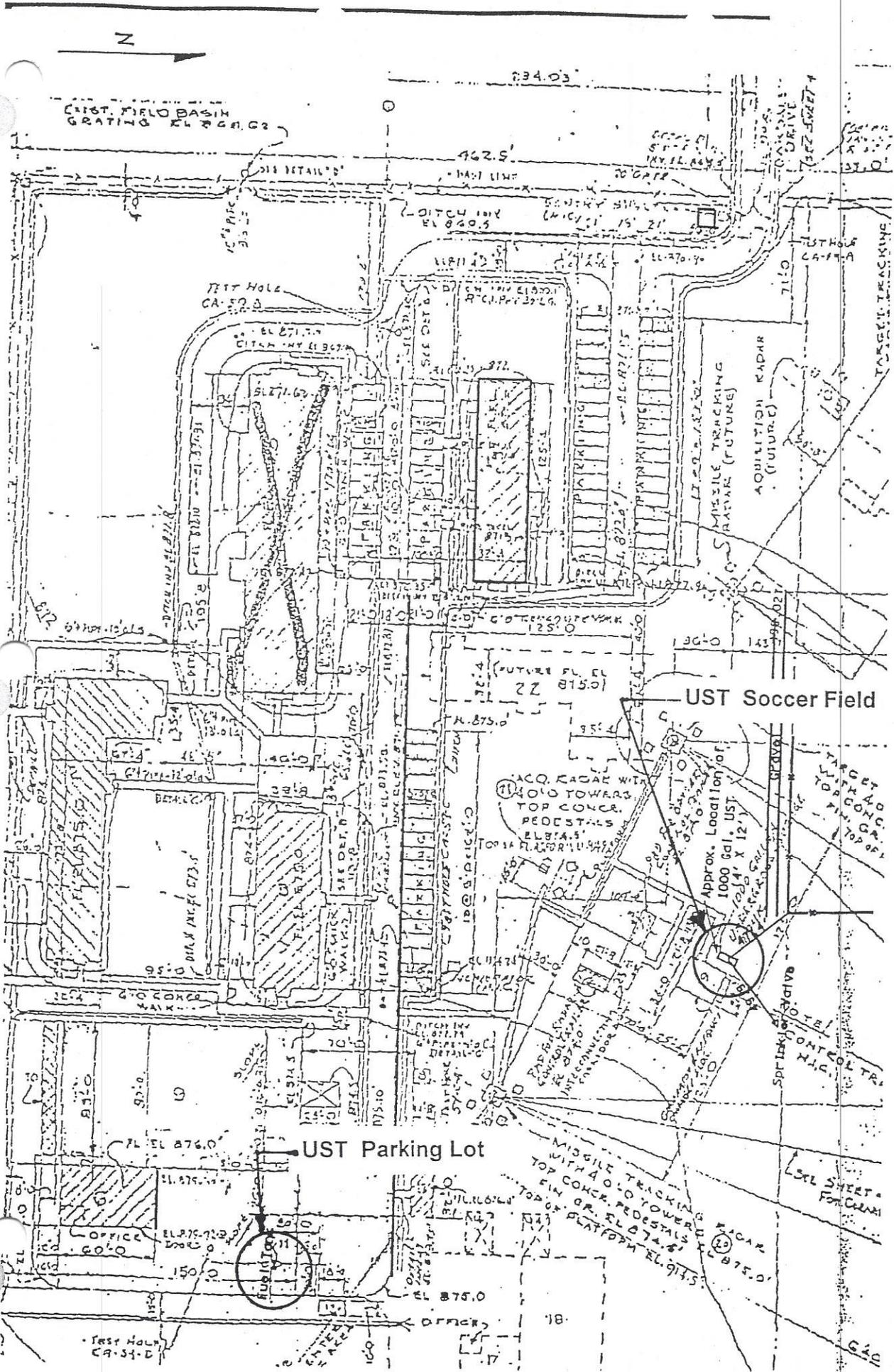


Figure 4 - Nike CL-59, Control Area, Parma Heights, Ohio - July 1955.

## 2.0 PURPOSE AND SCOPE

The purpose of this CWP is to describe the scope of work to be conducted and to identify the site-specific personnel, procedures, control, instructions, records and forms to be used under the delivery order to remove tanks at this site

### **3.0 WORK REQUIREMENTS**

#### **3.1 Permits and Notification**

Information will be provided by AmTech to the USACE Project Manager for submittal of the Permit for Underground Storage Tank Removal, Closure or Change In Service requirement. This permit must be obtained from the Ohio State Fire Marshal (SFM) or delegated fire authority. A thirty (30) day notification should also be sent to the SFM and Ohio EPA, prior to excavation. If tanks are not currently registered, they must be registered prior to notification to BUSTR for removal. When the UST is removed, all backfill material from the tank cavity excavation and piping trenches must be removed before collecting the closure assessment samples. Closure assessment samples will consist of two (2) samples, one at each end of the tank. One sample for every 20 ft of the piping removed will also be collected and analyzed. A Site Feature Scoring System has to be completed to determine whether a release has occurred.

Samples will be collected and scored in accordance with BUSTR Petroleum UST Corrective Action regulations (1301:7-9-13). Contaminant action levels are identified through the use of the BUSTR Site Feature Scoring System. Four (4) specific site features (distance to closest drinking water supply, average depth to groundwater, soil type and conduits or receptors) are scored in accordance with BUSTR criteria. Site Feature 4 (natural and/or manmade conduits or receptors) is scored by using the Site Feature Number 4 Worksheet. Maximum constituent concentrations then will be obtained from the BUSTR action Level Table after determining the and total score from the Site Feature Scoring System. The Site Feature Scoring System Table, the Site Feature Number 4 Worksheet, and the BUSTR Action Level Table are provided in Appendix A.

If sample contaminant levels at any of the UST sites exceed the appropriate action levels using the scoring system and action level table, then a site assessment in accordance with OAC 1301:7-9-13 must be conducted to delineate the full extent of the release. Should action levels be exceeded at any sampling location, the USACE Contracting Officer Representative (COR) will be contacted to advise them of the situation. No additional work will be conducted until AmTech is directed to do so.

If any releases of petroleum products to the environment are identified during the performance of the excavations, the USACE or designated Field Engineer will be notified immediately so notification of the release may be made within 24 hours to the SFM. A release is suspected if there is presence of free petroleum substance in the excavation or presence of petroleum vapors in man-made structures. A release is confirmed if contamination in soil or groundwater exceeds the Site Feature Scoring System action levels.

The UST Closure Report will be submitted to COE within 30 days. Within 45 days of receipt of sample results for the UST removal, the UST Closure Report must be completed and submitted to the SFM. All forms and permits have to be signed by the COE representative.

Cold cutting techniques are planned for use during tank cutting activities. AmTech shall acquire the necessary permits (including state) prior to performing the work. All buried utilities shall be marked prior to any excavation. The buried utilities in the excavation areas shall be precisely located by hand digging to prevent accidental damage.

### **3.2 Project Sequence**

Following mobilization to the site, the project will be initiated by removing the tank contents from the parking lot, removal of UST and UST associated piping, removal of all backfill material and assessment sampling. The site will be barricaded, if contamination is suspected. The tank in the soccer field will be located next. If found, this tank will be removed and assessment samples collected. If tank is not found, the excavation will be backfilled. If the assessment samples are below the regulatory level, the site will be backfilled and site restored.

### **3.3 Locations Of Excavation Equipment, Exclusion Zones, Utility Hookups, Pipelines, and Security Requirements**

Excavation equipment, staging areas, transportation routes, and utility hookups will be located on-site as coordinated with USACE personnel. Exclusion zones will be determined based upon the Health and Safety Plan requirements. All underground buried cables/lines will be marked by Ohio Utility Protection Service.

### **3.4 Mobilization**

Activities will include mobilizing personnel and equipment to the site, orienting workers to site conditions and reviewing applicable sections of the Health and Safety Plan. A preconstruction meeting will be conducted with the USACE representative to spot the equipment at the site.

### **3.5 Work Zones**

The following work zone has been identified at the UST site:

A construction zone large enough to contain the excavation and dirt storage areas will be established at the work site. This area will be marked with construction fencing, barricades and/or caution tape. Access to this area will be limited to those individuals who are actively working on the project. The size of this area will be adequate to stockpile up to 150 CY of soil and the removed tank.

### **3.6 Health and Safety**

Health and Safety procedures will be implemented in accordance with the specific Health and Safety Plan. The Health and Safety Plan is found in the Work Plan.

### **3.7 Underground Storage Tanks**

This section addresses the procedure that will be used to remove both USTs. It also describes the procedures that will be followed to remove impacted soils which may be encountered in the process of removing the USTs.

The UST removal activities will commence after mobilization of construction personnel and equipment to the site. Specific work elements are described below.

**3.7.1 Site Clearing and Preparation:** The excavation area in the parking lot will be cleared of asphalt as necessary to accommodate excavation activities. No structures, such as buildings or shacks will need to be removed for the UST removal work.

**3.7.2 UST Removal Activities:** The UST removal process will proceed as follows. A backhoe or equivalent will be used to remove surface material from the tank location including concrete and asphalt, as necessary. The backhoe will then remove soil to expose the top of the UST and piping. Underground utilities will be marked by the Ohio Underground Utility

Protection Service. Hand digging will be performed around all marked underground lines/cables and utilities.

While the tank is still in place, the remaining product and sludge will be pumped from the tank to a vacuum truck or 55-gallon, DOT approved drums. The interior of the tank will be accessed through vents and will be pressure washed, to the extent possible, in place. The wash water will be pumped into a vacuum truck or 55-gallon, DOT approved drums. This cleaning shall be performed before the tank is removed from the ground. The quantity of water generated by pressure washing will be minimized to the extent practicable.

The excavation will then proceed around the tank. The tank will be removed from the ground with a backhoe. The tank will be placed on a secure, level area, with blocking to prevent movement. The tank will be placed on plastic.

In cases where it is necessary to maintain an inerted atmosphere in the tank, corrosion holes, if present, will be plugged with screwed plugs. Dry ice will be inserted to inert the tank. The level of explosive contaminants will be measured with an LEL portable detector. The tank will be labeled on the exterior clearly indicating the tank number, the former contents, inerting activities and date. While inerted, the tank ends will be cut. The tank will be removed within 24 hours from the site.

**3.7.3 Tank Pads:** Hold-down-pads will require removal unless the Fire Marshal or a certified Fire Safety Inspector authorizes to leave it in place. Once the tank has been removed from the ground, an excavator will be used to break up the pad. The excavator will then be used to remove the concrete from the excavation. If re-bar needs to be cut, the concrete will be removed to grade and cut.

**3.7.4 Soil Segregation/Sampling:** During the tank removal, the excavation area will be visually inspected for indications of a release. Clean soil will be segregated and stockpiled on plastic 6 mil sheeting, based on visual observations and the use of a photoionization detector (PID) or a flame ionization detector (FID). Clean top soil will be conserved for use during restorations at the soccer field site.

All tank backfill and impacted soil will be stockpiled on plastic and properly covered to prevent run-off. The stockpile will be stored until analysis is completed. Soils excavated will be sampled prior to shipment to the extent required by the disposal facility. The clean stockpile will be sampled according to Table 1, 1301:7-9-17, Ohio UST Regulations, two (2) grab samples shall be taken for field screening for 0 to 25 CY, six (6) for 26 to 100 CY of soil generated, and 1 sample with the highest PID reading shall be taken and sent for analysis. If quantity is between 101 to 500 CY, eight (8) samples will be field screened and two (2) samples will be sent for analysis. All samples shall be grab samples.

After removal of all tank backfill material, closure assessment samples will be collected from the following areas in accordance with the BUSTR. Native soil will not be excavated.

- From the excavation floor at both ends of the tank (two samples)
- One sample every 20 feet along the piping runs. (USACE Representative will be notified if this is necessary).

The laboratory to be used for analysis is:

Test America  
2960 Foster Creighton Drive  
Nashville, TN 37204  
Phone: (615) 726-0177

If water covers the floor of the excavation, it should be removed. If within 24 hours of removal the water does not recharge, soil samples should be collected. However, if water recharges, then a water sample must be collected. A Shelby tube or a grab sample from the backhoe bucket will be collected for soil samples. Water samples will be collected using a disposable bailer.

Following collection of the assessment samples, the excavation area will be backfilled if no contamination is noted through visual observation or PID readings. If contamination is noted, then the excavation area will be lined with seamless 6-mil plastic sheeting. Surface water will be directed away from the open excavation. Temporary fencing or barricading will be placed around the open excavation. This excavation protection will be maintained until the laboratory

results for all assessment samples have been obtained. Any surface water or rain water that has collected on the plastic sheeting will be pumped directly onto the ground prior to backfilling the excavations. Coordinate the discharge of any clean surface water with the government's representative before discharging.

If the analytical results from the closure assessment samples indicate that a release has not occurred, then backfilling will be performed.

If the analytical results indicate the soil is impacted, notification must be made to the USACE COR and the BUSTR. Remediation of a site with a release will require development of a Site Assessment (SA) report delineating the vertical and horizontal extent of soil and groundwater contamination. This should be submitted within 180 days of the release report. After approval of the SA report, a Remedial Action Plan (RAP) is to be submitted before remediation can occur. USACE authorization will be necessary to complete these reports.

**3.7.5 Release Reporting:** In the situation where visual inspection, screening or analytical results indicates that a release has occurred, the USACE COR will be notified by the AmTech Site Manager. The AmTech Site Manager will then provide the SFM with the required release notification within 24 hours of discovery of the release. A release must be reported to SFM by telephone at 1-800-686-2878 or (614) 752-7938 within 24 hours of discovery of the contamination.

**3.7.6 Soil Stockpiling:** The excavated soil will be stockpiled at a location near the excavation. The stockpile, where possible, will be placed at locations with higher elevations, away from drains, to avoid damming of surface water flow. 6-mil plastic sheeting will be placed under the stockpiles. Also, 6-mil plastic sheeting will be placed over the stockpiled soil so that any rainwater will not mix with stockpiled soils, and any runoff is clean water, without contamination.

Storm water run-off from stockpiles of excavated soil and run-off into excavation areas will be controlled during the sample analyses period. Stormwater run-off will be diverted, as necessary, from open excavation areas with berms during storm events. Any storm water

which enters the excavation will be clean water, on top of the 6 mil barrier, and will be diverted, or pumped onto the adjacent ground after coordination with the government representative.

**3.7.7 Dewatering Methods and Waste Water Management:** Groundwater is not expected to be encountered during excavation activities. However, contingency plans have been developed if water should be encountered. Attempts will be made to avoid the generation of unnecessary waste water due to the potential cost of disposal. In general, tank excavations will stop at the water table surface unless additional excavations are necessary to remove a tank or pad. Water will only be removed from an excavation if there is a specific reason to do so. For example, reasons may include the following: to access the tank pad; to determine whether groundwater recharge is occurring; to achieve the compaction standard when backfilling; or, to maintain the structural integrity of the excavation.

Groundwater will be removed and containerized until characterization and disposal can occur.

### **3.8 Decontamination**

**3.8.1 Personnel Decontamination:** Personnel decontamination will be performed in accordance with the Health and Safety Plan.

**3.8.2 Equipment/Vehicles Decontamination:** Equipment decontamination will be performed prior to removing equipment from an impacted area. A temporary decontamination pad will be constructed using timbers and plastic sheeting to collect rinseate. The rinseate will be placed in vacuum trucks or 55-gallon DOT drums and disposed with other waste water.

**3.8.3 Disposal of Personal Protective Equipment:** Personal protective equipment will be checked with a PID or FID. If an elevated reading is not detected, the personal protective equipment will be disposed as general refuse. If an elevated reading is detected, that particular item will be placed in a DOT approved 55-gallon drum or soil stockpile for off-site disposal for potential disposal as a contaminated waste.

### **3.9 Site Restoration**

**3.9.1 Backfilling:** The excavations will be backfilled with either available excavated soils or backfill brought from outside source. Available excavated soils will be used if closure assessment sample results indicate that no action levels have been exceeded. If field screening indicated the soil to be impacted, the excavated soil can only be used after sampling and analysis of the soil has been performed and analytical results indicate that contaminant concentrations do not exceed the BUSTR action levels. The available excavated soil will be sampled and analyzed in accordance with the sampling and analysis section.

The excavations will be backfilled with uncontaminated soil, which is free from debris and organic matter, similar to that of adjacent soils. Where possible, clean soil from the excavations will be used for backfill. In some cases, soil will be brought on-site to provide the quantity of soil necessary to complete backfilling.

The backfill soil will be placed in 8" lifts and compacted with a plate compactor to 93% of maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D698). On-site compaction testing will be performed using a nuclear density gauge. One (1) compaction reading will be taken for each compacted layer. The previously segregated top soil will be replaced after the compaction is complete.

**3.9.2 Sodding/Restoration:** The soccer field site will be sodded and watered once. The parking lot site will be topped off with 6-inches of stone and three (3) inches of asphalt placed. The edges will be saw-cut where old asphalt meets new asphalt.

### **3.10 Demobilization**

After completion of the on-site work, demobilization of personnel and equipment will take place.

### **3.11 Construction Schedule**

A construction schedule and task milestones has been developed for completion of major deliverables and field activities and is presented below as Table 1. The construction schedule will be updated to reflect the actual progress versus the planned progress, with an explanation of any actual or anticipated delays, and the actions being taken or required to correct the schedule slippage, if necessary.

**TABLE 1**  
**CONSTRUCTION SCHEDULES**

MAJOR DELIVERABLE OR FIELD ACTIVITY	COMPLETION DATE
Draft Work Plan Submittal	7/24/00
USACE Review Comments	8/7/00
Final Work Plan	8/11/00
Submit State Required Documentation	8/11/00
Remove UST	8/28/00
Submit Closure Reports To COR	9/30/00

### 3.12 Site Security

Safety equipment for the implementation of project activities will include barricades, caution tape, and construction pylons which will be placed around open excavations as a safety precaution.

### 3.13 Off-Site Disposal Facilities Capabilities For Managing Contaminated Materials

Contaminated soils (non- hazardous waste) will be disposed at American Landfill, 7916 Chapel Street, S.E., Waynesburg, Ohio. Petroleum contaminated water, sludge, and residual product will be disposed at an approved disposal/recycling facility. All disposal documents will be completed and copies kept for record. The State Fire Marshal/BUSTR, Soil Disposal/Treatment Notification Form will be completed.

## 4.0 SAMPLING AND ANALYSIS

This Section describes the data quality objectives and the corresponding quality assurance standards by which all sample analyses will be conducted as part of the field and laboratory programs to be performed. The purpose of this plan is to ensure that the collection and analysis of samples are performed in a manner appropriate for the intended data usage and that the results will be valid and usable.

Sampling and analysis for the soccer field tank will only be performed if the tank is found and removed.

### 4.1 Decontamination

Equipment used in sampling shall be decontaminated prior to its use. Equipment that may directly or indirectly contact samples shall be decontaminated in a designated decontamination area. In addition, measures will be taken to prevent the sample from coming into contact with potentially contaminating substances such as tape, oil, engine exhaust, corroded surfaces, and dirt.

The following procedures shall be used to decontaminate all large pieces of equipment. This decontamination procedure shall be performed before equipment is used and between each sampling location.

1. If necessary, scrape all visible dirt, grime, grease, oil, loose paint, and rust flakes from excavation equipment (i.e., excavator bucket).
2. Sample will be collected from the center of the bucket.

The following procedures shall be used to decontaminate sampling devices such as mixing bowls and spoons.

1. The equipment shall be scrubbed with potable water and alconox, or equivalent laboratory grade detergent. Rinse equipment with potable water.

2. Rinse equipment with deionized water.
3. Allow equipment to air-dry on a clean surface or rack, such as Teflon, stainless steel, or oil-free aluminum. If the sampling devices will not be used immediately, it will be wrapped in aluminum foil.

## 4.2 Waste Handling

Waste generated during the field activities may include the following:

1. Excavated soils;
2. Product and sludge from storage tanks and associated pipelines;
3. Wastewater from cleaning of the storage tanks and pipelines;
4. Decontamination water; and,
5. Excavation pit water, if any.

**4.2.1 Excavated Soils:** Soils excavated during UST removal will be stockpiled as either clean soil or impacted soil. Visual screening (i.e., olfactory, product sheen) and a photoionization detector (PID) or flame ionization detector (FID) during excavation will be used to differentiate between the different stockpiles. Soils displaying any evidence of contamination through the field screening will be placed separately from clean material. Both clean and impacted soils will be placed on 6-mil plastic.

Any soil with PID or FID reading above background will be placed in the impacted soil stockpile. Readings will be obtained from background soil samples collected from non-impacted areas that are representative of natural background conditions. PID or FID screening shall be conducted by filling a container or ziplock® plastic bag half-full with soil. The container or plastic bag shall then be sealed (e.g. aluminum foil placed on top of a jar and secured with a screw-on lid). The screening sample will be allowed to equilibrate for ten (10) minutes at room temperature. The PID or FID probe will be inserted into the head space of the sample (e.g. remove lid and insert probe through aluminum foil). The maximum reading will be recorded.

Top soil will be conserved as much as is practical for use during site restoration. The soils will be stockpiled on and covered with plastic sheeting.

### **Impacted Soil**

Impacted soil excavated from the removed tank sites will be stockpiled on and covered with plastic sheeting in a central stockpiling area near the excavations at each site. Samples from the impacted soil stockpiles shall be collected for waste characterization.

Samples collected from the potentially contaminated soils (impacted stockpiles) will be analyzed per the landfill's requirements for disposal.

After review of the analytical data, the soil from the potentially contaminated stockpiles will be shipped off-site to a licensed facility for disposal.

### **Clean Soil**

Before using any excavated clean soil, one (1) sample for up to 100 CY or two (2) samples for up to 500 CY, exhibiting highest PID reading will be submitted for analysis. The number of soil samples will be screened per section 3.7.4. The sample from gasoline tank will be analyzed for BTEX and TPH. The samples from heating oil tank will be analyzed for BTEX, TPH and PAH. The sample results will be compared with the regulatory levels prior to using this material as backfill.

**4.2.2 Product and Sludge from USTs and Pipelines:** Product and sludge will be removed from the USTs and pipelines. The liquids will be removed from the tanks with a pump and placed in a drum, then transported directly to a licensed disposal facility.

Product and sludge will be analyzed for waste characterization parameters as determined by the selected disposal facility. After characterization the product/sludge shall be transported to an approved disposal facility.

**4.2.3 Wastewater from Washing of the USTs and Pipelines:** During the cleaning of the USTs, wash water containing varying concentrations of gasoline and diesel will be generated. All wastewater, shall be containerized in 55 gallon DOT drums or a vacuum truck and transported to the selected disposal facility handling product/sludge

**4.2.4 Decontamination Water:** Wash and rinse waters generated during the decontamination of equipment will be collected in the 55-gallon DOT drums or the vacuum truck with the wastewater from the cleaning of the USTs and pipelines. All wastewater collected will be disposed at the facility handling product/sludge.

**4.2.5 Excavation Pit Water:** It is assumed that groundwater will not enter the excavations. If water is encountered, then further excavation will be limited, to the extent possible, to the groundwater surface. Groundwater shall be left in the excavation unless it hinders tank removal operations. Excavation pit water samples (if obtained) shall be collected and analyzed in accordance with Section 4.3.1.

Groundwater, if removed from the excavation, will be pumped using a vacuum truck and shipped off-site for disposal by a licensed contractor. Sampling and analysis of the groundwater performed if required by the selected disposal facility.

### **4.3 SAMPLING PROCEDURES**

The following sampling will be conducted:

1. Excavation Sampling
  - Closure Assessment Sampling
2. Waste Sampling
  - Impacted Soils
  - Product, Sludge, Wastewater and Decontamination Water

**4.3.1 Closure Assessment Sampling:** In accordance with BUSTR regulations, closure assessment samples will be collected from the excavation pit in the following areas after removal of the tank backfill material:

- From the excavation floor at both ends of the tank
- One sample at least every 20 feet along the piping runs, if present

**TABLE 2**  
**PARAMETERS FOR BUSTR CLOSURE ASSESSMENT**  
**AND ANALYTICAL METHODS**

SITE NAME	TANK CONTENTS	PARAMETERS	SW 846 METHODS
Nike CL-59	Diesel	BTEX	Soil: EPA Method 8020 Water: EPA Method 602
		TPH	Soil: EPA Method 418.1, Water NA
	Gasoline	PAH	Soil: EPA Method 8100, Water Method 610
		BTEX	Soil: EPA Method 8029, Water: EPA Method 602
		TPH	Soil: EPA Method 8015

**4.3.2 Waste Sampling:** Waste sampling has been separated into individual components depending upon its source and characteristics.

**Impacted Soils**

Waste characterization samples will be collected from the impacted soil stockpile. The sample shall be analyzed for parameters as required by the landfill for disposal. A stainless steel scoop or other similar tool shall be used to remove stockpiled soil and collect the impacted soil sample. Tools used to collect the sample shall be decontaminated in accordance with Section 4.1 prior to their use. The sample shall then immediately be placed in a cooler containing ice. One (1) composite waste characterization sample (except for VOCs) will be collected for each impacted soil stockpile. Soil in equal amounts will be collected from five (5) random locations in the impacted stockpile and combined to form one (1) composite sample. The soil shall be collected from the impacted stockpile, placed in a mixing bowl and thoroughly mixed. The shall be transferred from the mixing bowl to the appropriate sample container. The jar shall be completely filled to limit head space.

**Product, Sludge, Wastewater and Decontamination Water**

Product and sludge shall be sampled for waste characterization. Samples will be analyzed as required by the selected disposal facility. A glass coliwasa or bailer will be lowered into the

drums to obtain samples if the product is predominantly liquid. A liquid/sludge coliwasa may be employed should the drum contents be highly viscous or a sludge.

**4.3.3 Sample Handling:** This section presents sample identification guidance, the required sample containers, preservation techniques, and holding times, and sample packaging and shipping procedures.

Immediately after collection, all samples shall be sealed, labeled, and placed in a cooler containing ice. Soil sample jars shall be filled. All VOC sample jars shall be completely filled to limit headspace. Custody seals shall be placed on the coolers prior to shipment to the laboratory. Chain-of-Custody forms shall be completed, placed in ziplock® bags, and taped to the inside of the cooler lid. The cooler lid will be closed and sealed with clear packing tape. Sample jars shall be of sufficient size and quantity as outlined by the laboratory for the parameters being analyzed. Table 4 and Table 5 lists container sizes and quantity, preservatives and holding times.

#### 4.3.4 Sample Designations

Each site will be assigned a number for the purposes of sample label designation. These designations are indicated below in Table 3.

**TABLE 3  
SITE DESIGNATION NUMBERS**

SITE NAME	SAMPLE DESIGNATION NUMBER
Gasoline Tank	01
Heating Oil Tank	02

Samples shall be labeled using the following designations:

#### Impacted Soil Stockpile Samples

The first character for samples collected from the impacted soil stockpile shall be an N to designate an environmental sample. The next two (s) characters shall be the site designation number where the soils were excavated. The next two (2) characters shall be IS. This will

indicate that the soil sample was collected from one of the impacted soil stockpiles. The last two characters will be the chronological number of the environmental sample obtained.

The following is an example of the sample designations for the impacted soil stockpiles.

N01IS02 - This indicates that an impacted soil stockpile sample was collected at the gasoline tank site and it was the second environmental sample collected.

### **Product and Sludge Samples**

The first character for product and sludge samples shall be an N to designate an environmental sample. The next two (2) characters shall be the site designation number where the product/sludge was removed. The next two (2) characters shall be PS. This will indicate that it is a product/sludge sample. The last two (2) characters shall be the chronological number of environmental samples collected.

### **Closure Assessment Samples**

The first character for site assessment samples shall be an N to designate an environmental sample. The next two (2) characters shall be the site designation number of the tank site where the samples were collected. The next two (2) characters shall be SA. This will indicate that it is a site assessment sample. The last two (2) characters shall indicate bottom-east, west, north or south ( i.e., 'BE' refers to 'bottom east').

**4.3.5 Sample Containers, Preservation, and Holding Times:** To preserve sample integrity and the validity of the final data, all samples will be collected in the containers and preserved as indicated in Table 4 and Table 5. The maximum allowable holding times for each analytical parameter in each sample medium are also presented in Table 4 and Table 5.

**4.3.6 Sample Packaging and Shipment:** Sample packaging for shipment will be done to prevent breakage and release of materials. The procedures for sample packaging will be as follows:

1. The volume of the sample will be limited to the quantity needed for analysis.
2. Plastic sample containers will be protected from puncture and glass containers will be well cushioned when packed for shipment.

3. Screw lids will be firmly tightened.
4. Leakage will be minimized by the use of internal bagging.
5. All samples suspected to be hazardous materials will be shipped in strict accordance with U.S. Department of Transportation Regulations (U.S. DOT, 49 CFR Section 172.1 or 49 CFR 173.3)

#### 4.4 Sample Custody

Sample jars will be filled in the field, sealed, labeled and immediately placed in a cooler with ice. Custody of the samples shall be maintained by the sampling team until the samples are shipped to the laboratory. Samples shall be transported to the general sample processing area for packing and shipping. A chain-of-custody form, Figure 5, shall be completed, signed, and placed in a zip lock® bag and taped to the inside of the cooler lid. The chain-of-custody form shall include the following information.

- 1) Project Name
- 2) Parameter
- 3) Date and Time Sample was Collected
- 4) Location ID and Sample Type
- 5) Location Class Code
- 6) Lot Control Number
- 7) Sample Matrix
- 8) Sample Method and Depth
- 9) Number of Containers
- 10) Preservative

A copy of the chain-of-custody form will be kept with the sample files. Upon arrival at the laboratory, the chain-of-custody shall be signed by the laboratory personnel. A copy of the signed chain-of-custody from the laboratory shall accompany the analytical results.

#### 4.5 Quality Control

The laboratory will comply with the QC requirements of the analytical methods. One (1) duplicate sample for each site will be collected and analyzed.

TABLE 4 -- SAMPLE CONTAINERS, PRESERVATIVES AND HOLDING TIMES FOR SOIL SAMPLES

Analytical Parameter <sup>(a)</sup>	Container <sup>(b)</sup>	Number of Containers per Sample <sup>(c)</sup>	Preservation	Holding Time <sup>(d)</sup>
BTEX	4-oz, wide-mouth, G, w/Teflon® liner	2	Ice to 4°C	14 days
TPH	8-oz, wide-mouth, G, w/Teflon® liner	1	Ice to 4°C	V-TPH: 14Days; SV-TPH: 7 Days to extraction; analysis within 40 days
PAH	8-oz wide mouth glass	1	Ice to 4°C	14 days till extraction, 40 days after extraction

(a) BTEX = Benzene, Toluene, Ethylbenzene, Xylenes; TPH Total Petroleum Hydrocarbons.  
 (b) G = Glass

(c) The number of containers will be two times the amount noted for samples designated for field replicate analyses.  
 (d) When only one holding time is designated, it is the total holding time until analysis.

TABLE 5 -- SAMPLE CONTAINERS, PRESERVATIVES AND HOLDING TIMES FOR AQUEOUS SAMPLES

Analytical Parameter <sup>(a)</sup>	Container <sup>(b)</sup>	Number of Containers per Sample <sup>(c)</sup>	Preservation	Holding Time <sup>(d)</sup>
PAH	1 liter amber glass	4	Cool to 4°C	7 days till extraction; 40 days after extraction
BTEX	40 mL, G, vial w/Teflon®-lined septa cap	2	Ice to 4°C, add 4 drops conc. HC1 to pH<2	14 days

(a) BTEX = Benzene, Toluene, Ethylbenzene and Xylenes; TPH= Total Petroleum Hydrocarbons.  
 (b) All containers must have lids with Teflon® liners or seals. G = Glass; P = High-Density Polyethylene; L = Liter.  
 (c) When only one holding time is designated, it is the total holding time until analysis.



## 5.0 DOCUMENTATION AND REPORTING

Following completion of the site activities and receipt of all laboratory results, field and closure reports, as required by BUSTR will be prepared and presented to the USACE. The report will include all laboratory results, photographs documenting all site activities, disposal documentation (soil, tanks, groundwater, etc.), and a site plan indicating the excavation area, nearby buildings or other pertinent site feature, previous location of the UST and piping, and sample location

APPENDIX A

BUSTR SCORING

### SITE FEATURE SCORING

SITE FEATURES	COLUMN A		COLUMN B		COLUMN C		COLUMN D	
	SCORE 20 IF TRUE	SCORE	SCORE 15 IF TRUE	SCORE	SCORE 10 IF TRUE	SCORE	SCORE 5 IF TRUE	SCORE
1. Distance of UST system from closest drinking water supply well or intake currently in use.	>1000 feet		301-1000 feet		<301 feet		Inside of designated sensitive area.	
2. Average depth to ground water.	>50 feet		31-50 feet		15-30 feet or unknown		<15 feet	
3. Predominant soil type of substratum.	Clay or Shale		Silt or Clayey Sands or Fine Sandstone		Silty Sand or Fine Sand or Sandstone or Unknown.		Clean Sand or Gravel or Conglomerate	
4. Natural and/or manmade conduits or receptors.	<8		8-10		11-13		<13	

TOTAL SCORE = \_\_\_\_\_

### BUSTRACTION LEVELS

	CATEGORY 4	CATEGORY 3	CATEGORY 2	CATEGORY 1
TOTAL SCORE	>71	70-51	50-31	<31
Constituents level in soil:				
Benzene	.500 PPM	.335 PPM	.170 PPM	.006 PPM
Toluene	12 PPM	9 PPM	7 PPM	4 PPM
Ethylbenzene	18 PPM	14 PPM	10 PPM	6 PPM
Total Xylenes	85 PPM	67 PPM	47 PPM	28 PPM
TPH level in soil:				
Analytical Group No. 1 (gasoline)	600 PPM	450 PPM	300 PPM	105 PPM
Analytical Group Nos. 2, 3, and 4 (diesel)	1156 PPM	904 PPM	642 PPM	380 PPM

### SITE FEATURE NUMBER 4 WORKSHEET

SITE LOCATION	Possible Points	Total Scored
Basements or subsurface foundations within one hundred feet of UST system	4 points	
Storm sewer within fifty feet of UST system	4 points	
Sanitary sewer within fifty feet of UST system	4 points	
Septic system leach field within fifty feet of UST system	2 points	
Water line main within fifty feet of UST system	1 point	
Natural gas line main within fifty feet of UST system	1 point	
Bedrock area prone to dissolution along joints or fractures (i.e., caves & sinkholes) within one hundred feet of UST system	1 point	
Faults of known fractures within one hundred feet of UST system	1 point	
Buried telephone/television cable main within fifty feet of UST system	1 point	
Buried electrical cable main within fifty feet of UST system	1 point	
	TOTAL POINTS	

# **SITE HEALTH & SAFETY PLAN**

**REMOVAL OF TWO USTs IN NATHAN HALE PARK  
AT THE FORMER NIKE CL-59 SITE  
PARMA HEIGHTS, OHIO**

**Indefinite Deliverables Contract No. DACA27-97-D-0006  
Delivery Order 0015**

**July 21, 2000**

**Prepared for:**

**Department of the Army  
U.S. Army Engineer District, Louisville  
Corps of Engineers  
Louisville, Kentucky**

**Prepared by:**

**AmTech Engineering, Inc.  
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Indianapolis, Indiana 46268**

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Appendix C	Heat Stress
Appendix D	OSHA 200 Form & USACE Accident Investigation Report (Form 3394)
Appendix E	Equipment Calibration Checklist

## LIST OF ACRONYMS

ANSI	-	American National Standards Institute
APR	-	Air Purifying Respirator
ACGIH	-	American Conference Of Governmental Industrial Hygienists
AST		Aboveground Storage Tank
BUSTR	-	Bureau of Underground Storage Tank Regulations
CFR	-	Code Of Federal Regulations
CGI	-	Combustible Gas Indicator
DECON	-	Decontamination
DOT		Department Of Transportation
HNU-PID	-	HNu Photoionization Detector
HSP		Health and Safety Plan
IDLH	-	Immediately Dangerous To Life & Health
MSDS		Material Safety Data Sheet
NIOSH	-	National Institute For Occupational Safety & Health
OSHA	-	Occupational Safety And Health Administration
OVA	-	Organic Vapor Analyzer
PEL	-	Permissible Exposure Limit (OSHA Reg., Enforceable by law)
PPE	-	Personal Protective Equipment
PPM	-	Parts Per Million
SCBA	-	Self-contained Breathing Apparatus
SHSO	-	Site Health and Safety Officer
SOP	-	Standard Operating Procedure
TLV	-	Threshold Limit Value (ACGIH Recommendation)
TWA	-	Time Weighted Average
USACE	-	United States Army Corps of Engineers
UST		Underground Storage Tank

## **A. INTRODUCTION AND PRE-SITE ENTRY REQUIREMENTS**

This document describes the health and safety guidelines developed for the former Nike CL-59 site in Parma Heights, Ohio to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes for the scope of work covered under this delivery order.

Under indefinite deliverables contract number DACA27-97-D-0006, AmTech Engineering, Inc. (AmTech) has been retained by the United States Army Corps of Engineers (USACE), Louisville, Kentucky District to remove one (1) underground storage tank (UST) from beneath the asphalt parking lot and to locate and remove a second UST from beneath a soccer field at the former Nike CL-59 site located in Parma Heights, Ohio. Figure 1 shows a vicinity map and Figure 2 provides a location map of the site. Environmental contamination, if present, shall be remediated in accordance with the Bureau of Underground Storage Tank Regulations (BUSTR).

The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received or conditions change. Where appropriate, specific Occupational Safety and Health Administration (OSHA) standards or other guidance will be cited and applied. All subcontractors/visitors will be required to comply with this Site Health and Safety Plan (SHSP) in performance of their activities. The U. S. Army Corps of Engineers SAFETY AND HEALTH REQUIREMENTS MANUAL EM385-1-1 will be complied with in its entirety.

### **Material Safety Data Sheets**

Material Safety Data Sheets (MSDSs) for gasoline and heating oil are contained in Appendix A.

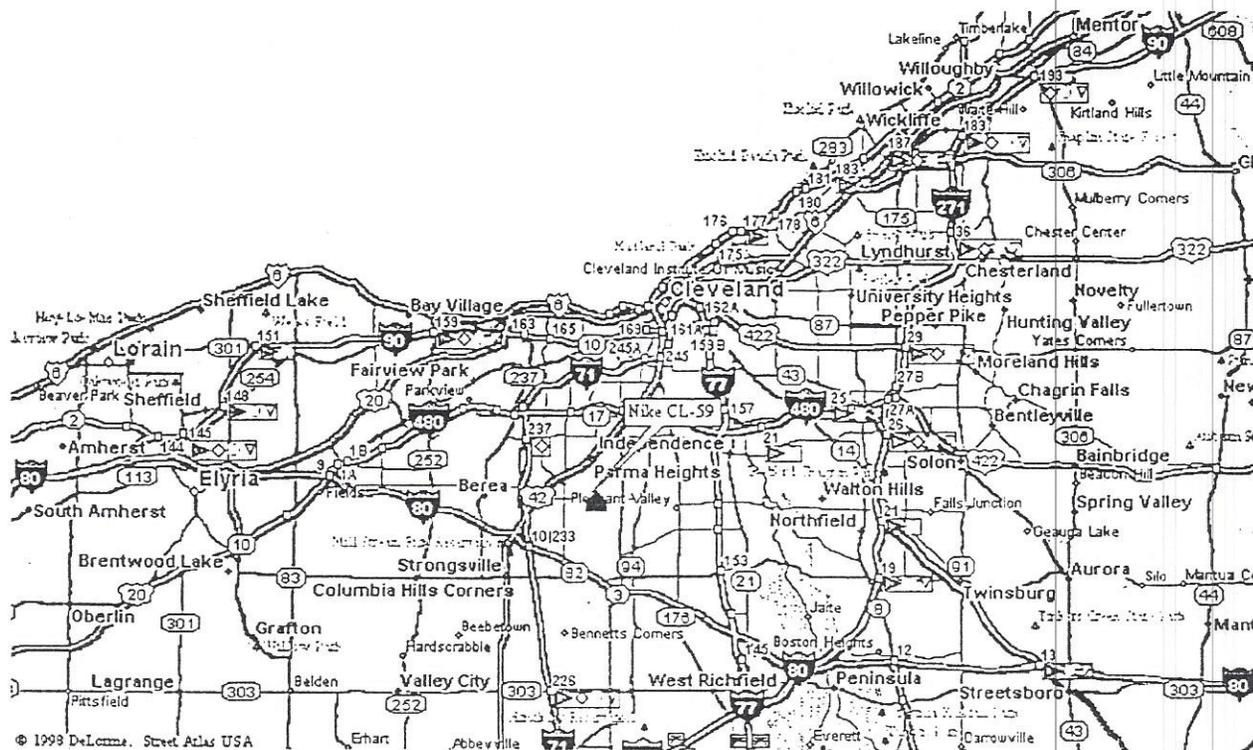


Figure 1 – General Location of Nike CL-59 – Parma Heights, Ohio.

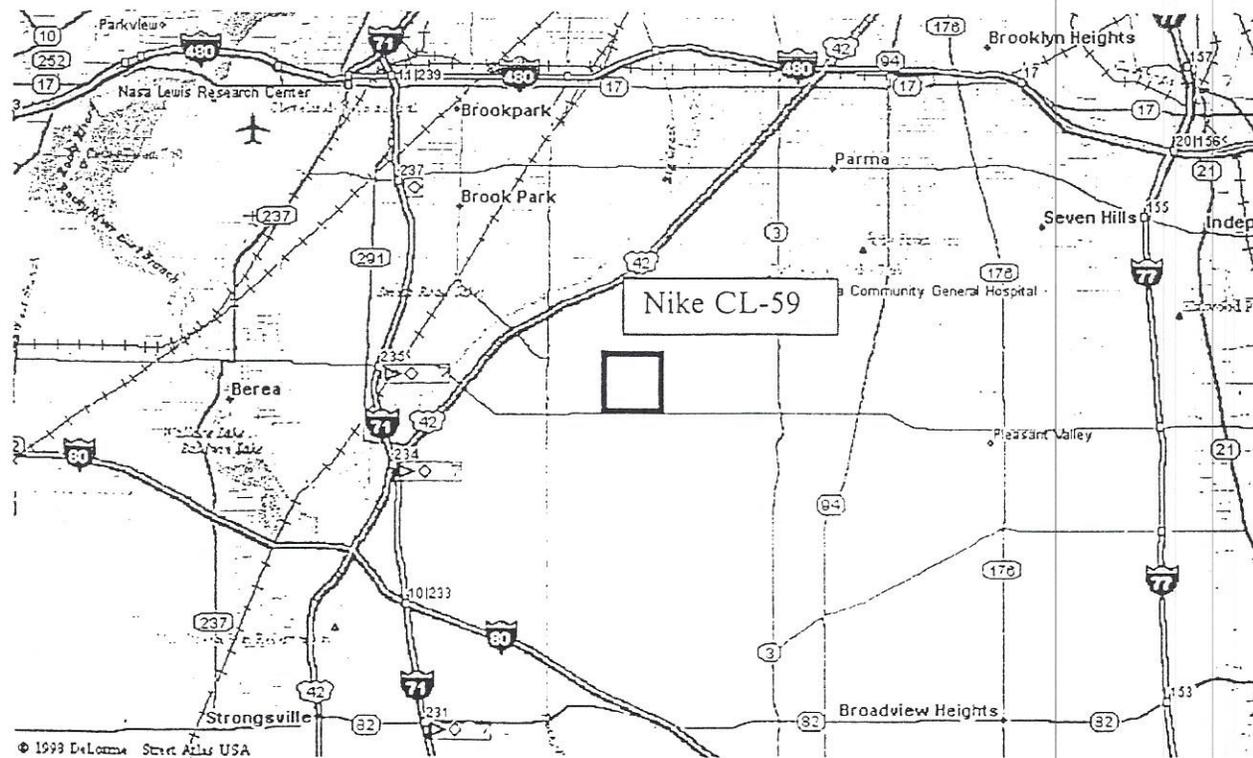


Figure 2 – General Location of Nike CL-59 – Parma Heights, Ohio.

### **Daily Safety Meetings**

Daily safety meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly, and to address worker health and safety concerns. A record of all personnel attending the meeting and a summary of what was covered in the meeting will be kept.

### **Site Safety Plan Acceptance Acknowledgment**

The Site Health & Safety Officer (SHSO) or designated representative shall be responsible for informing all individuals entering the construction zone, of the contents of this plan and ensuring that each person signs the Employee Certification Form in Sections I and J. By signing the Employee Certification Form, individuals are recognizing the hazards present on-site and agreeing to abide by the policies and procedures required to minimize exposure or adverse effects of these hazards. For the purpose of this plan, the construction zone is defined as the area twenty (20) feet from the construction activity. Where possible, this zone will be marked in the field using 'caution' tape.

All personnel performing site work and entering the construction zone shall have received training in accordance with OSHA 29 Code of Federal Regulations (CFR) 1910.120(e)(3), and shall be in compliance with the medical surveillance requirements of 29 CFR 1910.120(f). Documentation of training and medical surveillance compliance as applicable is the responsibility of each employer. Each employee should be able to provide proof of documentation. All personnel will have a minimum of 40 hours of health and safety training and 3 days of supervised field experience per OSHA 29 CFR 1910.120. As necessary, personnel will be required to attend an 8-hour Health and Safety Refresher course.

If subcontractors or other employees are brought onto the site for special tasks that do not require entry into the construction zone and do not require the above training, the SHSO will document the orientation of those workers through the use of the Certificate of Non-Exposed Worker/Visitor Acknowledgment (see Appendix B).

### **Respiratory Protective Equipment**

All personnel (including visitors) entering any construction zone requiring use of a respirator must have received training on its use and successfully passed a qualitative or quantitative respirator fit test in accordance with OSHA 29 CFR 1910.134 or American National Standards Institute (ANSI) Standard Z88.2 within the last 12 months (6 months in the event the respirator is worn for protection against asbestos, cadmium, or lead). Documentation of fit testing protocol is required for the use of negative pressure respirators for protection against airborne asbestos fibers (OSHA 29 CFR 1926.58), cadmium (OSHA 29 CFR 1926.63), or lead (OSHA 29 CFR 1910.1025).

### **Medical Surveillance Program**

The site personnel performing activities in accordance with a specific OSHA standard that requires enrollment in a medical surveillance program shall be covered by a medical surveillance program.

## B. GENERAL INFORMATION

The following provides a summary of the work to be performed within the scope of this project.

- a) Removal and disposal of two (2) USTs. The tank beneath the asphalt was associated with the vehicle fueling station and contained gasoline. The tank located beneath the soccer field was associated with radars and is believed to have contained heating oil.
- b) Sampling, analysis of samples, soil screening, recording, and reporting as related to contaminant identification, concentration estimation, project performance monitoring and quality assurance.
- c) Site restoration.

### Project Contacts:

1	Site Identifier	Former Nike CL-59 Site
2	Objective	Removal of two (2) USTs
3	Site Location	Nathan Hale Park at the Former Nike CL-59 Site Parma Heights, Ohio
4	AmTech Contact	Mr. Nadeem Siddiki Office Phone: 317-291-7285 Office Fax: 317-293-1440
5	AmTech Superintendent	Mr. Robert Dalton Cellular Phone: 317-714-1020
6	AmTech QC Manager/ Site Health & Safety Officer	Mr. A. Skandarajah Office Phone: 317-291-7285 Office Fax : 317-293-1440
7	USACE Contact	Ms. Shelly Davis Office Phone: 502-582-5321 Office Fax: 502-582-5168
8	USACE Contact (Construction Representative)	Mr. Dave Sennett Office Phone: 614-692-2784 Office Fax: 614-692-3632





## **E. FIELD ORGANIZATION**

### **QC Manager/SHSO:**

The QC Manager is responsible for implementing AmTech's Quality Control Program in accordance with the QC Plan Addendum for this project. The person will also serve as the Site Health and Safety Officer (SHSO). The SHSO is responsible for implementing the Health and Safety Plan in the field. The SHSO or a designated alternate must be on-site whenever work is in progress. The SHSO authority may be delegated to another qualified person, to serve as the designated alternate if the SHSO must leave the site for a short period of time.

### **Site Manager:**

The Site Manager will be responsible for performing the field tasks including:

- Removal and disposal of USTs, tank contents, and impacted oils.
- Environmental sampling activities.
- Site restoration.

### **USACE Field Representative:**

The USACE Field Representative is responsible to verify that work is completed in accordance with the Work Plan and will assist in resolution of technical questions.

Figure 3 provides an organization chart for this project.

ORGANIZATION CHART

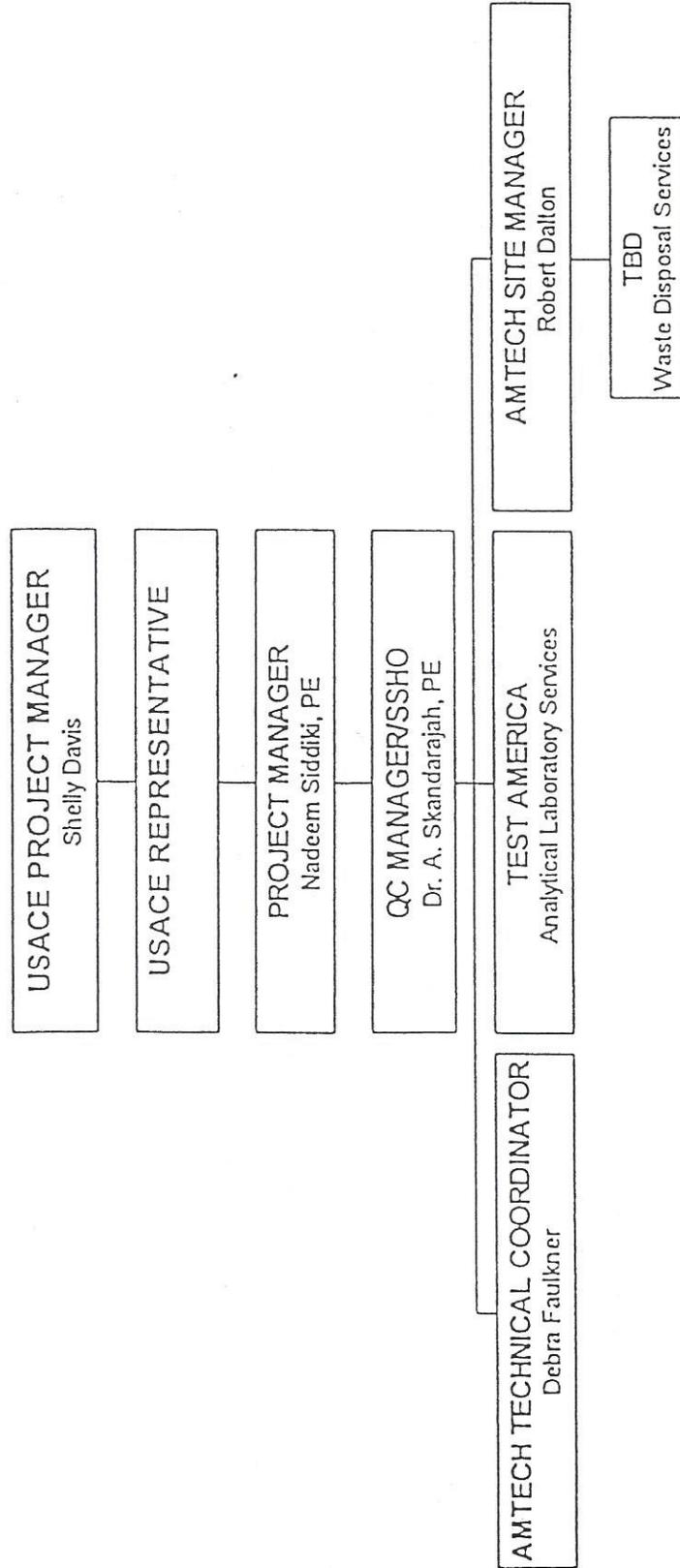


Figure 3

## F. SITE SAFETY WORK PLAN

1. **General Safety Requirements:** The following general safety procedures shall be followed by all persons entering and/or working on the site:
  - a) All persons involved in this project shall read and sign this Health & Safety Plan prior to entering or working on the site. The master copy (with signature sheet) of this Safety Plan will be held by the designated SHSO. A signature sheet is provided in Section I of this plan.
  - b) No employee or subcontractor may be allowed on-site without the prior knowledge and consent of the SHSO.
  - c) There will be no activities conducted on-site without sufficient backup personnel to permit operation of a buddy system. At a minimum, two persons must be present at the site. Visual, voice or radio communication will be maintained at all times.
  - d) All contractor or subcontractor personnel shall bring to the attention of the SHSO or designated alternate, any unsafe condition or practice associated with the site activities.
  - e) There will be no smoking, eating, drinking or application of cosmetics in the construction area as defined by the SHSO.
  - f) Hands, face and all other potentially contaminated areas shall be thoroughly cleaned prior to smoking, eating or other activities after any work in the construction area.
  - g) Team members must avoid unnecessary contamination (i.e., walking through known or suspect "hot" zones or contaminated puddles, kneeling or sitting on the ground, leaning against potentially contaminated barrels or equipment).
  - h) Respirators may not be worn with beards, long sideburns, or under other conditions that prevent a proper seal.
  - i) All excavation, heavy equipment operation, and general construction activities shall be performed in compliance with 29 CFR 1926.
  - j) All project personnel who to wear air purifying or air supplied respirators must first meet the training and medical requirements of 29 CFR 1910.134.
  - k) Aerial obstructions such as power lines and tree branches will be verified prior to movement of large equipment. A 20 foot horizontal clearance must be maintained from all aerial obstructions.
  - l) Locations of subsurface utilities and buried bulk wastes shall be verified prior to any excavation activities.
  - m) All accidents and/or injuries shall be immediately reported to the SHSO and to the USACE site contact.

n) All accidents and/or injuries shall be immediately reported to the SSHO and to the USACE site contact. Both the USACE-Accident Investigation Report (AIR) Form 3394 and the OSHA 200 Form as included in Appendix D shall be completed in accordance to the instructions and information required for each form. A copy of AmTech's OSHA 200 Form for the Years of 1999, 1998, and 1997 are provided in Appendix D. Also, Experience Modification Rates (EMR) for the last three (3) years are included. The current year EMR is .69. The previous two (2) years were 1.01. This was due to an error in paperwork with the insurance company. The error has been corrected and now reflects the no-accident status with an EMR of .69.

o) Daily safety meeting will be held at the start of each site operation to discuss current site conditions, field tasks being performed, plan modifications and work concerns.

3. Site Control:	Yes	No	
Map/Sketch Attached	<u>X</u>	<u>  </u>	
Site Secured	<u>  </u>	<u>X</u>	(fenced perimeter)
Perimeter Identified	<u>X</u>	<u>  </u>	
Zones of Contamination Identified	<u>  </u>	<u>X</u>	* (*Zones of Contamination will be established in the field.)

4. Protective Equipment Level

The following is a brief description of the personal protective equipment which may be required during various phases of the project. Although there is some flexibility to custom fit the actual items of protective equipment to the real-life situation, in general the levels of protection are defined as follows:

- a. LEVEL C - An intermediate level of chemical protection used when:
  - 1) Air concentrations of chemical are potentially above or known to be above ACGIH TWA-TLVs and APR will provide adequate protection.
  - 2) Non-IDLH atmospheres
  - 3) Chemicals are not destructive to skin
- b. LEVEL D - Minimum level of chemical protection used when:
  - (1) No concentrations of chemicals in excess of ACGIH TWA-TLV's
  - (2) No hazardous effect from skin contact or inhalation

The following are minimum OSHA-recommended requirements for worker protection.

Protection Level	Equipment
Level C	(1) Full-face, air-purifying respirator with HEPA and organic vapor combination cartridges, magenta and black or magenta and yellow.
	(2) Chemical resistant clothing (coveralls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposal chemical-resistant one-piece suit)
Level D	(1) Safety Boots
	(2) Safety glasses or splash goggles/face shield
	(3) Hard hat
	(4) Gloves as necessary
	(5) Standard work uniform or coveralls. Where "Modified Level D" is specified, 'Tyvek' or equivalent shall be used.

5. Hazardous Analysis and Personal Protection by Task:

Hazards present during the performance of this work are presented by each task below. The information on contaminants is included in Table 1, provided at the end of text section of this plan.

**A. Scope of Work: Removal of two USTs, Tank Contents, Impacted Soil, and Site Restoration at the Former Nike CL-59 site, Parma Heights, Ohio**

TASK	HAZARD	PROTECTION	PPE
1. Remove fuel from existing tanks	<ul style="list-style-type: none"> <li>Explosion/fire hazard</li> </ul>	<ul style="list-style-type: none"> <li>Ground fuel transfer equipment</li> </ul>	D
2. Excavate and uncover UST	<ul style="list-style-type: none"> <li>Buried utilities, if any</li> <li>Hit by excavation equipment</li> <li>Exposure from released contaminants</li> </ul>	<ul style="list-style-type: none"> <li>Obtain digging permits, mark all buried utilities prior to starting work. Hand dig around marked utilities.</li> <li>Stay in front and clear from equipment work zone</li> <li>Monitor excavated soils with a PID, upgrade to Level C if background level is exceeded.</li> </ul>	Modified D
3. Clean & remove tank	<ul style="list-style-type: none"> <li>Exposure to airborne contaminants</li> <li>Injury by tank rolling</li> </ul>	<ul style="list-style-type: none"> <li>Clean tank using existing vents and openings</li> <li>Monitor breathing zone, upgrade to Level C if above background or reading is exceeded.</li> <li>Block Tank</li> </ul>	Modified D
4. Tank cutting	<ul style="list-style-type: none"> <li>Explosion during tank cutting</li> </ul>	<ul style="list-style-type: none"> <li>Monitor LEL, keep &lt;10%, use non-sparking tools</li> </ul>	D
5. Excavation sampling	<ul style="list-style-type: none"> <li>Cave-in</li> </ul>	<ul style="list-style-type: none"> <li>Avoid entering excavation, sample from backhoe bucket (if acceptable). If entry into excavation is necessary, slope sides 1:1, provide a ladder for quick egress.</li> </ul>	Modified D
6. Close site awaiting chemical analysis results	<ul style="list-style-type: none"> <li>Fall into open excavation</li> </ul>	<ul style="list-style-type: none"> <li>Use snow fence and caution tape around excavation.</li> <li>Lock site access</li> </ul>	D
7. Backfilling & compaction	<ul style="list-style-type: none"> <li>Hit by equipment</li> <li>Cave-in (if compaction is done using hand held equipment)</li> </ul>	<ul style="list-style-type: none"> <li>Stay in front and clear of equipment work area.</li> <li>Use backhoe mounted compactor</li> <li>Slope sides 1:1 if entry into excavation is necessary</li> </ul>	D

8. Stock pile soil	<ul style="list-style-type: none"> <li>• Run-off from potentially impacted soil</li> <li>• Exposure to volatile organics in air.</li> </ul>	<ul style="list-style-type: none"> <li>• Line ground surface with 6 mils plastic cover stockpiles, berm sides.</li> <li>• Monitor with a PID, upgrade to Level C if background level is exceeded.</li> </ul>	D
9. Transport tank	<ul style="list-style-type: none"> <li>• Hit by tank being loaded</li> </ul>	<ul style="list-style-type: none"> <li>• Stay away from area when tank is being lifted</li> </ul>	D
*10. Load & transport contaminated soil	<ul style="list-style-type: none"> <li>• Hit by loading equipment.</li> <li>• Spill of soil from truck</li> </ul>	<ul style="list-style-type: none"> <li>• Stay clear of equipment</li> <li>• Clean dump edges and cover dump.</li> </ul>	D
11. Load & transport liquid waste drums	<ul style="list-style-type: none"> <li>• Manual moving can injure back</li> </ul>	<ul style="list-style-type: none"> <li>• Use proper equipment for loading drums</li> </ul>	D

## 6. Hazard Prevention

- \* Exercise great care to remain clear of heavy equipment. In operation of heavy equipment, exercise great care to move only into clear area.
- \* Conduct operations as much as possible from an area outside of the excavation without entering the excavation. Eliminate operations that expose workers to a cave-in hazard in any way, collect soil samples from backhoe bucket if acceptable to regulator agency.
- \* Entry into a Confined Space is not allowed for this project. UST cleaning and cutting shall be performed without entry into the tanks.
- \* Monitor for airborne contaminants. Allow excavations to purge and/or use personal protective equipment. Gas vapor is expected to be lighter than air in most cases. However, monitor low lying areas for fuel vapor accumulation.
- \* Provide adequate shoring or sloping of sides of the excavation if the excavations are to be entered by personnel. The protective systems (shoring, sloping or shielding) shall follow the requirements of OSHA 1926.652 Requirements for Protective Systems. Regularly inspect trenches for changing conditions.
- \* Provide ramps or ladders to trenches to allow safe access and egress, maximum 25 foot lateral travel to a ladder.
- \* Provide an adequate barrier around open excavations. Material from excavation must be placed away from edge to prevent cave ins and instability of pit.
- \* To prevent overexertion, limit manual lifting and emphasize mechanical means where practical.



Acids             Bases             Solvents  
 Containers (buckets, wading pools)  
 Hoses

c. Segregation, Decontamination and Disposal:

Level C - Segregated equipment drop, boot cover and glove wash, boot cover and glove rinse, tape removal, boot cover removal, outer glove removal, safety boot removal, splash suit removal, facepiece removal, inner glove removal, inner clothing removal, field wash, redress.

Level D - Segregated equipment drop, boot and glove wash, boot and glove rinse.

d. Decontamination Procedure Modification

The Site Health and Safety Officer will determine needs and methods for modification to decontamination procedures if necessary.

e. Site Entry Procedures:

Check with SHSO, observe speed limits, and wear appropriate PPE at all times on-site.

9. Work Limitations:                      Daylight hours only.

10. Site Waste Disposal:

\* Disposable PPE (Tyveks, gloves, respirator cartridge): On site rolloff boxes/waste drums.

\* Solid Waste (soda cans, paper, packing materials): On site rolloff boxes/waste drums.

G. **EMERGENCY INFORMATION**

1.

Contact	Name	Phone Number
Ambulance		911
Hospital Emergency Care	Parma Hospital	
	7007 Powers Blvd. Parma, Ohio 44129	440-743-3000
Fire		911
Police		911
<b>Non Site Specific Phone Numbers</b>		
Poison Control Center		800-632-2727
CHEMTREC		800-424-9300
TSCA Hotline		202-554-1404
Center for Disease Control		404-454-4100 (24 Hrs.) or 404-329-2888
National Response Center		800-424-8802
Pesticide Information Center		800-845-7633
EPA ERT Emergency		201-321-6660
RCRA Hotline		800-424-9346
Bureau of Explosive		202-835-9500
US EPA, Region V		312-353-2318 (24 Hrs.)
State Environmental Agency	Bureau of Underground Storage Tank Regulation (BUSTR)	614-752-7938

2. Notification and Verification:

Directions to Hospitals --

From the Nike CL-59 site, go east on Pleasant Valley Road about 1½ miles to Ridge Road. Go north (or left) onto Ridge Road. Go approximately 1 mile to Powers Blvd. Turn right onto Powers Blvd. to hospital. Hospital is located across the street from the Parma Towne Shopping Center.

Figure 4 provides a map showing the hospital location in relation to the site.

Present Status and Capability of Emergency Response Teams:

  X             Able to respond to site emergencies.  
                 Unable to respond to site emergencies.

3. **EMERGENCY RESPONSE/CONTINGENCY PLAN:**

Line of Authority:

The Site Health and Safety Officer (SHSO) will assume command and direct emergency operations until such time a more senior person actively assumes command, in which case the SHSO will advise and assist in direction of operations. Civil authorities responding to an emergency assume command of operations, and will have pre-arranged methods of determining the line of authority.

# HOSPITAL LOCATION

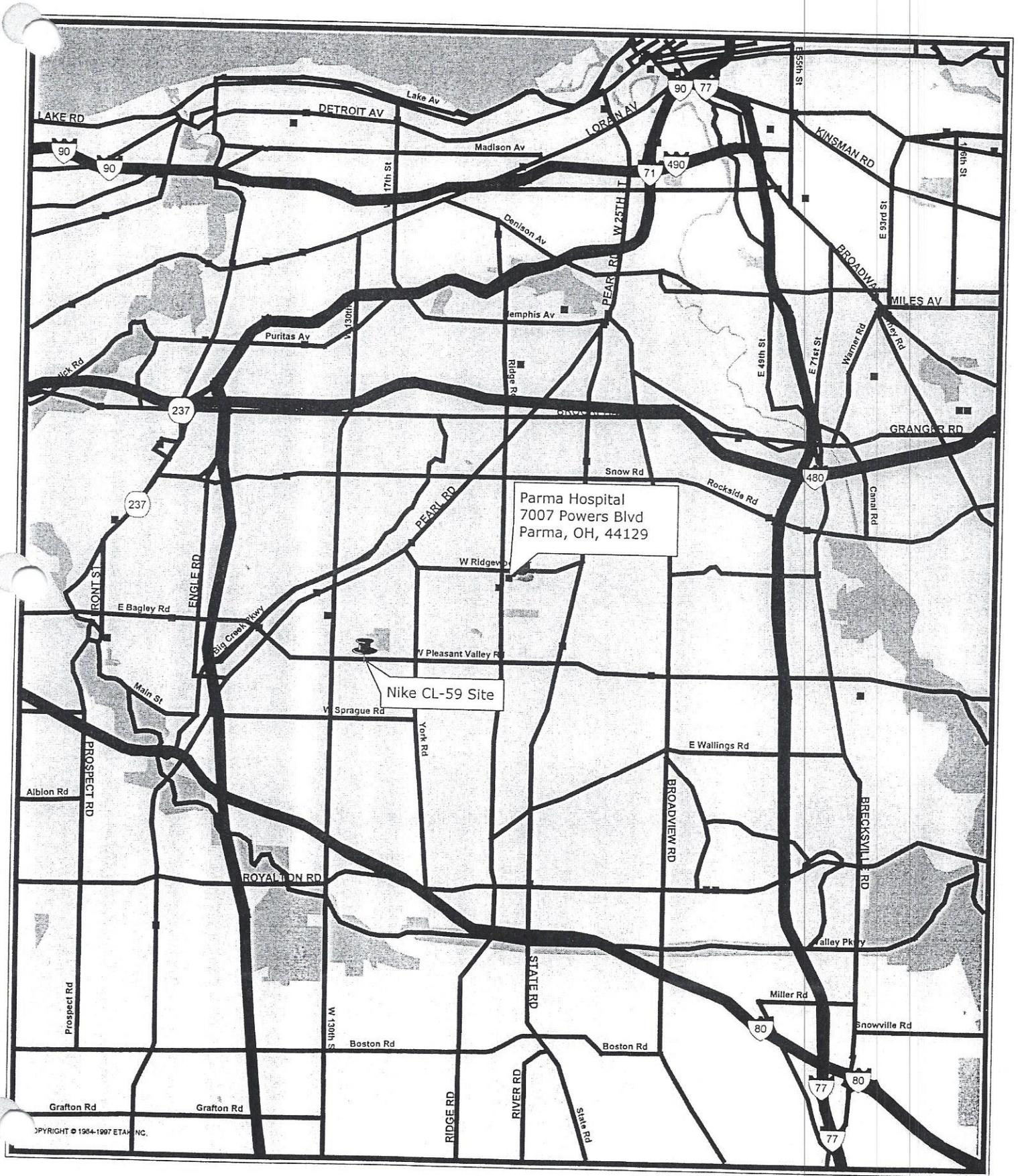


Figure 4

a. Injury/Exposure:

In the event of an injury, the victim should be stabilized and provided on-site first aid in the "clean zone". If an injury involves a potential trauma to the spinal cord, the victim shall remain where injured, if safely possible, and be moved by trained emergency medical technicians only. Minor injuries such as small lacerations, cuts and strains shall be initially treated on-site by the first aid qualified member of the field team. Ambulance and hospital support shall be provided for all major injuries such as head wounds, broken bones, and deep lacerations. Should an injury involve a contaminant exposure, and there is no potential spinal cord trauma, perform the following procedures:

- Escort victim to the decontamination area
- Remove all contaminated clothing
- Wash exposed body areas with a potable water flush (10 minutes)
- Cover with blanket or (if injury is not serious) dress victim in clean clothing
- Transport victim (with the extra copy of the H&S Plan) to hospital, if necessary.

Complete the attached USACE-Accident Investigation Report (AIR) Form 3394 and the OSHA 200 Form. Both of these forms and instructions for completion are contained in Appendix F. The forms shall be filled out completely and accurately in accordance to the required information on each form.

b. Release - Spill Containment:

Equipment will be fueled by means of a tank truck, in order to minimize the possibility of a release from a storage tank, and essentially eliminate the possibility of an unattended release. In the event a release occurs during the site activities, attempt to control, divert, absorb, or secure the source. Contact or inhalation hazards of gasoline will not be prevented by personnel wearing personal protective equipment. All hazardous material release incidents shall be reported to the appropriate Ohio State Fire Marshal office. The following information should be provided during a notification:

- \* Chemical/oil name or DOT I.D. number
- \* Chemical/oil hazard class
- \* Cause of release
- \* Quantity concentration of release

The Hazardous Materials Exposure Report should be filled out and submitted to the USEPA. A copy of this report form is attached in Appendix G.

c. Fire/Explosion:

In the event of a fire, attempt to extinguish it with a Class ABC fire extinguisher if safe to do so. If the fire appears to be growing "out of control", perform the following steps as applicable:

- \* Pull site horn/warning alarm or otherwise give alarm.
- \* Notify Fire Department
- \* Evacuate field team to the site entrance (relocate this assembly point if necessary)
- \* Verify all present
- \* Remove vehicles if safely possible
- \* Remove flammable field solvents if safely possible
- \* Await fire fighting forces
- \* Contact the Project Manager once the Fire Department is in control of the situation

d. Emergency Evacuation Routes:

Proceed by a safe route away from the immediate hazard.

e. Emergency Alerting Procedures:

Report to the SHSO immediately. The SHSO will alert job site personnel using one or more of the following methods. Constant blast with air horn, constant blow of car horn, or verbal instructions via two-way radio provided on-site.

Fire Extinguishers: Located on equipment.

Eyewash/Shower Station: AmTech will have a portable eyewash system at the sites.

Alarm Systems: Buddy system, air horn, word of mouth, two-way radios cell phones.

Emergency Phone: A cellular phone will be with the Site Manager. Emergency numbers will be in field vehicle and with the Site Manager with cellular phone.

First Aid Kits/Equipment: In field vehicle.

## H. HEALTH AND SAFETY PLAN REVIEW/APPROVAL

This HSP has been written for the exclusive use of AmTech Engineering employees, subcontractor personnel and visitors involved with this project. The HSP is written for the specified site conditions, dates, and personnel. The Plan must be amended if these conditions change. Preparation of this plan includes an assessment of personal protective equipment needs for all tasks at the site and appropriate equipment to fill those needs. This Plan communicates those selections to the employees who will work on-site.

### PLAN REVIEWED BY:

\_\_\_\_\_  
Certified Industrial Hygienist  
Mr. Tom Okuszki

\_\_\_\_\_  
Date

\_\_\_\_\_  
AmTech Program Manager  
Mr. Nadeem Siddiki

\_\_\_\_\_  
Date





## K. HEALTH & SAFETY LOG BOOK

The Site Health & Safety Officer will log general Site Health and Safety Information and will document subcontract personnel working on-site and other site visitors. At a minimum, the following information will be included on a daily basis:

- Date and time of observations
- Weather conditions
- Personnel on-site (w/company title)
- Topics of Daily Health and Safety Meetings and Attendees
- Work activity conducted
- Level(s) of protection
- Any health & safety-related issues or situations.

## L. HEALTH & SAFETY LOG SHEETS

The Site Health & Safety Officer, or designated person, will log general site Health and Safety information and will document personnel working on-site and other site visitors. At a minimum, the following information will be included on a daily basis:

- Date and time of observations
- Weather conditions
- Personnel on-site (w/company title)
- Topics of Daily Health and Safety Meetings and Attendees
- Work activity conducted
- Level(s) of protection
- Any health & safety-related issues or situations.

TABLES

TABLE 1

HAZARDOUS MATERIALS SUMMARY

The following Table summarizes relevant data about the hazardous materials potentially present at the site.

CHEMICAL	OSHA PEL	FLASH POINT	LEL	UEL	HEALTH HAZARD
Benzene	1.0 ppm TWA 5.0 ppm STEL	12°F	1.3%	7.1%	Carcinogen cumulative bone marrow damage
Toluene	200 ppm TWA 300 ppm Ceiling	40° F	1.3%	7.1%	Moderate irritation, eye, nose, throat
Ethylbenzene	100 ppm	59° F	1.0%	6.7%	Moderate irritation, eye, nose, throat
Xylene	100 ppm	81° F	1.0%	7.0%	Moderate irritation, eye, nose, throat

PEL: Permissible Exposure Limit  
LEL: Lower Exposure Limit  
UEL: Upper Exposure Limit

APPENDIX A

WRITTEN HAZARD COMMUNICATION PROGRAM  
AND  
MATERIAL SAFETY DATA SHEETS

## WRITTEN HAZARD COMMUNICATION PROGRAM

AmTech Engineering will in general rely on the health and safety information provided by the manufacturer or importer of a material. A Material Safety Data Sheet (MSDS) will be obtained whenever a substance is purchased that meets the OSHA definition of a Hazardous Chemical. In event of difficulty or inconvenience, a MSDS for a substance or mixture from another source is acceptable when it is determined to apply by an industrial hygienist or similarly qualified person. A copy of the MSDS will be provided to the Site Health and Safety Officer for the official site files.

Container Labeling: When a hazardous chemical is transferred from its original container to another container for use, a label must be provided to identify the content of the container and to provide an appropriate hazard warning. "HMIS" labels or equivalent may be used. The warning label should be affixed in a way that does not interfere with any other printed material or other information on the container. It must not obscure any other warning that is still appropriate. The U.S. Department of Transportation warning labels (used in transportation) must not be removed or partially or totally obliterated until the hazardous material and its hazards are no longer present in the empty packaging.

Material Safety Data Sheets: Each location shall develop a file of material safety data sheets for all chemicals present in work areas at that location, maintained by the Site Health and Safety Officer. Employees may view these files.

Training: Training will be provided when an employee is assigned to a work area, covering those hazards that are present in that work area, and also provided when a new hazard is introduced into the work area. Training at the time of assignment (hiring) includes the requirements of the OSHA Hazard Communication Standard, operations where exposure is possible, explanation of the hazard warnings and MSDSs, location of the written hazard communication program, the chemical inventory, methods and observations that may detect presence or release of hazardous chemicals, and measures employees can take to protect themselves from these hazards.

Non-Routine Tasks: The hazards of any non-routine tasks will be discussed with the affected workers (including the employees of subcontractors or other contractors whose work brings them into contact with the activity or chemical) by the worksite supervisor.

\* \* \* \* \*  
\* T R A D E N A M E S \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \*

\*\*\* IDENTIFICATION \*\*\*

RECORD NUMBER 155398  
LANGUAGE ENGLISH  
TRADE NAME(S) GASOLINE REGULAR UNLEADED  
PRODUCT IDENTIFICATION DATA PRODUCT CODE: C00000107301  
DATE OF MSDS 1988-10-07

\*\*\* MANUFACTURER INFORMATION \*\*\*

MANUFACTURER Sunoco Incorporated  
ADDRESS 36 York Mills Road  
North York Ontario  
Canada M5P 2C5  
Telephone: 519-337-2301  
EMERGENCY TELEPHONE NO.(S) 519-337-2301 (24 hours) Brenda Anderson

Gasoline, unleaded -- Page 2

\*\*\* MATERIAL SAFETY DATA \*\*\*

\*\*\* SECTION 1 - IDENTIFICATION \*\*\*

PRODUCT NAME - GASOLINE REGULAR UNLEADED M.S.D.S DATE: 10/07/88  
UN/NA NUMBER: UN1203  
SYNONYMS.....: UNLEADED REGULAR GASOLINE  
CAS REGISTRY NO:  
CAS NAME.....: NO CLASSIFICATION - MIXTURE  
CHEMICAL-FAMILY: A BLENDED MOTOR FUEL  
INFORMATION:  
SUPPLIER...: BRENDA ANDERSON  
PHONE.....: 519-337-2301

\*\*\* SECTION 2 - INGREDIENTS \*\*\*

LIGHT PETROLEUM DISTILLATE CONTAINING MANGANESE ANTIKNOCK ADDITIVE (18 MG/L MN), BENZENE 0.1-2% USE AS A MOTOR FUEL ONLY. DO NOT USE FOR ANY OTHER PURPOSE. WHMIS CLASSIFICATION: CLASS B DIV 2; CLASS D DIV 2A MIST FOR AN EIGHT HOUR WORKDAY SHOULD NOT EXCEED ONE MILLIGRAM OIL MIST PER CUBIC METER OF AIR."HAZARDOUS WHEN EMPTY"(PICTORIAL DRUM LABEL).

\*\*\* SECTION 3 - PHYSICAL DATA \*\*\*

BOILING POINT.....: 100 TO 225 (DEG. F) 38 TO 225 (DEG. C)  
MELTING POINT.....: N/A (DEG. F) (DEG. C)  
SPECIFIC GRAVITY.....: 0.74 (H2O=1)  
PACKING DENSITY.....: N/A (KG/M3)  
VAPOR PRESSURE.....: 325 - 525 (MM HG AT 20C)  
VAPOR DENSITY.....: 4 (AIR=1)  
SOLUBILITY IN WATER.: NIL (% BY VOL)  
PH INFORMATION.....: N/A AT CONC. G/L H2O  
% VOLATILES BY VOL.: 100  
EVAPORATION RATE....: RAPID&VARIES (ETHYL ETHER=1)  
OCTANOL/WATER COEFF.: N.D.  
APPEARANCE.....: COLORLESS LIQUID. G  
ODOR.....: GASOLINE ODOR  
ODOR THRESHOLD.....: 15 (EST) (PPM)

\*\*\* SECTION 4 - FIRE AND EXPLOSION DATA \*\*\*

FLASH POINT - 40 CLOSED CUP (DEG. F) -40 (DEG. C)  
AUTOIGNITION TEMP. APPROX. 750 (DEG. F) APPROX. 400 (DEG. C)

---NFPA CLASSIFICATION--- -----HAZARD RATING-----  
HEALTH - 1 0 - LEAST 3 - HIGH  
FIRE - 3 1 - SLIGHT 4 - EXTREME  
REACTIVITY 0 2 - MODERATE

SPECIFIC HAZARD

---FLAMMABLE LIMITS IN AIR---

LOWER EXPLOSIVE LIMIT (LEL) 1.5 % VOL.  
UPPER EXPLOSIVE LIMIT (UEL) 7.6 % VOL.

FIRE AND EXPLOSION HAZARDS -----

EXTREMELY FLAMMABLE LIQUID (FLASH POINT LESS THAN 20F)

EXTINGUISHING MEDIA -----

WATER FOG. CHEMICAL FOAM. DRY CHEMICAL POWDER. CARBON DIOXIDE.

SPECIAL FIRE FIGHTING INSTRUCTIONS----

WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIRE FIGHTING IN CONFINED SPACE.

\*\*\* SECTION 5 - HEALTH HAZARD INFORMATION \*\*\*

EXPOSURE LIMITS-----	SUN RECOMMENDATION		
8HR. TIME WEIGHTED PERMISSIBLE EXPOSURE	100	PPM	MG/M3
SHORT TERM EXPOSURE LIMIT: 015 MINUTES	150	PPM	MG/M3

\*\*\* ROUTES OF EXPOSURE AND EFFECTS \*\*\*

INHALATION -----

EXCESSIVE EXPOSURES MAY CAUSE IRRITATION TO EYES, NOSE, THROAT. DIZZINESS, LOSS OF BALANCE AND COORDINATION; UNCONSCIOUSNESS, COMA; RESPIRATORY FAILURE AND DEATH. MATERIAL HAS CAUSED CANCER IN ANIMAL STUDIES, THE SIGNIFICANCE TO HUMAN HEALTH IS UNDER STUDY.

SKIN -----

MODERATE IRRITATION WITH PROLONGED OR REPEATED CONTACT.

EYE -----

CONTACT WITH THE EYE MAY CAUSE TEMPORARY SMARTING.

INGESTION -----

HARMFUL OR FATAL IF SWALLOWED. PULMONARY ASPIRATION HAZARD IF SWALLOWED AND VOMITING OCCURS.

\*\*\* FIRST AID \*\*\*

INHALATION -----

MOVE PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION, OBTAIN MEDICAL ASSISTANCE.

SKIN -----

WASH WITH SOAP AND WATER UNTIL NO ODOR REMAINS. WASH CLOTHING BEFORE REUSE.

EYE -----

FLUSH WITH WATER FOR AT LEAST 15 MINUTES. IF IRRITATION PERSISTS, OBTAIN MEDICAL ASSISTANCE.

INGESTION -----

DO NOT INDUCE VOMITING] DO NOT GIVE LIQUIDS] OBTAIN MEDICAL ASSISTANCE. SMALL AMOUNTS WHICH ACCIDENTALLY ENTER MOUTH SHOULD BE RINSED OUT UNTIL TASTE OF IT IS GONE.

\*\*\* SECTION 6 - REACTIVITY DATA \*\*\*

STABILITY-----

STABLE.

INCOMPATIBLE MATERIALS-----

INCOMPATIBLE WITH STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION-----

PRODUCTS:

CARBON MONOXIDE AND ASPHYXIANTS

POLYMERIZATION-----

WILL NOT OCCUR.

\*\*\* SECTION 7 - SPECIAL PROTECTION INFORMATION \*\*\*

VENTILATION -----

USE ONLY WITH ADEQUATE VENTILATION. VENTILATE AS NEEDED TO COMPLY WITH EXPOSURE LIMIT.

\*\*\* PERSONAL PROTECTIVE EQUIPMENT \*\*\*

EYE -----

PRODUCT MINIMALLY IRRITATING TO EYES. LOCAL SAFETY POLICY DECISION.

GLOVES -----

IMPERVIOUS GLOVES RECOMMENDED WHEN PROLONGED SKIN CONTACT CANNOT BE AVOIDED.

RESPIRATOR -----  
CONCENTRATION-IN-AIR DETERMINES PROTECTION NEEDED. USE ONLY NIOSH  
CERTIFIED RESPIRATORY PROTECTION.  
OTHER -----  
NONE NORMALLY NEEDED.

\*\*\* SECTION 8 - DISPOSAL PROCEDURES \*\*\*

AQUATIC TOXICITY -----  
NOT DETERMINED.  
SPILL, LEAK OR RELEASE-----  
PREVENT IGNITION; STOP LEAK; VENTILATE AREA. WEAR RESPIRATORY  
PROTECTION FOR LARGE SPILL, LEAK OR RELEASE.  
WASTE DISPOSAL METHOD-----  
FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS.

\*\*\* SECTION 9 - SPECIAL PRECAUTIONS \*\*\*

STORAGE AND HANDLING CONDITIONS-----  
KEEP AWAY FROM HEAT, SPARKS AND FLAME. KEEP CONTAINER TIGHTLY CLOSED.  
NFPA CLASS IA STORAGE. AVOID PROLONGED BREATHING OF MIST OR VAPOR.  
NEVER SIPHON BY MOUTH.

\*\*\* SECTION 10 - ADDITIONAL PRECAUTIONS AND LABELS \*\*\*

SUN RECOMMENDS PRECAUTIONARY LABELING FOR SERVICE STATION PUMPS;  
PORTABLE CONTAINERS; AND DRUMS. ADDITIONALLY FOR DRUMS A "HAZARDOUS  
WHEN EMPTY" PICTORAL LOGO AND DOT FLAMMABLE LIQUID LABEL ARE REQUIRED.  
SPECIFICS AVAILABLE UPON REQUEST.

\* \* \* \* \*  
\* M S D S \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \* Issue : 95-2 (May, 1995) \*

\*\*\* IDENTIFICATION \*\*\*

MSDS RECORD NUMBER : 896520  
PRODUCT NAME(S) : BENZENE-FUEL COMPONENT  
PRODUCT IDENTIFICATION : PRODUCT CODE R00000006701  
DATE OF MSDS : 1993-06-10

\*\*\* MANUFACTURER INFORMATION \*\*\*

MANUFACTURER : SUN COMPANY, INC  
ADDRESS : Ten Penn Center  
1801 Market Street  
Philadelphia Pennsylvania  
U.S.A. 19103-1699  
Telephone: 215-977-6182 (Joanne Houck)  
EMERGENCY TELEPHONE NO. : 800-964-8861 (SUN COMPANY, AFTER NORMAL BUSINESS  
HOURS) 800-424-9300 (CHEMTREC, AFTER NORMAL BUSINESS  
HOURS)

\*\*\* MATERIAL SAFETY DATA \*\*\*

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

REVISION DATE: 05/10/1993  
UN NUMBER- UN1114

PRIMARY APPLICATION- CHEMICAL INTERMEDIATE

MANUFACTURER- SUN COMPANY, INC.  
TEN PENN CENTER  
1801 MARKET STREET  
PHILADELPHIA PA 19103-1699

SYNONYMS..... : BENZOL  
CAS REGISTRY NO: 71-43-2  
CAS NAME..... : BENZENE  
CHEMICAL FAMILY: AROMATIC HYDROCARBON  
INFORMATION

SUPPLIER.. JOANNE HOUCK  
PHONE.... : (215) 977-6182

EMERGENCY PHONE NUMBERS (AFTER NORMAL BUSINESS HOURS)  
SUN CO.. 1-800-964-8861  
CHEMTREC. 1-800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT/CAS NO.	LO%	HI%	OSHA		EXPOSURE GUIDELINES				UNIT	
			TWA	STEL	ACGIH	SUN/MFR		TWA		STEL
LIMITS FOR THE PRODUCT:										
			1	5	10					PPM

\* NO COMPONENTS FOR THIS PRODUCT \*

ADDITIONAL EXPOSURE LIMITS -----	GOVERNMENT REGULATION
8 HR. TIME WEIGHTED PERMISSIBLE EXPOSURE-	1.0 PPM      3.2 MG/M3
SHORT TERM EXPOSURE LIMIT .. - 15 MINUTES	5.0 PPM      16.0 MG/M3

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW -----

DANGER] EXTREMELY FLAMMABLE LIQUID & VAPOR - VAPOR MAY CAUSE FLASH FIRE.  
HARMFUL IF INHALED. HIGH VAPOR CONCENTRATIONS MAY CAUSE DIZZINESS.  
HARMFUL IF ABSORBED THROUGH SKIN. MAY CAUSE SKIN IRRITATION. CAUSES EYE  
IRRITATION. HARMFUL OR FATAL IF SWALLOWED. PULMONARY ASPIRATION  
HAZARD-CAN ENTER LUNGS AND CAUSE DAMAGE. CANCER HAZARD. CAN CAUSE SEVERE  
CHRONIC TOXICITY.

APPEARANCE-- COLORLESS LIQUID.      ODOR-- PLEASANT SWEET ODOR.

POTENTIAL HEALTH EFFECTS -----

PRIMARY ROUTES OF ENTRY- INHALATION( X ) SKIN( X ) EYE( ) INGESTION( )

INHALATION -----

LC50 IN RATS IS: 30000 MG/M3, TIME 7.0 HRS. EXCESSIVE EXPOSURES MAY CAUSE IRRITATION TO EYES, NOSE, THROAT, LUNGS; RESPIRATORY TRACT; CENTRAL NERVOUS SYSTEM (BRAIN) EFFECTS; HEADACHES, NAUSEA; SLEEP DISTURBANCES; EXCITABILITY; DIZZINESS, LOSS OF BALANCE AND COORDINATION; CONFUSION; UNCONSCIOUSNESS, COMA; RESPIRATORY FAILURE AND DEATH. REPEATED EXCESSIVE EXPOSURES MAY CAUSE BLOOD DISORDERS SUCH AS ANEMIA & LEUKEMIA. LIVER EFFECTS OR DAMAGE. KIDNEY EFFECTS OR DAMAGE. MATERIAL HAS BEEN RELATED TO CANCER IN HUMANS.

SKIN -----

SKIN ABSORPTION OF MATERIAL MAY PRODUCE SYSTEMIC TOXICITY. MAY CAUSE MILD TO MODERATE IRRITATION WITH PROLONGED OR REPEATED CONTACT. REMOVES NATURAL OILS & FATS FROM SKIN.

EYE -----

CONTACT WITH THE EYE MAY CAUSE MODERATE TO SEVERE IRRITATION.

INGESTION -----

HARMFUL OR FATAL IF SWALLOWED. MODERATELY TOXIC (LD50 0.5 TO 5 G/KG). ORAL LD50 IN RATS IS: 3.8 G/KG. PULMONARY ASPIRATION HAZARD IF SWALLOWED AND/OR VOMITING OCCURS - CAN ENTER LUNGS AND CAUSE DAMAGE.

CARCINOGEN LISTED BY-IARC (YES) NTP (YES) OSHA (YES) ACGIH (NO) OTHER (YES)

PRE-EXISTING MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE- DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, BLOOD-FORMING ORGANS, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG (E.G. ASTHMA-LIKE CONDITIONS).

=====  
4. FIRST AID MEASURES

INHALATION -----

MOVE PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION, OBTAIN MEDICAL ASSISTANCE.

SKIN -----

WASH WITH SOAP AND WATER UNTIL NO ODOR REMAINS. IF REDNESS OR SWELLING DEVELOPS, OBTAIN MEDICAL ASSISTANCE. IMMEDIATELY REMOVE SOAKED CLOTHING. WASH CLOTHING BEFORE REUSE. DESTROY CONTAMINATED SHOES.

EYE -----

FLUSH WITH WATER FOR AT LEAST 15 MINUTES. OBTAIN MEDICAL ASSISTANCE.

INGESTION -----

DO NOT INDUCE VOMITING] DO NOT GIVE LIQUIDS] OBTAIN EMERGENCY MEDICAL ATTENTION. SMALL AMOUNTS WHICH ACCIDENTALLY ENTER MOUTH SHOULD BE RINSED OUT UNTIL TASTE OF IT IS GONE.

=====  
5. FIRE FIGHTING MEASURES

FLASH POINT: 12 C.O.C. (DEG. F); MINUS 11 C.O.C. (DEG. C)  
AUTOIGNITION TEMP.: 1076 (DEG. F); 580 (DEG. C)

---FLAMMABLE LIMITS IN AIR---

LOWER EXPLOSIVE LIMIT (LEL): 1.3 % VOLUME  
UPPER EXPLOSIVE LIMIT (UEL): 7.9 % VOLUME

FIRE AND EXPLOSION HAZARDS -----

EXTREMELY FLAMMABLE LIQUID (FLASH POINT LESS THAN 20F)

EXTINGUISHING-MEDIA -----

WATER SPRAY. REGULAR FOAM. DRY CHEMICAL. CARBON DIOXIDE.

SPECIAL FIRE FIGHTING INSTRUCTIONS -----

USE WATER SPRAY. COOL TANK/ CONTAINER. WEAR SELF-CONTAINED BREATHING APPARATUS. WEAR STRUCTURAL FIREFIGHTERS PROTECTIVE CLOTHING.

NFPA/HMIS CLASSIFICATION

HEALTH - 2 / 2  
FIRE - 3 / 3  
REACTIVITY - 0 / 0  
PERSONAL PROTECTION INDEX - X

HAZARD RATING

0=LEAST            1=SLIGHT  
2=MODERATE       3=HIGH  
4=EXTREME

SPECIFIC HAZARD: FLAMMABLE LIQUID

=====

6. ACCIDENTAL RELEASE MEASURES

PREVENT IGNITION; STOP LEAK; VENTILATE AREA. CONTAIN SPILL. KEEP UPWIND OF LEAK. WEAR RESPIRATORY PROTECTION FOR LARGE SPILL, LEAK OR RELEASE. USE PERSONAL PROTECTIVE EQUIPMENT STATED IN SECTION 8. ADVISE EPA; STATE AGENCY IF REQUIRED. IN CANADA, ADVISE THE MINISTRY OF THE ENVIRONMENT, IF REQUIRED. ABSORB ON INERT MATERIAL. SHOVEL, SWEEP OR VACUUM SPILL.

=====

7. HANDLING AND STORAGE

KEEP AWAY FROM HEAT, SPARKS AND FLAME. KEEP IN COOL, DRY PLACE. KEEP CONTAINER TIGHTLY CLOSED. KEEP IN WELL VENTILATED SPACE. NFPA CLASS IB STORAGE. TRANSFER OPERATIONS MUST BE ELECTRICALLY GROUNDED TO DISSIPATE STATIC BUILDUP. AVOID PROLONGED BREATHING OF MIST OR VAPOR. AVOID CONTACT WITH THIS MATERIAL. WASH THOROUGHLY AFTER HANDLING. NEVER SIPHON BY MOUTH.

=====

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONSULT WITH A HEALTH/SAFETY PROFESSIONAL FOR SPECIFIC SELECTION.

VENTILATION -----

USE ONLY WITH ADEQUATE VENTILATION. VENTILATE AS NEEDED TO COMPLY WITH EXPOSURE LIMIT. LOCAL EXHAUST VENTILATION RECOMMENDED. EXPLOSION PROOF VENTILATION EQUIPMENT REQUIRED.

PERSONAL PROTECTIVE EQUIPMENT -----

EYE -----

SPLASH PROOF CHEMICAL GOGGLES OR FULL FACE SHIELD RECOMMENDED TO PROTECT AGAINST SPLASH OF PRODUCT.

GLOVES -----

PROTECTIVE GLOVES RECOMMENDED TO PROTECT AGAINST CONTACT WITH PRODUCT.

THE FOLLOWING GLOVE MATERIALS ARE ACCEPTABLE: NEOPRENE; NITRILE; POLYVINYL ALCOHOL; VITON;

RESPIRATOR -----

CONCENTRATION-IN-AIR DETERMINES PROTECTION NEEDED. USE ONLY NIOSH CERTIFIED RESPIRATORY PROTECTION. RESPIRATORY PROTECTION USUALLY NOT NEEDED UNLESS PRODUCT IS HEATED OR MISTED. HALF-MASK AIR PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES IS ACCEPTABLE TO 10 TIMES THE EXPOSURE LIMIT. FULL-FACE AIR PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES IS ACCEPTABLE TO 50 TIMES THE EXPOSURE LIMIT NOT TO EXCEED THE CARTRIDGE LIMIT OF 1000 PPM. PROTECTION BY AIR PURIFYING RESPIRATORS IS LIMITED. USE A POSITIVE PRESSURE-DEMAND FULL-FACE SUPPLIED AIR RESPIRATOR OR SCBA FOR EXPOSURES ABOVE 50X THE EXPOSURE LIMIT. IF EXPOSURE IS ABOVE IDLH (IMMEDIATELY DANGEROUS TO LIFE & HEALTH) OR THERE IS THE POSSIBILITY OF AN UNCONTROLLED RELEASE OR EXPOSURE LEVELS ARE UNKNOWN THEN USE A POSITIVE PRESSURE-DEMAND FULL-FACE SUPPLIED AIR RESPIRATOR WITH ESCAPE BOTTLE OR SCBA.

## OTHER -----

AVOID ALL SKIN CONTACT. IF CONTACT IS UNAVOIDABLE, WEAR CHEMICAL RESISTANT CLOTHING. THE FOLLOWING MATERIALS ARE ACCEPTABLE AS PROTECTIVE CLOTHING MATERIALS: POLYVINYL ALCOHOL (PVA); NEOPRENE; NITRILE; VITON; POLYURETHANE; SAFETY SHOWER AND EYE WASH AVAILABILITY RECOMMENDED. LAUNDRY SOILED CLOTHES. FOR NON-FIRE EMERGENCIES, POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS (SCBA) & STRUCTURAL FIREFIGHTERS' PROTECTIVE CLOTHING WILL PROVIDE LIMITED PROTECTION.

=====
   
9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT..... : 176 (DEG. F) \_\_\_\_\_ 80 (DEG. C)  
 MELTING POINT..... : 41.9 (DEG. F) \_\_\_\_\_ 5.5 (DEG. C)  
 SPECIFIC GRAVITY... : 0.87 (WATER=1)  
 PACKING DENSITY.... : N/A (KG/M3)  
 VAPOR PRESSURE..... : 75 (MM HG @ 20 DEG C)  
 VAPOR DENSITY..... : 2.7 (AIR=1)  
 SOLUBILITY IN WATER.: 0.06 (% BY VOLUME)  
 PH INFORMATION..... : N/A AT CONC. N/A G/L H2O  
 % VOLATILES BY VOL... : 100  
 EVAPORATION RATE... : 2.8 X SLOWER (ETHYL ETHER=1)  
 OCTANOL/WATER COEFF.: N.D.  
 APPEARANCE..... : COLORLESS LIQUID.  
 ODOR..... : PLEASANT SWEET ODOR.  
 ODOR THRESHOLD..... : 10 (PPM)  
 VISCOSITY..... : N.D. SUS @ N/A DEG F ... N.D. CST @ N/A DEG C  
 MOLECULAR WEIGHT... : 78.11 (G/MOLE)

=====
   
10. STABILITY AND REACTIVITY

## STABILITY -----

STABLE.

## CONDITIONS TO AVOID-

HEAT, SPARKS, AND OPEN FLAMES AND BUILD UP OF STATIC ELECTRICITY.

## INCOMPATIBLE MATERIALS -----

STRONG OXIDIZERS, ACTIVE METALS, HALOGENS, ACIDS.

## HAZARDOUS DECOMPOSITION -----

COMBUSTION WILL PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, AND IRRITATING ALDEHYDES AND KETONES.

## POLYMERIZATION -----

WILL NOT OCCUR.

=====
   
11. TOXICOLOGICAL INFORMATION

## FOR THE PRODUCT -----

## ACUTE TOXICITY

LC50 IN RATS IS: 30000 MG/M3, TIME 7.0 HRS. ORAL LD50 IN RATS IS: 3.8 G/KG.

INHALATION: VAPOR HARMFUL] OVEREXPOSURE TO HIGH CONCENTRATIONS CAN CAUSE CENTRAL NERVOUS SYSTEM (BRAIN) EFFECTS, HEADACHE, DIZZINESS, DIFFICULTY IN BREATHING, UNCONSCIOUSNESS, COMA, LIVER AND KIDNEY EFFECTS/DAMAGE, DEATH. THERE ARE REPORTS OF HEART IRREGULARITIES FROM MASSIVE EXPOSURES. IARC GROUP 1-HUMAN CANCER HAZARD. REPEATED/PROLONGED INHALATION CAN CAUSE BLOOD DISORDERS-ANEMIA TO LEUKEMIA. CHANGES IN CHROMOSOMES. FETAL EFFECTS IN ANIMAL STUDIES AT REPEATED/PROLONGED EXPOSURES. SKIN: CAN BE ABSORBED; IRRITATING. EYE: SEVERE IRRITATION POSSIBLE. ORAL: POISON] HARMFUL OR FATAL IF SWALLOWED. PULMONARY ASPIRATION HAZARD- CAN ENTER THE LUNGS AND CAUSE DAMAGE.

=====

12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY -----

LETHAL CONCENTRATIONS IN FRESH WATER: 5 PPM-6HOURS MINNOW; 20PPM-24HOURS SUNFISH; 10PPM TROUT; 31PPM BLUEGILL; 395PPM MOSQUITO FISH. SALTWATER TOXICITY: 21PPM-48 HOURS BRINE SHRIMP, 66PPM-24 HOUR BRINE SHRIMP.

=====
13. DISPOSAL CONSIDERATIONS

FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS. IN CANADA, FOLLOW FEDERAL, PROVINCIAL AND LOCAL REGULATIONS. RCRA HAZARDOUS WASTE. DO NOT FLUSH TO DRAIN/ STORM SEWER. INCINERATE UNDER CONTROLLED CONDITIONS. CONTRACT TO AUTHORIZED DISPOSAL SERVICE.

=====
14. TRANSPORTATION INFORMATION

DOT-
PROPER SHIPPING NAME- BENZENE
HAZARD CLASS- 3 (FLAMMABLE LIQUID)
IDENTIFICATION NUMBER- UN1114
LABEL REQUIRED- PG II, PLACARD; FLAMMABLE LIQUID

IMDG- PROPER SHIPPING NAME- BENZENE, CLASS 3, UN1114, PG II, FLAMMABLE LIQUI

IATA- PROPER SHIPPING NAME- BENZENE, CLASS 3, UN1114, PG II, FLAMMABLE LIQUI

=====
15. REGULATORY INFORMATION

SARA 302 THRESHOLD PLANNING QUANTITY. N/A

SARA 304 REPORTABLE QUANTITY ..... 10 POUNDS

SARA 311 CATEGORIES- IMMEDIATE (ACUTE) HEALTH EFFECTS.. Y
DELAYED (CHRONIC) HEALTH EFFECTS.. Y
FIRE HAZARD ..... Y
SUDDEN RELEASE OF PRESSURE HAZARD. N
REACTIVITY HAZARD ..... N

WHEN A PRODUCT AND/OR COMPONENT IS LISTED BELOW, THE REGULATORY LIST ON WHICH IT APPEARS IS INDICATED.

FOR THE PRODUCT - CA FL MA MN NJ PA 01 03 04 06 07 10

- 01=SARA 313 02=SARA 302/304 03=IARC CARCINOGEN
04=OSHA CARCINOGEN 05=ACGIH CARCINOGEN 06=NTP CARCINOGEN
07=CERCLA 302.4 08=WHMIS CONTROLLED PROD.
10=OTHER CARCINOGEN
PA=PENNSYLVANIA RTK NJ=NEW JERSEY RTK CA=CALIFORNIA PROP 65
MA=MASSACHUSETTS RTK MI=MICHIGAN 406 MN=MINNESOTA RTK
FL=FLORIDA RI=RHODE ISLAND IL=ILLINOIS
NY=NEW YORK WV=WEST VIRGINIA CT=CONNECTICUT
LA=LOUISIANA ME=MAINE OH=OHIO

THIS PRODUCT OR ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE U.S. TSCA INVENTORY.

=====

16. OTHER INFORMATION

DANGER: EXTREMELY FLAMMABLE. KEEP AWAY FROM HEAT, SPARKS, OR FLAME. DOT FLAMMABLE LIQUID LABEL REQUIRED. "HAZARDOUS WHEN EMPTY" DRUM LABEL REQUIRED. POISON LABEL REQUIRED. HARMFUL OR FATAL IF SWALLOWED. IF SWALLOWED, CALL A PHYSICIAN IMMEDIATELY. VAPOR HARMFUL. CANCER HAZARD--MAY CAUSE LEUKEMIA. OVEREXPOSURE MAY ALSO CREATE OTHER BLOOD DISORDERS. ANIMAL STUDIES HAVE SHOWN CANCERS OF MULTIPLE ORGANS. PROLONGED BREATHING OF 50 PPM BENZENE BY PREGNANT RATS WAS FETAL TOXIC (REDUCED BODY WEIGHT AND DELAYED SKELETAL DEVELOPMENT); HIGHER EXPOSURES PRODUCED ADDITIONAL EFFECTS ON THE OFFSPRING. ENSURE ADEQUATE VENTILATION. AVOID OVEREXPOSURE. AVOID SKIN CONTACT. PROLONGED OR REPEATED EXPOSURE TO HIGH CONCENTRATION OF BENZENE CAN RESULT IN EFFECTS TO THE LIVER AND KIDNEYS. THIS PRODUCT IS IN COMPLIANCE WITH THE INVENTORY REPORTING REGULATIONS FOR CANADA (DSL OR NDSL).

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1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

IN CASE OF EMERGENCY: Fort Saskatchewan, Alberta: (403) 998-8282  
Sarnia, Ontario: (519) 339-3711  
Verennes, Quebec: (514) 652-8941

Product: ETHYLBENZENE

Product Code: 29871

Effective Date: 10/25/94      Date Printed: 02/08/95      MSD: 000159

Dow Chemical Canada Inc.  
P.O. Box 1012, Sarnia, Ontario N7T 7K7

Prepared for use in Canada by the Product Quality, Compliance and Safety Department; Phone (519) 339-5083

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ethylbenzene, minimum      CAS# 00100-41-4      99.8%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

\*\*\*\*\*  
\*Danger: Flammable liquid and vapor. Appearance: Colorless \*  
\*liquid. Odor: Aromatic odor. \*  
\* \*  
\* EMERGENCY PHONE NUMBER 517-636-4400 / IN CANADA, SEE ABOVE \*  
\*\*\*\*\*

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight eye irritation. May cause very slight transient (temporary) corneal injury. Vapors may irritate eyes.

SKIN: Prolonged or repeated exposure may cause skin irritation, even a burn. May cause drying or flaking of skin. A single prolonged skin exposure is not likely to result in the material being absorbed through skin in harmful amounts.

INGESTION: Single dose oral toxicity is low. If aspirated (liquid enters the lung), may cause lung damage or even death due to chemical pneumonia.

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INHALATION: Excessive exposure may cause irritation to upper respiratory tract and lungs. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects. Lethargy may be a sign or symptom of excessive exposure.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive vapor concentrations are attainable and could be hazardous on single exposure. Excessive exposure may cause liver, kidney, lung and possibly blood effects. Although one early inhalation study reported an adverse effect on the testes of experimental animals, recent more comprehensive studies have not shown this to be an effect of ethylbenzene.

CANCER INFORMATION: Ethylbenzene did not cause cancer in long-term studies.

TERATOLOGY (BIRTH DEFECTS): Has caused birth defects in laboratory animals. Has been toxic to the fetus in laboratory animals at doses nontoxic to the mother.

REPRODUCTIVE EFFECTS: Available data are inadequate to determine effects on reproduction.

4. FIRST AID

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: The decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient. Excessive exposure may aggravate

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preexisting liver and kidney disease.

ANTIDOTES: No specific antidote.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 70F; 21C  
METHOD USED: TCC

FLAMMABILITY LIMITS

LFL: 1.0%  
UFL: 6.7%

FIRE FIGHTING INSTRUCTIONS: Keep vapors away from possible ignition sources. Vapors are heavier than air; be aware of their collecting in low areas. Do not extinguish fire but eliminate supply if possible.

EXTINGUISHING MEDIA: Water fog, foam (considered most effective), Carbon dioxide, dry chemical.

PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS: Use positive-pressure, self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

CLEANUP: If ambient temperature is above flash point, cover with foam until it can be cleaned up with vacuum truck and/or absorbent.

7. HANDLING AND STORAGE

HANDLING: Transfer in properly grounded equipment to avoid static charge.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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EXPOSURE GUIDELINE(S): Ethylbenzene: ACGIH TLV and OSHA PEL are 100 ppm TWA; 125 ppm STEL. PELs are in accord with those recommended by OSHA in the 1989 revision of PELs.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause discomfort, even though it is unlikely to cause injury.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. Use impervious gloves when prolonged or repeated contact could occur.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless liquid.

ODOR: Aromatic.

VAPOR PRESSURE: 7.1 mmHg @ 20C

VAPOR DENSITY: 3.66

BOILING POINT: 277F

SOLUBILITY IN WATER: 0.015% @ 25C

SPECIFIC GRAVITY: 0.864 @ 25/25C

10. STABILITY AND REACTIVITY

(CONTINUED ON PAGE 5)

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CONDITIONS TO AVOID: Material can be ignited under almost all normal temperature conditions. Keep away from possible ignition sources such as flames and spark-producing equipment.

INCOMPATIBILITY WITH OTHER MATERIALS: Oxidizing material e.g. perchlorates, calcium hypochlorites, etc.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

ACUTE

SKIN: The LD50 for skin absorption in rabbits is 15,400 mg/kg.

INGESTION: The oral LD50 for rats is 3,500 mg/kg.

MUTAGENICITY: Results of in vitro ('test tube') mutagenicity tests have been negative. Results of mutagenicity tests in animals have been negative.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT AND PARTITIONING: Bioconcentration potential is low (BCF less than 100 or Log Kow less than 3). Log octanol/water partition coefficient (log Kow) is 3.15. Bioconcentration factor (BCF) is 15 in goldfish. Potential for mobility in soil is medium (Koc between 150 and 500). Log soil organic carbon partition coefficient (log Koc) is 2.21. Henry's Law Constant (H) is 0.27 atm.m<sup>3</sup>/mol.

DEGRADATION & TRANSFORMATION: Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD greater than 40%). 20-Day biochemical oxygen demand (BOD20) is 1.27 p/p. 10-Day biochemical oxygen demand (BOD10) is 1.19 p/p. 5-Day biochemical demand (BOD5) is 0.92 p/p. Theoretical oxygen demand (ThOD) is calculated to be 3.17 p/p.

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Degradation is expected in the atmospheric environment within days to weeks.

ECOTOXICITY: Material is practically non-toxic to aquatic organisms on an acute basis (LC50 greater than 100 mg/L in most sensitive species). Acute LC50 for striped bass (*Morone saxatilis*) is 0.43 mg/L. Acute LC50 for bay shrimp (*Crangon nigricauda*) is 3.7 mg/L. Acute LC50 for rainbow trout (*Oncorhynchus mykiss*) is 14 mg/L. Acute LC50 for bluegill (*Lepomis macrochirus*) is 32-285 mg/L. Acute LC50 for fathead minnow (*Pimephales promelas*) is 43.6-48.5 mg/L. Acute LC50 for sheepshead minnow (*Cyprinodon variegatus*) is 49-275 mg/L. Acute LC50 for water flea (*Daphnia magna*) is 75 mg/L. Acute LC50 for mysid (*Mysidopsis bahia*) is 87.6 mg/L. Acute LC50 for guppy (*Poecilia reticulata*) is 97.1 mg/L. Acute LC50 for goldfish (*Carassius auratus*) is 94.4 mg/L. Acute LC50 for channel catfish (*Ictalurus punctatus*) is 210 mg/L. Maximum acceptable toxicant concentration (MATC) is >0.44 mg/L in fathead minnow. Growth inhibition threshold in bacteria is 12 mg/L. Growth inhibition EC50 for green alga (*Selenastrum capricornutum*) is 14 mg/L (sealed test vessels).

### 13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: Any disposal practice must be in compliance with all federal, state/provincial, and local laws and regulations. State/provincial and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Regulations may also vary in different locations. Chemical additions, processing, storage, or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate, or otherwise inappropriate. Waste characterization and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. None of these waste management options should be considered 'arranging for disposal'.

Do not allow into any sewers, on the ground, or into any body of water. The preferred waste management option is to: send to a properly licensed or permitted recycler, reclaimer, or incinerator.

### 14. TRANSPORT INFORMATION

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For DOT/TDG regulatory information, if required, consult transportation regulations, product shipping papers, or your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

CANADIAN REGULATIONS

=====

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

- B2 - flammable liquid with a flash point less than 37.8C
- D2A - material is teratogenic, embryotoxic, or fetotoxic
- D2A - possible, probable or known human carcinogen according to classifications by IARC or ACGIH
- D2B - eye or skin irritant

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

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REGULATORY INFORMATION: (CONTINUED)

COMPONENTS:	CAS #	AMOUNT (%w/w)
Ethylbenzene	CAS# 100-41-4	99.8%

U.S. REGULATIONS  
=====

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
ETHYL BENZENE	000100-41-4	99.8 %

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An immediate health hazard
- A delayed health hazard
- A fire hazard

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986:

This product contains a chemical(s) known to the State of California to cause cancer.

This product contains a chemical(s) known to the State of California to cause reproductive toxicity.

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## REGULATORY INFORMATION: (CONTINUED)

## TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
BENZENE	000071-43-2	PA2
ETHYL BENZENE	000100-41-4	NJ2 PA1 PA3 NJ3 NJ1

NJ1=New Jersey Special Health Hazard Substance (present at greater than or equal to 0.1%).  
 NJ2=New Jersey Environmental Hazardous Substance (present at greater than or equal to 1.0%).  
 NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).  
 PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).  
 PA2=Pennsylvania Special Hazardous Substance (present at greater than or equal to 0.01%).  
 PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

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REGULATORY INFORMATION: (CONTINUED)

-----  
OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

-----  
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	2
Flammability	3
Reactivity	0

-----  
For DOT regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

16. OTHER INFORMATION

MSDS STATUS: Revised to 16-section format.

(R) Indicates a trademark of The Dow Chemical Company  
The Information Herein Is Given In Good Faith, But No Warranty,  
Express Or Implied, Is Made. Consult The Dow Chemical Company  
For Further Information.

\* An Operating Unit Of The Dow Chemical Company

\* \* \* \* \*  
\* M S D S \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \* Issue : 95-2 (May, 1995) \*

\*\*\* IDENTIFICATION \*\*\*

MSDS RECORD NUMBER : 536542  
PRODUCT NAME(S) : TOLUENE (TOLUOL)  
DATE OF MSDS : 1988-06-29

\*\*\* MANUFACTURER INFORMATION \*\*\*

MANUFACTURER : Endura Manufacturing Co Ltd  
ADDRESS : 12425 149th Street  
Edmonton Alberta  
Canada T5L 2J6  
Telephone: 403-451-4242  
EMERGENCY TELEPHONE NO. : 403-459-4771 403-459-0980

\*\*\* MATERIAL SAFETY DATA \*\*\*

## MATERIAL SAFETY DATA SHEET

## PRODUCT AND PREPARATION INFORMATION

Date Prepared: 29 June 1988

Approved by: Art Bragg

Product Name: TOLUENE (TOLUOL)

Product Use: solvent

P.I.N.: UN 1294 3.2 (9.1) II

HAZARDOUS INGREDIENTS  
(see LEGEND below for details)

Ingredient	CAS #	TLV	%WT
Toluene	108-88-3	100 ppm	100
LD50: 5g/kg o-rat			
LC50/4h: 12 g/kg d-rbt			

LEGEND: o=oral d=dermal rbt=rabbit

## PHYSICAL DATA

Appearance: clear colorless liquid

Density: 0.87 g/mL

Boiling Point: 110 deg C

Freezing Point: -95 deg C

Vapor Density: 3.1

Vapor Pressure: 7.6 kPa @ 50 deg C

Evaporation Rate: 2.1

pH: N/A

Odor: characteristic

Odor Threshold: N/A

Coefficient of Water/Oil Distribution: N/A

## FIRE OR EXPLOSION HAZARD

Flash Point (TOC): 6 deg C

Autoignition: 896 deg F

Upper Flam. Limit, % by vol.: 6.7

Lower Flam. Limit, % by vol.: 1.3

Conditions of Flammability: Vapors from this product may travel or be moved by air currents and be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from the point of handling.

Hazardous Combustion Products: CO, CO2

Extinguishing Media: Use dry chemical, CO2, alcohol foam or water spray.

Special Fire Fighting Procedures: Respirators required for firefighting personnel. If possible to do so safely, shut off fuel to fire. Use water spray to cool fire-exposed surfaces and to protect personnel. Avoid spreading burning liquid with water spray used for cooling containers. When using water spray, boil-over may occur when the product temperature reaches the boiling point of water.

Explosion Data; Sensitivity to: Mechanical Impact - none  
Static Discharge - see above

## REACTIVITY DATA

Materials to Avoid: strong oxidizing agents. Product is otherwise stable.

HEALTH HAZARD DATA  
FIRST AID MEASURES AND TOXICOLOGICAL PROPERTIES

**Toxicology:** Effects of Overexposure: Eyes - Moderately irritating vapor. Liquid produces chemical conjunctivitis with mild transient corneal injury. Skin - Very low order of toxicity by skin absorption. However, frequent or prolonged contact may irritate the skin and cause dermatitis. Inhalation - The vapors have a low to moderate toxicity. In high concentrations the vapors are irritating and may cause headache, nausea, fatigue, weakness, euphoria, drowsiness, double vision, ataxia and coma. The irritating properties give warning as anesthetic concentrations are approached. Ingestion - Low order of subsequent vomiting may cause severe lung irritation.

**Chronic Health Hazards:** Repeated exposure to moderately high concentrations of toluene vapor may cause a toxic encephalopathy. Signs and symptoms include euphoria, hallucinations, behavioral disturbances, double vision, ataxia, convulsions and coma. Repeated exposure will produce symptoms of chronic poisoning, associated with disturbance of the central nervous system, nervous irritability, insomnia, nausea and fatigue.

**Other Health Hazards:** Studies in laboratory animals suggest that prolonged and repeated overexposure to Toluene vapors may cause hearing loss. Both the narcotic effect and the effect on the blood system are aggravated if the exposed person uses alcohol in large quantities. The reaction is further increased if the person has anemia, heart or lung disorder, or kidney or liver trouble. Persons with such conditions should not be allowed to work where they may be exposed to this solvent. Toluene is an experimental mutagen.

**First Aid:** Inhalation - Rescuers should wear respiratory protection. Remove victim immediately from contaminated area. Apply artificial respiration if breathing has stopped. If breathing is difficult, a qualified person should administer oxygen. Call a physician.

Ingestion - Give two glasses of water. Due to the possibility of aspiration into the lungs, do not induce vomiting. Keep at rest and call a physician.

Eyes - Flush with water for at least 15 minutes. Get medical attention if irritation persists.

Skin - Remove contaminated clothing and wash before reuse. Wash skin with soap and water. Seek immediate medical attention.

**Notes to Physician:** Permanent physiological disturbances have been described as a result of repeated exposure to high concentrations of toluene vapor, especially where associated with addictive sniffing of toluene or toluene-containing materials.

PREVENTATIVE MEASURES

**Personal Protective Equipment:** Personnel should wear chemical-resistant clothing and rubber or plastic (PVA) gloves and boots, safety glasses with side shields and a suitable air supplied respirator.

**Engineering Controls:** Adequate ventilation must be assured to prevent the accumulation of dangerous amounts of vapor or mist. Electrical and mechanical equipment should be explosion-proof.

**Leak or Spill Procedures:** Remove all sources of ignition. Prevent from entering sewers or water courses. Ventilate enclosed spaces or wear respiratory protection. Pump up (explosion proof equipment) or soak up with sand, cotton waste or other absorbent.

**Waste Disposal:** Dispose of waste according to local, provincial and federal regulations. Utilize authorized centres for disposal of combustible chemical material. In case of large spills warn public of downwind explosion hazard.

**Handling:** Avoid static charges and excessive heat. Keep containers tightly closed and upright when not in use. Product is a static accumulator. Transfer equipment should be properly grounded or bonded. Containers may retain hazardous residues when emptied and should be commercially cleaned before reuse.

**Storage:** Store in a cool, dry place, away from oxidizing agents and sources of ignition.

\* \* \* \* \*  
\* M S D S \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \* Issue : 95-2 (May, 1995) \*

\*\*\* IDENTIFICATION \*\*\*

MSDS RECORD NUMBER : 536543  
PRODUCT NAME(S) : XYLENE (XYLOL)  
DATE OF MSDS : 1988-06-29

\*\*\* MANUFACTURER INFORMATION \*\*\*

MANUFACTURER : Endura Manufacturing Co Ltd  
ADDRESS : 12425 149th Street  
Edmonton Alberta  
Canada T5L 2J6  
Telephone: 403-451-4242  
EMERGENCY TELEPHONE NO. : 403-459-4771 403-459-0980

\*\*\* MATERIAL SAFETY DATA \*\*\*

MATERIAL SAFETY DATA SHEET  
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## PRODUCT AND PREPARATION INFORMATION

Date Prepared: 29 June 1988  
Approved by: Art Bragg

Product Name: XYLENE (XYLOL)

Product Use: solvent

P.I.N.: UN 1307 3.3(9.2) III

HAZARDOUS INGREDIENTS  
(see LEGEND below for details)

Ingredient	CAS #	TLV	%WT
Xylene	1330-20-7	100 ppm	100
LD50: 5g/kg o-rat	14.1 g/kg d-rbt		
LC50/4h: 5000 ppm i-rat			

LEGEND: o=oral d=dermal rbt=rabbit i=inhalation

## PHYSICAL DATA

Appearance: clear colorless liquid  
 Density: 0.87 g/mL  
 Boiling Point: 137 - 143 deg C  
 Freezing Point: N/A  
 Vapor Density: 3.7  
 Vapor Pressure: 2.8 kPa @ 38 deg C  
 Evaporation Rate: 0.6  
 pH: N/A  
 Odor: characteristic  
 Odor Threshold: N/A  
 Coefficient of Water/Oil Distribution: N/A

## FIRE OR EXPLOSION HAZARD

Flash Point (TOC): 27 deg C  
 Autoignition: N/A  
 Upper Flam. Limit, % by vol.: 5.3  
 Lower Flam. Limit, % by vol.: 1.0  
 Conditions of Flammability: Vapors from this product may travel or be moved by air currents and be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from the point of handling.  
 Combustion Products: CO, CO2  
 Extinguishing Media: Use dry chemical, CO2, alcohol foam or water spray.  
 Special Fire Fighting Procedures: Respirators required for firefighting personnel. If possible to do so safely, shut off fuel to fire. Use water spray to cool fire-exposed surfaces and to protect personnel. Avoid spreading burning liquid with water spray used for cooling containers. When using water spray, boil-over may occur when the product temperature reaches the boiling point of water.  
 Explosion Data; Sensitivity to: Mechanical Impact - none  
 Static Discharge - see above

## REACTIVITY DATA

Materials to Avoid: strong oxidizing agents, strong acids or bases, amines. Product is otherwise stable.

HEALTH HAZARD DATA  
FIRST AID MEASURES AND TOXICOLOGICAL PROPERTIES

Toxicology: Effects of Overexposure: Eyes - Moderately irritating, but does not cause eye tissue damage. Skin - Very low order of toxicity by skin absorption. However, frequent or prolonged contact may irritate the skin and cause dermatitis. Inhalation - The vapors have a low to moderate toxicity. In high concentrations the vapors are irritating and may cause headache, nausea and unconsciousness. The irritating properties give warning as anesthetic concentrations are approached. However, concentrations in excess of 200 ppm may cause impaired reaction time and coordination. Ingestion - Low order of toxicity. However, minute amounts aspirated into the lungs during swallowing or subsequent vomiting may cause severe lung irritation.

Chronic Health Hazards: Liver and kidney damage in humans.  
First Aid: Inhalation - Rescuers should wear respiratory protection. Remove immediately from contaminated area. Apply artificial respiration if breathing has stopped. If breathing is difficult, administer oxygen.

Ingestion - Due to the possibility of aspiration into the lungs, do not induce vomiting. Keep at rest and call a physician.  
Eyes - Flush with water for at least 15 minutes. Get medical attention if irritation persists.

Skin - Remove contaminated clothing and wash before reuse. Wash skin with soap and water. Seek immediate medical attention.

Notes to Physician: Treatment is directed at the control of symptoms and the clinical condition. There is no specific antidote.

PREVENTATIVE MEASURES

Personal Protective Equipment: Personnel should wear chemical-resistant clothing and rubber or plastic (PVA) gloves and boots, safety glasses with side shields and a suitable air supplied respirator.

Engineering Controls: Adequate ventilation must be assured to prevent the accumulation of dangerous amounts of vapor or mist. Electrical and mechanical equipment should be explosion-proof.

Leak or Spill Procedures: Remove all sources of ignition. Prevent from entering sewers or water courses. Ventilate enclosed spaces or wear respiratory protection. Pump up (explosion proof equipment) or soak up with sand, cotton waste or other absorbent.

Waste Disposal: Dispose of waste according to local, provincial and federal regulations. Utilize authorized centres for disposal of combustible chemical material. In case of large spills warn public of downwind explosion hazard.

Handling: Avoid static charges and excessive heat. Keep containers tightly closed and upright when not in use. Product is a static accumulator. Transfer equipment should be properly grounded or bonded. Containers may retain hazardous residues when emptied and should be commercially cleaned before reuse.

Storage: Store in a cool, dry place, away from oxidizing agents and sources of ignition.

Shipping Information: Assure that the appropriate T.D.G. regulations are followed.

APPENDIX B

**CERTIFICATE OF NON-EXPOSED  
WORKER/VISITOR ACKNOWLEDGMENT**

**CERTIFICATE OF NON-EXPOSED  
WORKER/VISITOR ACKNOWLEDGMENT**

Project Name: \_\_\_\_\_ Contract No. \_\_\_\_\_

Site Address: \_\_\_\_\_  
\_\_\_\_\_

Contractor's Name: \_\_\_\_\_

Employee/Visitor's Name: \_\_\_\_\_

Procedures for the above project require the following: that you should be provided with and complete site-specific orientation; that you be equipped with proper personal protective equipment for the work or other activity you are involved in on-site; that your work or other activity on-site does **NOT** involve entry into any construction zone on-site (where exposure to site contaminants is considered possible); that you be instructed (by your employer or others) in the use of any personal protective equipment appropriate for your work or other activity on-site. If your work involves exposures to site contaminants and entry into any exclusion zone, you must demonstrate compliance with OSHA training and medical monitoring regulations set forth in the Code of Federal Regulations, Title 29, Part 1910.120 and this acknowledgment form is not appropriate for your purposes. By signing this certification, you are acknowledging that your employer has met these obligations to you.

**I HAVE READ, BELIEVE I UNDERSTAND, AND AGREE TO FOLLOW THE SITE HEALTH AND SAFETY PLAN.**

Employee/Visitor's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Social Security Number: \_\_\_\_\_

Site Health and Safety Officer Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Site Activities: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

APPENDIX C

HEAT STRESS

## HEAT STRESS

Construction personnel may be exposed to stressful climatic conditions at the Schilling S-5 site that may interfere with their physiological ability to regulate the basal body temperature. Heat illness is a physiological disorder that can occur in cold environments as well as in hot. Classification of different types of heat illnesses, clinical features, treatment and preventative measures to reduce the chances of heat illnesses are shown in the Table on the following page. The table is taken from a book entitled The Industrial Environment - It's Evaluation and Control, published by the National Institute For Occupational Safety and Health.

Classification, Medical Aspects, and Prevention of Heat Illness

Category	Clinical Features	Predisposing Factors	Underlying Physiological Disturbance	Treatment	Prevention
1. Temperature Regulation <i>Heat Stroke and Heat Hyperemia</i>	Heat Stroke: 1) <i>Hot Dry Skin</i> : red, mottled or cyanotic. 2) <i>High and rising</i> $T_c$ , 40.5°C and over. 3) <i>Brain disorders</i> : mental confusion, loss of consciousness, convulsions, coma as $T_c$ continues to rise. Fatal if treatment delayed. Heat Hyperpyrexia: milder form. $T_c$ lower, less severe brain disorders, some sweating.	1) Sustained exertion in heat by unacclimatized workers. 2) Lack of physical fitness and obesity. 3) Recent alcohol intake. 4) Dehydration. 5) Individual susceptibility. 6) Chronic cardiovascular disease in the elderly.	<i>Heat Stroke</i> : Failure of the central drive for sweating (cause unknown) leading to loss of evaporative cooling and an uncontrolled accelerating rise in $T_c$ . <i>Heat Hyperpyrexia</i> : partial rather than complete failure of sweating.	<i>Heat Stroke</i> : Immediate and rapid cooling by immersion in chilled water with massage or by rapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. <i>Heat Hyperemia</i> : Less drastic cooling required if sweating still present and $T_c < 40.5^\circ$ .	Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8-14 days by graded work and heat exposure. Monitoring workers during sustained work severe heat.
2. Circulatory Hypostasis <i>Heat Syncope</i>	Fainting while standing erect and immobile in heat.	Lack of acclimatization.	Pooling of blood in dilated vessels of the skin and lower parts of the body.	Remove to cooler area. Recovery prompt and complete.	Acclimatization. Intermittent activity to assist venous return to heart.
3. Salt and/or Water Depletion <i>a) Heat Exhaustion</i>	1) Fatigue, nausea, headache, giddiness. 2) Skin clammy and moist. Complexion pale, muddy or hectic flush. 3) May faint on standing with rapid thready pulse and low blood pressure. 4) Oral temperature normal or low but rectal temperature usually elevated (37.5-38.5°C). <i>Water restriction type</i> : Urine volume small, highly concentrated. <i>Salt restriction type</i> : Urine less concentrated, chlorides less than 3 g/l.	1) Sustained exertion in heat. 2) Lack of acclimatization. 3) Failure to replace water and/or salt lost in sweat.	1) Dehydration from deficiency of water and/or salt intake. 2) Depletion of circulating blood volume. 3) Circulatory strain from competing demands for blood flow to skin and to active muscles.	Remove to cooler environment. Administer salted fluids by mouth or give I-V infusions of normal saline (0.9%) if unconscious or vomiting. Keep at rest until urine volume and salt content indicate that salt and water balances have been restored.	Acclimatize workers using a breaking-in schedule for 1 or 2 weeks supplement dietary salt only during acclimatization. Ample drinking water to be available at all times and to be taken frequently during work days.
<i>b) Heat Cramps</i>	Painful spasms of muscles used during work (arms, legs, or abdominal). Onset during or after work hours.	1) Heavy sweating during hot work. 2) Drinking large volumes of water without replacing salt loss.	Loss of body salt in sweat. Water intake dilutes electrolytes. Water enters muscles, causing spasms.	Salted liquids by mouth, or more prompt relief by I-V infusion.	Adequate salt intake with meals. In unacclimatized men, provide salted (0.1%) drinking water.
4. Skin Eruptions <i>a) Heat Rash (miliaria rubra; "prickly heat")</i>	Profuse tiny mixed red vesicles (blister-like) on affected areas. Pricking sensations during heat exposure.	Unrelieved exposure to humid heat with skin continuously wet with unevaporated sweat.	Plugging of sweat gland ducts with retention of sweat and inflammatory reaction.	Mild drying lotions. Skin cleanliness to prevent infection.	Cooled sleeping quarters to allow skin to dry between heat exposures.
<i>b) Anhidrotic Heat Exhaustion (miliaria profunda)</i>	Extensive areas of skin which do not sweat on heat exposure, but present goose flesh appearance, which subsides with cool environments. Associated with incapacitation in heat.	Weeks or months of constant exposure to climatic heat with previous history of extensive heat rash and sunburn. Rarely seen except in troops in wartime.	Skin trauma (heat rash; sunburn) causes sweat retention deep in skin. Reduced evaporative cooling causes heat intolerance.	No effective treatment available for anhidrotic areas of skin. Recovery of sweating occurs gradually on return to cooler climate.	Treat heat rash and avoid further skin trauma by sunburn. Periodic relief from sustained heat.
5. Behavioral Disorders <i>a) Heat Fatigue - Transient</i>	Impaired performance of skilled sensorimotor, mental, or vigilance tasks, in heat.	Performance decrement greater in unacclimatized, and unskilled men.	Discomfort and physiological strain.	Not indicated unless accompanied by other heat illness.	Acclimatization and training for work in the heat.
<i>b) Heat Fatigue Chronic</i>	Reduced performance capacity. Lowering of self-imposed standards of social behavior (e.g., alcoholic overindulgence). Inability to concentrate, etc.	Workers at risk come from homes in temperate climates, for long residence in tropical latitudes.	Psychosocial stresses probably as important as heat stress. May involve hormonal imbalance, but no positive evidence.	Medical treatment for serious cases. Speedy relief of symptoms on returning home.	Orientation on life abroad (customs, climate, living conditions, etc.)

APPENDIX D

OSHA 200 FORM  
AND  
USACE ACCIDENT INVESTIGATION REPORT (FORM 3394)

**1. ACCIDENT CLASSIFICATION**

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
<input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY <input type="checkbox"/> CONTRACTOR <input type="checkbox"/> PUBLIC	<input type="checkbox"/> <input type="checkbox"/> FATAL <input type="checkbox"/> OTHER	<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER <input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

**2. PERSONAL DATA**

a. NAME (Last,First,MI) \_\_\_\_\_ b. AGE \_\_\_\_\_ c. SEX  MALE  FEMALE d. SOCIAL SECURITY NUMBER \_\_\_\_\_ e. GRADE \_\_\_\_\_

f. JOB SERIES/TITLE \_\_\_\_\_ g. DUTY STATUS AT TIME OF ACCIDENT  ON DUTY  TDY  OFF DUTY h. EMPLOYMENT STATUS AT TIME OF ACCIDENT  ARMY ACTIVE  ARMY RESERVE  VOLUNTEER  PERMANENT  FOREIGN NATIONAL  SEASONAL  TEMPORARY  STUDENT  OTHER (Specify) \_\_\_\_\_

**3. GENERAL INFORMATION**

a. DATE OF ACCIDENT (month/day/year) \_\_\_\_/\_\_\_\_/\_\_\_\_ b. TIME OF ACCIDENT (Military time) \_\_\_\_\_ c. EXACT LOCATION OF ACCIDENT \_\_\_\_\_ d. CONTRACTOR'S NAME (1) PRIME: \_\_\_\_\_ (2) SUBCONTRACTOR: \_\_\_\_\_

e. CONTRACT NUMBER \_\_\_\_\_ f. TYPE OF CONTRACT  CONSTRUCTION  SERVICE  A/E  DREDGE  OTHER (Specify) \_\_\_\_\_ g. HAZARDOUS/TOXIC WASTE ACTIVITY  SUPERFUND  DERP  IRP  OTHER (Specify) \_\_\_\_\_

**4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see instructions)**

a. CONSTRUCTION ACTIVITY \_\_\_\_\_ (CODE) # \_\_\_\_\_ b. TYPE OF CONSTRUCTION EQUIPMENT \_\_\_\_\_ (CODE) # \_\_\_\_\_

**5. INJURY / ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f & g - see instructions)**

a. SEVERITY OF ILLNESS / INJURY \_\_\_\_\_ (CODE) # \_\_\_\_\_ b. ESTIMATED DAYS LOST \_\_\_\_\_ c. ESTIMATED DAYS HOSPITALIZED \_\_\_\_\_ d. ESTIMATED DAYS RESTRICTED DUTY \_\_\_\_\_

e. BODY PART AFFECTED PRIMARY \_\_\_\_\_ (CODE) # \_\_\_\_\_ SECONDARY \_\_\_\_\_ (CODE) # \_\_\_\_\_ f. NATURE OF ILLNESS / INJURY \_\_\_\_\_ (CODE) # \_\_\_\_\_ g. TYPE AND SOURCE OF INJURY/ILLNESS TYPE \_\_\_\_\_ (CODE) # \_\_\_\_\_ SOURCE \_\_\_\_\_ (CODE) # \_\_\_\_\_

**6. PUBLIC FATALITY (Fill in line and corresponding code number in box - see instructions)**

a. ACTIVITY AT TIME OF ACCIDENT \_\_\_\_\_ (CODE) # \_\_\_\_\_ b. PERSONAL FLOATATION DEVICE USED?  YES  NO  N/A

**7. MOTOR VEHICLE ACCIDENT**

a. TYPE OF VEHICLE  PICKUP/VAN  AUTOMOBILE  TRUCK  OTHER (Specify) \_\_\_\_\_ b. TYPE OF COLLISION  SIDE SWIPE  HEAD ON  REAR END  BROADSIDE  ROLL OVER  BACKING  OTHER (Specify) \_\_\_\_\_ c. SEAT BELTS USED NOT USED NOT AVAILABLE (1) FRONT SEAT \_\_\_\_\_ (2) REAR SEAT \_\_\_\_\_

**8. PROPERTY/MATERIAL INVOLVED**

a. NAME OF ITEM	b. OWNERSHIP	c. \$ AMOUNT OF DAMAGE
(1) _____	_____	_____
(2) _____	_____	_____
(3) _____	_____	_____

**9. VESSEL / FLOATING PLANT ACCIDENT (Fill in line and corresponding code number in box from list - see instructions)**

a. TYPE OF VESSEL/FLOATING PLANT \_\_\_\_\_ (CODE) # \_\_\_\_\_ b. TYPE OF COLLISION/MISHAP \_\_\_\_\_ (CODE) # \_\_\_\_\_

**10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)**

\_\_\_\_\_

11 CAUSAL FACTOR(S) (Read Instruction Before Completing)

<p>a (Explain YES answers in item 13)</p> <p>DESIGN: Was design of facility, workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>INSPECTION/MAINTENANCE: Were inspection &amp; maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OPERATING PROCEDURES: Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>a. (CONTINUED)</p> <p>CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?</p> <p><input type="checkbox"/> YES (If yes, attach a copy.) <input type="checkbox"/> NO</p>
--	---

12. TRAINING

<p>a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. TYPE OF TRAINING.</p> <p><input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB</p>	<p>c. DATE OF MOST RECENT FORMAL TRAINING.</p> <p>____ / ____ / ____ (Month) (Day) (Year)</p>
--	---	---

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes) (Use additional paper, if necessary)

a. DIRECT CAUSE

b. INDIRECT CAUSE(S)

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.

<p>a. BEGINNING (Month/Day/Year) ____ / ____ / ____</p>	<p>b. ANTICIPATED COMPLETION (Month/Day/Year) ____ / ____ / ____</p>		
<p>c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT</p> <p>CORPS _____</p> <p>CONTRACTOR _____</p>	<p>d. DATE (Mo/Da/Yr) ____ / ____ / ____</p>	<p>e. ORGANIZATION IDENTIFIER (Div, Br, Sect)</p>	<p>f. OFFICE SYMBOL</p>

16. MANAGEMENT REVIEW (1st).

a.  CONCUR b.  NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE
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17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)

a.  CONCUR b.  NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE
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18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a.  CONCUR b.  NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS.

SIGNATURE	TITLE	DATE
-----------	-------	------

19. COMMAND APPROVAL

COMMENTS

COMMANDER SIGNATURE	DATE
---------------------	------

**GENERAL.** Complete a separate report for each person who was injured, caused, or contributed to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

**INSTRUCTIONS FOR SECTION 1 – ACCIDENT CLASSIFICATION.** (Mark All Boxes That Are Applicable.)

- a. **GOVERNMENT.** Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.
  - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.
  - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to government property (including motor vehicles).
  - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
  - (4) **DIVING ACTIVITY**—Mark if the accident involved an in-house USACE diving activity.
- b. **CONTRACTOR.**
  - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any contractor lost-time injury/illness or fatality.
  - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to contractor property (including motor vehicles).
  - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
  - (4) **DIVING ACTIVITY**—Mark if the accident involved a USACE Contractor diving activity.
- c. **PUBLIC.**
  - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).
  - (2) **VOID SPACE**—Make no entry.
  - (3) **VEHICLE INVOLVED**—Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.
  - (4) **VOID SPACE**—Make no entry.

- f. **JOB SERIES/TITLE**—For government civilian employees enter the pay plan, full series number, and job title, e.g. GS-0810/Civil Engineer. For military personnel enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc.,
- g. **DUTY STATUS**—Mark the appropriate box.
  - (1) **ON DUTY**—Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.
  - (2) **TDY** - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.
  - (3) **OFF DUTY** - Person was not on official business at time of accident
- h. **EMPLOYMENT STATUS**—(FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

**INSTRUCTION FOR SECTION 3 – GENERAL INFORMATION**

- a. **DATE OF ACCIDENT**—Enter the month, day, and year of accident.
- b. **TIME OF ACCIDENT**—Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).
- c. **EXACT LOCATION OF ACCIDENT**—Enter facts needed to locate the accident scene. (installation/project name, building number, street, direction and distance from closest landmark, etc.,).
- d. **CONTRACTOR NAME**
  - (1) **PRIME**—Enter the exact name (title of firm) of the prime contractor.
  - (2) **SUBCONTRACTOR**—Enter the name of any subcontractor involved in the accident.
- e. **CONTRACT NUMBER**—Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.
- f. **TYPE OF CONTRACT**—Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.
- g. **HAZARDOUS/TOXIC WASTE ACTIVITY (HTW)**—Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

**INSTRUCTIONS FOR SECTION 4 – CONSTRUCTION ACTIVITIES**

- a. **CONSTRUCTION ACTIVITY**—Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

**CONSTRUCTION ACTIVITY LIST**

- |                         |                            |
|-------------------------|----------------------------|
| 1. MOBILIZATION         | 14. ELECTRICAL             |
| 2. SITE PREPARATION     | 15. SCAFFOLDING/ACCESS     |
| 3. EXCAVATION/TRENCHING | 16. MECHANICAL             |
| 4. GRADING (EARTHWORK)  | 17. PAINTING               |
| 5. PIPING/UTILITIES     | 18. EQUIPMENT/MAINTENANCE  |
| 6. FOUNDATION           | 19. TUNNELING              |
| 7. FORMING              | 20. WAREHOUSING/STORAGE    |
| 8. CONCRETE PLACEMENT   | 21. PAVING                 |
| 9. STEEL ERECTION       | 22. FENCING                |
| 10. ROOFING             | 23. SIGNING                |
| 11. FRAMING             | 24. LANDSCAPING/IRRIGATION |
| 12. MASONRY             | 25. INSULATION             |
| 13. CARPENTRY           | 26. DEMOLITION             |

**INSTRUCTIONS FOR SECTION 2 – PERSONAL DATA**

- a. **NAME**—(MANDATORY FOR GOVERNMENT ACCIDENTS, OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.
- b. **AGE**—Enter age.
- c. **SEX**—Mark appropriate box.
- d. **SOCIAL SECURITY NUMBER**—(FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).
- e. **GRADE**—(FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.

b. TYPE OF CONSTRUCTION EQUIPMENT—Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

**CONSTRUCTION EQUIPMENT**

- |                                    |                                |
|------------------------------------|--------------------------------|
| 1. GRADER                          | 13. DUMP TRUCK (OFF HIGHWAY)   |
| 2. DRAGLINE                        | 14. TRUCK (OTHER)              |
| 3. CRANE (ON VESSEL/BARGE)         | 15. FORKLIFT                   |
| 4. CRANE (TRACKED)                 | 16. BACKHOE                    |
| 5. CRANE (RUBBER TIRE)             | 17. FRONT-END LOADER           |
| 6. CRANE (VEHICLE MOUNTED)         | 18. PILE DRIVER                |
| 7. CRANE (TOWER)                   | 19. TRACTOR (UTILITY)          |
| 8. SHOVEL                          | 20. MANLIFT                    |
| 9. SCRAPER                         | 21. DOZER                      |
| 10. PUMP TRUCK (CONCRETE)          | 22. DRILL RIG                  |
| 11. TRUCK (CONCRETE/TRANSIT MIXER) | 23. COMPACTOR/VIBRATORY ROLLER |
| 12. DUMP TRUCK (HIGHWAY)           | 24. OTHER                      |

**INSTRUCTIONS FOR SECTION 5—INJURY/ILLNESS INFORMATION**

a. SEVERITY OF INJURY / ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

- |     |   |
|-----|---|
| NOI | NO INJURY                                       |
| FAT | FATALITY  |
| PTL | PERMANENT TOTAL DISABILITY                      |
| PPR | PERMANENT PARTIAL DISABILITY                    |
| LWD | LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK |
| NLW | RECORDABLE CASE WITHOUT LOST WORKDAYS           |
| RFA | RECORDABLE FIRST AID CASE                       |
| NRI | NON-RECORDABLE INJURY                           |

b. ESTIMATED DAYS LOST—Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED—Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY—Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED—Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
BZ	TRUNK OTHER	

HEAD, INTERNAL

C1	SINGLE EAR INTERNAL
C2	BOTH EARS INTERNAL
C3	SINGLE EYE INTERNAL
C4	BOTH EYES INTERNAL
CB	BRAIN
CC	CRANIAL BONES
CD	TEETH
CJ	JAW
CL	THROAT, LARYNX
CM	MOUTH

ELBOW

FINGER

TOE

HEAD, EXTERNAL

KNEE

LEG, HIP, ANKLE, BUTTOCK

HAND

FOOT

TRUNK, BONES

SHOULDER

THUMB

TRUNK, INTERNAL ORGANS

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury / illness from the list below. This nature of injury / illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury / illness name on the line and place the corresponding CODE letters in the box provided.

CN	NOSE
CR	THROAT, OTHER
CT	TONGUE
CZ	HEAD OTHER INTERNAL
EB	BOTH ELBOWS
ES	SINGLE ELBOW
F1	FIRST FINGER
F2	BOTH FIRST FINGERS
F3	SECOND FINGER
F4	BOTH SECOND FINGERS
F5	THIRD FINGER
F6	BOTH THIRD FINGERS
F7	FOURTH FINGER
F8	BOTH FOURTH FINGERS
G1	GREAT TOE
G2	BOTH GREAT TOES
G3	TOE OTHER
G4	TOES OTHER
H1	EYE EXTERNAL
H2	BOTH EYES EXTERNAL
H3	EAR EXTERNAL
H4	BOTH EARS EXTERNAL
HC	CHIN
HF	FACE
HK	NECK/THROAT
HM	MOUTH/LIPS
HN	NOSE
HS	SCALP
KB	BOTH KNEES
KS	KNEE
LB	BOTH LEGS/HIPS/ ANKLES/BUTTOCKS
LS	SINGLE LEG/HIP ANKLE/BUTTOCK
MB	BOTH HANDS
MS	SINGLE HAND
PB	BOTH FEET
PS	SINGLE FOOT
R1	SINGLE COLLAR BONE
R2	BOTH COLLAR BONES
R3	SHOULDER BLADE
R4	BOTH SHOULDER BLADES
RB	RIB
RS	STERNUM (BREAST BONE)
RV	VERTEBRAE (SPINE; DISC)
RZ	TRUNK BONES OTHER
SB	BOTH SHOULDERS
SS	SINGLE SHOULDER
TB	BOTH THUMBS
TS	SINGLE THUMB
V1	LUNG, SINGLE
V2	LUNGS, BOTH
V3	KIDNEY, SINGLE
V4	KIDNEYS, BOTH
VH	HEART
VL	LIVER
VR	REPRODUCTIVE ORGANS
VS	STOMACH
VV	INTESTINES
VZ	TRUNK, INTERNAL; OTHER

**ADDENDUM TO THE QUALITY CONTROL PLAN**

**REMOVAL OF TWO USTs IN NATHAN HALE PARK  
AT THE FORMER NIKE CL-59 SITE  
PARMA HEIGHTS, OHIO**

**Indefinite Delivery Contract No. DACA 27-97-D-0006**

**JULY 21, 2000**

**Prepared for:**

**Department of the Army  
U.S. Army Engineer District, Louisville  
Corps of Engineers  
Louisville, Kentucky**

**Prepared by:**

**AmTech Engineering, Inc.  
4343 Saguaro Trail  
Indianapolis, Indiana 46268**

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### FORMS

## 1.0 INTRODUCTION

Under an indefinite delivery contract with the U.S. Army Corps of Engineers (USACE), Louisville District, AmTech Engineering Inc., has been issued a delivery order to remove two (2) Underground Storage Tanks (USTs), located at the former Nike CL-59 site, Parma Heights, Ohio. Following removal of the tanks and assessment sampling, the site will be backfilled with clean material and restored.

Upon award of the contract AmTech had submitted a Quality Control Plan (QCP) to USACE, this addendum is prepared for the above referenced delivery order. The purpose of this plan is to insure compliance with the contract documents, to insure quality workmanship through the duration of the project, and to provide the owner with the intended finished product. Moreover, it is the policy of this company to provide quality workmanship and the greatest value to our clients.

At AmTech, all employees are charged with the responsibility for implementing and maintaining Quality Control in our own work and the work of our consultants and subcontractors. Under this Contract, several AmTech employees will have specific duties and responsibilities to ensure the proper implementation and maintenance of our QC Plan for the entire work of this contract.

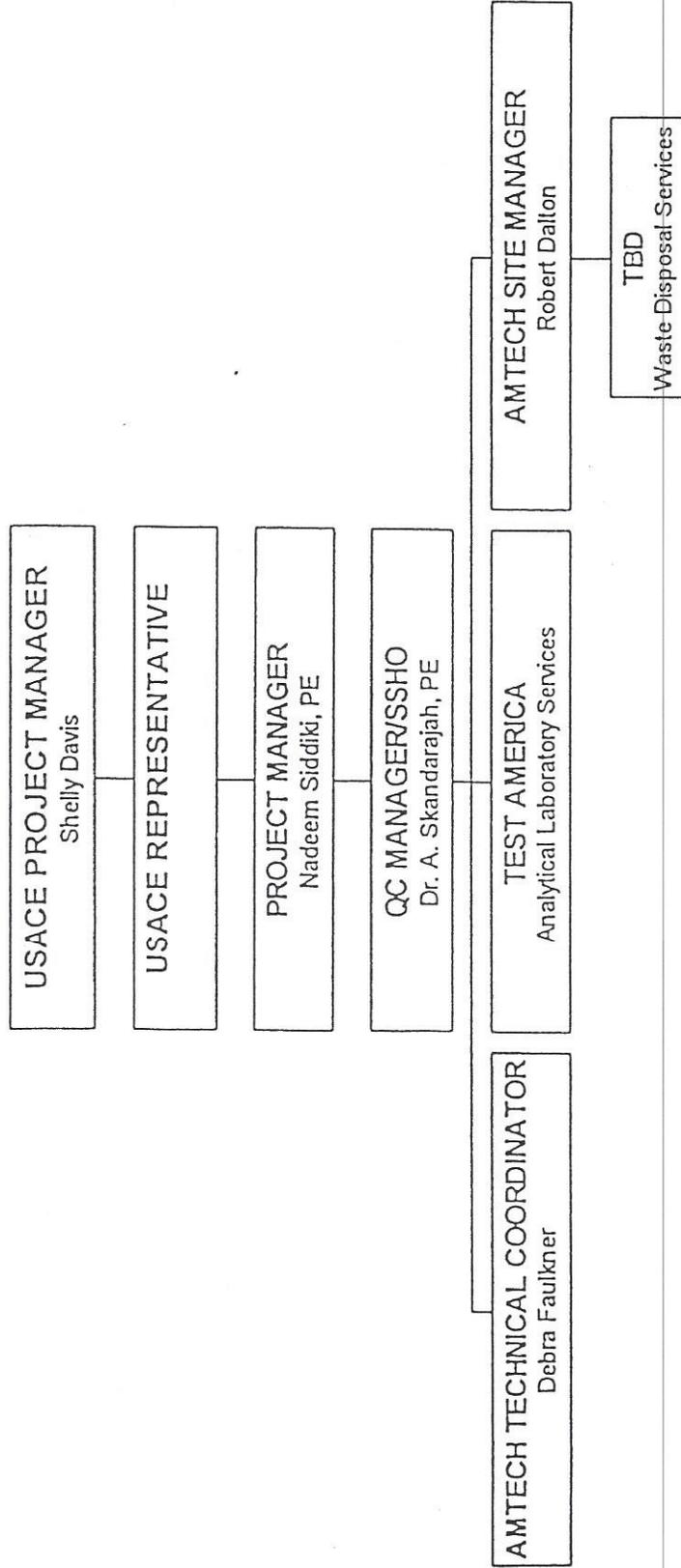
### **Monitoring The Quality Control Manager**

Throughout the project, AmTech's Vice President, Nadeem Siddiki, will be involved in Quality Assurance, being responsible for the quality performance of the entire project staff and operations, including the QC Plan. The QC Manager will report directly to Mr. Siddiki with regard to QC issues on the project. Mr. Siddiki will monitor and check the activities and progress of the QC Manager, to ensure that his duties are completed in a thorough, accurate, and timely manner. Mr. Siddiki will notify the Contracting Officer, 7 days in advance, of any change in the QC Plan.

## 2.0 ORGANIZATIONAL CHART

(See Next Page)

# ORGANIZATION CHART



### 3.0 APPOINTMENT LETTERS

(See Next Page)

# AmTech

Engineering, Inc.

4343 Saguaro Trail  
P.O. Box 68846  
Indianapolis, IN 46268

**Tel:** (317) 291-7285  
**Fax:** (317) 293-1440

July 20, 2000

Dr. A. Skandarajah  
AmTech Engineering, Inc.  
4343 Saguaro Trail  
Indianapolis, Indiana 46268

RE: Removal of USTs  
Former Nike CL-59 Site.

Dr. Skandarajah:

By this letter you are hereby appointed as the Quality Control Manager for the referenced project. As the QC Manager, you are responsible for implementing AmTech's Quality Control Program in accordance with our QC Plan and the contract documents, and you have the authority to direct the removal and replacement of any non-conforming work. Under this plan you will:

- Create and implement an Inspection Schedule.
- Prepare and implement a Testing Plan, and ensure that the testing is properly scheduled and executed. Complete a Testing Log and distribute the completed information as required in the QC Plan. Review and monitor the accreditation, qualifications, techniques, and equipment accuracy of outside testing laboratories.
- Review for approval all submittals and ensure that submittals are on-site and properly referenced when checking materials and installations.
- Attend and conduct QC meetings with our superintendents, foremen, and the client's representatives
- Record and distribute minutes of such meetings.
- Implement the three phases of quality control.
- Reject non-conforming materials and workmanship and record such rejection in the Contractor Daily Quality & Activity Report for that day.
- Implement procedures to identify, record, track, and complete rework items.
- Furnish signed certificates with each pay application confirming compliance with the QC Plan for the work for which payment is requested.
- Furnish a signed certificate attesting compliance with the QC Plan upon the completion of the work.
- Maintain current and complete records of QC program operations and activities.

Sincerely,

AMTECH ENGINEERING, INC.

Nadeem J. Siddiki, PE  
Vice President  
February 10, 2000

# AmTech

Engineering, Inc.

4343 Saguaro Trail  
P.O. Box 68846  
Indianapolis, IN 46268

**Tel:** (317) 291-7285  
**Fax:** (317) 293-1440

July 20, 2000

Mrs. Shelly Davis  
US Army Corps of Engineers  
Louisville District Office  
600 Dr. Martin Luther King, Jr. Place, Room 821  
Louisville, KY 40202-2230

RE: Removal of USTs  
Former Nike CL-59 Site

Dr. A. Skandarajah has been appointed AmTech's Quality Control Manager for the referenced project. In order to implement the QC Plan required for this project, he will review and become thoroughly familiar with our QC Plan and all construction documents. In accordance with our QC Plan, he will:

- Create and implement an Inspection Schedule.
- Prepare and implement a Testing Plan, and ensure that the testing is properly scheduled and executed. Complete a Testing Log and distribute the completed information as required in the QC Plan. Review and monitor the accreditation, qualifications, techniques, and equipment accuracy of outside testing laboratories.
- Review for approval all submittals and ensure that submittals are on-site and properly referenced when checking materials and installations.
- Attend and conduct QC meetings with our superintendents, foremen, and the client's representatives. Record and distribute minutes of such meetings.
- Implement the three phases of quality control.
- Reject non-conforming materials and workmanship and record such rejection in the Contractor Quality & Contractor Production Report for each working day.
- Implement procedures to identify, record, track, and complete rework items.
- Furnish signed certificates with each pay application confirming compliance with the QC Plan for the work for which payment is requested.
- Furnish a signed certificate attesting compliance with the QC Plan, upon the completion of the work.
- Maintain current and complete records of QC program operations and activities.

Sincerely,

AMTECH ENGINEERING, INC.

Nadeem J. Siddiki, PE  
Vice President

**1. QUALIFICATIONS OF QC PERSONNEL**

**(See Resumes Attached)**

**Name:** A. Skandarajah, P.E., Ph.D

**Education/Degree:** PhD//1992/Soil Mechanics  
MS/1983/Geotechnical Engineering  
BS/1979/Civil Engineering

**Certifications:** Professional Engineer, Indiana

**Experience:** 12 Years

**Project Assignment:** Quality Control Manager

**Experience History:**

Dr. Skandarajah has over **12 years of direct experience in providing engineering support for civil and environmental engineering projects**. He serves as senior engineer responsible for the field investigations, subsurface investigations, geophysical and hydrogeological surveys, monitoring well design, and installation oversight. He also plans and directs geotechnical investigations, soil testing, geophysical surveys, shoring and sheet-piling requirements, preparation of tank removal and building demolition plans, etc. His related experience includes:

**Air Force Center for Environmental Excellence, Wurtsmith AFB, MI** – As a project engineer, he is currently managing three (3) pilot testing programs for remediation of soils and groundwater. The pilot testing program includes soil vapor extraction and air sparging systems at the three (3) sites. His responsibilities include directing the pilot test program consisting of determining the test duration, use of helium and sulfur hexa fluoride as tracers, managing sampling and analysis requirements. The test data will be used to install four (4) remediation systems at the base. As a project engineer, he also planned over 20 Ground Penetrating Radar and Electronic Magnetometer surveys for the location of in-ground and previously removed UST sites. He also developed tank removal procedures to eliminate the need of sheet-piling at 4 of the tank locations. He was also responsible for supervising all subsurface investigations necessary for the above tasks.

**Air Force Center for Environmental Excellence, Rickenbacker ANGB, OH** – On this project, he was responsible for remedial action studies, surface and subsurface investigations, geophysical surveys for the closure of 22,300 LF of fuel hydrant system at Rickenbacker AFB. Dr. Skandarajah was Project Engineer in charge of geophysical for the entire pipe length, over 160 Geoprobe sampling and site surveys. He provided an intensive review of available as-built drawings, resulting in marking the corrected location of the existing fuel pipes; accomplishing significant cost savings in field digging operations.

**US Army Corps of Engineers, Kansas City District** – Dr. Skandarajah was directly responsible for the site investigations and design development of fourteen (14) Underground Storage Tanks removal project at Olathe Naval Air Station, Kansas. He developed design and UST removal procedures for tanks located very close to active railroad lines and building foundations by eliminating the need for sheetpiling, thus generating considerable cost savings. He completed site investigation/characterization, collected groundwater and soil samples, prepared remedial action plan, final specifications, cost estimates, and construction drawings.

**RESUME – Dr. Skandarajah**  
**Page Two**

Dr. Skandarajah, as Project Environmental Engineer is in charge of all remedial site investigations, surface & subsurface explorations, geophysical and geotechnical studies, plans, site sampling quality control, and coordination with subconsultants and contractors. He is also a member of the QA/QC team to monitor the quality on schedule and within budget completion of this project.

**US Property Fiscal Office, Military Department of Indiana** – This project involved the collection of samples for TCLP analysis, storm water samples for NPDES permit, and storm water pollution prevention plans at various sites throughout Indiana.

Dr. Skandarajah, as Project Environmental Engineer was in charge of the water and soil sample collections, analytical laboratory testing, chemical data quality assurance, and preparation of pollution prevention plans for **Camp Atterbury, Stout Field, Helicopter Maintenance Facility at Shelbyville, Indiana.**

**United Airline Maintenance Center – Indianapolis, IN** – AmTech was responsible for the subsurface investigations, soil testing, geotechnical report, and quality assurance for one-third of the site of this one billion dollar UAL project in Indianapolis, IN.

Dr. Skandarajah was the Project Manager and Senior Geotechnical Engineer on this project. He was responsible for the site drilling activities, collection of soil samples, laboratory soil testing, environmental testing for hydrocarbons and other hazardous materials, development of soil test report and on-going QA/QC of field activities from the beginning to the end of this project.

This project was recognized for Excellence in Quality, by the Indiana Chapter of the American Society of Civil Engineers.

**Name:** Debra Faulkner, Project Scientist

**Education/Degree:** BS/1981/Environmental Science

**Experience:** 15 Years

**Project Assignment:** Alternate QC Manager

**Experience History:**

Ms. Faulkner has **over 15 years of combined experience in environmental investigations, remediation, hazardous waste management, air pollution control, water resource management and regulatory compliance.**

Her related experience includes:

**US Army Corps of Engineers, Kansas City District** – She participated in development of a RI/FS Work Plan, wrote 80% of the plan contents, Also involved with the preparation of the Sampling and Analysis Plan consisting of a Field Sampling Plan and a Quality Assurance Project Plan. Field activities included soil gas surveys, surface and sub-surface soil sampling, installation and sampling of shallow and bedrock monitoring wells. She also participated in remedial design of UST removals including preparation of a Field Investigation Plan and a Chemical Data Acquisition Plan. On another project, she prepared the scope of Phase II Remedial Investigations which included geophysical surveys, installation of shallow and deep monitoring wells, sampling of impoundments and wells.

She is also participating in Site Assessment and Investigations at a third site. All the above sites have metals and chlorinated solvent contamination.

**Air Force Center for Environmental Excellence, Rickenbacker ANGB, and Wurtsmith AFB** – As a project scientist, Ms. Faulkner developed majority of the plans, and reports for these projects. She was involved with development of design documents, negotiations with regulatory agencies and reviewers, interpretation of regulatory requirements and development of investigative techniques and procedures for delineation of contamination and extent of cleanup requirements. At Wurtsmith AFB, she has determined the scope of services to delineate three (3) petroleum contaminated groundwater plumes and investigations at a previously removed underground storage tank site. The investigations completed included soil and groundwater sampling using a \_Geoprobe and a mobile chemical analysis laboratory.

She is also in charge of determining the extent of PCB contamination at three sites including development of remedial action and site closures.

**Fort Benjamin Harrison** – As a project scientist, she is responsible for determining regulatory requirements for a closure of a pesticide/herbicide storage facility. The scope of work includes characterization of building materials, regulatory compliance and a remedial action for a clean closure.

**Fernald Department of Energy Facility** – She has over four years of experience with the Fernald Environmental Management Group, a Department of Energy (DOE) facility in Ohio. She provided the compliance lead on a Project Team responsible for the safe neutralization and

**RESUME – D. Faulkner**

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## Page Two

disposal of hazardous waste. Provided regulatory interpretations of environmental and safety requirements for DOE activities, interfaced with regulatory agencies and the DOE in relation to Site Remediation activities.

Specific accomplishments include the drafting of RCRA / CERCLA Integration Groundwater Monitoring Plan, preparation of a RCRA Part B Permit Application and coordination of the RCRA Groundwater Annual Report.

**Indiana Department of Environmental Management (IDEM), Office of Solid & Hazardous Waste Management** – She has over four years of experience in hazardous waste management. Her responsibilities included supervision of Compliance Monitoring Staff as a Group Leader, assisting the regulatory community and the public with regulatory questions, referral of cases for IDEM enforcement, development of enforcement cases, drafting of Notices of Violations, conducting of settlement conferences and review of documents submitted in response to Final Orders. She also interacted with the U. S. EPA with respect to IDEM / EPA enforcement cases.

**IDEM Office of Air Management** – She has over four years of experience with the IDEM Office of Air Management. Her responsibilities included the development and interpretation of air pollution rules, regulations and standards, public hearings, Findings of Fact and recommendations for Rule changes and assisting in the strategy development for an approved Indiana State Implementation Plan (SIP).

**Indiana Department of Public Works (IDPW)** – As a Flood Control Technician for the IDPW, she monitored and calculated the amount of discharge flow from Eagle Creek Reservoir to maintain a constant pool elevation, reduce flood damage and provide an adequate water supply for the City of Indianapolis.

Ms. Faulkner has completed numerous continuing education courses in environmental and safety management and is currently completing a MS degree in Environmental Management.

## **5.0 DUTIES, RESPONSIBILITIES & AUTHORITIES OF QUALITY CONTROL PERSONNEL**

The QC Manager (and the Alternate QC Manager) will have the following duties and responsibilities:

1. The QC Manager will have the authority and the responsibility to reject any non-conforming work, improper submittals, or non-conforming testing techniques or methods. He will record such actions in the Contractor's Daily Quality & Activity Report.
2. The QC Manager will implement the procedures for reviewing, approving, and managing submittals. The QC Manager will submit the names of any additional persons authorized to review and certify submittals.
3. The QC Manager will attend the Mutual understanding meeting and prepare minutes of that meeting for mutual approval.
4. The QC Manager will conduct regular QC meetings with the superintendent and trade foremen, as needed. He will record and distribute minutes of those meetings.
5. The QC Manager will perform THREE PHASES OF CONTROL to ensure that work complies with the contract requirements. The THREE PHASES OF CONTROL will adequately cover both on-site and off-site work and will include the following for each Definable Feature of Work:

### **5.1 PREPARATORY PHASE**

- a) Review each paragraph of the applicable specifications sections/Work Plan;
- b) Review the contract drawings if applicable
- c) If applicable, verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.
- d) Review the testing plan and ensure that provisions have been made to provide the required QC testing.
- e) Examine the work area to ensure that the required preliminary work has been done;
- f) Examine the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;

- g) Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required MSDS sheets are maintained on site.
- h) Discuss construction methods.

**5.2. INITIAL PHASE:**

- 1. Establish the quality of workmanship required;
- 2. Confirm that the preparatory work has been completed properly.
- 3. Resolve conflicts;
- 4. Ensure that testing is performed properly.

**5.3. FOLLOW-UP PHASE:**

- 1. Ensure that the work is in compliance with the contract documents and requirements;
  - 2. Maintain the quality of workmanship required;
  - 3. Ensure that testing has been performed and review test results for compliance; and
  - 4. Ensure that rework items are corrected.
6. The QC Manager will notify the Contracting Officer of any Preparatory and Initial Phases/Inspections being performed off-site, in advance of their performance. These Initial Phases/Inspections will be documented in the Contractor's Daily Report. The QC Manager will implement procedures to identify, record, track, and complete rework items.
7. The QC Manager will furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that as-built drawings are current, and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.
8. The QC Manager will furnish a certificate to the Contracting Officer attesting the "the work has been completed, inspected, tested, and is in compliance with the contract." The QC Manager will maintain current and complete records of QC program operations and activities.

A preparatory Checklist follows this section.

## Preparatory Inspection Checklist

Indefinite Deliverable Contract No. DACA27-97-D-0006

a. **Specification Section: Construction Work Plan, Removal of Two (2) USTs in Nathan Hale Park at the Former Nike CL-59 Site**

*Definable Features of Work:*

1. Locate and determine orientation of underground utilities (if any) at both sites.
2. Locate each area in the field and delineate the exclusion zone. This zone should be large enough to stockpile 150 tons of impacted soil.
3. Excavate and remove the tank in the parking lot. A PID and visual observation will be used to screen for impacted soils. A PID reading above background will be used, in conjunction with visual observations, as an indicator for impacted soil. Soils will be separated between clean and impacted. All soils will be stockpiled on and covered with 6-mil Visqueen.
4. After removal of tank and all backfill material, assessment samples will be collected. One (1) sample will be collected at each end of tank.
5. If impacted soil is found, the excavation pit will be bermed and lined with 6-mil or thicker plastic with no seams to protect the pit from rain or surface waters run-off. Excavation protection will be maintained until receipt of all analytical results from the samples collected. If impacted soil is not found, the excavation will be backfilled.
6. The soccer field area will be excavated (20CY) to locate the tank. If the tank is found, step 3, 4 & 5 will be completed. If the tank is not found, the area will be backfilled.
7. The footprint of the excavations and sample point locations will be field measured to generate a drawing to be used in the closure report.
8. If the results for assessment samples exceed the BUSTR Action Levels, the USACE representative will be notified for further direction.
9. Clean backfill will be used for site restoration. Backfill will be compacted to 93% standard proctor.

10. One (1) sample from the contaminated stockpile will be collected for characterization per landfill requirements. The samples will be analyzed for disposal purposes. All stockpiles will be covered with 6 mil Visqueen until removed from the site for disposal. A limited amount (less than 50 gallons) of liquid waste may be disposed with the stockpiled soil. This water will be mixed so as not to generate any free liquid. Greater quantities, if generated, will be disposed off-site. For off-site disposal, one (1) wastewater (decontamination water) sample will be collected and analyzed for characterization and disposal.
11. Non-hazardous/special waste notification forms will be used for documenting waste removal/disposal. Any manifests (including non-hazardous/special waste) shall be routed through the Louisville Corps of Engineers, Project Office or on-site representative for signature.
12. Grab soil samples will be collected and field screened from the clean stockpiles. The number of field screenings and number of laboratory analysis will be in accordance with the Sampling & Analysis Section of the CWP.
13. Reuse as backfill or dispose off-site clean stockpiles depending upon the analytical results.
14. Demobilization

**b. Shop Drawings/Submittals:**

Approved:            Construction Work Plan  
                              Site Safety and Health Plan  
                              Addendum to the Contractor's Quality Control Plan

**c. Materials:**

1. Up to 100 tons of backfill material (both tank sites after excavation is complete and no contaminated soil removed)
2. Visqueen – 8 rolls
3. Personal Protective Gear
4. Drums – 4
5. Sample Bottles/Coolers/Ice

**d. Necessary Equipment:**

1. Crew truck with tools

2. Backhoe excavator
3. Photoionization Detector (PID)
4. CGI/Oxygen Meter

**e. Time Frame of Work**

Submit Draft Work Plan	July 24, 2000
Review and Approval of Work Plan	August 11, 2000
Initiate Field Activities	August 28, 2000
Complete Field Activities	y September 15, 2000
Submit Draft Report	By September 30, 2000

**f. Accident Prevention-Hazard Controls:**

Follow the safety measures as described in the approved Site Safety and Health Plan as prepared by AmTech.

**g. Laboratory:**

Test America  
2960 Foster Creighton Drive  
Nashville, TN 37204  
Phone (615) 726 0177

**h Subcontractor:**

Waste Management

**6.0 SUBMITTALS**  
**(Not Applicable)**

## **7.0 INSPECTION SYSTEM**

The Inspection System employs the Specific QC Plan, and the Three Phases of Quality control to ensure that all work is properly planned, inspected and complies with the contract requirements. The QC Manager will implement the Inspection System as follows:

### **7.1. THREE PHASES OF CONTROL**

The QC Manager will perform THREE PHASES OF CONTROL to ensure that work complies with the contract requirements. The THREE PHASES OF CONTROL will adequately cover both on-site and off-site work and will include the following for each Definable Feature of Work:

### **7.2. PREPARATORY PHASE:**

The QC Manager will conduct the preparatory phase with the superintendent and the project manager responsible for the Definable Features of the work. He will document the results of the preparatory phase actions in the Contractor Quality Control Report. He will perform the following prior to beginning work on each Definable Feature of Work:

- a) Review the applicable Work Plans;
- b) Review the testing plan and ensure that provisions have been made to provide the required QC testing.
- c) Examine the work area to ensure that the required preliminary work has been done;
- d) Examine the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved Work Plan;
- e) Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required MSDS sheets are maintained on site.
- f) Discuss construction methods with the superintendent and USACE Representative as required.

### 7.3 INITIAL PHASE:

When construction crews are ready to start work on a Definable Feature of Work, the QC Manager will conduct the Initial Phase with the superintendent and the foremen responsible for the Definable Feature of Work. He will observe the initial segment of the Definable Feature of Work to ensure that the work complies with the contract documents. He will document the results of the initial phase in the Contractor Quality Control Report. He will repeat the Initial Phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. He will perform the following for each Definable Feature of the Work:

- a) Establish the quality of workmanship required;
- b) Confirm that the preparatory work has been completed properly.
- c) Resolve conflicts;
- d) Ensure that testing is performed properly.

### 7.4 FOLLOW-UP PHASE:

The QC Manager will perform the following daily for on-going work, or more frequently as necessary until the completion of each Definable Feature of Work, and he will document the Follow-up Phase activity in the Contractor's Daily Quality Report:

- a) Ensure that the work is in compliance with the contract documents and requirements;
- b) Maintain the quality of workmanship required;
- c) Ensure that testing has been performed and review test results for compliance; and
- d) Ensure that rework items are corrected.

*NEXT PAGE*

### 8.0 LIST OF DEFINABLE FEATURES OF WORK

A list of Definable Features of Work is as follows:

1. Mobilization / Pre-construction Meeting.

2. Tank Removals and Completion of Backfill Soil Removal
3. Sampling & Backfill

## **9.0 TESTING PROCEDURE:**

The QC Manager shall insure that all field testing is scheduled and performed as specified in the contract documents. Field tests shall be made by qualified independent testing agencies and laboratories, under the control and inspection of the QC Manager. Field tests will be logged into the Contractor Quality Control Report, and into the Monthly Testing Summary Report. All test results will be included with the Report.

### **Testing Plan and Log:**

A Testing Plan and Log will be prepared and, following Testing Summary Report, will be used:

**FIELD SCREENING WITH PID  
CLEAN SOIL STOCKPILE**

Location	PID Reading (ppm)/ Comment
<b>Gasoline Tank (Parking Lot)</b>	<b>Approximate CY * _____</b>
	#1
	#2
	#3
	#4
	#5
	#6
	#7
	#8
<b>Heating Oil Tank (Soccer Field)</b>	<b>Approximate CY * _____</b>
	#1
	#2
	#3
	#4
	#5
	#6
	#7
	#8

\*      0-25 CY      2 screens – Submit 1 for lab analysis with highest PID reading.  
       26-100 CY    6 screens – Submit 2 for lab analysis with highest PID reading.  
       101-500 CY   8 screens – Submit 2 for lab analysis with highest PID reading.



The QC Manager will identify, record, track, and complete rework items. He will use the "Rework Log" form as a tracking tool. See attached blank copy of the form.

1. Upon discovery of non-conforming work (by the QC Manager, the Superintendent, or USACE Personnel) the QC Manager will enter the deficiency on the Rework Log, number and date it, and enter the information on the Contractor Quality Control Report.
2. The responsible sub, supplier, or trade will be contacted concerning correction of the non-conforming work, and a procedure and a date for correction will be determined and entered on the Rework Log.
3. The QC Manager will follow up daily, or weekly, as required to achieve the rework date, until the work has been corrected. Rework Logs will be submitted to the Contracting Officer until all Rework items in the project have been completed.

## 10.0 DOCUMENTATION

Documentation of the operations of the CQC organization will include the following:

1. CONTRACTOR QUALITY CONTROL REPORT:

All quality control activity (Three Phases of Control), testing activity, rework items, and rework items completed will be on this daily report. This report will be submitted daily to the Contracting Officer or assigned representative recipient.

2. MEETING MINUTES of Preparatory Phase meetings and Pre-installation meetings for definable features of work will be used to record and establish understandings and quality standards.
3. TESTING PLAN AND LOG will be used to plan for testing to be done in each definable feature of work. The results of all testing will be sent to the COR as they are completed.
4. MONTHLY TESTING SUMMARY REPORT will be used to affirm that testing has been completed as scheduled, and will record the results of the tests in summary form.

5. REWORK ITEMS LOG

6. QC CHECKLIST

The following documents will also be kept on-site and available to all inspectors, workers, tradesmen and subcontractors;

- a. PLANS, SPECIFICATIONS, ADDENDA AND MODS
- b. APPROVED SUBMITTALS (Not Applicable)
- c. MATERIAL SAFETY DATA SHEETS (MSDS)
- d. SAFETY PLAN, POSTERS AND NOTICES
- e. SAFETY MEETING MINUTES

## 11.0 CERTIFICATION

1. Each Contractor Quality Control Report will contain the statement "On behalf of the Contractor, I certify that this report is complete and correct and all equipment and material used and work performed during this reporting period is in compliance with the contract plans and specifications to the best of my knowledge, except as noted above."
2. With each payment request, the QC Manager will furnish a certificate to the Contracting Officer, signed by the QC Manager, attesting that as-built drawings are current, and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.
3. Upon completion of the work, the QC Manager will furnish a certificate to the Contracting Officer attesting the "the work has been completed, inspected, tested, and is in compliance with the contract."

**FORMS**



# CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE \_\_\_\_\_

PHASE IDENTIFY DEFINABLE FEATURE OF WORK, LOCATION AND LIST PERSONNEL PRESENT

Y-YES, N-NO, SEE REMARKS;  
BLANK-NOT APPLICABLE

PREPARATORY			THE PLANS & SPECS HAVE BEEN REVIEWED. THE SUBMITTALS HAVE BEEN APPROVED. MATERIALS COMPLY WITH APPROVED SUBMITTALS. MATERIALS ARE STORED PROPERLY. PRELIMINARY WORK IS DONE CORRECTLY. SAFETY REQUIREMENTS HAVE BEEN MET. TESTING PLAN HAS BEEN REVIEWED. WORK METHOD SCHEDULE DISCUSSED
INITIAL		TESTING PERFORMED & WHO PERFORMED TEST	PRELIMINARY WORK IS DONE CORRECTLY. SAMPLE HAS BEEN APPROVED PREPARED SAFETY REQUIREMENTS HAVE BEEN MET. TEST RESULTS ARE ACCEPTABLE. WORK IS IN COMPLIANCE WITH THE CONTRACT.
FOLLOW-UP		TESTING PERFORMED & WHO PERFORMED TEST	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE.

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)

REWORK ITEMS CORRECTED TODAY (FROM REWORK LOG)

REMARKS

On behalf of the contractor, I certify that this report is complete and correct and all equipment and material used and work performed during this reporting period is in compliance with the contract plans and specifications to the best of my knowledge except as noted above.

\_\_\_\_\_  
AUTHORIZED COC MANAGER AT SITE

\_\_\_\_\_  
DATE

## CONSTRUCTION REPRESENTATIVE REPORT

DATE \_\_\_\_\_

CONSTRUCTION REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

\_\_\_\_\_  
CONSTRUCTION REPRESENTATIVE

\_\_\_\_\_  
DATE



