GROUNDWATER TECHNOLOGY

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# FACILITY CLOSURE PLAN
# SAFETY-KLEEN SERVICE CENTER
# FACTORY AND MITCHELL
# MATTYDALE, NEW YORK

**U.S. EPA I.D. NUMBER: NYD 000824581**

**August 13, 1993**

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# 1.0 INTRODUCTION

Safety-Kleen Corporation (Safety-Kleen) operates a hazardous waste accumulation point for spent solvent generated by Safety-Kleen customers from their facility located at the corner of Factory and Mitchell Avenues in Mattydale, New York (Figure 1, Site Location Map). The location of the facility structures (offices, warehouse, solvent return system), adjacent properties, and other site features are shown on Figure 2, Site Map. On June 6, 1990, the former 12,000 gallon used mineral spirits underground storage tank (UST) was removed in accordance with the Consent Order (# C7-0001-90-03), enforce for this site. During the time of the tank removal, a new doubled walled 11,000 gallon underground storage tank system was installed. Further, approximately 800,000 gallons of groundwater and 1,000 cubic yards of soil were removed from the used mineral spirits tank excavation in an effort to remove residual impacts in this area. The tank closure activities are fully described in the Closure Report prepared by Groundwater Technology, Inc.

Prior to the removal of the 12,000 gallon UST, impacts to the subsurface soils and groundwater were found to be present on and off-site in November, 1989. Based upon these findings, Safety-Kleen completed multiple subsurface investigation work scopes to fully delineate the extent of impacts, in addition to installing and operating groundwater extraction and soil vapor extraction systems from the area of the underground storage tanks and the return and fill station. Further, based upon the results of the most recent investigation (Phase II Investigation Report, dated July 28, 1992), Safety-Kleen expanded the remedial system in order to complete remediation of both on and off-site impacts in an accelerated manner.

In April, 1993 Safety-Kleen began construction of a new facility on VIP Parkway in Dewitt, New York. This new facility has been granted a full RCRA Part B permit and will be operating in accordance with Title 6 NYCRR Part 373-2 and 40 CFR Part 264 regulations. Construction of the facility is scheduled to be completed in November of 1993, at which time all operations at the Mattydale facility will cease. Therefore, in anticipation of this, Safety-Kleen has prepared this Facility Closure Plan (FCP) which presents closure performance standards for both soil and groundwater, and the procedures to decontaminate and remove (if applicable) the active hazardous waste management units (HWMUs) at the Mattydale, New York facility.


SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE
SYRACUSE WEST QUADRANGLE
7.5 MINUTE SERIES
DATE: 1973
PHOTOREVISED: 1978

QUAD LOCATION

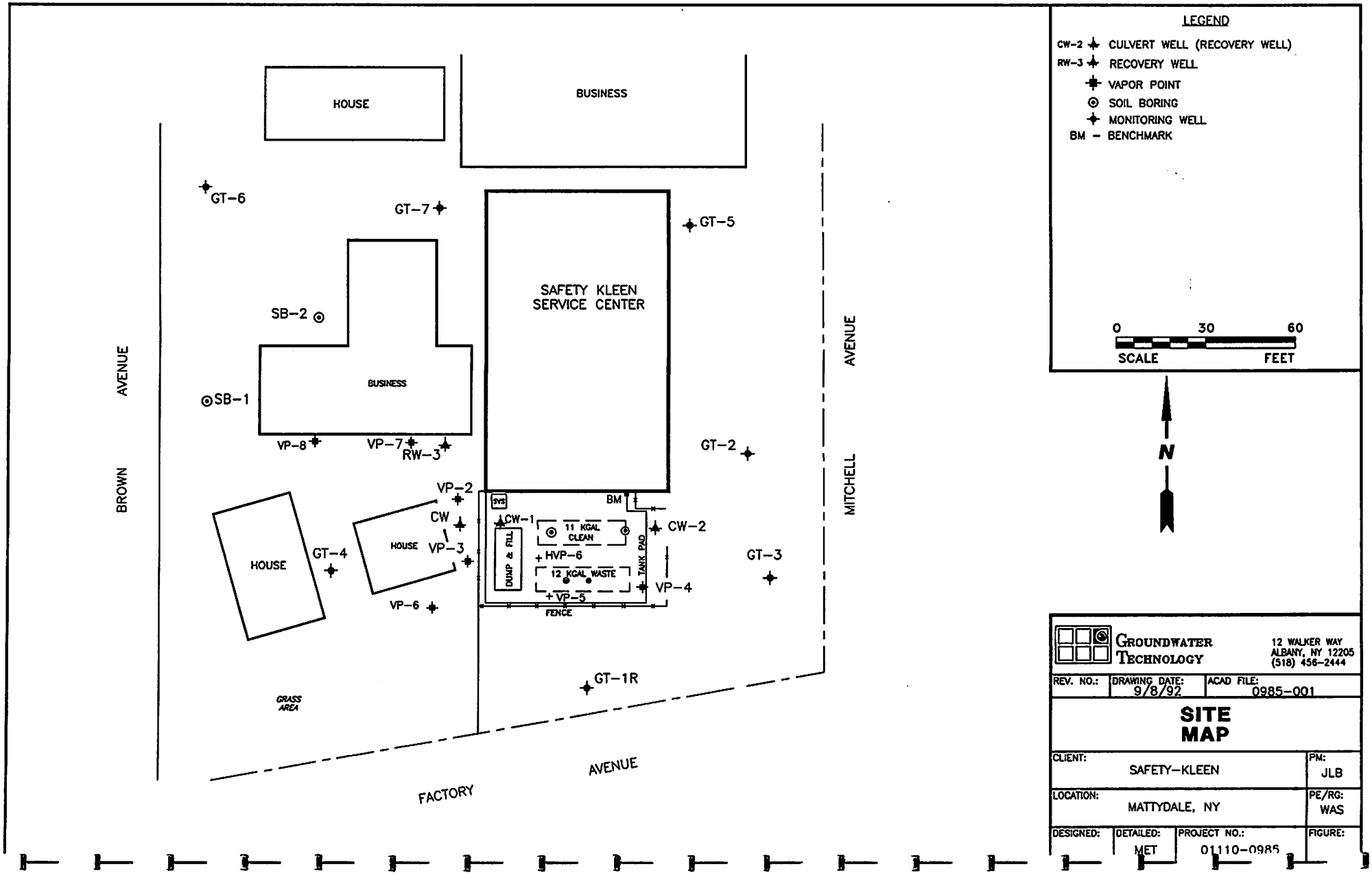
SCALE 1:24,000

0 2,000 4,000

SCALE FEET

N

| | | |
|---|---|---|
| DESIGNED: JLB | **SITE LOCATION MAP** | |
| DETAILED: DEO | CLIENT: SAFETY-KLEEN CORPORATION | DRAWING DATE: 7/22/93 |
| CHECKED: | LOCATION: MATTYDALE, NEW YORK | FIGURE: 1 |

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| REV. NO.: | DRAWING DATE: | ACAD FILE: |
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| | 9/8/92 | 0985-001 |

# SITE MAP

| CLIENT: | PM: |
|---|---|
| SAFETY-KLEEN | JLB |
| LOCATION: MATTYDALE, NY | PE/RG: WAS |

| DESIGNED: | DETAILED: | PROJECT NO.: | FIGURE: |
|---|---|---|---|
| | MET | 01110-0985 | |

The applicable regulations governing this closure are included in Title 6 NYCRR Subpart 373-3 and Part 265 of 40 CFR for interim status facilities. As required by Title 6 NYCRR Subpart 373-3.7(c) and 40 CFR Part 265.112(a), a copy of the approved FCP will be maintained at the facility until closure is certified complete by the owner and an independent New York State registered Professional Engineer.

## 1.1 Regulatory Status

The Safety-Kleen Mattydale, New York Service Center has been operating as an interim status hazardous waste storage facility since March 1, 1979. No hazardous waste treatment or disposal activities are conducted at the site. The active regulated HWMUs at this facility include: (1) A Container Storage Area (CSA) used to temporarily store immersion cleaner, dry cleaning wastes and mineral spirits dumpster sludge, prior to shipment off-site, (2) a 12,000 gallon used mineral spirits UST for the storage of spent solvent, (3) a return and fill station (two wet dumpsters and the associated piping) which is used to collect the used mineral spirits, and convey it back to the used mineral spirits UST via subsurface piping.

It should also be noted that there is a second remaining 11,000 gallon UST located in the same tank pit as the used mineral spirits UST. This tank is used to store clean mineral spirits. The clean mineral spirits UST will be removed during the facility closure using the same guidelines/procedures that will be employed to decommission the 12,000 gallon used mineral spirit tank HWMU. Therefore one tank pit will be generated.

## 1.2 General Closure Information

Safety-Kleen will be performing a full closure of the Mattydale, New York facility in conformance with the above referenced regulations. As discussed in detail in Section 2.0, the facility closure will involve decommissioning the following HWMUs as outlined below:

Used Mineral Spirits Underground Storage Tank:

- Tank interior decontamination, and
- Tank removal/destruction and excavation backfilling,

Return and Fill Station:

- Decontamination and destruction of the return and fill station dumpsters,
- Decontamination of the return and fill station interior structures, and
- Decontamination and removal of the return and fill station piping.

Container Storage Area:

- Decontamination of the floors, and secondary containment curbing and concrete sump.

Remediation procedures will be conducted (if necessary) in accordance with the site's Consent Order in order to treat any impacted below grade media via the specified remedial systems. Given that remediation of this site is being completed under the site's Consent Order, and that confirmatory sampling will be required in support of closure of the site environmental media (soil and groundwater) closure of the three HWMUs will be considered complete if:

- The rinsate closure performance standards have been met, and
- The Facility Closure Plan was implemented as prescribed.

Therefore, Safety-Kleen will certify that the FCP was implemented as approved, and that the physical units (not the environmental media around or below the units) were clean closed in accordance with the FCP.

Further, above grade materials or appurtenant equipment will be decontaminated (and removed and either scrapped or reused) in such a manner that all waste residues and system components will be removed during closure in accordance with Title 6 NYCRR Subpart 373-3.10(h)(1) and 40 CFR 265.197(a).

## 1.3 Notification of Closure

By submittal of this FCP, Safety-Kleen is notifying the New York State Department of Environmental Conservation (NYS DEC) of their intent to close this facility in accordance with Title 6 NYCRR Subpart 373-3.7(c)(4), which specifies that this notification shall occur at least 180 days before closure is expected to begin. However, Safety-Kleen is prepared to initiate closure activities as soon the Dewitt, New York site is fully operational, and the Mattydale facility has been vacated.

## 1.4 Facility Information

| | |
|---|---|
| Owner/Operator: | Safety-Kleen Corporation<br>1000 N. Randell Road<br>Elgin, Illinois 60120<br>(798) 697-8460 |
| Corporate Contact: | Keith M. Marcott, CPG, CHMM<br>Senior Project Manager-Remediation<br>Safety-Kleen Corporation<br>P.O. Box 430<br>Hagaman, New York 12086<br>(518) 843-6725 |
| Facility Location: | Factory and Mitchell Ave<br>Mattydale, NY 13211 |
| Facility Phone Number: | (315) 455-1426 |
| EPA ID Number: | NYD000824581 |
| SIC Codes: | 7399, Business Services, N.E.C.<br>5172, Petroleum Product Wholesalers<br>5084, Industrial Machining & Equipment<br>5013, Automotive Part & Supplies |

## 1.5 Description of Operations

Safety-Kleen is a service-oriented company which supplies and recycles mineral spirits and chlorinated solvents in addition to leasing small parts washing equipment. The business is conducted from local service centers that warehouse the products and equipment required for their sales area. The representatives for the service centers furnish clean solvent to the customers, pick up the used solvent and check that the leased equipment is in good working order.

Safety-Kleen handles two types of solvents; mineral spirits (stoddard solvent) and a special blend of chlorinated and water-phase solvent known as immersion cleaner. The solvents are distributed to and collected from the customer in covered drums. Once at the service center, the mineral spirits are stored in bulk storage tanks while the immersion cleaner remains in drums and stored in a secured area.

The solvents from the Mattydale, New York Service Center are regenerated at one of Safety-Kleen's Recycle Centers in the United States. The solvent cycle is essentially a closed loop, going from the service center to the customer, from the customer to the service center, from the service center to the regeneration center, and then from the regeneration center back to the service center.

## 1.6 Site Location and Description

The facility is located in an area zoned for light industrial and residential use on a lot that is 0.32 acres in size. The latitudinal and longitudinal coordinates of the service center are 43 degrees, 5 minutes, 25 seconds North and 76 degrees, 8 minutes, 0 seconds West (Figure 1, Site Location Map).

## 1.7 Characteristics and Quantity of Waste

This section addresses the characteristics of used mineral spirits, clean mineral spirits, immersion cleaners, dry cleaning solvents, tank bottom sludge and dumpster mud. Each of these waste products may be encountered during closure activities.

### Characteristics of Mineral Spirits (Stoddard Solvent)

- Trade name "Safety-Kleen 105 Solvent". Typically this material has a flash point below 105 degrees Fahrenheit.
- It is comprised primarily of petroleum hydrocarbons in the C9 to C11 range. It typically contains less than one percent by volume of chlorinated hydrocarbons.
- Mineral spirits' main use is as a degreasing agent for automobile repair and industrial maintenance operations.
- Used mineral spirit consists of Safety-Kleen 105 Solvent with water, oil and grease, solids, and small amounts of chlorinated hydrocarbons.
- The used mineral spirits generally contain approximately two to ten percent by volume of oil and grease.
- Flash point of used mineral spirit typically ranges 95 to 115 degrees F. Used mineral spirits is a characteristic hazardous waste by virtue of its flash point (less than 140 degrees F). It may also exhibit toxic characteristics according to TCLP standards for benzene (D018) and perchlorethylene (D039).

### Characteristics of Tank Bottom Sludge and Dumpster Mud

- These materials consist of solids, oil and grease, water, and small amounts of mineral spirits.
- Bottom sludge may contain levels of lead, cadmium and chrome which may exceed the TCLP limit.
- Dumpster mud is similar to bottom sludge except it may contain small metal parts and a lesser proportion of mineral spirits.
- Dumpster mud is a characteristic hazardous waste by virtue of its flash point (less than 140 degrees F) and possibly by its toxicity due to lead, cadmium and chrome levels.

**Immersion Cleaner, Carburetor and Cold Parts Cleaner:**

- The trade name is Safety-Kleen Immersion Cleaner/Carburetor and Cold Parts Cleaner 609.
- The product is used for removing carbon residue from various automotive and other industrial parts.
- In its virgin state, this product is a clear, dark amber in color liquid which has an aromatic odor, and is nonflammable.
- The old formula is comprised primarily of ortho-dichlorobenzenes, methylene chloride and cresylic acid. The new formula is primarily comprised of a mixture of aromatic hydrocarbons, N-Methyl 1,2-Pyrrolidone, Di-Propylene Glycol and Oleic acid.
- The old formula is a hazardous waste by virtue of its corrosivity (D002) and toxicity due to the presence of both methylene chloride (F002) and cresylic acid (F004). The new formula may be hazardous waste by virtue of its toxicity (DOO6, D007, and DO18).

**Dry Cleaning Solvent and Wastes:**

- The trade name is Perchloroethylene. The product is used in the dry cleaning industry to remove stains from clothing and other dry goods.
- Primarily perchloroethylene is used as the dry cleaning fluid. Both mineral spirits and trichlorotrifluoroethane are also used to a lesser degree.
- Dry cleaning wastes generally consist of spent filter cartridges, powder residues (from diatomaceous earth or other powder filtration systems) and still bottoms.
- The product is considered a hazardous waste by virtue of its toxicity due to the presence of perchloroethylene (D039), and trichlorotrifluoroethane and by flammable characteristic (D001) when mineral spirits is used.

## 1.8 Maximum Inventory of Waste [6 NYCRR 373-3.7 c(2)(iii)]

In accordance with 6 NYCRR 373-3.7 c(2)(iii), the following table summarizes the current maximum inventory of hazardous waste that can currently be held on-site.

**Table 1**

**Inventory of Hazardous Waste Storage Capacity**

| Hazardous Waste Management Unit | Quantity | Total Storage (gallons) |
|---|---|---|
| Used Mineral Spirits UST | 1 | 12,000 |
| Return and Fill Station (Closing) | 1 | 588 |
| Container Storage Area (Closing) | 1 | 4,176 |
| | Total: | 16,764 |

**Note: All HWMUs are being closed**

## 1.9 Closure Performance Standards

Safety-Kleen has developed closure performance standards (CPSs) which must be achieved in order for the HWMU's to be considered clean closed. Clean closure of the HWMUs will consist of achieving the appropriate rinsate decontamination levels (and the physical removal of appropriate HWMUs from the site). If the final rinsate samples contain less than five parts per million (ppm) mineral spirits, as determined by the Total Petroleum Hydrocarbons (TPH-GC) analysis, the return and fill station and the used mineral spirits HWMUs will be considered clean, and those components that will be treated as scrap metal will be transported from the site as a non-hazardous material. If the total mineral spirit TPH value exceeds five ppm, further cleaning will be performed. The results will be reported to Safety-Kleen prior to the components being removed from the site.

If the final rinsate sample from the CSA contains less than one ppm total halogenated volatile organic compounds (HVO's), as determined by the EPA Method 8240 analysis, the CSA will be considered clean. If the total HVO's exceed one ppm, further cleaning will be performed. The results will be reported to Safety-Kleen prior to the removal of any parts being removed from the CSA (if applicable). The CPSs, appropriate analytical methods, and each HWMUs final disposition are summarized below in Table 2:

**Table 2**

**HWMU Closure Performance Standards**

| HWMU | Rinsate CPS | Analytical Method | HWMU Disposition |
|---|---|---|---|
| Used Mineral Spirits UST | >/= 5 ppm MS | TPH-GC | D & R |
| Return and Fill Station | >/= 5 ppm MS | TPH-GC | D & R |
| Container Storage Area | >/= 1 ppm HVOs | EPA 8240 | D |

**KEY**

| | |
|---|---|
| ppm | Parts per million |
| >/= | Less than or equal to |
| TPH-GC | Total petroleum hydrocarbons by gas chromatography |
| MS | Mineral Spirits |
| HVOs | Halogenated volatile organics |
| D & R | Decontaminate, Remove from the site |

The final rinsate action levels were established based on: (1) The return and fill station and used mineral spirits UST will be either reused or destroyed, and therefore they need only be sufficiently clean in order to transport them over-the-road, (2) based upon Safety-Kleen's experience with other closures, the one and five ppm limits are technically achievable, and (3) all rinsate waters generated during the decontamination process will be transported and handled as a hazardous waste.

The specific rinsate sampling procedures, analytical quality assurance and quality control, and other pertinent HWMU decontamination sampling information can be found in section 2.7, Facility Closure Sampling Plan.

# 2.0 DESCRIPTION OF FACILITY CLOSURE ACTIVITIES

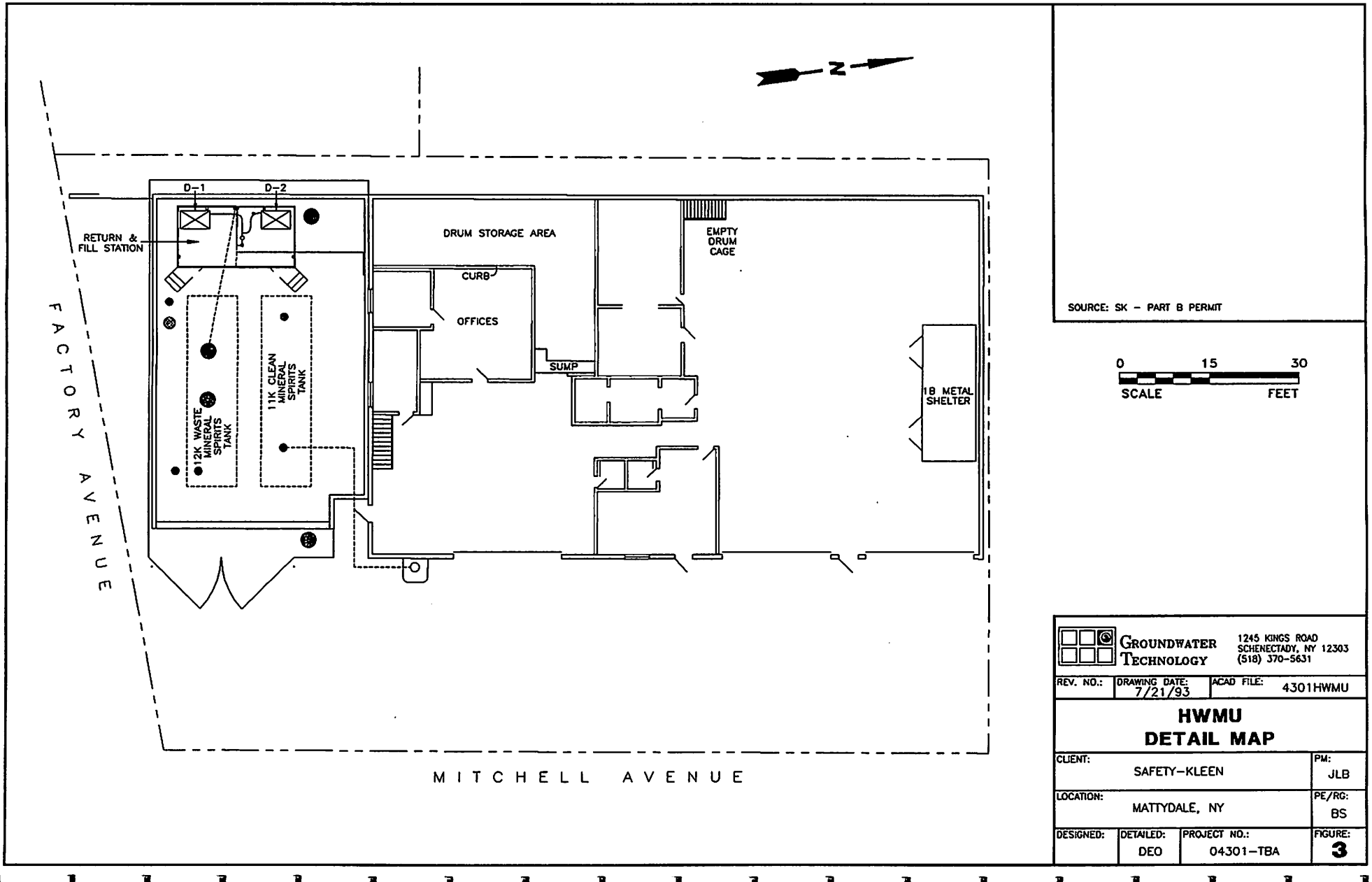
## 2.1 Overview

This section describes the procedures that will be followed in order to close the three HWMUs at the Safety-Kleen Mattydale, New York Service Center (Figure 3, HWMU Detail Map). The purpose of the procedures will be to decontaminate or remove all system components and waste residues on the physical units (tanks, return and fill station parts, and the CSA walls, sump and floor) in accordance with Title 6 NYCRR Subpart 373-3.10(h)(1) and 40 CFR 265.197(a). Therefore, there will be no need for further maintenance, no threat to human health and environment, and no post-closure escape of hazardous wastes or hazardous constituents to groundwater, surface water, or the atmosphere from the units. Remediation of environmental media at the facility will continue under the auspices of the Consent Order.

Key aspects of the closure will be conducted under the supervision of a qualified, independent, New York State registered, Professional Engineer or his/her authorized representative. Closure will commence upon receipt of the NYS DEC approval of the closure plan and when the Dewitt, New York facility is fully operational and the Mattydale facility has been vacated, closure will be completed within 180 days after receipt of the approval letter or the last receipt of hazardous waste, whichever is later, unless an extension to this time is specifically requested.

## 2.2 Site Health and Safety Plan

A site-specific Health and Safety Plan (HSP) which establishes policies and procedures to protect workers and the general public from potential hazards associated with the site is included in this FCP as Appendix A. The HSP has been prepared in accordance with the Occupational Safety and Health Administration (OSHA) "Hazardous Waste Operations and Emergency Responses" regulations cited in 29 CFR 1910.120. The HSP will be reviewed and signed by all Safety-Kleen personnel and its subcontractors who are involved in the closure activities. A copy of the HSP will remain on site during the facility closure field activities.




SOURCE: SK – PART B PERMIT

0 15 30
SCALE FEET

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| REV. NO.: | DRAWING DATE: | ACAD FILE: |
|---|---|---|
| | 7/21/93 | 4301HWMU |

# HWMU DETAIL MAP

| CLIENT: | PM: |
|---|---|
| SAFETY-KLEEN | JLB |
| LOCATION: MATTYDALE, NY | PE/RG: BS |

| DESIGNED: | DETAILED: | PROJECT NO.: | FIGURE: |
|---|---|---|---|
| | DEO | 04301-TBA | 3 |

## 2.3 Return and Fill Station Closure

The return and fill station is used to collect and return the spent mineral spirits to the used mineral spirits storage tank. Decontamination of the return and fill station will be done prior to the cleaning and removal of the underground storage tanks. At closure, the sediment in the dumpsters will be removed, drummed, labeled, and manifested for proper treatment and disposal at a Safety-Kleen recycle center. The dumpsters, dock area, and its enclosure will be thoroughly cleaned with a high pressure wash system and an emulsifying detergent. The components will then be triple rinsed with tap water. All wash and rinsate waters will be discharged through the existing return and fill station piping and will be collected in the used mineral spirits tank. Once the return and fill station sidewalls have been decontaminated, they will be taken down with heavy equipment. It is estimated that 200 gallons of rinsate will be generated during the return and fill station closure process. The construction debris will be loaded into dumpsters and left on site pending disposition.

A final rinsate sample will be collected from each dumpster. The samples will be analyzed for volatile organic compounds in order to determine the effectiveness of the decontamination process. Section 2.7 presents the specific HWMU closure sampling program that will be followed. The clean dumpster and dock structure will be reused by Safety-Kleen or disposed of as scrap metal. If the unit is scrapped, certificates of destruction will be included in the Certified Facility Closure Report. In addition, Safety-Kleen will arrange for the proper handling and disposal of the construction debris in accordance with applicable local, state and federal guidelines. Disposal manifests will be secured as appropriate.

## 2.4 Underground Storage Tank System Closure

In order to safely clean, remove and decommission the underground storage system, the following tasks will be performed during the closure activities:

- Gain access to each tank, and remove the remaining material from each tank and ship the material to a Safety-Kleen Recycle Center.
- Decontaminate and disconnect all appurtenant piping and pumping equipment, rinse, scrape and squeegee the tank interiors, in order to remove all residual waste material and rinsate.
- Remove appurtenant equipment and reuse or sell as scrap.
- Remove the tanks and piping from the excavation.
- Transport/properly dispose of all waste material generated during the project.
- Backfill the excavation with clean fill materials.

When working on the UST systems, all sources of ignition will be removed. Under circumstances where "hot work" (welding, burning, grinding, etc.) is to be performed in or on the tank, a test for combustion gases shall be taken. This is referred to as an explosimeter test. People working in the immediate area will be informed of the work being done, and they will inform the watcher or supervisor immediately of any unusual occurrence which makes it necessary to evacuate the tank.

Before removing any residual waste from a tank, all piping and appurtenant equipment associated with the UST will be flushed with clean mineral spirits followed by an emulsifying detergent solution SK 666 Detergent), and triple rinsed with clean water in order to remove residual material from the piping interiors, and the walls and floor of the used mineral spirits tank system.

Prior to tank entry and at regular intervals, the following tank interior atmosphere tests shall be performed: 1) oxygen ($O_2$) monitoring, 2) flash/lower explosive limit (LEL) monitoring, and 3) photo-ionization potential monitoring for vapor phase volatile organic content. The results of all tests will be displayed on site. Once a tank has been opened, it will be provided with positive ventilation.

Personnel working inside the UST systems will don full face respiratory protection and protective clothing. Storage tanks are considered confined spaces (i.e. spaces open or closed having a limited means of egress in which poisonous gases or flammable vapors might accumulate or an oxygen deficiency might occur), and confined space entry requires special procedures. During such situations, the Standby Observer System will be implemented. In addition, the Health and Safety Plan (Appendix A) will be consulted prior to entering the tank, and the site and District health and safety managers will be notified of such entry prior to implementing the FCP.

The contents of each tank will be removed from the manway or other opening using a pump, vacuum truck or similar equipment. The contents will be shipped (as a hazardous waste) by tanker truck to a Safety-Kleen recycle center. To gain access to a tank, the top manway will be used. Special care will be exercised to minimize spark generation when working on a tank which has contained ignitable material.

The tanks will then be visually inspected to determine the approximate quantity and physical conditions of any remaining waste material, as well as the integrity of the tank. During tank cleaning operations, supply valves will be closed and tagged and bleeder valves left open; or supply piping will be disconnected. Pumps or motors normally activated by automatic controls will be checked manually to be sure they have been disconnected. Instrument power switches will be tagged "OFF".

Each tank interior will be decontaminated in-place using an emulsifying detergent (Safety-Kleen 666 Detergent) and triple rinsed with water. A sample of the final rinsate from the used mineral spirits tank will be collected and analyzed for volatile organic compounds in order to determine the effectiveness of the decontamination process. HWMU decontamination rinsate sampling details can be found in Section 2.7. Rinsate generated from this procedure will be removed from the tanks by a Safety-Kleen vacuum truck. The evacuated materials (sludge and waste waters) will be transported (as a hazardous waste) to a Safety-Kleen recycle center for treatment. The quantity of wash fluid generated (estimated at approximately 500 gallons) will be kept to a minimum in order to limit the amount of waste material.

Following tank interior decontamination, the underground storage systems (tanks and associated piping) will be excavated. Each tank interior will be monitored with an O2/LEL meter prior to excavation to ensure that any flammable vapors are purged prior to removal. If vapors are detected, a sufficient quantity of dry ice or another NFPA approved inerting material/procedure will be introduced into the tank in order to ensure that all flammable vapors have been purged before the tank removal is initiated. The tanks will be removed from the excavation using a crane (other piece of similar heavy equipment), placed on polypropylene, chocked and left on-site until the results of the rinsate samples have been received.

The concrete pad covering the tanks will be removed and stock-piled (on and covered by polypropylene) on-site. The soil/backfill covering each tank will be removed from the tank tops and stockpiled within the excavation as feasible. Any soil removed from the excavation will be screened with a photoionization detector (PID), and returned to the excavation once the tank systems are removed.

Approximately 1,000 cubic yards of soil were removed from the excavation during 1990. Clean fill was placed around the waste mineral spirits tank in the over excavated pit and also in the groundwater recovery trench located underneath the return and fill station during the installation of the waste mineral spirits tank. In addition, impacts to both soil and groundwater in the vicinity of the tank pit have been addressed in the past via remedial systems operated in accordance with the Consent Order. A new system has recently been installed which will continue to address this area. If there are any residual impacts detected in the tank pit fill via the PID, these impacts will be addressed with the Consent Order specified site remedial system, and confirmatory samples will be collected, as appropriate, when remediation is complete.

After removal, each tank will be thoroughly inspected for holes and corrosion and photographed. Following the inspection, the waste mineral spirits tank will either be rendered inoperative by cutting holes into each end, or reused by Safety-Kleen. Given that this tank is an API STiP-3 glasteel UST with integral secondary containment, it may be re-used at Safety-Kleen's discretion. The clean mineral spirits tank will be rendered inoperative by cutting holes in each end, and scrapped.

Following tank removal activities, the tank pit will be backfilled with clean fill material and brought up to grade. The decontaminated tanks and appurtenant piping will be loaded onto a trailer, transported from the site and cut up for scrap once the results of the rinsate samples have been received (documenting the decontamination standard has been met as stipulated in Section 2.7). Photographs and notes on the condition of the tanks and piping, along with the certificate of destruction, will be included in the Partial Closure Report.

## 2.5 Container (Drum) Storage Area Closure

The container storage area (CSA) is used for the storage of drums of used immersion cleaner, dry cleaning waste and dumpster sediment (Figure 3, HWMU Detail Map). The CSA is comprised of floor space within the main warehouse, around which a concrete secondary containment berm (approximately 6" wide, by two feet high) continuously surrounds the perimeter of the storage area. Further an approximate 10 'x 2' x 2' secondary containment sump (which is covered with a metal grate) is located at the entrance way into the CSA.

At closure, all drums will be removed and transported to a Safety-Kleen recycle center. Prior to shipment the drums will be properly packaged, labeled and manifested. The contents of the drums will be reclaimed and the drums will be cleaned for reuse. All appurtenant equipment will be removed from the drum storage area prior to the commencement of closure activities. All necessary electrical power to the drum storage area will be shut off (if required for health and safety purposes) and the main panel circuit breakers will be locked out and tagged.

The concrete floor, secondary containment curbing, and secondary containment sump will be thoroughly cleaned with a high pressure wash system and an emulsifying detergent. These areas will then be triple rinsed with tap water. The following tasks will be performed during the drum storage area closure:

- **Task 1: Concrete Floor, Secondary Containment Curbing and Sump Inspection**

  The concrete floor, secondary containment curbing and secondary containment sump will be inspected (prior to the commencement of decontamination) by a New York State independent registered Professional Engineer. Any cracks, missing seals, etc. will be noted and filled with an inert silicone sealer (clear). Soil from below the concrete floor (conditions permitting) will be sampled if breaches in the floor are noted by the Professional Engineer. The soil sampling locations will be determined in the field based on the Professional Engineer's integrity inspection. A complete description of the soil sampling activities (if needed) are described in Section 2.7, Facility Closure Sampling Plan.

- **Task 2: Worker Decontamination Area Designation**

  Once the decontamination process begins, workers who enter and exit the CSA will be required to remove footwear overboots and/or other contaminated apparel within a designated worker decontamination area (WDA). A portable shallow plastic wading pool structure (approximately 8' x 8' x 2') will be placed next to the designated CSA entry/exit location so that workers can step from the CSA into the WDA. A second worker will assist the other so that the procedure is conducted safely, and in accordance with the FCP. Once inside this area, rubber overboots will be removed, and placed in a Safety-Kleen container for temporary storage (so they may be redone later or properly disposed of). Other apparel will be removed as needed and decontaminated with a water wash and rinse. A Safety-Kleen vacuum truck will remove any water which accumulates within the WDA and it will be handled as a hazardous waste and transported to a Safety-Kleen recycle center for disposal.

- **Task 3: CSA Interior Decontamination**

  The floor, approximately four feet up on each wall, the secondary containment curbing and the sump will be decontaminated with a high pressure wash, an emulsifying detergent and triple rinsed with water. The decontamination water will be directed to the sump and removed with a vacuum truck. The decontamination water will be handled and transported as a hazardous waste, and taken to a Safety-Kleen recycle center for treatment and disposal. A final floor and sump rinsate sample will be collected as prescribed in Section 2.7 in order to document that the decontamination standard has been achieved. If the rinsate sample indicates that the decontamination has not been completed, tasks 1 thru 3 will be completed again, and an additional rinsate sample will be collected.

## 2.6 Equipment Decontamination

Cleaning equipment and any other equipment in contact with hazardous waste, will be washed with a detergent solution (SK 666 Detergent) and the wash water will be pumped into a tanker truck, portable tank or drums which are designed for accumulation and storage of the wastewater. The decontamination area will consist of a nylon reinforced polypropylene liner laid over grade. Hay bales will be placed under the perimeter of the liner and folded over the bales, there-by creating a containment berm. A vacuum truck will remove the rinsate from the bermed area.

Equipment to be decontaminated may include pumps, various shovels, hoses, safety and small equipment (scrapers, etc.). Rinsate will be transported as a hazardous waste to a Safety-Kleen recycle center for treatment. It is estimated that 100 gallons of rinsate will be generated during the equipment decontamination process.

## 2.7 Facility Closure Sampling Plan

### Rinsate Sampling:

The final return and fill station dumpsters, CSA and used mineral spirits tank interior rinsate samples, will be analyzed as indicated in Table 3. The final rinsate samples will be collected using disposable polypropelene bailers.

### Container Storage Area Soil Sampling:

If subsurface soil samples are collected from beneath the concrete floors, a small diameter (2" or less) hole will be cored and a hand auger will be used to retrieve a soil/subbase sample from approximately 6-12 inches from beneath the concrete (conditions permitting). The sample designations and the analyses that will be run on each are presented in Table 3. Volatile headspace readings (as determined with a photoionization device) will be recorded for each soil sample obtained.

Between soil sampling locations, the concrete core bit and hand auger will be placed over a contained area (a 30 gallon barrel) and decontaminated according to the following procedure: 1) Sampling equipment will be washed with a Liquinox soap and water wash, 2) rinsed with distilled water, 3) rinsed with methanol, 4) followed by another distilled water rinse, 5) rinsed with nitric acid, and 6) rinsed once again with distilled water.

**TABLE 3**

**Facility Closure Sampling Plan**

| SAMPLE LOCATIONS | SAMPLE ID | MATRIX | UANT | EPA ANALYSES |
|---|---|---|---|---|
| HMU SAMPLING: | | | | |
| R/F-DUMPSTER-LEFT | RFD-LEFT | WATER | 1 each | TPH-GC |
| R/F-DUMPSTER-RIGHT | RFD-RIGH | WATER | 1 each | TPH-GC |
| USED TANK-FINAL RINSE | UTFR-1 | WATER | 1 each | TPH-GC |
| CONTAINER STORAGE AREA | CSA-1 | WATER | 1 Each | EPA 8240 |
| CSA SUB-BASE SOILS * | CSA-B-X | SOIL | 1 each | EPA 8240 |
| (Only if PE Required.) | | | | |
| QA/QC SAMPLING: | | | | |
| BLND DUP-CSA RINSATE | DUP-CSA | WATER | 1 Each | EPA 8240 |
| BLND DUP-R/F RINSATE | DUP-R/F | WATER | 1 Each | TPH-GC |
| RINSE WATER SOURCE | RW-SRCE | WATER | 1 Each | TPH-GC, EPA 8240 |
| TRIP BLANK | TB-X | WATER | 1 Each | EPA 8240 |

KEY

TPH-GC = Total Petroleum Hydrocarbons by G.C. (MOD EPA METHOD 8015)

X = Volume collected based on conditions.

Mattdale FCP
8/9/93-v:2
FCP-sam2.wk1

**General Procedures and Analytical Protocols:**

All samples retained for fixed based laboratory analysis will be sent to GTEL Laboratories in Milford, NH. NYS DEC ASP Category B Quality Assurance/Quality Control (QA/QC) and reporting procedures will be followed as appropriate. The TCL and respective method detection limits for each analysis are included in Appendix B. These are consistent with those already established at other Safety-Kleen sites throughout New York State.

During all sampling activities, the field sampler will wear new disposable latex or nitrile gloves between each location. All media samples collected will be prepared in accordance with applicable laboratory and US EPA SW-846 (3rd edition, 1986) protocols (Appendix C, Recommended Sample Containers, Preservation, Storage, and Holding Times). Laboratory batch QA/QC samples such as duplicates, matrix spikes, matrix spike duplicates, and surrogate recoveries as applicable will be processed. An internal laboratory QA officer (someone other than the analysts) will review the data package and prepare a brief narrative of the QA/QC results. The analytical results, narrative and the lab QA/QC sample results will be part of the laboratory data package. The laboratory data will be reported, and the QA/QC data will be available for inspection at both GTEL labs, and GTI's office in Schenectady, New York. Laboratory Quality Assurance/Quality Control (QA/QC) Criteria for each specified method is included in Appendix D. Appendix E is a description of the Laboratory's internal data validation procedures and criteria that will be followed.

## 2.8 Certified Closure Report

The Facility Closure Report will be prepared according to the guidelines stated in Title 6 NYCRR Part 373-3.7(f)(1) and 40 CFR Part 265.115. The report will be reviewed and certified by an independent Professional Engineer registered in the State of New York in order to demonstrate that compliance with the approved Facility Closure Plan was attained. The report text will contain:

- operating status of the facility,
- description of the HWMUs closed,
- description of the closure field tasks performed,
- chronological field log of closure activities,
- description of the closure sampling protocols,
- description/discussion of the analytical data,
- volume and method of hazardous waste removed from the facility, and
- Professional Engineer certification.

The report appendices will contain a directory of project contacts, bills of lading, manifests or certificates of destruction issued, laboratory analytical and QA/QC testing results, a copy of the NYS DEC approved Facility Closure Plan, and photodocumentation of the closure activities.

## 3.0 ESTIMATED CLOSURE COSTS

The estimated cost of conducting partial closure as specified in this plan is estimated at $ 80,700 in 1993 dollars. This closure cost estimate is based on the cost of hiring a third party to close the hazardous waste management units in accordance with 6 NYCRR 373-2.8(c)(1)(ii). The costs are detailed below:

**1.0 Health & Safety Plan Preparation**

Professional Services ($ 200.00)

Includes:

- Prep health and safety plan according to 29 CFR 1910.120

**Total Task 1.0 = $ 200.00**

**2.0 Project Organization & Management**

Professional Services ($ 2,500.00)

Includes:

- Written notification of Fire Marshall's office
- Subcontractor coordination
- Locating underground utilities
- Project organization
- Coordination with Safety-Kleen/NYS DEC
- Project QA/QC by GTI senior and technical staff

**Total Task 2.0 = $ 2,500.00**

**3.0 Hazardous Waste Management Unit Closure**

Professional Services ($ 7,500.00)

Includes:

- Supervision of subcontractors
- Photodocumentation of closure activities
- Collection of rinsate samples
- Documentation and shipment of lab samples
- Closure observation by Professional Engineer (2 days)

Subcontractor Services ($ 20,000.00)

Includes:

- Decontaminate and dismantle return and fill station
- Decon of the CSA
- Cut/cap piping as needed
- Removal of the Tank System

Equipment Rental and Miscellaneous Expenses ($ 2,500.00)

Includes:

- PID detector rental
- Explosimeter rental
- Travel expenses
- Sample shipment costs

Analytical Services ($ 7,500.00)

Includes:
- TPH-GC
- volatile organics (EPA 8240)

**Total Task 3.0 = $ 37,500.00**

**4.0 Disposal of Contaminated Wastes**

Professional Services $ 1,500.00

Includes:
- Preparation of waste disposal applications
- Supervision of removal of wastes
- Photo-documentation of waste removal
- Coordination of removal activities with Safety-Kleen

Third Party Disposal (17,500 gallons @ $ 2.00/gallon) $ 35,000.00

**Total Task 4.0 = $36,500.00**

**5.0 Closure Report and Certification**

Professional Services ($ 4,000.00)

Includes:
- Chronological site-specific activities
- Decontamination procedures description
- Waste disposal manifests
- Tank disposal manifests
- Analytical testing results presentation
- Graphics preparation (base maps, etc)
- Photodocumentation
- Certification of closure signed by P.E.

**Total Task 5.0 = $ 4,000.00**

**Estimated Total Project Costs: $ 80,700.00**

**Note:** This cost estimate assumes that this unit is closed clean. If site conditions reveal that this is not the case, changes in this cost estimate will be required.

## 4.0 FACILITY CLOSURE SCHEDULE

Closure activities at the Mattydale, New York service center will begin following approval of the FCP by the NYS DEC, the Dewitt facility is fully operational and the Mattydale site is completely vacated. The NYS DEC will be supplied a copy of a schedule two weeks prior to the commencement of field work.

## 5.0 FINANCIAL/LIABILITY CONSIDERATIONS FOR CLOSURE

Safety-Kleen Corp. is the owner/operator of the Mattydale, New York service center. The cost for closure of the facility, as estimated above, will be assured through a letter of credit with a standby trust fund. In accordance with the applicable New York State Hazardous Waste Management Regulations, Safety-Kleen must possess sudden and non-sudden liability insurance. Safety-Kleen currently carries both of these types of coverage for the Mattydale, New York facility. Certificates of Insurance will be submitted upon request. Financial and liability assurance was provided to the NYS DEC with the Part B permit application.

# APPENDIX A
# HEALTH AND SAFETY PLAN

GROUNDWATER TECHNOLOGY

FIELD COPY

~~FILE COPY~~

GROUNDWATER TECHNOLOGY, INC.

Chadds Ford West, Rt. 1, Chadds Ford, PA 19317 (215) 388-1466
Fax: (215) 388-6298

SITE SAFETY PLAN

S.K.

REQUESTED AND PREPARED

Mattydale

FOR

SAFETY KLEEN
FACTORY AVE
SYRACUSE, N.Y.

Project Number

PREPARED BY:

KENNETH J. DILUIGI, CSM, CIHT, CET
REGIONAL HEALTH & SAFETY MANAGER

GROUNDWATER TECHNOLOGY, INC.
CHADDS FORD WEST, THE CONCORD BUILDING
U.S. ROUTE 1
CHADDS FORD, PENNSYLVANIA 19317

12/6/89
DATE

INDUSTRIAL.SSP

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Spill or Air Release

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- Vapor Monitoring Sheets
- Mini-Ram Data Sheets
- Calibration Logs

**Appendix I -** Map to Hospital

Groundwater Technology, Inc.
Chain of Command - Responsible Individuals

1. Frank Aceto , Regional Manager

2. Kenneth J. DiLuigi, CSM, CIHT, CET , Regional Health & Safety Manager

3. JOE BASILE , Project Manager

4. KEITH MARCOTT , Project Supervisor

5. JOE BASILE , Site Safety Officer

6. " " , Site Fire/Medical Officer

The chain of command for this project is as follows:

- Immediate job coordination problems and/or scheduling will be brought to the attention of the Project Manager.
- Problems relative to personnel health and safety will be brought to the attention of the Regional Health & Safety Manager or Site Safety Officer.
- Job progress meetings and problems requiring corporate coordination and input will be brought to the attention of personnel listed above.

## 1.0 GENERAL

This site-specific Health and Safety Plan shall be in effect throughout the duration of the project. All personnel, regardless of the company for which they are employed, are subject to the requirements of this plan.

## 2.0 SITE HISTORY AND PROJECT DESCRIPTION

- A RELEASE OF MINERAL SPIRITS OCCURED 1 MONTH AGO

- REMEDIATION SHALL INCLUDE
  1) SOIL GAS SURVEY
  2) INSTALL SOIL VENT SYSTEM
  3) DEPLOY WTDP
  4) PERFORM RECEPTOR SURVEY
  5) INDUSTRIAL HYGIENE SAMPLING

## 3.0 WORK AREAS

Work and support areas shall be established based on ambient air data and proposed work sites. They shall be established in order to contain contamination within the smallest areas possible and shall ensure that each employee has the proper personal protective equipment for the area or zone in which work is to be performed.

Adequate safety instruction signs shall be placed in areas where admittance is restricted due to hazardous environment. Proper care shall be maintained to assure that all work areas are contained.

Personnel shall not, under any circumstances, be permitted on the site alone. All personnel shall use the "Buddy System", in groups of two or more, while on site.

This mandate is in effect for all site activity in Level C or above, or, in Confined Space Entry activities. Personnel may be on site alone for Level D site activity, if confined space entry activities are not in progress.

## 4.0 PROTECTIVE EQUIPMENT

### 4.1 General

Protective clothing shall be worn by all persons on site as

directed by the site supervisor and/or safety officer of the job. This person is named in the beginning of this report.

### 4.2 Personnel Protection Requirements and Methods

Action levels shall have been developed by Groundwater Technology's industrial hygienists and safety professionals. Action levels are those concentrations of which an upgrade in protective clothing or equipment is required. Organic vapor concentrations are to be continuously monitored in the field by use of an OVA and/or HNu with readings being taken in the breathing space occupied by the field personnel to determine whether an action level has been exceeded.

The Site Safety officer will designate the appropriate level of protection for personnel entering the work area as determined by the predetermined action level and Groundwater Technology's air monitoring program. It will be the responsibility of each contractor to supply their personnel with the required personal protective equipment and to ensure that they are knowledgeable and proficient in its use.

Respiratory protection shall be selected for use as warranted by ambient air monitoring and type of site work being performed. Levels of Protection are as follows, from highest protection needed to no protection, within each of the four categories:

Level A

Level A should be selected when the highest level of respiratory, skin and eye protection is needed.

- o Approved, positive pressure-demand, self contained breathing apparatus (SCBA) or airline
- o Full encapsulating, chemical-resistant clothing

  Type CHALLENGE 5200

- o Gloves (outer), chemical-resistant

  Type NBR

- o Gloves (inner), chemical-resistant

  Type LATEX

- o Chemical-resistant disposable outer-boot coverings,

  Type NEOPRENE

- o Steel toe and shank boots
- o Hard hat
- o All seams between protective clothing items will be sealed with duct tape

- o Two-way radio communications

Level B

Level B should be selected when the type and atmospheric concentrations of substances have been identified and a high level of respiratory protection, but less skin protection, is required. It should also be selected for initial site entries, or, when the atmosphere contains less than 19.5% oxygen.

- o Approved, positive pressure demand, self-contained breathing apparatus (SCBA) or airline
- o Chemical-resistant clothing

  Type P.E. TYVEK

- o Gloves (outer), chemical-resistant

  Type NBR

- o Gloves (inner), chemical-resistant

  Type LATEX

- o Chemical-resistant disposable outer-boot coverings

  Type LATEX

- o Steel toe and shank boots
- o Hard hat
- o All seams between protective clothing items will be sealed with duct tape

Level C

Level C should be selected when the type of air contaminants have been identified, concentrations have been measured, and a canister is available that can remove this contaminant. The atmospheric concentration of oxygen must be greater than an equal to 19.5%.

- o Approved, full-face air purifying, canister-equipped respirator
- o Chemical-resistant clothing

  Type P.E. TYVEK

- o Gloves (outer), chemical-resistant

  Type NBR

- o Gloves (inner), chemical-resistant

  Type LATEX

- o Chemical-resistant disposable outer-boot coverings

  Type LATEX

- o Steel toe and shank boots
- o Hard hat
- o All seams between protective clothing items will be sealed with duct tape

Modified Level D

Level D should be worn when the contaminants are known within acceptable respiratory limits and there is no hazard form direct skin contact.

- o Gloves (outer), chemical-resistant

  Type NBR

- o Gloves (inner), chemical-resistant

  Type LATEX

- o Chemical-resistant disposable outer-boot coverings

  Type LATEX

- o Steel toe and shank boots
- o Hard hat
- o Standard work uniform
- o Goggles or safety glasses

After selection of the proper respiratory protection device(s), documentation shall be developed governing the operating procedures to be followed, based on employee/wearer training on proper use and limitations of specific device(s). No person may be assigned a task requiring the use of respiratory protection equipment without first being properly trained in its use and limitations. Before wearing of any respiratory protection equipment is permitted, wearer must first complete a fit test, and must be completely aware of fitting procedures.

No person may be assigned a task requiring the use of respiratory equipment where it has been determined that said person has a physical limitation which might result in injury in conjunction with respiratory equipment use. A physician shall be consulted as to individual limitations based on information obtained in baseline physical examinations, and subsequent follow-up examinations.

All respiratory equipment shall be properly fitted to worker(s) who will be using such equipment. All equipment shall be properly cleaned and inspected for worn parts as often as necessary. SCBA's should be inspected once a month at a minimum. All equipment shall

be cleaned before being worn by different operators.

Any persons wearing glasses must wear short-templed or no-templed glasses which may be taped to the wearers face, to prevent interference with respiratory face piece. Wearing of contact lenses in contaminated areas, or with respiratory protection, is prohibited.

Applicable protective clothing shall be selected and worn at all times by employees exposed to, or in areas suspected of, contamination.

**4.3 Action Levels**

All initial site access and activities will be done in Level D attire as noted in Section 4.2.

**4.3.1 Ionization Detector Response**

Type FID -or- PID

| | | | |
|---|---|---|---|
| 0 | to 50 | : | Level D to be worn |
| 51 | to 750 | : | Level C to be worn |
| 751 | to 10,000 | : | Level B to be worn |
| Above | 10,000 | : | Immediately withdraw from area |

**4.3.2 Combustible Gas Response**

| | | |
|---|---|---|
| 0.0 to 20.0% LEL | : | Continue with normal activity |
| Above 20.0% LEL | : | Immediately withdraw from area |

**4.3.3 Oxygen Detector Response**

| | | |
|---|---|---|
| 0.0 to 19.5% Oxygen | : | Level B is mandatory |
| 19.5% to 23.0% Oxygen | : | Continue with normal activity |
| Above 23% Oxygen | : | Immediately withdraw from area |

**4.3.4 Radiation Monitor Response**

| | | |
|---|---|---|
| 0.0 to 2.0 mR/hr | : | Continue with normal activity |

| | | |
|---|---|---|
| 2.0 to 3.0 mR/hr | : | Level C is mandatory |
| 3.0 to 5.0 mR/hr | : | Level B is mandatory |
| Above 5.0 mR/hr | : | Immediately withdraw form area |

### 4.3.5 Other Considerations

_____

_____

_____

_____

_____

_____

The levels for ionization detector response may be upgraded by the response to either oxygen or radiation. These levels may never be downgraded without the express permission of the Regional Health & Safety Manager (i.e., Ionization detection reveals that Level D apparel be worn to 500 units on the meter, and the meter shows that 50 units are present. The oxygen meter reveals that the concentration is 17.8%. The normal Level D response is now upgraded to Level B.)

Contact the Regional Health & Safety Manager for the choice of proper gloves and suits, or, if clarification of any of the action levels as listed above is needed.

## 4.4 Decontamination Procedures

Where high levels of site contamination are discovered such that respiratory, skin and eye protection are necessary, decontamination will be required. A support area will be positioned so that no one is permitted to enter or leave without passing through this area. At the boundary between the work and support areas, decontamination processes for equipment and personnel are required. All access to and from the work area will be through this section of the support area.

Decontamination will be performed to protect workers from exposure to dangerous materials and to eliminate the hazard of contamination on equipment.

All water used in decontamination procedures should be stored in portable storage tanks, until sufficient amounts are stockpiled to facilitate disposal treatment.

At each work location reusable sampling and personal protective equipment will be decontaminated prior to sampling, between each sample, and after sampling. Sampling equipment will be decontaminated by steam cleaning or washing with a mixture of alconox and water, the rinsed twice with distilled water and allowed to air dry on a clean plastic tarp. All decontamination solution shall be disposed at the work station where it was generated. Disposable sampling and personal protective equipment will be placed in plastic bags and temporarily stored in designated drums. These drums shall be disposed of according to regulatory guidelines, if necessary.

Following proper decontamination procedures (decon) is as important as donning the appropriate safety gear. If proper decon is not done, many of the protective measures taken while working on-site can be for naught. All workers on-site must always be conscious of the different ways they can be exposed to the hazardous material.

Gloves and boots are the first items that should be deconned. Four basins should be set up near the decon station at the beginning of the day. These basins should be large enough to step into. A brush will be available to clean the boots and gloves.

First Basin - soap and water - boot cleaning
Second Basin - water - boot rinsing
Third Basin - soap and water - glove cleaning
Fourth Basin - water - glove rinsing

A hose can be used to clean the respirators and other equipment.

The sequence of steps for removing and cleaning personal protective equipment follows:

- Wash gloves, boots, and outer disposable tyvek coveralls.
- Rinse work gloves, boots, coveralls.
- Remove tape at wrists, ankles and neck.
- Remove outer boots (if used) and outer gloves.
- Remove respirator or mask.
- Wash respirator.
- Package and/or dispose of respiratory or filters.
- Package boots and gloves or dispose of them.
- Dispose of all contaminated items in properly labeled drums.

- o If necessary, copy notes from contaminated paper onto clean paper while wearing inner gloves (surgical gloves) at decon station area.
- o Remove latex gloves.
- o Dispose of latex gloves and contaminated note paper.
- o Wash hands and face.

## 5.0 SAFETY EQUIPMENT

### 5.1 General

This section applies to all equipment required on-site to prevent injury.

### 5.2 Color Code

#### 5.2.1 Red

Red shall be used to identify fire equipment; identify containers of flammable materials; stop bars/buttons on mechanical machinery used for emergency power disconnection.

Red lights shall be provided at barricades or obstructions. Danger signs shall be painted red.

#### 5.2.2 Yellow

Yellow shall be used as the basic color for identifying caution. Physical hazards shall be marked by yellow signs, (i.e., tripping, falling, hitting against, caught in between, etc.).

### 5.3 Warnings and Notifications

Signs and tags shall be of a design in accordance with 29 CFR 1910.145.d. Specific signs designated in this section are danger, caution, slow-moving vehicle, biological hazard, and safety instruction. Signs shall be worded in a clear, concise manner, positive in suggestion, accurate in fact.

Tags shall be used for temporary situations, to warn of broken equipment or other similar hazard. These tags are only temporary, as is the hazard being called to attention. Temporary hazards should be remedied as quickly as possible. This can be done by either fixing the damaged item or dismantling, removing or rendering the item tamper-proof. Tags will be designed in accordance with 29 CFR 1910.145.f-2.

### 5.4 Communications for Entry Into Hazardous Areas

Where large distances may separate workers or in extremely dangerous areas, a communication network shall be established using portable two-way radios. The use of hand signals may be employed in close areas where portable radios are inconvenient, or unavailable.

All employees shall be trained in understanding hand and radio signals, to alleviate any problems encountered in the case of an emergency. All radio equipment shall be certified as intrinsically safe.

## 6.0 FIRE PREVENTION

### 6.1 General

Fire prevention and protection techniques shall be instituted on-site to minimize sparks. Emergency procedures in case of fire shall be discussed with workers before every new work area location or new work activity begins. Diagrams of emergency routes shall be displayed in the work areas and in areas and any other areas where workers will break and relax from work activities.

Only FM approved metal safety cans will be used to transport and store flammable liquids.

All gasoline and diesel-driven engines requiring refueling must be shut down and allowed to cool before filling.

Smoking is not allowed during any operations within the work area in which petroleum products or solvents in free-floating, dissolved or vapor forms, or other flammable liquids may be present.

No open flame or spark is allowed in any area containing petroleum products, or other flammable liquids.

### 6.2 Explosive Gas Survey

Before any new work locations are entered, or, before any daily work activities have begun, an explosive gas survey shall be conducted by a GTI representative. If there are no explosive gases or vapors, work activities may commence. If explosive levels are registered, then work activities shall halt and workers moved out of the immediate work area. Work will not commence until explosive levels are no longer registering on the meter or the source of the explosive gases are found and corrected. During work activities, monitoring for explosive vapors shall be continuous.

## 7.0 MEDICAL SURVEILLANCE PROGRAM

### 7.1 General

This section covers all employees included in on-site testing or supervision that may be exposed to potential health hazards.

### 7.2 Physicals

A baseline physical examination must be conducted on all employees before they are permitted to engage in sampling, cleanup and remedial action work. A complete medical survey should be completed on each employee upon start of employment. Yearly re-examinations should be performed to update information on employee health status.

Any time an injury occurs while on the job, in areas where potential or known hazard exist, the injured party shall submit to periodic monitoring of blood, pulmonary functions, skin contamination, etc., at a clinic equipped for such monitoring. This monitoring should be continued until the extent of contamination, if any, can be accurately determined. Any injured person who is currently undergoing periodic testing will not be permitted back to work in a hazardous atmosphere. This restriction shall be continued until conclusive evidence can be presented that returning to work will not further endanger the employee's health. At this time, a Return to Work form will be completed by the attending physician.

Where injury does not involve potential hazardous contamination, but does result in limitation of work abilities, the employee should not return to work until a doctor has examined the injury, and determined it sufficiently healed. At this time, a Return to Work form will be completed by the attending physician.

## 8.0 ON-SITE MEDICAL PROVISIONS

### 8.1 General

This section covers all required on-site medical services, hygiene services and information pertaining to area hospitals and clinics that are necessary for treatment of injury.

### 8.2 Accident Reporting

When an emergency situation occurs, a warning procedure should be initiated by the first person to recognize the situation. Warning may consist of short blasts of an air horn for injuries or illness, or, a long continuous blast of the horn when immediate evacuation of an area is necessary. In the event of accident or injury of any type on-site, a report of such accident shall be made immediately. The site supervisor shall be responsible for remedial plan of action. Supervisor shall be responsible for completing an Injury Report.

### 8.3 First Aid

Eye washes will be located on site, and shall be within defined work area where contact with hazardous materials may occur. A complete industrial first aid kit shall also be located on site. It will be the responsibility of the prime contractor to supply these items. It shall be the responsibility of the site supervisor/safety officer to notify all employees as to the location and proper use of these items. No first aid supplies shall be used in such a manner which constitutes misuse or poses a threat of contamination to area.
Vehicles used for site work will be equipped with a first aid/safety kit and safety equipment including:

- fluorescent vests,
- cones,
- flags (as needed)
- hazard tape
- barricades (as needed)
- fire extinguisher,
- flashlight and extra batteries,
- water, suitable for drinking,
- portable eye wash,
- ear plugs,
- safety goggles,
- 2 Tyvek suits,
- plastic garbage bags, and
- appropriate emergency bandage material.

### 8.4 Heat Stress

Heat stress may be of concern depending upon the ambient temperature. The heat stress of personnel on-site shall be monitored by use of an oral thermometer, using a reading taken at the beginning of the work day or shift as a baseline.

If any person shows an increase of greater than one (1) degree from the reading taken at the beginning of the work day or shift, that person shall be relieved of duty until his ambient body temperature returns to the baseline reading. He/She shall immediately be encouraged to use adequate control methods to reduce his/her body temperature.

If, after returning to the baseline, a similar event occurs, the person shall be relieved of duty for the duration of the work day. He/She shall be also be relieved of duty if overt signs of heat exhaustion, or, heat stroke are present.

One or more of the following control measures can be used to help control heat stress:

- Provision of adequate liquid to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an

accurate indicator of adequate salt and fluid replacement.

- Replacement fluids can be a 0.1% salt water solution, commercial mix such as Gatorade or Quick Kick, or a combination of these and fresh water.

- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts for workers or earlier/later work schedules.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

- All breaks are to be taken in a shaded area.
- Employees shall remove impermeable protective garments during rest periods.

- Employees shall not be assigned other tasks during rest periods.

- All employees shall be informed of the importance of adequate rest, acclimatization and proper diet in the prevention of heat stress.

Heat Stress Monitoring

Heat stress may occur even in moderate temperatures and may present heat rash, heat cramps, heat exhaustion, and/or heat stroke.

Monitoring procedures should be implemented to prevent heat stress arising from any of the following: environmental conditions, use of personal protective equipment, intensity of workload. Such procedures may include the following:

Heart Rate Evaluation

Heart rates should be measured periodically by taking a 30 second radial pulse (thumb side of wrist using middle and ring fingers and multiplying the number of beat by 2) at the beginning of a rest period. Frequency of monitoring is determined according to adjusted air temperature and level of personal protective equipment worn. See Table 1.

| Adjusted ** Temperature | Normal * Ensemble | Impermeable * Ensemble |
|---|---|---|
| 90 F or above | After @ 45 min work | After @ 15 min work |
| 87.5-90 F | After @ 60 min work | After @ 30 min work |
| 82.5-87.5 F | After @ 90 min work | After @ 60 min work |

| | | |
|---|---|---|
| 77.5-82.5 F | After @ 120 min work | After @ 90 min work |
| 72.5-77.5 F | After @ 150 min work | After @ 120 min work |

* For work levels of 250 Kcal/hr

** Calculate adjusted air temperature by using this equation:
temp adj F = temp f + (13 x % sunshine)
Measure air temp with bulb shielded from radiant heat.

| Signs and Symptoms of Heat Stress | Treatment |
|---|---|
| Heat rash<br>- red rash on the skin | Increase fluid intake |
| Heat cramps<br>- muscle spasms<br>- pain in the hands, feet, and abdomen | Rest in cool areas |
| Heat exhaustion<br>- pale, cool moist skin<br>- heavy sweating<br>- dizziness, nausea, fainting | Apply cool water to skin surfaces |
| Heat stroke<br>red, hot, usually dry skin<br>- lack of or reduced perspiration<br>- nausea<br>- dizziness and confusion<br>- strong, rapid pulse<br>- coma | Transport to nearest hospital -- if symptoms are not reversed by above measures. |

**8.5 Cold Stress**

If the project extends into the winter, cold stress could be an occupation stress which can be addressed.

- Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body which have high surface-area-to-volume ratios such as fingers, toes, and ears are the most susceptible.

- Two factors influence the development of a cold injury; ambient temperature and the velocity of the wind. Wind

chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees F., with a wind of 15 miles per hour is equivalent in chilling effect to still air at least 18 degrees below zero.

- o As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph is increased to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

- o Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

  - Frost nip or initial frostbite: characterized by sudden blanching or whitening of skin.

  - Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

  - Deep frostbite: tissues are cold, pale and solid; extremely serious injury.

  - Systematic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: 1) shivering, 2) apathy, listlessness, sleepiness and sometimes rapid cooling of the body to less than 95 degrees F., 3) unconsciousness, glassy state, slow pulse, and slow respiratory rate, 4) freezing of the extremities, and finally 5) death.

- o Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia.

- o Blankets, warm drinks (other than caffeinated coffee) and warm break areas are essential.

- o The overall goal is to keep from getting wet. If one does get wet, he/she should dry off and change clothes.

- o Cold stress training is also appropriate for work at the site.

**8.6 Emergency Notification**

A complete list of all State and local Police Departments, Ambulance, and Rescue Departments and a listing complete with routes to all hospitals and emergency facilities shall be maintained by the Site Safety Officer, and second in command. The list must include phone numbers and quickest routes to areas

facilities. The Site Safety Officer shall also contact the hospitals or emergency treatment center and inform them of an injured workman. Advice on the transportation method, and if necessary, decontamination or treatment shall be sought. Cost for medical treatment shall be the responsibility of the Prime Contractor. Facilities to be listed on the site are listed below, including telephone numbers.

Police Department STATE POLICE
(315) - 457-2600
911

Fire Department MATHDALE
(315) - 425 - 3333
911

EMS Unit MAY MAC
(315) - 425 - 3333
911

Hospital ST. JOSEPH'S
301 PROSPECT AVE.
SYRACUSE, N.Y.
(315) - 425 - 5111

## 9.0 AIR QUALITY/AMBIENT AIR MONITORING

### 9.1 General

This section will govern all air monitoring to be done on-site preceding the start of operations. It will also govern ongoing air monitoring during testing and cleanup of site. Reliable measurement of airborne contaminants are necessary to select appropriate protective equipment. Protection equipment will be

necessary, based on the potential health effects of exposure to contaminants found.

## 9.2 Preliminary Survey

During all operations, air monitoring shall be conducted by a trained professional from GTI. The professional shall have working experience in the chemical industry and/or chemical waste disposal industry. He/She will have a sound working knowledge of state and federal occupational safety and health regulations, and formal training in occupational safety and health. The preliminary survey shall be conducted in the following manner:

Portable real-time instrumentation to be utilized will be:

- Century Foxborough Organic Vapor Analyzer
- HNu PI-101 Photoionization Detector
- Explosimeter
- Oxygen meter
- Radiation Survey Meter

All proposed areas where sampling, excavation, or any other operation is to take place shall be monitored continuously.

## 9.3 Daily Surveys

All daily monitoring procedures shall be the same as those described above in the preliminary monitoring procedures except that the level of personal protection may be stepped up or down if the level of respiratory, skin or eye protection permits.

Ambient air monitoring shall be conducted throughout the duration of all operations on site. A minimum of five locations around the perimeter of the site will be established and actively monitored during operations. High risk workers shall be monitored due to the possibility of significant exposure varying directly with distance from the source. Monitoring these workers conserves resources that would be necessary to monitor workers further removed from the contaminated source.

In the event that daily air analysis result in the ambient air exceeding recommended levels for the respiratory equipment utilized, the Project Site Supervisor will be notified immediately. The Project Site Supervisor shall immediately inspect operating conditions at the site and attempt to determine the cause of the elevated levels in the ambient air. The Project Site Supervisor may require changes in the operating procedures in order to reduce or eliminate elevated conditions.

In the event elevated levels persist after several attempts to reduce such levels, the Project Site Supervisor will immediately stop all operations at that location and either:

a. Step-up respiratory and worker protection to next level of protection.

OR

b. Remove workers from that location until conditions are improved.

At that time, ambient air monitoring shall be continued until safe levels are reduced.

This program will be conducted and monitored by Groundwater Technology, Inc. All equipment utilized for sampling shall be maintained and calibrated as per factory specification and shall be documented and included in project record documents. All ambient air monitoring results shall be provided to the Project Site Supervisor within 1 hour of having obtained results. These results shall be in written form and in ink.

**9.4 Records**

Accurate records shall be kept of all air monitoring results. These records should include date, time, place of sample, air temperature, weather conditions, and a physical description of any obvious hazards that may influence the results of the tests. These records shall be maintained as part of the on-site documentation, and shall be retained by the owner at the conclusion of the project. A copy of these records will be retained by Groundwater Technology, Inc., if permitted, to maintain accurate site records.

**9.5 Hazard Assessment**

Personnel present on-site shall be advised of all potential hazards associated with substances that are present.

An evaluation of potential hazards has been conducted utilizing information acquired form the client, or a designated representative, to ensure that site activities, personnel protection and emergency materials expected to be encountered.

The chemical information listed below represents the most hazardous conditions that may be present on the site. It represents a combined correlation of data from each of the containments known to be present on the site, giving levels which are deemed to be having the greatest potential for adverse health affects.

If the contents of the site are unknown, because of lack of sampling data, the space below will be marked UNKNOWN.

If data is not available for the parameters listed below, they will be listed as NOT AVAILABLE.

| | | |
|---|---|---|
| TLV | Threshold Limit Value | 100 |
| TLV-TWA | Threshold Limit Value-Time-Weighted Average | 100 |
| TLV-STEL | Threshold Limit Value-Short-Term Exposure Limit | N/A |
| TLV-C | Threshold Limit Value-Ceiling | N/A |
| PEL | Permissible Exposure Limit | N/A |
| REL | Recommended Exposure Limit | 50 |
| IDLH | Immediately Dangerous to Life or Health | 10,000 |
| ODOR T. | Odor Threshold | N/A |
| V.P. | Vapor Pressure | < 5 mm |
| I.P. | Ionization Potential | < 10.2 eV |
| FL-P | Flash Point | 100°F |
| LEL | Lower Exposure Limit | UNKNOWN |
| UEL | Upper Exposure Limit | UNKNOWN |

### 9.6 Engineering Controls

Where feasible, engineering controls shall be the primary means utilized to maintain containment exposure within the limits prescribed to be safe.

## 10.0 SITE SECURITY

The Project Site Supervisor shall be responsible for the management of any security systems implemented at the site. Access to the site shall be at the discretion of the site supervisor.

No visitors shall be allowed without the approval of the Project Supervisor. Visitors shall not be permitted to enter known or suspected active hazardous work areas without proper indoctrination by the Site Safety Officer and Project Supervisor.

## 11.0 PROGRESS MEETINGS/EMPLOYEE TRAINING

## 11.1 Tailgate Safety Meetings

Tailgate safety meetings shall be held at the beginning of each shift at a central location in a non-contaminated area. This area should be noted on the site plan. All ongoing activities shall be discussed, and air monitoring results will be presented. Safety measures shall be reviewed to ensure all employees are aware of all precautionary methods.

## 11.2 Orientation/Indoctrination

Orientation and Indoctrination of all new employees shall be conducted by the Project Site Supervisor/Safety Officer before the new workers are allowed access to the work area. The indoctrination shall include discussion of work activities, chain of command, respiratory protection program, emergency work exits and any other applicable information governing everyday work activities.

## 11.3 Training

It is important that all employees be properly trained in all tasks to be performed. This training includes, but is not limited to, sampling and removal procedures, protective clothing fitting, decontamination procedures where necessary, proper care to be used around extremely toxic or flammable materials, and proper care to be observed in areas of extreme danger. All employees are required to be trained in the following areas of health and safety awareness:

- Basic Safety: this includes cause and prevention of slip, trip and fall hazards, safe drum handling and opening techniques, safe lifting techniques, heat stress illness and its prevention, etc.

- Hazardous Protection: dealing with the identification, recognition and safe work procedures of toxic materials. This would include having knowledge of the use and limitation of applicable protective clothing, respirators, and decontamination procedures. Respirator fit tests for all employees required to use respirators fall under this training category. Information pertaining to routes of exposure, toxic effects, and specific nature of the job which could result in exposure should be conveyed at this time.

- First Aid and Cardiopulmonary Resuscitation: at least one employee on each shift, as well as the project manager and/or site safety officer, should be trained in the proper procedures for administering first aid and CPR.

## 11.4 Worker and Community Right-To-Know

The following contaminants have been identified in either groundwater or soil samples as being in excess of prescribed limits:

| | |
|---|---|
| MINERAL SPIRITS | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

A work place survey, made available from the Department of Health, and an Environmental Survey, made available from the Department of Environmental Protection have been completed.

It is also required that Hazardous Substance fact sheets be kept on site, in the same location as the above listed surveys. A notice shall be posted as to the availability of the information kept on site. This board shall also contain any other pertinent information relating to employee rights from the DEP, Department of Health, and the Department of Labor.

Any person needing specific information on any of the chemicals listed above should contact the Site Safety Officer. They will be provided in accordance with OSHA 29 CFR 1910.1200.

Any employee request for work place surveys or hazardous fact sheets must be responded to within five days. All employees must be formally informed in writing of the hazardous nature of all substances to be handled, as well as the health hazards these substances might pose. Proper training in the handling of all substances on site must be performed. The importance of proper training cannot be over-stressed.

## 12.0 CONTRACTOR COMPLIANCE

All EPA, state and federal regulations shall be adhered to by site employees during excavation, disposal and construction operations. The contractors will also conduct medical screening examinations

for employees, comply with the personnel protective programs, and emergency response procedures, etc. Statements of commitment and understanding of procedures will be signed by all subcontractor personnel, as well as by GTI personnel.

## 13.0 OCCUPATIONAL NOISE

Requirements set forth in the OSHA Hearing Conservation Amendment (OSHA 1910.95) shall be adhered to during work on-site. Both area noise monitoring and personnel noise dosimetry shall be conducted by the Site Safety Officer to determine the level of noise and the adequate level of protection. Hearing protection shall be provided where sound pressure levels exceeds 85 dB (a weighted scale, slow response). Hearing protection shall be required where sound pressure levels in areas and/or on equipment exceeds 90 dB (a weighted scale, slow response).

## 14.0 HEAVY EQUIPMENT OPERATIONS AND HEAVY MATERIALS HANDLING SAFETY

The following information warrants extra attention regarding work around heavy equipment (drilling rigs, front and/backhoe loaders, etc.) and heavy materials:

- Use common sense.
- Hard hats shall be worn at all times on-site. Other protective gear as specified in this site safety plan is applicable as well.
- Pay attention at all times.
- Maintain visual contact at all times.
- Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators.
- Be aware of footing at all times.
- All heavy equipment shall have backup alarms of some type.
- Only qualified people are to operate heavy equipment.
- Use chains, hoists, straps, and any other equipment to safely aide in moving heavy materials.
- Never walk directly in back of, or to the side of, heavy equipment without the operator's knowledge.
- Never use a piece of equipment unless you are familiar with its operation. This applies to heavy as well as light equipment (e.g., chain saws).

- Pipe sections and other materials to be removed during any project are extremely heavy. Make sure all precautions have been taken prior to moving. Let the equipment, not your body, do the moving.

- Be sure that no underground or overhead power lines, sewer lines, gas lines, or telephone lines will present a hazard in the work area.

- Get help whenever you are in doubt about a material's weight. Use the buddy system.

- Ensure that air bottles are secured properly to heavy mobile equipment.

## 15.0 EMPLOYEE CERTIFICATION

All on-site workers, regardless of the company with which they are employed, are required to have read this entire Health and Safety plan, and must sign the accompanying form to acknowledge this.

## 16.0 SITE SAFETY PERSONNEL RESPONSIBILITIES

The responsibilities of all personnel involved in health and safety operations are stated below:

Project Manager:

The Project Manager will be responsible for implementing the project and obtaining any necessary personnel or resources for the completion of the project. Specific duties will include:

- coordinating the activities of all subcontractors, to include informing them of the required personal protective equipment and insuring their signature acknowledging this Site Safety Plan (see Appendix A),

- selecting a Site Safety Officer and field personnel for the work to be undertaken on site,

- ensuring that the tasks assigned are being completed as planned and on schedule,

- providing authority and resources to ensure that the Site Safety Officer is able to implement and manage safety procedures,

- preparing reports and recommendations about the project to clients and affected Groundwater Technology, Inc. personnel,

- ensuring that all persons allowed to enter the site (i.e., EPA, contractors, state officials, visitors) are made aware of the potential hazards associated with the substances known or suspected to be on site, and are knowledgeable as to the on-site copy of the specific site safety plan.

- ensuring that the Site Safety Officer is aware of all of the provisions of this site safety plan and is instructing all personnel on site about the safety practices and emergency procedures defined in the plan, and

- ensuring that the Site Safety Officer is making an effort to monitor site safety, and has designated a Field Team Leader to assist with the responsibility when necessary.

Health and Safety Manager

The Health and Safety Manager shall be responsible for the overall coordination and oversight of the site safety plan. Specific duties will include:

- approving the selection of the types of personal protective equipment (PPE) to be used on site for specific tasks,

- monitoring the compliance activities and the documentation processes undertaken by the Site Safety Officer,

- evaluating weather and chemical hazard information and making recommendations to the Project Manager about any modifications to work plans or personal protection levels in order to maintain personnel safety,

- coordinate upgrading or downgrading PPE with Site Safety Officer, as necessary, due to changes in exposure levels, monitoring results, weather, other site conditions,

- approving GTI field personnel for work on-site, taking into consideration their level of safety training, their physical capacity, and their eligibility to wear the protective equipment necessary for their assigned tasks (i.e.: Respirator Fit Testing Results), and,

- overseeing the air monitoring procedures as they are carried out by site personnel for compliance with all company health and safety policies.

Site Safety Officer

The Site Safety Officer shall be responsible for the implementation of the site safety plan on site. Specific duties will include:

- monitoring the compliance of field personnel for the

routine and proper use of the PPE that has been designated for each task,

- routinely inspecting PPE and clothing to ensure that it is in good condition and is being stored and maintained properly,

- stopping work on the site or changing work assignments or procedures if any operation threatens the health and safety of workers or the public,

- monitoring personnel who enter and exit the site and all controlled access points,

- reporting any signs of fatigue, work-related stress, or chemical exposures to the Project Manager and/or Health and Safety Manager,

- dismissing field personnel from the site if their actions or negligence endangers themselves, co-workers, or the public, and reporting the same to the Project Manager and/or Health and Safety Manager,

- reporting any accidents or violations of the site safety plan to the Project Manager and/or Health and Safety Manager, and documenting the same for the project in the project records,

- knowing emergency procedures, evacuation routes and the telephone numbers of the ambulance, local hospital, poison control center, fire and police departments,

- ensuring that all project-related personnel have signed the personnel agreement and acknowledgments form contained in this site safety plan,

- coordinate upgrading and downgrading PPE with the Health and Safety Manager, as necessary, due to changes in exposure levels, monitoring results, weather, and other site conditions, and

- perform air monitoring with approved instruments in accordance with requirements stated in this Site Safety Plan (see monitoring procedures on page 20 for specific information).

- report to the Health and Safety Manager the results of air monitoring and routine site inspections.

**Field Team Leader**

In the event that the Project Manager and the Site Safety Officer are not on site, the Field Team Leader will assume all responsibilities of the Site Safety Officer.

Other Field Personnel

All field personnel shall be responsible for acting in compliance with all safety procedures outlined in the site safety plan. Any hazardous work situations or procedures should be reported to the Site Safety Officer so that corrective steps can be taken.

## 17.0 CONFINED SPACE ENTRY

Confined spaces can be identified as an area having any one of the following characteristics:

- o limited openings for entry and exit
- o unfavorable natural ventilation
- o not designed for continuous worker occupancy

Included within this definition are excavations, storage tanks, impoundments, silos, pipelines, pits and vaults.

All personnel are urged to use caution in identifying any of the areas listed above, and, to plan their approach to operations conducted in these areas.

All personnel are urged to use all engineering controls possible to avoid entering these areas. Examples of this would include using remote sampling equipment, or, using a contractors back hoe bucket to collect soils for sampling, rather than personnel entering the excavation.

If engineering controls cannot be used or are not effective, numerous safety measures need to be put in place before any personnel shall be permitted to enter a confined space, as follows:

Continuous ambient air monitoring will be performed at all times while in an active work area.

Constant monitoring with flame or photoionization detectors will be done to detect the presence of contaminating substances. An off-site background level will be noted and documented in Appendix G.

The level of protection will be determined by noting the action levels in Section 4.3.

Constant monitoring of combustible gas levels will be done to detect possible explosive hazards.

If the detectors show readings between 0 and 20.0% of the lower explosive limit (LEL), all site activities may continue.

If the detectors show readings above 20.0% of the lower explosive

limit (LEL), all site activities will cease immediately and all personnel will be withdrawn to an area which is under 20.0% of the LEL.

Constant monitoring of oxygen levels will be done to detect the possibility of oxygen deprivation.
If the detectors show readings between 0% and 19.5% oxygen, the level of protection will be upgraded to Level B immediately, as noted in Section 4.2.

If the detectors show readings between 19.5 and 23.0% oxygen, all site activities may continue.

If the detectors show readings above 23.0% oxygen, all site activities will cease immediately and all personnel will be withdrawn to an area which is under 23.0% of the LEL.

Constant monitoring for radioactive levels will be done to detect the presence of elevated radiation levels.

The level of protection will be determined by noting the action levels in Section 4.3.

Self-contained breathing apparatus shall be kept immediately adjacent to the work area, and shall be removed from their cases ready for immediate use.

No open flames are permitted in, or adjacent to, any confined space. Fire extinguishers will be kept at the work area.

All personnel entering a confined space will be equipped with lifelines and life belts before entering.

A trained back-up person will be on hand at all times. This person's sole responsibility will be to monitor the progress of the tasks being performed.

No entry will be permitted into any excavation more than waist deep without wall shoring being in place.

Ventilation, for air supply and control of temperature extremes, may be accomplished by the use of fans or blowers.

Personnel should use extreme caution while standing on loose, granular material stored in bins, silos and hoppers such as sand, coal or grain, which can engulf and suffocate a worker.

Personnel should use caution around slick surfaces, and be aware of falling objects.

## 18.0 DRILLING SAFETY

During the drilling operation (2) persons designated as "driller"

and "helper" must be present on the rig at all times.

The immediate area around the rig shall be cordoned off with temporary barricades or fencing to keep the traffic away from the rig.

Only personnel authorized by Groundwater Technology, Inc. are to be allowed within the area of drilling. If any unauthorized personnel enter the work area, Groundwater Technology, Inc. will shut down operations until the area is cleared.

The mast of the drilling rig must maintain a minimum clearance of 20 feet from any overhead electrical cables.

All drilling operations will cease immediately during any electrical storms.

Groundwater Technology, Inc. has the authority to shut down the drilling operations at any time a hazardous situation is deemed present.

## 19.0 EXCAVATING/TRENCHING SAFETY

All excavation and trenching work must comply with all safety regulatory agency rules. Prior to any excavation work, the existence and location of underground pipe, electrical conductors, etc. must be determined. The walls and spaces of all excavations more than five (5) feet deep or excavated below a building footing or foundation shall be guarded properly by shoring, sloping of the ground, or equivalent means.

Daily inspections of excavations shall be made. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until the necessary safeguards have been taken.

Trenches more than four (4) feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of access.

All equipment such as pipe, tools, etc. shall be kept out of traffic lanes and access ways. Equipment shall be stored to prevent danger to personnel at any time.

All trenches shall be completely guarded on all sides. A minimum of two (2) feet from the edges will be maintained. Trench guarding shall consist of wooden, metal, or heavy plastic barricades spaced no further apart than 20 feet. Such barricades shall not be less than 36 inches high when erected.

Battery-lighted barricades shall be used as follows:

- A minimum of two (2) battery-lighted barricades shall be used

at corners, one on either side of the barricades.

- At least one (1) battery-lighted barricade shall be used where vehicular traffic approaches the trench at right angles.

- Where trenches parallel roadways the distance between battery-lighted barricades should not exceed 40 feet.

- All battery-lighted units should be serviced as necessary to ensure equipment is operating.

Protection between barricades shall consist of at least 3/4 inch wide nylon tape (yellow or yellow and black). The tape shall be stretched between barricades.

All barricaded sections immediately adjacent to where pedestrians cross trenches shall be guarded with a minimum of 2 by 2 inch wooded rails from the bridge to the first adjacent barricade. This barricade shall not be less than eight (8) feet horizontally to the top of the first barricade.

All pedestrian bridges shall be of sufficient strength to prevent no greater vertical deflection than 1/2 inch when a 250 pound weight is applied to the center of the bridge.

Handrails shall consist of an intermediate and top rail on both sides of the bridge. The top rail shall be a minimum of 42 inches high and capable of withstanding a lateral force of 200 pounds against the center of the top rail.

All surfaces which a person could reasonably contact should be sufficiently free of splinters, nails, or protrusions which may cause injury.

All bridges intended for vehicular traffic shall be constructed to withstand twice the load of the heaviest vehicle anticipated.

All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

## 20.0 PEROXIDE SAFETY

Peroxide is an extremely strong oxidizer, with a variety of uses including bioreclamation and cleaning. All personnel should be aware that this material poses the possibility of being extremely hazardous.

All personnel shall wear full-face air purifying respirators equipped with Combination Cartridges (GMC-H) when using Peroxide on any site. This will provide maximum face and eye protection for the employee.

All personnel shall wear Polyethylene coated Tyvek coveralls with

attached hood, and either Neoprene and Nitrile Butyl Rubber (NBR) gloves while using Peroxide.

Clothing shall be immediately removed if a splash occurs, and should then be rinsed with copious amounts of water to reduce fire hazards caused by spontaneous combustion.

An eye wash bottle or portable eye wash station, as well as copious amounts of clean, potable water for dilution, washing or rinsing shall be kept on site while conducting operations.

In the event of a splash to the eyes, personnel shall immediately use copious amounts of water to irrigate the eyes for at least ten (10) minutes. They should then report directly to the Emergency Department of the nearest hospital, without delay.

Never allow Peroxide to come into contact with combustible material (paper, rags, leather gloves or boots, etc.). This poses an extremely high fire hazard from spontaneous combustion.

A multi-purpose dry-chemical fire extinguisher shall also be on-site during operations.

When using Peroxide from drums, personnel should never add anything into the drum, including unused product. All drums should be capped upon completion of dispensing operations. Caps should never be left off for any period of time.

If drums or product tanks are noted to be hissing, bubbling or steam is coming from them, the peroxide has been contaminated and the risk of container explosion or rupture is a very strong possibility without immediate mitigation.

Use copious amounts of water spray to cool the drum, or, dump the contents of the drum onto the ground and dilute with copious amounts of clean water. The Fire Department should be contacted if a large water supply is needed.

If used in stripper towers for cleaning, personnel should use product pumps for addition to tops of the tower. Personnel shall not, under any circumstances, climb ladders to add product to the tops of towers.

Never use copper, brass or steel as a storage container or in delivery valves or lines.

Contact the Regional Health & Safety Manager or DuPont representative if you have any questions regarding Peroxide safety.

## 21.0 ACID STRIPPER TOWER CLEANING

Hydrochloric (Muriatic) acid is an extremely strong corrosive, with a variety of uses including cleaning. All personnel should be

aware that this material, and especially its by-products, may pose the possibility of being extremely hazardous.

All personnel should wear full-face air purifying respirators equipped with Combination Cartridges (GMC-H) when using Hydrochloric Acid on any site. This will provide maximum face and eye protection for the employee.

All personnel shall wear Polyethylene coated Tyvek coveralls with attached hook, and either Neoprene or Nitrile Butyl Rubber (NBR) gloves while using Hydrochloric Acid.

Clothing shall be immediately removed if a splash occurs and should then be rinsed with copious amounts of water to reduce the possibility of severe burns.

An eye wash bottle or portable eye wash station, as well as copious amounts of clean, potable water for dilution, washing or rinsing shall be kept on site while conducting operations.

In the event of a splash to the eyes, personnel shall immediately use copious amounts of water to irrigate the eyes for at least ten (10) minutes. They should then report directly to the Emergency Department of the nearest hospital, without delay.

When using Hydrochloric Acid from drums, personnel should never add anything into the drum, including unused product. All drums should be capped upon completion of dispensing operations. Caps should never be left off for any period of time.

If used in stripper towers for cleaning, personnel should use product pumps for addition to tops of the tower. Personnel shall not, under any circumstances, climb ladders to add product to the tops of towers.

If sulfides are present in the process stream of tower influent or effluent, the addition of Hydrochloric acid may cause Hydrogen Sulfide to form.

Hydrogen Sulfide is an extremely toxic, potentially lethal, gas with a characteristic "rotten egg" odor, which has been identified by the USEPA as an acutely toxic substance.

It has an Occupational Safety and Health Administration (OSHA) Permissable Exposure Limit (PEL) of 10 ppm. This is considered very low for any substance. The Immediate Danger to Life and Health level for this substance is 300 ppm.

It should also be pointed out that air-purifying respirators are completely ineffective against Hydrogen Sulfide. Any upgrade from Level D protection, due to exposure levels above 10 ppm, will go directly to level B, on supplied air.

To ensure that personnel are not exposed while conducting this

operation, colormetric detector (Draeger) tubes will be used to measure Hydrogen Sulfide concentrations in ambient air. This is to be done immediately adjacent to any opening in the tower before manways or manheads are completely opened, or any connections to the tower are made.

A Model A Samplair Pump Kit (Catalog #464080) and Hydrogen Sulfide Detector Tubes (Catalog #460058) from MSA should be used for the above air monitoring operation. Directions for using the tubes are furnished in the boxes. If you have any questions regarding proper use, please contact the Regional Safety Director immediately.

If levels exceed 10 ppm, please exit the area and contact the Regional Health & Safety Manager or the project manager immediately.

## 22.0 Electrical Safety

All electrical equipment and power cables in and around wells or structures suspected of containing chemical contamination must be intrinsically safe and equipped with a three-wire, ground lead that has been rated as explosion-proof for hazardous atmospheres (Class 1, Division 1&2). In accordance with OSHA 29 CFR 1926.404, approved ground fault circuit interrupters (GFCI) must be used for all 120 volt, single phase, 15 and 20 ampere receptacle outlets on the site which are in use by employees and which are not part of the permanent wiring as defined by the NEC 1987.

The GFCI is a fast-acting circuit breaker which senses small imbalances in the circuit caused by current leakage to ground, and in a fraction of a second shuts off the electricity. However, the GFCI will not protect the employee from line-to-line contact hazards (such as a person holding two "hot" wires or a hot and neutral wire in each hand). The GFCI does provide protection against the most common form of electrical shock hazard - the ground fault. It also provides protection against fires, overheating, and destruction of insulation on wiring.

GFCIs can be used successfully to reduce electrical hazards on construction sites. Tripping of GFCIs, interruption of current flow, is sometimes caused by wet connectors and tools. It is good practice to limit exposure of connectors and tools to excessive moisture by using watertight or sealable connectors. Providing more GFCIs or shorter circuits can prevent tripping caused by the cumulative leakage from several tools or by leakages from extremely long circuits. (Adapted from OSHA 3007; Ground-Fault Protection on Construction sites, 1987.)

## 23.0 APPROVALS

Approved by:

District or Territory Manager
Groundwater Technology, Inc.

Project Manager
Groundwater Technology, Inc.

Site Safety Officer
Groundwater Technology, Inc.

Kenneth J. DiLuigi, CSM, CIHT, CET
Regional Health & Safety Manager
Groundwater Technology, Inc.

# APPENDIX A

APPENDIX A
CONTINGENCY PLAN
EVACUATION PLAN

Although very unlikely, it is possible that a site emergency could necessitate evacuating all personnel from the site. If such a situation develops, the Site Safety Officer, or designated representative, will notify the Project Supervisor, or vice versa, of the event and appropriate signal will be given for site evacuation. The above officers shall ensure that the evacuation is carried out in a calm, controlled fashion.

All personnel shall exit the site and shall congregate in an area designated by the Project Supervisor and/or Site Safety Officer to be safe. The route of evacuation will be dependent on wind direction, severity and type of incident, etc.

The Project Supervisor and/or Site Safety Officer shall ensure that all personnel are accounted for. If someone is missing the Site Safety Officer will alert emergency personnel.

This may done by contacting the appropriate Police Department as listed in Section 8.0.6. Advise them of the situation and request and expedient response by Emergency Services personnel.

Contact the Project Manager, Health & Safety Manager and District Manager as soon as possible after attending to the evacuation. During office hours they may be contacted by phone. If after hours they should be contacted at their residence, by car phone or beeper.

# APPENDIX B

APPENDIX B
CONTINGENCY PLAN
MEDICAL EMERGENCY

The following procedures should be instituted immediately in the event of a medical emergency involving illness or injury to one of GTI's employees while on-site.

The site should be shut-down and immediately secured. The area in which the injury or illness occurred should be considered off-limits until the cause of the illness or injury is known.

In the event of a non-trauma related illness or injury, instantaneous real-time air monitoring with flame or photoionization detectors should be acquired to ascertain if the illness or injury was caused by potential exposure to hazardous materials. Monitoring should be done both upwind and downwind of the incident site.

Assess the victim's condition for the nature of injury or illness. Pay close attention to the level of consciousness and any cardiac or respiratory involvement.

If the victim appears to be critically injured (i.e. unconsciousness, cardiac or respiratory abnormalities, stroke, seizures, etc.). support the victim's vital functions. Administer CPR if needed. Notify Police, Fire Department and EMS Units immediately.

This may be done by contacting the appropriate Police Department as listed in Section 8.0.6. Advise them of the situation and request an expedient response by Emergency Services personnel.

The victim should be decontaminated as soon as possible after removal from the contaminated environment. This should be done in non-contaminated area well away from the source of the problem. Extreme care should be used to avoid cross-contamination. The victim should be washed by water spray or safety shower. Contaminated protective clothing should be removed after washing. The victim should be covered with plastic or fitted with a Tyvek 1422 suit. The SCBA or CCROV should be removed last, except in the case of a critical injury where the victim requires respiratory support. The victim should not be transported until decontamination is performed to the degree that personnel will not be subjected to cross-contamination.

The Fire Department should be notified if manpower is immediately needed, or if access to water to wash and decontaminate the victim is not available at the location.

If the victim appears to be critically injured, they should be transported to the nearest Emergency Room as soon as possible. Under no circumstances should the victim be transported to the hospital in anything other than an EMS Unit staffed by qualified personnel.

If the victim's condition appears to be non-critical, and is anything more severe than minor cuts or bruises, they should be transported to the nearest hospital. Under no circumstances should the victim be transported to the hospital in anything other than an EMS Unit staffed by qualified personnel.

If the victim has sustained extremely minor injuries or a minor illness, it will be up to the discretion of the Site Safety Officer whether or not the victim should be treated on-site, and, may continue to work. If the Site Safety Officer determines that the victim may not continue to work, the victim should be decontaminated, relieved of duty for the day and returned to the office, if during normal working hours. An occupational physician from the current medical surveillance contractor, or the victim's family physician should be contacted. If after hours, the victim should be decontaminated and transported to the nearest hospital.

Contact the Project Manager, Health & Safety Manager or District Manager as soon as possible after attending the needs of the victim. During office hours they may be contacted by phone. If after hours they should be contacted at their residence, by car phone or beeper.

The incident should be documented both in the project file and on Injury/Illness Report Form.

# APPENDIX C

APPENDIX C
CONTINGENCY PLAN
CONTAMINATION EMERGENCY

The following procedures should be instituted immediately in the event of contamination to one of the GTI's employees by Hazardous Materials.

If Emergency Rescue is needed to remove the victim from the contaminated area, notify, Police, Fire Department and EMS Units immediately.

This may be done by contacting the appropriate Police Department as listed in Section 8.0.6. Advise them of the situation and request an expedient response by Emergency Services Personnel.

Absolutely no Emergency Rescue is to be attempted without having a trained back-up present.

If the victim is able to move under their own power, escort them to a non-contaminated area as soon as possible.

The site should be shut-down immediately secured. The area in which the contamination occurred should be considered off-limits until the arrival of trained personnel who are properly equipped with the appropriate personal protective equipment and monitoring instrumentation.

Assess the victim's condition for the nature of injury or contamination. The victim should be considered symptomatic if they exhibit any evidence of abnormal symptoms. Pay close attention to the level of consciousness and any cardiac or respiratory involvement. Use special care to insure that you do not become contaminated as well. If any abnormal symptoms are present, notify Police, Fire Department and EMS units immediately.

This may be done by contacting the appropriate Police Department as listed in section 8.0.6. Advise them of the situation and request an expedient response by Emergency Services Personnel.

Attempt to identify the exact type of material involved. If the material cannot be positively identified, attempt to acquire a grab sample. Use extreme caution if the danger of being contaminated exists.

The victim should be decontaminated as soon as possible after removal from the contaminated environment. This should be done in non-contaminated area well away from the source of the problem. Extreme care should be used to avoid cross-contamination. The victim should be washed by water spray or safety shower. Contaminated protective clothing should be removed after washing. The victim should be covered with plastic or fitted with a Tyvek 1422 suit. The SCBA or CCROV should be removed last, except in the case of critical injury where the victim requires respiratory

support. The victim should not be transported until decontamination is performed to the degree that personnel will not be subjected to cross-contamination.

If the victim appears to be critically injured (i.e. unconsciousness, cardiac or respiratory abnormalities, seizures, etc.), support the victim's vital functions. Administer CPR if needed.

The Fire Department should be notified if manpower is immediately needed, or, if access to water to wash and decontaminated the victim is not available at the location.

If the victim appears to be symptomatic, they should be transported to the nearest Emergency Room as soon as possible. Under no circumstances should the victim be transported to the hospital in anything other than an EMS unit staffed by qualified personnel.

If the victim appears to be asymptomatic, the victim should be decontaminated, relieved of duty for the day and returned to the office, if during normal working hours. An occupational physician from the current medical surveillance contractor should be contacted.

If after hours, the victim should be decontaminated and transported to the nearest hospital.

Contact the Project Manager, Health & Safety Manager and District Manager as soon as possible after attending to the needs of the victim. During office hours they may be contacted by phone. If after hours they should be contacted at their residence, by car phone or beeper.

The incident should be documented both in the project file and on an Injury/Illness report form.

# APPENDIX D

APPENDIX D
CONTINGENCY PLAN
FIRE EMERGENCY

The following procedures should be instituted immediately in the event of a fire on-site.

The site should be shut-down and immediately secured. The area in which the fire occurred should be considered off-limits until the cause can be determine. All non-essential site personnel should be evacuated from the site to a safe, secure area. Notify the Fire Department immediately.

This may be done by contacting the appropriate Fire Department as listed in Section 8.6. Advise them of the situation and the identity of any hazardous material involved.

The four classes of fire along with their constituents are as follows:

Class A: Wood, cloth, paper, rubber, many plastics, ordinary combustible materials.

Class B: Flammable liquids, gases and greases.

Class C: Energized electrical equipment.

Class D: Combustible metals such as magnesium, titanium, sodium, potassium.

Small fires on-site may be actively attacked for control and extinguishment. Extreme care should be taken while in this operation and protective clothing such as Nomex or PBI should be worn to protect the employee. If the fire involves hazardous materials, positive-pressure self-contained breathing apparatus is mandatory.

The designated Site Fire Safety Officer, or his representative, will be responsible for all fire fighting activities on the site.

All approaches to the fire should be done from the upwind side if possible. Distance from the employee to the fire should be close enough to ensure proper attack of the extinguishing material, but far enough away to ensure that the employee is safe. The proper extinguisher should be utilized for the Class(s) of fire present on the site.

If possible, the fuel source should be cut off or separated from the fire. Care must be taken when performing operations involving the shut-off of values and manifolds, if present.

Examples of proper extinguishing agents are as follows:

Class A - Water
Water with 1% AFFF Foam (Wet Water)
Water with 6% AFFF or Fluroprotein Foam
ABC Dry Chemical
Halon 1211

Class B - ABC Dry Chemical
Purple K
Halon 1211
Carbon Dioxide
Water with 6% AFFF Foam

Class C - ABC Dry Chemical
Halon 1211
Carbon Dioxide

Class D - Metal-X Dry Powder

No attempt should be made against large fires. These should be handled by the Fire Department.

Contact the Project Manager, Health & Safety Manager and Division Manager as soon as possible. During office hours they may be contacted by phone. If after hours they should be contacted at their residences, by car phone or beeper.

All fire extinguishers should be recharged and inspected by qualified personnel after any use. They should be returned to their proper location after recharge.

# APPENDIX E

APPENDIX E
CONTINGENCY PLAN
SPILL OR AIR RELEASE OF HAZARDOUS MATERIAL

The following procedures should be instituted IMMEDIATELY in the event of a spill or air release of a hazardous material on-site.

The site should be shut-down and immediately secured. The area in which the spill or release occurred should be considered off-limits until the cause can be determined and site safety can be evaluated. All non-essential site personnel should be evacuated from the site to a safe, secure area.

The spilled or released product should be immediately identified and appropriate measures, such as dikes or birms, should be instituted to halt and contain the flow. If the spill extends into waterways, the Coast Guard and the National Response Center (1-800-424-8802) should be notified immediately. Spill booms should be put in place in an attempt to curb downstream contamination.

Instantaneous real-time air monitoring with ionization and combustible gas indicators should be started. Monitoring should be done both upwind and downwind of the spill site or release point. An evaluation of upgrades in personnel protective equipment as indicated in Section 4.3 should be made based upon the results of the air monitoring.

If the material is unknown, Level B protection as listed in Section 4.2 is mandatory. Samples of the material should be acquired to facilitate identification of the material.

If the results of the monitoring show that the levels of contaminants exceed IDLH values as listed in Section 9.5, the site should be immediately evacuated and the appropriate Federal, State, County and local regulatory authorities and emergency response personnel should be notified.

Notify the Police and Fire Departments IMMEDIATELY if contaminants are found to have migrated off-site into populated areas, a large spill of flammable products is involved, or, the material is considered acutely toxic or exceeding published IDLH values.

This may be done by contacting the appropriate Department as listed in Section 8.6. Advise them of the situation and the identity of any hazardous materials involved.

The procedures as listed above should be instituted if there is a discovery of an acutely toxic material in much larger quantities than expected. In this case, all employees on the site should be cleared to a safe area and briefed in a tailgate safety meeting.

The spill or release should be reported to the appropriate Federal, State, County and local regulatory authorities per the reporting standards of those regulatory agencies.

Contact the Project Manager, Safety Director, and District Manager as soon as possible. During office hours they may be contacted by phone. If after hours, they should be contacted at their residence, by car phone or beeper.

# APPENDIX F

GROUNDWATER TECHNOLOGY, INC.

# SIGN - OFF SHEETS

This is to certify that I have read, fully understand and agree to comply fully with the attached Health and Safety Plan furnished to me by Groundwater Technology, Inc. for the above project.

| NAME | SIGNATURE | COMPANY | DATE |
|---|---|---|---|
| N. Pressly | | GTI | 12/18/89 |
| K Marcott | | GTI | 12/18/89 |
| T.J. Taxon | | TAXON EXCAVATION | 12/20/89 |
| D. Robbins | DAVID Robbins | TYREE | 6/7/90 |
| | J JOACHIM | TYREE | 6/7/90 |
| John A Giles | John A Giles | 11 | 11 |
| Brian Bacon | Brian Bacon | Tyree | 6/7/90 |
| Tim Kemper | Tim Kemper | GTI | 6/13/90 |
| DANIEL C. LEAHY | Daniel C. Leahy | GTI | 6/15/90 |
| Brian Wagner | Brian Wagner | GTEL | 6/19/90 |
| | | | |

GROUNDWATER TECHNOLOGY, INC.

# SIGN - OFF SHEETS

This is to certify that I have read, fully understand and agree to comply fully with the attached Health and Safety Plan furnished to me by Groundwater Technology, Inc. for the above project.

| NAME | SIGNATURE | COMPANY | DATE |
|---|---|---|---|
| Greg Sherwin | Greg Sherwin | GTI | 12/3/92 |
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GROUNDWATER TECHNOLOGY, INC.

# SIGN - OFF SHEETS

This is to certify that I have read, fully understand and agree to comply fully with the attached Health and Safety Plan furnished to me by Groundwater Technology, Inc. for the above project.

| NAME | SIGNATURE | COMPANY | DATE |
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GROUNDWATER TECHNOLOGY, INC.

# SIGN - OFF SHEETS

This is to certify that I have read, fully understand and agree to comply fully with the attached Health and Safety Plan furnished to me by Groundwater Technology, Inc. for the above project.

| NAME | SIGNATURE | COMPANY | DATE |
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# APPENDIX G

GROUNDWATER TECHNOLOGY, INC.

PROJECT NAME _____

PROJECT NUMBER _____

DATE OF SAMPLING _____

CONTAMINANTS _____

# RESULTS OF VAPOR MONITORING

| TIME | IONIZATION DETECTOR READING | | | EXPLOSIMETER READING | | RADIATION MONITOR READING | LOCATION | PURPOSE | INITIALS |
|---|---|---|---|---|---|---|---|---|---|
| | FID | 10.2eV PID | 11.7eV PID | % LEL | % $O_2$ | mR/hr | | | |
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GROUNDWATER TECHNOLOGY, INC.

PROJECT NAME _____

PROJECT NUMBER _____

DATE OF SAMPLING _____

CONTAMINANTS _____

# RESULTS OF VAPOR MONITORING

| TIME | IONIZATION DETECTOR READING | | | EXPLOSIMETER READING | | RADIATION MONITOR READING | LOCATION | PURPOSE | INITIALS |
|---|---|---|---|---|---|---|---|---|---|
| | FID | 10.2eV PID | 11.7eV PID | % LEL | % $O_2$ | mR/hr | | | |
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GROUNDWATER TECHNOLOGY, INC.

PROJECT NAME _____

PROJECT NUMBER _____

DATE OF SAMPLING _____

CONTAMINANTS _____

# RESULTS OF VAPOR MONITORING

| TIME | IONIZATION DETECTOR READING | | | EXPLOSIMETER READING | | RADIATION MONITOR READING | LOCATION | PURPOSE | INITIALS |
|---|---|---|---|---|---|---|---|---|---|
| | FID | 10.2eV PID | 11.7eV PID | % LEL | % $O_2$ | mR/hr | | | |
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GROUNDWATER TECHNOLOGY, INC.

PROJECT NAME _____

PROJECT NUMBER _____

DATE OF SAMPLING _____

CONTAMINANTS _____

# RESULTS OF VAPOR MONITORING

| TIME | IONIZATION DETECTOR READING | | | EXPLOSIMETER READING | | RADIATION MONITOR READING | LOCATION | PURPOSE | INITIALS |
|---|---|---|---|---|---|---|---|---|---|
| | FID | 10.2eV PID | 11.7eV PID | % LEL | % $O_2$ | mR/hr | | | |
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GROUNDWATER TECHNOLOGY, INC.

PROJECT NAME _____

PROJECT NUMBER _____

SAMPLING DATE _____

## MINI-RAM SAMPLING LOG

| TIME | READING | SA | TLV | SAMPLE LOCATION |
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GROUNDWATER TECHNOLOGY, INC.

# INSTRUMENT CALIBRATION LOG

| DATE | INSTRUMENT | TEST GAS | ppm | READING | ADJUSTED? | SIGNATURE |
|---|---|---|---|---|---|---|
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |
| | | | | | YES NO | |

# APPENDIX H

# MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
1145 CATALYN STREET
SCHENECTADY, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

NO. 334A

MINERAL SPIRITS
TYPE II
Revision B

DATE July 1984

## SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: MINERAL SPIRITS, TYPE II
DESCRIPTION: Refined distillates of petroleum. It is the higher boiling half of Type I distillate (MSDS #334) with a controlled distillation range and flash point, >140 F.
OTHER DESIGNATIONS: Stoddard Solvent (high flash point); Petroleum Distillate, Spirits or Naphtha (combustible); White Spirits; GE Material D5B8D; CAS #008 052 413; ASTM D235, Type II.
MANUFACTURER: Available from many suppliers.

## SECTION II. INGREDIENTS AND HAZARDS

| | % | HAZARD DATA |
|---|---|---|
| Mineral Spirits, Type II | | 8-hr TWA 100 ppm* (or 525 mg/m$^3$). |
| Typical Composition: | | |
| Paraffinic hydrocarbons | 40-60 | |
| Naphthenic hydrocarbons (Cycloparaffins) | 30-40 | |
| Aromatic hydrocarbons | 5-15 | Eye, Human 470 ppm/15M (Irritation Effect) |

*ACGIH (1983) TLV; STEL is 200 ppm for Stoddard Solvent.
Current OSHA PEL for Stoddard Solvent is 500 ppm.
NIOSH has recommended a 10-hr TWA of 60 ppm or 350 mg/m$^3$.
The "action level" is also recommended to be 350 mg/m$^3$.

## SECTION III. PHYSICAL DATA

| | | | |
|---|---|---|---|
| Boiling point, 1 atm, deg F | 350-412 | Specific gravity 60/60F | ca 0.8 |
| Vapor pressure @ 25 C, mm Hg | ca 4 | Volatiles, % | ca 100 |
| Vapor density (Air=1) (average) | ca 5 | Evaporation rate (BuAc=1) | 0.08 |
| Solubility in water | Insoluble | | |

Appearance & Odor: Clear, colorless liquid with a characteristic petroleum odor that is usually perceptible to humans at about 1 ppm in air. Olfactory fatigue can occur in 6 minutes at low conc.

## SECTION IV. FIRE AND EXPLOSION DATA

| Flash Point and Method | Autoignition Temp. | Flammability Limits in Air | Lower | Upper |
|---|---|---|---|---|
| 140 F minimum (TCC) | 450-500 F | % by volume | 0.9 | 6 |

Extinguishing media: Foam, dry chemical, carbon dioxide, and water spray or fog. Use of a direct stream of water on burning liquid can scatter flames. In a fire situation or when it is heated or misted, it becomes a hazardous, highly flammable material.
Use self-contained breathing apparatus for respiratory protection in fighting fires in enclosures.

## SECTION V. REACTIVITY DATA

This material is stable in closed containers under its normal handling and storage conditions. It does not polymerize.
As a combustible hydrocarbon liquid (OSHA Class IIIA), it can react violently with strong oxidizing agents such as chlorine, oxygen, or such strong oxidizing acids as nitric and sulfuric.
Thermal-oxidative degradation can produce carbon monoxide and partially oxidized hydrocarbons.

NO. 334A

## SECTION VI. HEALTH HAZARD INFORMATION

TLV 100 ppm (See Sect II)

This material is a central nervous system depressant and a mucous membrane irritant. Symptoms of overexposure include dizziness, headache, intoxication with euphoria leading to unconsciousness. Nose and throat irritation may occur from inhalation. Prolonged or repeated skin contact will cause defatting, irritation and dermatitis. Eye contact with liquid can cause conjunctivitis. Eye irritation can also occur after 15 minutes exposure to vapors at 470 ppm. A fatal ingestion dosage for humans is estimated at 3-4 ounces. Aspiration into the lungs after ingestion can cause edema; and one ounce aspirated may be fatal.

FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min., including under eyelids.

Skin Contact: Promptly remove solvent wet clothing and wash contact area with soap and water. Get medical help if irritation persists or if large body area contacted.

Inhalation: Remove to fresh air. Restore and/or support breathing as needed. (If breathing is difficult, give oxygen therapy.) Get medical help.

Ingestion: Contact physician! Aspiration a hazard! Give 3 oz of USP white mineral oil or edible vegetable oil to drink. Do not induce vomiting unless medical help is not available, the victim is alert, >1-2 oz has been ingested.

## SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of large spills. Eliminate sources of heat or ignition. Provide adequate ventilation. Clean-up personnel need protection against skin contact and inhalation of vapors. Contain spill. Recover liquid when possible. Absorb small spills and residues with vermiculite, dry sand, or similar material. Pick up and place in suitable containers. Avoid discharing Mineral Spirits directly into a sewer or surface waters!

DISPOSAL: Absorbed material can be buried in an approved landfill, incinerated, or removed via a licensed solvent disposal company. Follow Federal, State and Local regulations.

## SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and, especially when heated or misted, local exhaust ventilation (explosion-proof) to meet TLV requirements. A chemical cartridge respirator with organic vapor cartridge and a full facepiece can be used below 1000 ppm. Self-contained breathing apparatus with a full facepiece has been recommended for use up to 5000 ppm.

Approved protective gloves should be used to prevent prolonged or repeated skin contact.

Chemical safety goggles and/or face shield should be used where splashing is possible. An eyewash station and washing facilities should be accessible.

Remove contaminated clothing (fire and health hazard); thoroughly dry or launder before reuse.

Preplacement and periodic medical exams should emphasize skin, liver, kidney, central nervous system, and respiratory diseases for those regularly exposed. Individuals with such problems may be at an increased risk from exposure.

## SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in a cool, clean, well-ventilated, fire resistant storage area away from oxidizing agents and sources of heat and ignition. Use a solvent storage room or cabinet that meets requirements for an OSHA Class IIIA Combustible liquid. Store in closed metal drums or safety cans with identifying labels. Prevent physical damage to containers.

If heated or mist is present, bond and ground containers for transfers of liquid to prevent static sparks, use nonsparking tools, follow electrical codes, no smoking.

Use with good ventilation. Avoid inhalation of mist or vapors. Prevent eye contact and repeated or prolonged skin contact.

DOT Classification: PETROLEUM NAPHTHA I.D. No. UN1255 Label: (None)
PETROLEUM DISTILLATE I.D. No. UN1268 Label: (None)

DATA SOURCE(S) CODE: 2-7,11-14,16,27,31,47,49



APPROVALS: MIS/CRD

INDUST. HYGIENE/SAFETY 7-23-84

MEDICAL REVIEW: 1 August 1984

# APPENDIX I

# APPENDIX B

# PROJECT COMPOUND LIST AND METHOD DETECTION LIMITS

## Project Compound List and Method Detection Limits (MDLs)

| Total Petroleum Hydrocarbons by GC for Soils/Water | |
|---|---|
| **Analyte** | **Detection Limit, mg/kg & ug/l** |
| Gasoline | 10/50 |
| Mineral Spirit | 10/50 |
| Kerosine | 10/50 |
| Diesel | 10/50 |
| Fuel Oil #6 | 10/50 |
| Lubricating Oil | 10/50 |

| EPA Method 8240 for Soils/Water | |
|---|---|
| **Analyte** | **Method Detection Limit, µg/kg & ug/l** |
| Chloromethane | 1.1/1.1 |
| Bromomethane | 1.6/1.1 |
| Vinyl Chloride | 1.9/1.1 |
| Chloroethane | 1.8/1.6 |
| Methylene Chloride | 1.2/0.8 |
| Acetone | 2.5/4.4 |
| Carbon Disulfide | 1.3/1.8 |
| 1,1-Dichloroethene | 2.0/1.5 |
| 1,1-Dichloroethane | 0.9/1.0 |
| 1,2-Dichloroethene (cis + trans) | 0.8 &1.1/1.3 & 1.0 |
| Chloroform | 0.8/1.0 |
| 1,2-Dichloroethane | 1.4/0.8 |
| 2-Butanone | 3.8/5.9 |
| 1,1,1-Trichloroethane | 3.1/1.5 |
| Carbon Tetrachloride | 1.2/1.3 |
| Vinyl Acetate | 6.5/1.4 |
| Bromodichloromethane | 1.8/0.5 |
| 1,2-Dichloropropane | 3.1/0.8 |
| cis-1,3-Dichloropropene | 1.5/2.3 |
| Trichloroethene | 2.1/1.6 |
| Dibromochloromethane | 3.4/1.4 |
| 1,1,2-Trichloroethane | 3.2/1.9 |
| Benzene | 2.2/1.3 |
| 2-Chloroethyl Vinyl Ether | 3.4/2.8 |
| trans-1,3-Dichloropropene | 0.5/2.5 |
| Bromoform | 0.3/1.3 |
| 4-Methyl-2-Pentanone | 3.2 |

| | |
|---|---|
| 2-Hexanone | 0.9/4.1 |
| Tetrachloroethene | 1.4/7.5 |
| 1,1,2,2-Tetrachloroethane | 2.0/1.6 |
| Toluene | 2.2/1.4 |
| Chlorobenzene | 3.6/1.6 |
| Ethylbenzene | 1.0/1.3 |
| Styrene | 3.1/1.2 |
| Xylenes (total) | 6.7/2.7 |
| 1,2-Dichlorobenzene | 3.4/2.2 |
| 1,3-Dichlorobenzene | 2.9/1.5 |
| 1,4-Dichlorobenzene | 3.8/1.7 |

## APPENDIX C

## RECOMMENDED CONTAINERS,PRESERVATION,STORAGE, AND HOLDING TIMES

**RECOMMENDED CONTAINERS,PRESERVATION,STORAGE, AND HOLDING TIMES**
**SAFETY-KLEEN**
**NORTH AMITYVILLE, NEW YORK**

| PARAMETER | ANALYSIS METHOD | MATRIX | SAMPLE CONTAINER[1] | VOLUME | NUMBER OF CONTAINERS | PRESERVATION | HOLDING TIME |
|---|---|---|---|---|---|---|---|
| **FOR SOIL SEDIMENTS SAMPLES** | | | | | | | |
| NON-HALOGENATED VOLATILE ORGANICS | Total Petroleum Hydrocarbons by GC | SOIL | G(b) TefCap | 4 oz[2] JAR | 2 | COOL 4° C | 14 DAYS |
| VOLATILE ORGANICS | EPA 8240 | SOIL | G(b) TefCap | 4 oz[3] JAR | 2 | COOL 4° C | 14 DAYS |
| METALS | Priority Pollutant Metals | SOIL | P(c) TefCap | 8 oz JAR | 2 | Cool 4° C | 14 DAYS |
| **FOR GROUNDWATER AND QA/QC SAMPLES** | | | | | | | |
| NON-HALOGENATED VOLATILE ORGANICS | Total Petroleum Hydrocarbons by GC | WATER | G(b) TefSep | 40 ml[3] | 3 | COOL 4° C HCL pH < 2 | 14 DAYS |
| VOLATILE ORGANICS | EPA 8240 | WATER | G(b) TefSep | 40 ml[4] | 3 | COOL 4° C HCL pH < 2 | 14 DAYS |
| METALS | Priority Pollutant Metals | WATER | P(c) TefCap | 500 ml | 2 | COOL 4° C $HNO_3$ | 14 DAYS |

GROUNDWATER TECHNOLOGY

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1 G(x) = glass; AG(x) = amber glass; P(x) = plastic; TefSep = Teflon Septum; TefCap = Teflon Cap
x = cleaning protocol as follows; a = acid wash + oven dry; b = oven dry; c = acid wash

2 Fill completely to avoid volatile loss.

3 Fill vial completely to avoid volatile loss. Remove any air bubbles.

**RECOMMENDED CONTAINERS, PRESERVATION, STORAGE AND HOLDING TIMES**

**FOR CONCRETE SAMPLES**

| PARAMETERS | ANALYSIS METHOD | MATRIX | SAMPLE CONTAINER[4] | VOLUME | NUMBER OF CONTAINERS | PRESER-VATION | HOLDING TIME |
|---|---|---|---|---|---|---|---|
| Flash Point | EPA 6010 | Concrete | G(a) TefCap | 8 oz[5] | 2 | Cool 4° C Dark | 7 days[6] |
| Reactivity | SW 846 Section 7.3 | Concrete | G(a) TefCap | 8 oz[2] | 2 | Cool 4° C Dark | 7 days[3] |
| pH | EPA 9040/9045 | Concrete | G(a) TefCap | 8 oz[2] | 2 | Cool 4° C Dark | 7 days[3] |

GROUNDWATER TECHNOLOGY

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4 G(x) = glass; AG(x) = amber glass; P(x) = plastic; TefSep = Teflon Septum; TefCap = Teflon Cap; x = cleaning protocol as follows: a = acid wash + solvent wash + oven dry; b = oven dry; c = acid wash.

5 Fill completely to avoid volatile loss.

6 From the sampling date.

**CRITERIA FOR EPA 8240**
**Soil/Water**

| MATRIX SPIKE COMPOUND | LOW TO MEDIUM SOIL MATRIX/WATER MATRIX | |
|---|---|---|
| | PERCENT SPIKE RECOVERY (in %) | RELATIVE PERCENT DIFFERENCE (RPD-in %) |
| 1,1-DICHLOROETHENE | 59-172/61-145 | 22/14 |
| TRICHLOROETHENE | 62-137/71-120 | 24/14 |
| CHLOROBENZENE | 60-133/76-127 | 21/11 |
| TOLUENE | 59-139/76-125 | 21/13 |
| BENZENE | 66-142/75-130 | 21/13 |

| SURROGATE COMPOUND | LOW TO MEDIUM SOIL MATRIX/WATER MATRIX |
|---|---|
| | PERCENT SURROGATE RECOVERY (in %) |
| TOLUENE-$d_8$ | 81-117/88-110 |
| 4-BROMOFLUROBENZENE | 74-121/86-115 |
| 1,2-DICHLOROETHANE-$d_4$ | 70-121/76-114 |

Calibration Frequency

Operational Frequency's are outlined below. Operational recalibration will occur whenever calibration verification acceptance limits are exceeded. These procedures and acceptance limits have been established in GTEL's SOP Manual issued June 22, 1993.

| INSTRUMENT DESCRIPTION (ANALYTE TYPE) | INITIAL CALIBRATION (IC) | INITIAL CALIBRATION VERIFICATION (ICV) | CONTINUING CALIBRATION VERIFICATION (CCV) |
|---|---|---|---|
| GC\MS (VOL, SEMIVOL) | AFTER REPAIR, COLUMN CHANGE, OR FAILURE OF ICV/CCV | MID-RANGE STANDARD AND QCCS WITH IC | DAILY MID-RANGE STANDARD (REQUIRED EVERY 12 HOURS) |

**CRITERIA FOR TOTAL PETROLEUM HYDROCARBONS BY GC**
**Soil/Water**

| MATRIX SPIKE COMPOUND | SOIL MATRIX/WATER MATRIX | |
|---|---|---|
| | PERCENT SPIKE RECOVERY | RELATIVE PERCENT DIFFERENCE (RPD) |
| DIESEL | 60-140% | <40% |
| | | |
| SURROGATE COMPOUND | SOIL MATRIX | |
| | PERCENT SURROGATE RECOVERY | |
| ORTHO-TERPHENYL | 50-150% | |

Calibration Frequency

Operational Frequency's are outlined below. Operational recalibration will occur whenever calibration verification acceptance limits are exceeded. These procedures and acceptance limits have been established in GTEL's SOP Manual issued May 11, 1992.

| INSTRUMENT DESCRIPTION (ANALYTE TYPE) | INITIAL CALIBRATION (IC) | INITIAL CALIBRATION VERIFICATION (ICV) | CONTINUING CALIBRATION VERIFICATION (CCV) |
|---|---|---|---|
| GC/FID (PETROLEUM HYDROCARBONS) | APPROPRIATE REFERENCE MATERIALS AFTER REPAIR, COLUMN CHANGE, OR FAILURE OF ICV/CCV | DIESEL QCCS WITH IC | DAILY MID-RANGE STANDARD, 5% |

# APPENDIX E

# LABORATORY DATA VALIDATION AND REPORTING

Data validation practices will be followed to insure that new data is not altered and that an audit trail is developed for data that will be reduced. Data validation practices will occur in the laboratory.

## E.1 Data Reduction

### E.1.1 Field Data Collection and Reduction

Field personnel will log all field measurements, observations, and field instrument calibrations in bound, waterproof field notebooks. Notebook entries will be dated, legible, and contain accurate and inclusive documentation of an individual's project activities. Because the logbook will be used to write reports, it will contain only facts and observations. Language will be objective, factual, and free of personal feelings or other terminology that may prove inappropriate. Each individual making an entry into the field notebook will date and sign their entry. It is anticipated that the data reduction for this investigation will be minimal and will consist primarily of tabulating analytical results.

### E.1.2 Laboratory Data Collection and Reduction

The data reduction scheme used in the lab for each of the measurement parameters, including the formulas used for calculating concentrations for both water, soils, and concrete, will be that stated in the standard operating procedure for the analytical method used. All analyses will utilize a bound notebook into which will be recorded the following items, at a minimum:

a) analyst,
b) date,
c) sample number (lab #), and
d) analysis set-up conditions, e.g., dilutions, auto-sampler position number, or other instrument specifics not covered by an SOP.

For instrumental analysis, this analysis notebook will be instrument-specific and referred to as an instrument log. For other types of analysis, this analysis logbook will also contain all raw data collected by the analyst.

For all analyses, the data will not be blank-corrected and will be flagged if blanks do not meet acceptability criteria. Additionally, any result that is less than ten times the value of the blank will be considered suspect. Chemists and technicians will be responsible for the measurement/ analysis of any specific parameter, and for any calculations associated with the determination of parameter concentrations. All calculations are listed in the referenced method. The chemists and their supervisors will be responsible for reviewing all results, applying calculation checks on a minimum of 20 percent of the results on each report. These individuals will be responsible for determining whether or not the results are acceptable, though the ultimate authority to determine acceptability will be with the Director of Quality Assurance. The laboratory section manager will be responsible for the final review of all data and for the proofing of reports prior to submittal of the reports to Groundwater Technology.

Final reports will be typed from the in-process report forms approved by the supervisor after the review of all supporting data. The in-process forms along with all hardcopy data output and other case records will be stored together for at least five years in a single secure location indexed by project number. This location will be in GTEL's laboratory in Milford, N.H.

All data will be cross-checked for correctness by GTEL's QA Officer for reported values, detection limits, percent moisture and dilution factors (if applicable), after data has been reduced and transcribed into the final reporting format. The procedure to be used in the final cross-check of the data in the final report format will be as follows:

1. obtain the laboratory data or field notebooks and final reports
2. compare the sample numbers and description
3. compare the sample date and time (if provided)
4. compare all positive results with those reported in the laboratory report, and
5. laboratory data will be checked for corrections with mathematical calculations during the Data Validation process.

## E.2 Internal Laboratory Validation

A complete record of each sample's history will be available for documenting its progress from the time of sample collection to arrival at the laboratory and through the laboratory from sample receipt to reporting. Data validation will include the use of dated entries, signed by analysts and supervisors, on worksheets and logbooks used for all samples, the use of sample tracking and numbering systems to logically follow the progress of samples through the laboratory, and the use of quality control criteria to reject or accept specific data. The QA/QC criteria which must be satisfied for this project has been stipulated in Table 5 of this document.

## E.3. Data Reduction, Reporting, and Report Storage

### E.3.1 Data Reduction

Analytical data will be generated from direct-reading instruments, reporting integrators or data management computer software. The automated outputs will include identifications of compounds, concentrations, and retention times. Outputs will be in graphic form (chromatograms), spectra, recorder charts, and in printed tabular form. The outputs will be in a standard format specified for each analysis and monitored for consistency. For direct reading instruments, the Analyst will be required to record all results into a bound lab notebook.

Auxiliary data produced for internal records, which will not normally be reported to customers as part of the analytical data, will include the following: laboratory worksheets, laboratory notebooks, sample tracking system forms, instrument logs, standard records, maintenance records, calibration records, and associated quality control records. These sources will be available, however, for inspection during audits to determine the validity of data.

### E.3.2 Data Reporting

A typical standard data report form will contain at a minimum, the following information:

(a) laboratory ID number,
(b) site ID number,
(c) sample ID number,
(d) date sampled,
(e) date analyzed,
(f) parameters measured,
(g) units in which each parameter is reported,
(h) analytical methods used,
(i) detection limits,
(j) date of extraction, if applicable.
(k) certification statement by the person responsible for validation of the data concerning sample integrity and QA acceptance, and
(l) QC data and validation assessment must be reported along with the sampling results.

The field notebook will require, at minimum, the following entries:

a. date and time of information recorded;
b. all personnel on-site on that date:
c. sampling location (and map referenced);
d. sample date, time, source of sample containers;
e. weather conditions (temperature, humidity, wind speed and direction, observation of skies, and other physical observations);
f. sample matrix;
g. sample depth;
h. note if sample is duplicate, blank, composite or grab;
i. well purging information (volume purged, temperature, pH and conductivity, depth to water);
j. number of sample containers collected in chronological order and the parameter to be analyzed;
k. the method of sample shipment with air bill number, name of overnight courier and laboratory receiving the samples;
l. all samples shipped on the chain-of-custody;
m. calibration of all instruments (pH pens, conductivity meters, PID, turbidity meters, etc); and,
n. readings from all field parameters measured, preservation, if applicable.

### E.3.3 Report Storage

All final customer report folders will be filed in a secure area in the laboratory documentation office. Quality control sample reports are maintained in a separate file. All data, chromatograms, calculations, and reports will be stored for a minimum of five years.