EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Letter of Transmittal

To: Mr. Christopher Alonge
NYS DEC
50 Wolf Road, Room 242
Albany, N.Y 12233

Date: 4/3/01	Earth Tech I.D. 43015
Attention: cga	
Subject: Work Plan	

WE ARE SENDING YOU:

☒ Attached ☐ Prints ☐ Under separate cover via _____ the following items:
☐ Shop Drawings ☐ Change Order ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	4/2/01	1	Additional Site Characterization Work Plan

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For Approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ___ corrected prints
☐ For review and comment ☐ _____
☐ For Bids Due _____, 20

REMARKS:

Copy to: DMM, JMO, P. Maxwell, and File

Signed: Mark Williams

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY
12 Metro Park Road • Albany, New York 12205
• Phone (518) 458-1313 • Fax: (518) 458-2472

WILSONART
INTERNATIONAL

Wilsonart International Inc.
2400 Wilson Place
P.O. Box 6110
Temple, TX 76503-6110

254.207.7000
Fax 254.207.2384

April 2, 2001

Mr. Christopher Alonge, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action, Room 242
50 Wolf Road
Albany, New York 12233-7010

Subject: Additional Site Characterization
NYSDEC Voluntary Cleanup Program Site#: V-00322-3
Wilsonart International, Inc., 1 Brenner Drive, Congers, New York

Dear Mr. Alonge:

This work plan is for Earth Tech, Inc. to assist Wilsonart International, Inc. (Wilsonart) in the completion of additional tasks for the focused environmental investigation of the above-referenced Site.

The purpose of the investigation is to compile and develop factual information to address Wilsonart's contention that the FREON-113 and trichloroethene (TCE) impacted groundwater detected on-site, and in the region, is the result of an off-site source(s) unrelated to Wilsonart's past use of the property. The objective of performing this additional work is to fulfill investigatory commitments made by Wilsonart to the New York State Department of Environmental Conservation (NYSDEC) and Rockland County Department of Health (RCDH) to get to the endpoint of Wilsonart's involvement with the voluntary cleanup program.

SCOPE OF SERVICES

The additional site characterization activities consist of the collection of additional existing data (i.e., collect and review available Sanborn mapping), completion of a photo-lineament analysis, and collection of another round of groundwater samples at the Site. These three additional work items (two are already completed) are described below:

Review of Sanborn Maps

Earth Tech will obtain and summarize information from available Sanborn historical fire insurance maps that depict prior uses of nearby properties in the suspected source areas. It is our objective to obtain and review Sanborn mapping for parcels to the east (upgradient) of the Site that may indicate potential concerns. The results of the review of Sanborn mapping will be included in Section 1.1, Records Review, of the Subsurface Investigation Report.

Schedule
The Sanborn maps were ordered from Environmental Data Resources, Inc. on February 12, 2001. Earth Tech will summarize preliminary findings of the Sanborn mapping during the week of March 19, 2001.

Photo-Lineament Analysis *(This activity has been completed but is included herein because is part of the "Additional Site Characterization")*

Earth Tech will oversee the photo-lineament analysis of the study area to better understand and identify observable, natural linear features (bedrock fractures, joint traces or lineaments) in the bedrock. Fracture zones or areas of fracture concentration in the underlying bedrock are typically areas of higher permeability and may serve to control the pathways of bedrock groundwater flow in the region. The results of the photo-lineament analysis will be added to Section 1.3, Review of Aerial Photographs, of the Subsurface Investigation Report.

Schedule
The aerial photographs were ordered from Mr. Robert W. Shuey, P.G. on February 8, 2001. The aerial photographs were received by Earth Tech on March 2, 2001. The fracture trace analysis was performed by Mr. Samuel Gowan, Ph.D. on March 7, 2001. Earth Tech will summarize preliminary findings of the photo-lineament analysis by March 23, 2001.

Groundwater Sampling and Analysis

The typical approach to sampling wells for VOCs involves purging three casing volumes of water prior to collecting a groundwater sample. The November 2000 groundwater samples of on-site wells were collected using this methodology. We understand that the Department, NYSDOH, and RCDH recognize that there is "a likely upgradient off-site source that is a contributing component to the observed groundwater contamination at the Wilsonart Site". Although significant levels of FREON-113 and TCE were observed in wells MW-5, MW-7, and MW-8, which are upgradient of well MW-3, the highest concentration of contaminants have been detected at on-site well MW-3.

Earth Tech researched the sampling methodology employed and came across numerous technical abstracts that indicated that removal of three to five well volumes, prior to sampling, may be unnecessary, or may produce undesirable effects (i.e., integration of differing water types). Since newly-installed monitoring wells MW-7 and MW-8 had slotted screens 20 feet in length, it is possible that the groundwater chemistry detected previously in these two wells may be somewhat diluted in comparison to values observed at well MW-3 which had a 10-foot screen. For example, the concentration of TCE at MW-8 (91 ug/L) was roughly one-half the concentration of TCE reported previously at well MW-3 (180 ug/L).

Earth Tech proposes to collect groundwater samples in three phases to assess the potential for dilution, stratification, and temporal changes.

Phase 1 A Kemmerer sampler to collect depth discrete groundwater samples to characterize groundwater quality i n the vicinity of the wells. This sampler was selected based on review of other samplers that can be used to discern potentially significant vertical concentration differences (including stratification and dilution) in the wells. The phenomenon of dilution and vertical stratification is a distinct possibility given the nature of the local aquifer and well construction differences. Prior to conducting the second groundwater sampling event, a Kemmerer sampler will be gently lowered with a support line to a desired depth (i.e., 1 to 2 feet from the bottom of well) at monitoring wells MW-3 and MW-8. The sampler will be secured and allowed to equilibrate overnight. In the following morning, each Kemmerer sampler will be "struck", closing both ends of the sampler. The Kemmerer will be raised through the water column and the collected groundwater will be transferred into 40 ml. vials for subsequent laboratory analysis. Each dedicated Kemmerer will be decontaminated, as described in Attachment A, and temporarily stored in a secure area (i.e., inside vehicle).

Phase 2 In order to compare results from the first groundwater sampling event (November 2000), an additional round of groundwater samples [MW-1 through MW-9] will be collected from the wells, via disposable bailer, after three volumes have been removed. All groundwater samples will be analyzed for VOCs (EPA Method 8260), FREON-113, plus tentatively identified compounds.

Phase 3 In order to compare results with the Phase 1 groundwater sampling activity, wells MW-3 and MW-8 will then be redeveloped using a weighted PVC bailer. The water column will be bailed from the base of the well. Once an additional five well volumes have been purged, the dedicated, and decontaminated, Kemmerer will be re-lowered to the previously-attained depth (i.e., 1 to 2 feet from bottom of well) at wells MW-3 and MW-8. Each Kemmerer will be secured until the messenger is "struck" , effectively closing both ends of the sampler. The Kemmerer will then be raised through the water column and the collected groundwater will be transferred into preserved 40 ml. vials for subsequent laboratory analysis.

In addition to the groundwater sampling, Earth Tech will record groundwater levels to further define groundwater flow patterns at the Site. Earth Tech will also measure and record in-well water temperatures (wells MW-3, MW-5, MW-7, and MW-8) to assess localized horizontal flow zones and in-well groundwater flow, and gain insight into Site groundwater quality trends due to inflections of the temperature logs. Earth Tech will log temperature profiles before purging each applicable monitoring well.

Assumptions

All groundwater samples will be analyzed for VOCs (EPA Method 8260), FREON-113, plus tentatively identified compounds.
Category B deliverables will be provided for quality assurance/quality control purposes.
Purge water will require containerization in six 55-gallon drums.

Schedule

It is anticipated that the sampling and associated activities will take place during the latter half of the week of March 19, 2001 (i.e., March 22 and 23, 2001).

Earth Tech has already initiated work pertaining to these supplemental tasks. Please contact the undersigned when you are ready to discuss or present your comments to the attached Work Plan. Thank you in advance for your anticipated cooperation. Please contact me at (254) 207-2804 or maxwelp@wilsonart.com or Mark Williams of Earth Tech at (518) 437-8368 or mark_williams@earthtech.com, should you have any questions regarding this amended work plan.

Very truly yours,

Wilsonart International, Inc.

Paul Maxwell
Manager of Environmental Affairs

Enclosures: As Noted

John Olm, NYSDOH BEEI
Daniel Miller, Ph.D., Rockland County Department of Health
Mark Williams, Earth Tech

ATTACHMENT A

EQUIPMENT DECONTAMINATION PROCEDURES

Cleaning of Field Sampling and Measurement Equipment

All equipment and tools used to collect samples for chemical analyses including Kemmerer® samplers, will be decontaminated using the following procedures:

- Non-phosphate detergent wash;
- Tap water rinse;
- Laboratory-grade methanol or isopropanol rinse;
- Distilled/Deionized water rinse; and
- If equipment is to be stored for future use, allow to air dry and then wrap in aluminum foil (shiny-side out) or seal in plastic bags.

Cleaning of Water Level Meter

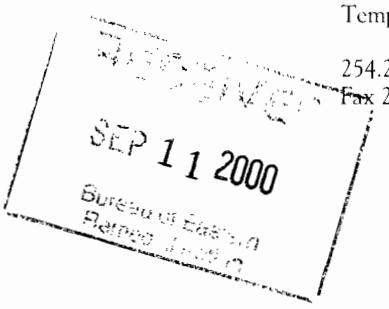
In general, the portions of the cable and probe (water level meter), which has come in contact with groundwater, will require the following cleaning procedure prior to reuse at another monitoring wellat the site:

- Exterior wash of probe and cable with non-phosphate detergent; and
- Distilled water rinse

WILSONART
INTERNATIONAL

Wilsonart International Inc.
2400 Wilson Place
P.O. Box 6110
Temple, TX 76503-6110

254.207.7000
Fax 254.207.2384



September 8, 2000

New York State Department of Environmental Control
Bureau of Eastern Remediation
Division of Environmental Remediation
50 Wolf Road, Room 242
Albany, New York 12233-7010
Attn: Mr. Chris Alonge

Re: Work Plan, 1 Brenner Drive, NYDEC Voluntary Cleanup Program, Site # V-00322-3

Dear Mr. Alonge;

Wilsonart International, Inc. (Wilsonart) has received the NYSDEC's consolidated comments to the August 2000 Workplan. The following responses are requested to be incorporated into the August workplan and made a part of the signed agreement in lieu of providing yet another complete workplan for review.

Based upon review of your comments, the following responses are provided, beginning with the first item requesting revision or clarification:

2.1) Last paragraph in Section 2.3

- All collected soil samples (that may be potentially submitted for laboratory analysis) will be preserved in accordance with accepted analytical protocols.

2.2) Third and Fourth paragraphs of Section 2.5

- Hollow stem augers are preferrable and will be used if possible. Previous overburden drilling at the site required the use of air rotary method to complete drilling. Initially, hollow stem augers will be used unless unable to complete the drilling. Soil samples will be collected at two feet intervals until bedrock is reached.

2.3) Last paragraph of Section 2.7

- Spelling of "nephelometric" is hereby corrected.

2.4) *Last sentence in Section 2.9*

- The concentration of individual volatile organic compounds will be reported for all samples tested.

2.5) *Last paragraph in Section 2.11*

- A temporary decontamination pad will be established in the eastern portion of the parking lot. All decontamination fluids and associated sediments will be collected, contained and characterized for appropriate disposition.

2.6) *First paragraph of Section 2.12*

- Samples will be field screened for headspace analysis by either PID or FID.

2.7) Uncontaminated drill cuttings and sediments will be controlled to prevent their runoff into streams or storm water catch basins.

3.1) Section 1.5

- Please replace the last sentence with the following: "The intent of the investigation, as listed in Section 2.1 (General) is to compile and develop investigory data to achieve a release or covenant not to sue for the entire parcel represented as 1 Brenner Drive (the 'Site')".

3.2) Section 1.4

- Please delete the fourth sentence of Section 1.4-3(d) and replace with: "Monitoring well MW-5 appears to be upgradient of all other existing wells at the Site."

3.3) The planned laboratory to complete all sample analysis work associated with the Site is Adirondack Environmental Services, Inc. of Albany, New York, an NYSDOH ELAP CLP certified lab.

3.4) The QC Officer for this work will be Earth Tech's C. Brett Mongillo, of the Albany, NY office.

Thank you for your prompt review of this submittal. As discussed, Wilsonart has a scheduled sale closing on next Tuesday, September 12th. The buyer is to be provided a completed and executed copy of the VCP Agreement for this Site at that time. Your assistance in helping Wilsonart accomplish this time schedule is very much appreciated. If there are any questions with this response, please immediately call me for resolution.

Sincerely,

Emil Studinka, Jr.

C: Steven Soleymani
Dan Case
Mark Williams (Earth Tech)

C. BRETT MONGILLO

MANAGER, CHEMISTRY SERVICES

EDUCATION

BS 1986 Chemistry University of Missouri- Rolla, Rolla, Missouri

REGISTRATIONS & CERTIFICATIONS

NYSDEC accepted third party data validation contractor.
NYSDEC accepted Immunoassay Field Technician.

PROFESSIONAL SUMMARY

Chemistry: Varied chemistry experience includes 13 years of consulting in hazardous waste site investigations involving collection and on-site analysis of environmental samples. Conducted field and laboratory analyses involving gas chromatography and immunoassay technologies. Media of interest have included soil, water, surface samples, ambient air and soil gas. Thirteen years experience in data validation of analytical data deliverables for adherence to USEPA CLP protocols and NYSDEC ASP protocols. Consulting work also included interpretation of analytical data in reference to the condition of sites under investigation. Early employment experiences included analyst positions in laboratories conducting gas chromatography analyses.

Currently acting as Earth Tech QA/QC Officer on all NYSDEC Superfund RI/FS and Design/Construct/Manage projects. Related responsibilities include the management of the collection and chemical analysis of field samples; laboratory data quality review; management of analytical result databases; and interpretation and reporting of chemical data.

Prepared Quality Assurance Project Plans (QAjPPs) and Sampling and Analysis Plans (SAPS) and acted as QA/QC officer for environmental investigation and remediation projects.

Acts as technical advisor to management on numerous projects for the preparation of project work plans.

Set up and managed field laboratories employing gas chromatographs with PID, FID, and ECD for the analysis of soil, water and soil gas.

Coordinated and conducted numerous field investigations employing field screening techniques such as soil/water head space and soil gas analysis by gas chromatography and immunoassay analysis of soil, water and wipe samples for pesticides, herbicides, petroleum hydrocarbons and PCBs.

Versed in the data quality objectives required by state and federal environmental analytical methods as well as validation criteria established by various state and federal agencies. Have employed this knowledge to assess the validity and usability of data generated on many levels of environmental investigations and subsequently prepared data validation and usability reports to regulatory agencies.

Acts as primary technical liaison between Earth Tech and contract laboratories.

Industrial Hygiene/Safety: Experienced in many areas of industrial hygiene including construction safety oversight, environmental project health and safety oversight, HASP preparation and review, HAZWOPER (OSHA 1910.120) initial and refresher training, exposure assessment monitoring, industrial health and safety compliance auditing, development of health and safety programs and procedures for industrial clients, and program-related client training. Expert in the use of typical personal exposure and ambient air quality sampling equipment, as well as real-time instrumentation used for indoor air quality assessments and HAZWOPER style investigations for health and safety monitoring (e.g., FID, PID, DataRam, SUMMA, CO, CO_2, LEL, calorimetric tubes, etc.). Safety experience includes extensive lockout/tagout, and machine guarding and confined space evaluations.

Served as Site Safety Officer for slurry wall trenching and construction at a project in Schenectady, New York chemical plant. Excavation was conducted through heavily contaminated soil.

Served as night shift safety officer during annual paper plant shut down in Fort Edward, New York. Was responsible for all aspects of safety over site and permit processing.

Served as Site Safety Officer at a contaminated soil removal and thermal treatment project in Saratoga Springs, New York. Was responsible for all aspects of construction safety and air monitoring for project personnel and public safety.

Prepared and conducted 40 hour (initial) and 8 hour (refresher) HAZWOPER training courses (OSHA 1910.120).

Prepared written health and safety programs and policies for industrial clients. Also prepared and conducted associated safety training programs for these clients (e.g., hazard communication, confined space entry, respiratory protection, lockout/tagout, asbestos awareness, lead awareness, blood borne pathogens, emergency spill response, etc.).

Prepared, or reviewed for completeness, numerous health and safety plans (HASPS) for environmental investigation and remediation projects.

Served as Health and Safety Officer on numerous environmental investigation and remedial construction projects.

Conducted full OSHA compliance audit of an abrasives manufacturing facility in Troy, New York. Project report included discussion of potential risk, root causes for non-compliance, immediate corrective actions, and long range managed solutions to prevent a reoccurrence of non-compliance.

Conducted and managed quarterly assessment monitoring for silica exposure at an iron foundry in Hudson Falls, New York. Conducted an initial noise exposure assessment and subsequent personal dosimetry at the same facility. Peripheral project work involved on-going consultation with the client on health and safety issues.

Conducted machine guarding audit of electronics manufacturing facility in Schenectady, New York. The completed assessment detailed potential risks and suggested corrective actions.

Prepared Job Hazard Assessments (JHA) and lockout/tagout procedures for over one hundred machines at an electronics manufacturing facility in Schenectady, New York.

PROFESSIONAL MEMBERSHIPS

Iroquois Section of the American Industrial Hygiene Association

EMPLOYMENT HISTORY

1998-present	Earth Tech, Inc. (acquired Rust Environment &Infrastructure)
1996-1998	Absolute Consulting Services (Sole Proprietorship)
1993-1996	ERM Northeast
1987-1993	Dunn Corporation (merged into RUST)

OFFICE LOCATION

Albany, New York

7. Brief resume of key persons, specialists, and individual consultants anticipated for this project.

a. **Name & Title:** **Brett Mongillo**
Manager, Chemistry and Sampling Services

b. **Project Assignment:** QA/QC

c. **Name of Firm with which associated:** **Earth Tech**

d. **Years experience:** **With This Firm** 6 **With Other Firms** 7

e. **Education: Degree(s)/Year/Specialization**
B.S. 1986 Chemistry University of Missouri-Rolla, Rolla, Missouri

f. **Active Registration: Year First Registered/Discipline**
NYSDEC accepted third party data validation contractor.
NYSDEC accepted Immunoassay Field Technician.

Key Qualifications for this Contract:

- Environmental investigation and remediation project management experience
- Groundwater treatment system operation and maintenance project management

g. **Other Experience and Qualifications relevant to the proposed project:**

Chemistry Services: Mr. Mongillo's varied chemistry experience includes 13 years of consulting in hazardous waste site investigations involving collection and on-site analysis of environmental samples. He has significant experience in the sampling and analysis of a wide variety of media (including soil, water, surface samples, ambient air and soil gas) and has conducted field and laboratory analyses involving gas chromatography and immunoassay technologies. Mr. Mongillo has over 13 years of experience in data validation of analytical data deliverables for adherence to USEPA CLP protocols and NYSDEC ASP protocols. His consulting work also included interpretation of analytical data in reference to the condition of sites under investigation.

Industrial Hygiene & Safety: Mr. Mongillo is also experienced in many areas of industrial hygiene including construction safety oversight, environmental project health and safety oversight, HASP preparation and review, HAZWOPER (OSHA 1910.120) initial and refresher training, exposure assessment monitoring, industrial health and safety compliance auditing, development of health and safety programs and procedures for industrial clients, and program-related client training.

Mr. Mongillo's past project experience includes:

- Acted as technical advisor to management on numerous projects for the preparation of project work plans.
- Prepared Quality Assurance Project Plans (QAjPPs) and Sampling and Analysis Plans (SAPS) and acted as QA/QC officer for environmental investigation and remediation projects.
- Set up and managed field laboratories employing gas chromatographs with PID, FID, and ECD for the analysis of soil, water and soil gas.
- Coordinated and conducted numerous field investigations employing field screening techniques such as soil/water head space and soil gas analysis by gas chromatography and immunoassay analysis of soil, water and wipe samples for pesticides, herbicides, petroleum hydrocarbons and PCBs.

Mr. Mongillo is well versed in the data quality objectives required by state and federal environmental analytical methods as well as validation criteria established by various state and federal agencies. He has used this knowledge to assess the validity and usability of data generated on many levels of environmental investigations and subsequently prepared data validation and usability reports to regulatory agencies.

His industrial hygiene and safety experience includes:

- Served as site safety officer for slurry wall trenching and construction at a project in Schenectady, New York chemical plant. Excavation was conducted through heavily contaminated soil. (1994)
- Served as night shift safety officer during annual paper plant shut down in Fort Edward, New York. He was responsible for all aspects of safety over site and permit processing. (1996)
- Served as site safety officer at a contaminated soil removal and thermal treatment project in Saratoga Springs, New York. He was responsible for all aspects of construction safety and air monitoring for project personnel and public safety. (1997)
- Prepared and conducted 40-hour (initial) and 8-hour (refresher) HAZWOPER training courses (OSHA 1910.120). (1991-Present)
- Prepared written health and safety programs and policies for industrial clients. Also prepared and conducted associated safety training programs for these clients (e.g., hazard communication, confined space entry, respiratory protection, lockout/tagout, asbestos awareness, lead awareness, blood borne pathogens, emergency spill response, etc.). (1991-Present)
- Prepared, or reviewed for completeness, numerous health and safety plans (HASPS) for environmental investigation and remediation projects. (1991-Present)

7. Brief resume of key persons, specialists, and individual consultants anticipated for this project.

a. Name & Title: **Brett Mongillo**
Manager, Chemistry and Sampling Services

b. Project Assignment: Program Manager

c. Name of Firm with which associated: **Earth Tech**

d. Years experience: With This Firm | With Other Firms

e. Education: Degree(s)/Year/Specialization
B.S. 1986 Chemistry University of Missouri-Rolla, Rolla, Missouri

f. Active Registration: Year First Registered/Discipline
NYSDEC accepted third party data validation contractor.
NYSDEC accepted Immunoassay Field Technician.

Key Qualifications for this Contract:

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- Served as night shift safety officer during annual paper plant shut down in Fort Edward, New York. He was responsible for all aspects of safety over site and permit processing.
- Served as site safety officer at a contaminated soil removal and thermal treatment project in Saratoga Springs, New York. He was responsible for all aspects of construction safety and air monitoring for project personnel and public safety.
- Prepared and conducted 40-hour (initial) and 8 hour (refresher) HAZWOPER training courses (OSHA 1910.120).
- Prepared written health and safety programs and policies for industrial clients. Also prepared and conducted associated safety training programs for these clients (e.g., hazard communication, confined space entry, respiratory protection, lockout/tagout, asbestos awareness, lead awareness, blood borne pathogens, emergency spill response, etc).
- Prepared, or reviewed for completeness, numerous health and safety plans (HASPS) for environmental investigation and remediation projects.

WILSONART
INTERNATIONAL

Wilsonart International Inc.
2400 Wilson Place
P.O. Box 6110
Temple, TX 76503-6110

254.207.7000
Fax 254.207.2384

August 17, 2000

Mr. Christopher G. Alonge
NY State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action, Room 242
50 Wolf Road
Albany, New York 12233-7010

Re: NYSDEC Voluntary Cleanup Program Site #V-00322-3
Wilsonart International, Inc. 1 Brenner Drive, Conger, New York

Dear Mr. Alonge:

Wilsonart International, Inc. is pleased to submit for your review the revised Subsurface Investigation Work Plan and attachments for our site located at 100 Brenner Drive in Congers, New York. The work plan has been modified to incorporate all of your comments from your letter date June 29,2000. Wilsonart believes this document should address all of the NYDEC's concerns and allow us to start the investigation of the site.

If you have any questions concerning this submittal, please contact me at 254-207-2437.

Sincerely,

Emil Studinka pm

Emil Studinka, CIH, CSP
Director, Regulatory & Safety Services
Wilsonart International, Inc.

/attachment

engineering and technology for the planet.

Subsurface Investigation Work Plan

Prepared for:
Wilsonart International, Inc.
2400 Wilson Place
Temple, Texas 76503-6110

Prepared by:
Earth Tech, Inc.
12 Metro Park Road
Albany, New York 12205

May 2000
Revised: August 2000

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APPENDICES

1.0 INTRODUCTION

1.1 GENERAL

Wilsonart International, Inc. (Wilsonart) has opted to participate in the "Investigation and Remediation" type of voluntary agreement of the Voluntary Cleanup Program (VCP). This action supersedes the previous VCP Application submitted by Lester, Schwab, Katz & Dwyer, LLP on November 22, 1999. At the request of Wilsonart, Earth Tech has prepared this work plan to perform a focused subsurface investigation at Wilsonart's former storage and distribution warehouse, located in the hamlet of Congers, Rockland County, New York (Figure 1). The purpose of the investigation is to compile and develop factual information to address Wilsonart's contention that the trichloroethene (TCE) impacted groundwater detected on-Site is the result of an off-Site source(s) unrelated to Wilsonart's past use of the property. The proposed activities include the compilation and review of existing data, completion of an on-Site Subsurface Investigation (SI) in accordance with a NYSDEC-approved Work Plan, and preparation of a Report that summarizes the results of the SI.

The 4.81-acre parcel consisted of vacant land until 1969. The vacant land was owned by Karl F. Kirchner, Mike Wallace and Jerome Johnson. The aforementioned individuals were named as "Owners" in a Declaration of Restrictive Convenents dated August 13, 1963 (Lester, Schwab, Katz & Dwyer, LLP, November 1999). These individuals subsequently formed the partnership, Congers Associates. The whereabouts of these individuals or the partnership is not known. Premark International, Inc. (a.k.a. Ralph Wilson Plastics Division, Wilsonart) acquired the title of the property (by deed) on June 19, 1968 from Congers Associates, Inc (Recorded: July 12, 1968: Liber 845, cp 810).

Premark International, Inc. built one 30,000-ft^2 warehouse building in 1969. Wilsonart is a manufacturer of surfacing materials for countertops, cabinets, tub and shower surrounds, commercial fixtures and flooring. This facility served the northeastern United States and was used only for storage and distribution purposes. Wilsonart suspended operations at this location in December 1994.

Hudson Technologies, Inc. (HTI) of 275 N. Middletown Road, Pearl River, New York 10965 leased the property from Wilsonart between February 4, 1997 and August 1, 1999 to operate an aerosol packaging service facility. HTI surrendered the leasehold premises to Wilsonart by mutual consent of the parties on August 1, 1999.

The Site is currently inactive. In November 1999, Illinois Tool Works, Inc. (ITW) of Glenview, Illinois purchased Wilsonart. Ownership/Leasing history is detailed below:

Prior to June 19, 1968	Lands owned by Congers Associates of Great Neck, New York
June 19, 1968 to December 1994	4.81-acre parcel acquired by Rexall Drug and Chemical Co., Inc. of Los Angeles, California; lands occupied by Premark International, Inc., Ralph Wilson Plastics Division (a.k.a. Wilsonart International of Temple, Texas)
February 4, 1997 – August 1, 1999	Building leased to HTI of Pearl River, New York
November 23, 1999	ITW acquired Wilsonart and obtained title to the parcel.

The NYSDEC has raised a concern regarding the presence of volatile organic compounds (VOCs) detected in groundwater on the property, and has requested an additional investigation. The SI outlined in this work plan was developed to provide data to address the NYSDEC's concerns, which were

summarized by Mr. Dale A. Desnoyers (NYSDEC Chief, State Superfund and Voluntary Cleanup Bureau) in a January 12, 2000 letter to Mr. Ronald S. Pordy (Lester, Schwab, Katz & Dwyer, LLP of New York, N.Y.). This work plan provides for the investigation of soil and groundwater quality to determine the source of groundwater impacts, define limits of potential soil and groundwater impacts, and further characterize groundwater flow conditions.

1.2 PROPERTY DESCRIPTION AND BACKGROUND

The former Wilsonart warehouse is located at 1 Brenner Drive west of Route 303, in the western portion of a commercial and industrial area in the hamlet of Congers, Town of Clarkstown, Rockland County, New York. As mentioned previously, Wilsonart used the warehouse exclusively for storage and distribution purposes. The 4.81-acre property was acquired by Wilsonart in 1968 and consists of a building (25%), parking lot (10%), lawn (5%) and wooded areas (60%). The footprint of the warehouse building is approximately 30,000 square feet with approximately 20 percent allocated for office space. The warehouse, which was built in 1969, consists of steel frame and masonry construction with poured concrete floors. Three large loading docks are present along the eastern side of the warehouse building. A glue room located in the southwest corner of the warehouse building; was used to store adhesive materials.

The Site is bounded by a sanitary sewer easement (Rockland County Sewer District No. 1), Conrail (CSX) and residential properties to the west and by a drainage easement and Sturz Enterprises, Ltd. to the north. To the east are commercial/light industrial-zoned lands owned by Rendahl Corp., Diversified Properties, Inc., Precious Realty, Inc. and several other commercial / light industrial businesses. The Site is bound to the south by undeveloped, vacant land, owned by Denlo Realty Corp., and residential properties.

Wilsonart discontinued operations at the warehouse in December 1994. No orders, decrees or other legal documents regarding violations of the Environmental Conservation Law or equivalent federal environmental statutes are known to have been received by Wilsonart.

According to Mr. Jerry Brickwood, Town of Clarkstown Sewer Department, there is no documentation that the Site was connected to the Town's Sewer District 35 - Contract B (August 14, 2000). Rockland County Sewer District 1, which also provides service adjacent to the Brenner Drive area, was also contacted regarding connections to the Site. According to Mr. Martin Dolphin, the 1 Brenner Drive property occupants (Wilsonart and HTI) had no Industrial Pretreatment Permits with the Rockland County Sewer Department (August 14, 2000). This suggests that the Site may not be connected to the County Sewer District 1. Further review of this subject, via the Freedom of Information Law, would document existing and historic on-Site stormwater and sanitary waste management practices at the Site.

1.3 PRIOR USES/CONTAMINATION OF THE PROPERTY

"Greenfield Site" (Prior to June 19, 1968)

Parcel was vacant with no improvements.

Wilsonart Occupancy (June 1968 – December 1994)

During Wilsonart's occupancy, the former warehouse facility included inventories of laminate, and flammable and non-flammable adhesives. The flammable and non-flammable adhesive products were manufactured in Temple, Texas and were temporarily stored inside the warehouse in 55-gallon drums, 5-gallon pails, 1 gallon cans, 1 quart cans and 1 pint cans. Based upon review of operational history and

inventory records the following chemicals were used to manufacture these items: lactol or heptane, toluene, MEK, acetone, hexane, methanol, and 1,1,1-trichloroethane (TCA). A summary of chemical inventory is provided in Table 1. Trichloroethene (TCE) was not used to manufacture the adhesive materials stored at the former Wilsonart warehouse facility.

Diesel fuel was stored in one 12,000-gallon underground storage tank (UST) and one 6,000-gallon UST located north of the warehouse. The USTs were installed in 1974 and were removed, along with all associated pumps and piping, in October 1987 (Appendix A). Tank Tech performed the removal according to state guidelines in place at the time. After the tanks were removed, Mr. Bob Patterson (Rockland County Department of Health, Division of Environmental Health) inspected the excavation. No evidence of leakage from the USTs was reported (Rockland County Health Department, 1987). Clean fill was used to backfill the tank excavations.

In February 1985, the Rockland County Department of Health, Division of Environmental Health issued three violations (Appendix B). The violations are listed below:

1. Emergency Plans, floor plans, and hazardous material inventory statement were not submitted to RCDOH or were maintained on premises;
2. Portable containers not properly stored or handled; and
3. Required posting or labeling not present or satisfactory.

Hudson Technologies, Inc. Occupancy (February 4, 1997 – August 1, 1999)

HTI (HTI) of Pearl River, New York leased the parcel from Wilsonart to house its Congers, New York production facility for its aerosol packaging line. HTI, which provides on-Site refrigerant recovery, reclamation and management services along with a full stock of various refrigerant types, announced the closure of its Congers, New York facility on August 11, 1999.

HTI was contacted to provide information relating to the chemical inventory stored and used during their occupancy of the Site (Appendix C). According to Mr. Stephen P. Mandracchia, Executive Vice President of HTI, the following chemicals were used and/or stored at various times and in varying quantities:

- Dichlorodifluoromethane (R-12);
- Tetrafluoroethane (R-134a);
- Chlorodifluoromethane / 2 methyl propane / chloro-1,1-difluoroethane mixture (R-406a);
- Chlorodifluoromethane (R-22);
- Chlorodifluoromethane & Chloropentafluoroethane mixture (R-502);
- 2,2 dichloro-1,1,1-trifluoroethane (R-123);
- Welding gases consisting of Acetylene, Argon, Oxygen and Carbon Dioxide;
- Liquid Nitorogen; and
- Small containers of various and miscellaneous cleaning solutions.

1.4 PREVIOUS INVESTIGATIONS

The following investigations have been performed on the subject property. Listed below are details that pertain to the environmental assessment of the Site:

1. Environmental Products & Services, Inc. (EP&S), Phase 1 Environmental Site Assessment – 1 Brenner Drive, Congers, New York 10920, prepared for Hudson Technologies, Inc, March 2, 1998.

HTI, which expressed an interest in purchasing the property from Wilsonart, hired EP&S, a remedial firm, to prepare a Phase 1 Environmental Site Assessment (ESA) of the subject property. Conclusions made by EP&S were:

- Site is not connected to the public sanitary sewer system;
- Suspended ceiling tiles may contain asbestos in the office and maintenance area of building;
- Lead-based paint was observed in various portions of the building;
- Two debris piles were observed exterior to the building;
- Inspection of the glue room, used to store laminate materials, revealed spillage;
- No underground storage tanks (USTs) were observed on the Site. Records reviewed indicate that two fuel oil USTs were removed in October 14, 1987 (Earth Tech's review (April 2000) indicated that two diesel fuel USTs (one 12,000-gallon and one 6,000-gallon) existed on-Site between 1974 and 1987) existed along the exterior of the northeastern corner of the Site building); and
- NYSDEC files reviewed indicated that 40 documented spills have occurred within ¼ to ½ mile of the Site (Earth Tech's later review (April 2000) indicated that the environmental database search was incorrectly centered on 100 Brenner Drive. The Site is located at 1 Brenner Drive, approximately 1/4 mile to the west.).

EP&S recommended that a Phase II subsurface investigation be performed.

2. Environmental Products & Services, Inc., Phase II Subsurface Investigation – "100" Brenner Drive, Congers, New York 10920, prepared for Hudson Technologies, Inc., August 31, 1998.

EP&S installed and sampled three 30-foot deep monitoring wells (MW-1, MW-2 and MW-3) to evaluate if there were any potential environmental impacts from former Wilsonart operations. Particular emphasis was placed on the loading dock area, septic tank/leachfield area and former fuel oil USTs area. Conclusions formulated by EP&S are listed below:

- Volatile Organic Compounds (VOCs) were detected at or above NYSDEC guidance values for groundwater in all three wells. While minor amounts of petroleum VOCs were evident, the majority of the VOCs detected reportedly came from sources such as solvents and degreasers.
- Direction of groundwater flow at the Site was reported as east-northeast to the west-southwest.
- The petroleum and chlorinated solvent-impacted groundwater was "allegedly" due to former operations at the Wilsonart facility. This statement had no factual or technical substantiation.

3. Earth Tech, Inc. (Earth Tech), Supplemental Phase II Investigation Letter Report – Former Wilsonart Facility, "100" Brenner Drive, Congers, New York 10920, prepared for Wilsonart International, Inc. November 14, 1998.

Earth Tech performed an investigation for Wilsonart to further delineate Site conditions, define the possible source of groundwater VOC impacts at the Site and to assess the possibility of off-Site sources. Field activities included:

- Surveying;

- Collection of 26 passive soil gas samples, which were strategically placed throughout the Site. The samples were analyzed for VOCs by United States Environmental Protection Agency (USEPA) Method 8260 (Figure 2);
- Installation of one overburden monitoring well and two bedrock monitoring wells to provide additional geologic, hydrogeologic and environmental data. Selected subsurface soil samples were analyzed for VOCs by USEPA Method 8260; and
- Following development, the three existing wells (MW-1, MW-2 and MW-3) and three newly installed wells (MW-4, MW-5 and MW-6) were sampled for VOC analysis (Figure 2).

Conclusions drawn by Earth Tech included:

- Direction of groundwater flow on the Site, as observed on October 21, 1998, is generally westward with a slight flow divide along the western edge of the Site (Figure 3).
- The presence of the flow divide appears to indicate that the source of the VOC impacts in groundwater is located east of the Site.
- Wilsonart is not the likely source of the VOC impacts due to the following findings:

  a) VOCs not detected in the overburden, either from passive soil gas sampling or subsurface soil testing;
  b) VOCs were not detected in groundwater within the shallow overburden;
  c) Soil gas samples, soil boring samples and groundwater samples collected near potential former source areas (i.e., glue room and septic/leach field) were all non-detect for VOCs.; and
  d) The highest TCE concentrations in the bedrock water-bearing zone occur in wells MW-3 (494 micrograms per liter (ug/L)) and MW-5 (160 ug/L). The highest 1,1,1-Trichloroethane (TCA) concentrations in the bedrock water-bearing zone also occur in wells MW-3 (63 ug/L) and MW-5 (20 ug/L). The NYSDEC groundwater standard for TCE and TCA is 5 ug/L. These monitoring wells (MW-3 and MW-5) appear to be upgradient of the other existing monitoring wells (MW-1, MW-2, MW-4 and MW-6) at the Site. A summary of analytical results is provided in Appendix D of the attached Work Plan.

- No Freon compounds, which were packaged by HTI, were detected in any soil and/or groundwater sample.

1.5 PROJECT SITE

For the purposes of conducting this investigation under NYSDEC's Voluntary Cleanup Program (VCP), Wilsonart elects to define the "Site" as the entire 4.81-acre parcel (Tax Map Section No. 128, Block A, Lot 5.08). Based on previous groundwater monitoring conducted at the property, the direction of groundwater flow, within the Site boundary, is westward. The Site thus primarily includes the portion of the property that is hydraulically downgradient of impacted wells MW-3 and MW-5.

2.0 SCOPE OF WORK

2.1 GENERAL

Several activities are planned to assess potential environmental impacts to the property and the extent of the known VOC-impacted groundwater. To the extent possible or practical, the activities will be conducted in a sequential manner. Depending on the results obtained from each activity, and on input from NYSDEC, NYSDOH and Rockland County DOH, Earth Tech may recommend modifications to subsequent activities.

A subsurface investigation will be conducted, and will include the collection of soil and groundwater samples. The purpose of the investigation is to compile and develop information to address Wilsonart's contention that the VOC-impacted groundwater on-Site is the result of an off-Site source(s) unrelated to Wilsonart's use of the property. Wilsonart intends to achieve a release or "covenant not to sue" for the entire Site and, ultimately, sell the Site as a commercial property. A summary of the scope of work is as follows:

- Perform Site walkover;
- Review environmental records;
- Perform focused water well survey;
- Review available aerial photographs;
- Develop Site vicinity map;
- Excavate and field screen up to five test pits;
- Collect and analyze a minimum of four soil samples during the test pitting program;
- Collect and analyze surface water/sediment upgradient of impacted well MW-3, if encountered;
- Drill and field screen two soil borings/rock corings;
- Collect and analyze a minimum of four subsurface soil samples from the two borings;
- Install two bedrock groundwater monitoring wells;
- Develop the newly installed monitoring wells;
- Monitor water levels and collect a sample from all on-Site groundwater monitoring wells;
- Slug test the monitoring wells to evaluate the hydraulic conductivity of the upper bedrock water-bearing zone; and
- Survey locations and elevations of newly installed monitoring wells.

If the data generated are not adequate to demonstrates the off-Site origin of TCE [or not sufficient to assess the potential exposure by off-Site receptors, it may be necessary to collect additional samples at off-Site locations].

Details of the work activities that will be conducted are provided in the following subsections. Detailed Standard Operating Procedures (SOPs) for carrying out these activities are provided in Appendix E.

2.2 DATA COMPILATION AND REVIEW

2.2.1 Site Inspection

Representatives from Wilsonart and the NYSDEC will accompany Earth Tech during the Site walkover. Earth Tech, Wilsonart and the NYSDEC will stake the proposed locations of test pits and soil borings/monitoring wells prior to mobilization. Proposed test pit and soil boring/monitoring well locations are shown on Figure 4. These proposed locations were selected based on the documented past

land uses and Site activities, access and geographical considerations, and the data gaps remaining from previous investigations.

Earth Tech will also inspect accessible portions of the property and from public right-of-ways, observe adjacent parcels that are within ½ mile east and/or south of the property. The purpose will be to identify obvious and apparent causes for concern, such as the improper storage or use of chemicals or wastes, and the presence of tanks, stains, unusual odors, stressed vegetation, filled areas, and other indications of the potential presence of hazardous substances.

2.2.2 Records Review

Prior to the initiation of on-Site activities, Earth Tech will review available environmental records and reports of the NYSDEC, NYSDOH, Rockland County Department of Health, Division of Environmental Health and Town of Clarkstown with reference to potential TCE sources east and south of the Site. The objective of this file review is to obtain pertinent and reliable information from reports, maps, surveys, release cleanup records, and other written materials. Available information on Site history provided by Wilsonart will also be reviewed. Additional review will include the inspection of utility mapping and Property records for indications of prior uses or releases of hazardous substances adjacent to the property. Earth Tech will describe or list each identified large aboveground storage tank (AST) or underground storage tank (UST) that is on or near the property (except water tanks), and identify exterior ASTs and/or USTs on adjacent parcels that may present a significant environmental risk if a release were to occur.

2.2.3 Water Well Review

A review of public records concerning public and private water wells within ½ mile of the Site will also be conducted. Reviews will focus on the location of wells, name of owner, age and usage of the well, stratigraphic unit screened, well construction, static water levels, well yield, water quality, and any other relevant data which can be obtained. Earth Tech will also review the chemical analytical data obtained via FOIL request from the Rockland County Department of Health, NYSDOH, and NYSDEC for water supply wells in the vicinity of the property. Data may be limited as the area to be assessed is primarily within a commercial and residential area.

2.2.4 Aerial Photograph Review

Historical aerial photographs that depict the property and surrounding area will be reviewed. Particular attention will be given to potential off-Site TCE sources and the vicinity of the known groundwater impacts. The significance of each identified potential area of concern will be assessed using professional judgment, considering such factors as its nature, magnitude, and known or potential impact upon the property, and if associated with an off-Site source, the location of that source with respect to the property.

Once the water well survey and aerial photograph review have been performed a site vicinity map will be prepared. This map will summarize information gathered during the data compilation and review process. The site vicinity map will identify adjoining property usage, known private water wells, potential off-Site chlorinated solvent sources and utility easements.

2.3 TEST PITS

The leachfield is believed to be the depository for all on-Site non-process water wastes and sanitary wastes. It was believed that floor drains in the "glue room" were connected to the leachfield, which is north of the former warehouse facility (Appendix . A recent Site visit revealed that there were no floor drains in the glue room.

The actual configuration of the on-Site storm water and sanitary waste piping systems will be defined during the Site Inspection (Section 2.2.1) and Records Review (Section 2.2.2). Because the management of sanitary/non-process water wastes is not certain, the test pitting program will be flexible. For example, if the initial subsurface investigation data identifies the need to focus on another potential on-Site source area, other than the leachfield, than the test pitting program will be modified accordingly. However, at this stage it appears that the leachfield would be the most logical area to investigate the discharge of on-Site sanitary / non-process water wastes.

The test pitting program is intended to evaluate the environmental character of the soils underlying the leachfield, and to assess this area as a potential source of significant groundwater impact. The leachfield is located to the north of the former warehouse facility and west of well MW-1. Exploratory test pits will be excavated to achieve the following objectives.

- To characterize the nature and extent (lateral and vertical) of fill and its variability; and
- To collect soil samples for screening and possible laboratory analysis.

Test pits will investigate specific locations. It is anticipated that up to five test pits will be excavated (Figure 4). Proposed locations are based on the documented past land uses and Site activities, access and geographical considerations, and the data gap remaining from previous investigations. These target area locations may be slightly adjusted in the field by Earth Tech's geologist based on conditions actually encountered. The test pits will be excavated in a deliberate sequence: precautions will be taken to prevent cross-contamination. In addition, an Earth Tech representative will also conduct work zone and perimeter air monitoring during this phase of investigation (Appendix H, Chapter 9.0).

Test pits will be excavated with a backhoe with nominal 12-foot excavation depth capability. The water table is expected to be approximately 10 to 20 feet. Each test pit location will be screened with a photo ionization detector (PID) or flame ionization detector (FID) and visual observation prior to excavating. Excavated materials will be placed within a bermed area lined with poly adjacent to each test pit to prevent contact of surface soils with excavated materials. The surficial soil will be cast aside in a designated area for use as surficial backfill.

During excavation, the Earth Tech geologist will note the presence and depth of disturbed soils and groundwater seeps (if any); and document soil discoloration or staining, fill characteristics, perched water zones, sheens and non-aqueous phase liquids, and so forth. The geologist will work with the operator to sample the side wall soil at approximately 1-2 foot intervals, including the following locations:

- Ground surface, i.e. 0-2 foot depth;
- Soil or fill with the suspected highest headspace reading, if any;
- Soil or fill with the most intense or distinctive discoloration or staining, if any;
- Native soil immediately beneath the suspect leachfield; and
- Native soil just above inferred water table near the bottom of the excavation.

The geologist will promptly inspect the samples, classify the soil according to Modified Burmister, log the stratigraphy, and place the samples into clean, labeled containers. Soil headspace will be screened for organic vapors. Pertinent field observations, including headspace readings, and the presence or absence of standing water in the excavation bottom, will be documented on a test pit log.

Prior to test pit backfilling, the possible presence of venting organic vapors will be investigated in each test pit by lowering the PID or FID sensor into the completed excavation, and recording the measurement. The field geologist will verify that the results of the discrete headspace measurements and the test pit

screening appear reasonable, e.g., organic vapors detected in test pit can be explained by organic vapors detected in a discrete sample. Photographs will then be taken (with scale and identifier), and the necessary observations completed, before ordering the test pit to be backfilled.

Following completion of the test pit, all the excavated material will be returned to the excavation sequentially, i.e. top to top and, bottom to bottom. The backfill will be tamped as it is placed to ensure that all of the excavated material can be returned to the excavation. After backfilling is complete, the surficial soil will be screened visually and by PID or FID to verify that the final test pit cover soil does not appear impacted. All excavations will be surveyed for subsequent plotting on a Site base map.

At the end of each day of test pitting, the Earth Tech geologist will review the samples collected and recommend which samples should be laboratory analyzed to best achieve project objectives. It is estimated that four samples will be analyzed for VOCs (EPA SW-846 Method 8260) and Freons with ASP Category B Deliverables. Samples not analyzed will be archived.

2.4 SURFACE WATER AND SEDIMENT SAMPLING

Surface water and sediment samples will be obtained, if available, to identify potential off-Site sources that may have contributed contaminated runoff to the Site. One round of three grab samples of surface water and sediment samples will be obtained. These samples will be analyzed for VOCs (EPA SW-846 Method 8260) with Category B deliverables. All samples will be obtained during normal flow conditions or, if one or more sampling locations have no flow during such conditions, during the initial period of flow following a precipitation event. The procedure for obtaining surface water and sediment samples is presented in Appendix E.

2.5 SUBSURFACE SOIL SAMPLING AND ANALYSIS

Information obtained from previous drilling indicates that relatively compact glacial till overlies bedrock (Brunswick Formation). The historical boring log data indicates that the glacial till ranges in thickness from approximately 4 feet to 22 feet below ground surface (Appendix G). It is expected that in areas where the bedrock is close to the surface and saturated, the glacial till is likely hydraulically connected to the upper bedrock water-bearing zone.

Three soil borings/rock corings (MW-7, MW-8 and MW-9) will be advanced through the glacial till to the bedrock interface using a drill rig. The locations of the proposed boreholes are shown on Figure 4. An Earth Tech geologist or hydrogeologist will be on-Site to oversee the drilling program and select and prepare soil samples for laboratory analysis. An Earth Tech representative will also conduct work zone and perimeter air monitoring during this phase of investigation (Appendix H, Chapter 9.0).

Earth Tech will use a qualified driller that can furnish an all terrain rotary drilling rig with sufficient torque to enable the hollow stem augers to penetrate through the Site soils. Parratt-Wolff Inc., of East Syracuse, New York, will be retained for air rotary drilling.

Overburden drilling for the installation of monitoring wells will be performed using a four-inch O.D. tri-cone roller bit using an air rotary method. The soil at each borehole will be continuously sampled with a 2-inch outside diameter (O.D.) split-spoon sampler, to confirm subsurface geologic conditions. Samples will be characterized, logged and the headspace of all samples will be field screened for VOCs using a PID equipped with a 10.2 eV lamp or FID. Earth Tech will prepare soil boring logs and well installation logs for each well (Appendix E).

Once the top of bedrock is encountered, drilling will proceed using four-inch O.D. HX techniques. To confirm the presence and characteristics of bedrock, the drilling will penetrate 10 to 20 feet into the bedrock. Bedrock will be cored using a five-foot core barrel at each proposed bedrock monitoring well location. A qualified on-Site geologist will describe the lithology of rock core samples and orientation of bedrock bedding planes and fractures. Appendix E presents the form used for core logs.

Soil boring MW-7 will be advanced along the eastern property boundary south-southeast of impacted monitoring well MW-3 to evaluate soil and groundwater quality conditions upgradient of well MW-3 (Figure 4). Soil boring MW-8 will be drilled at a location that is east of existing monitoring well MW-3 to evaluate the potential for an off-site source for the groundwater impacts observed at monitoring wells MW-3 and MW-5 (Figure 4). Soil boring MW-9 will be advanced east of the drainage ditch along the southwest portion of the Site downgradient from existing bedrock well MW-3 and proposed bedrock wells MW-7 and MW-8 (Figure 4). Borings will be drilled to a depth consistent with the existing wells on-Site (approximately 35-feet). At a minimum, two soil samples will be collected from each boring. Additional soil samples may be submitted if PID or FID screening or visual examination indicate the presence of potentially impacted soil.

Subsurface samples selected for laboratory analysis will be submitted to a laboratory that is approved by the New York State Department of Health (NYSDOH) to provide Analytical Services Protocol (ASP) Category B deliverables. Selected soil samples will be analyzed for volatile organic compounds utilizing EPA SW-846 Method 8260. Sampling QA/QC procedures to be followed, including the collection of duplicate and blank samples, are presented in Appendix J.

2.6 MONITORING WELL INSTALLATION

A bedrock monitoring well will be installed at three locations on the Site (MW-7 through MW-9). The three new monitoring wells will be installed to an estimated depth of 35 feet, with well screens installed within the upper 10 to 15 feet of the saturated zone. These new bedrock wells will be installed to provide a more comprehensive depiction of groundwater flow patterns, hydraulic gradients and groundwater quality within the bedrock water-bearing zone beneath the Site.

The three monitoring wells will be constructed through the drill casing using traditional monitoring well construction procedures. The wells will be constructed of flush threaded 2-inch I.D. schedule 40 PVC well screen (0.01-inch slot) and threaded end cap attached to the base of a solid riser pipe. The wells will be installed with a sand filter pack, appropriately graded for the 10 slot screen, that will extend from at least 2 inches below the base to 1 to 2 feet above the top of the well screen. A 1/2-foot thick layer of fine choke sand will be placed above the filter sand. A 3-foot thick bentonite seal will be placed above the fine choke sand and hydrated with potable water. A thick cement-bentonite grout will be tremied from the top of the bentonite seal to approximately 3 feet below grade. The grout seal will be constructed following the SOP methods presented in Appendix E. The well will be finished with a lockable flush-mounted curb box installed over the riser pipe and set into concrete to prevent unauthorized access and provide protection for the wells. The well identification number will be clearly labeled on the outside of each curb box. A schematic of a typical bedrock monitoring well is shown in Appendix E.

2.7 WELL DEVELOPMENT

Each newly constructed bedrock groundwater monitoring well will be developed to:

- remove residual, formational silts and clays, thereby reducing turbidity during sampling that could potentially interfere with chemical analyses; and,

- Increase the hydraulic conductivity immediately around the well, which reduces the potential of the well to yield an insufficient volume of water during the sampling event.

Each monitoring well will be developed in accordance with the SOP presented in Appendix E, Monitoring Well Development Procedures. A well development log will be completed by a qualified on-Site chemist/geologist and/or hydrogeologist to document well development activities.

A goal of 50 napthalometric units (NTU) has been established for well development. Earth Tech will monitor and record the volume of water removed from each well, temperature, pH and specific conductance, as well as turbidity, until it is determined that the well is yielding representative groundwater. If 50 NTUs cannot be obtained, then well development will continue until the turbidity and other field parameters have stabilized.

2.8 WATER LEVEL MEASUREMENTS

A round of water level measurements will be collected from six existing groundwater monitoring wells and the three newly installed wells to provide information on hydraulic gradient and groundwater flow direction at the Site. The round of water level measurements will be collected prior to groundwater sampling (Section 2.9). A comprehensive groundwater contour map will subsequently be prepared to note groundwater flow patterns and hydraulic gradients within the bedrock water-bearing zone beneath the Site (Section 5.0). The SOP for collecting water level measurements is presented in Appendix E, Water Level Measurement Procedures.

2.9 GROUNDWATER SAMPLING AND ANALYSIS

Earth Tech will collect one round of groundwater samples from each of the six existing groundwater monitoring wells (MW-1 through MW-6) and the three newly installed wells (MW-7, MW-8 and MW-9). The samples will be collected no sooner than 14 days after the development of the newly installed wells. The timing of the groundwater sampling event will be coincident with the water level measurements.

Groundwater samples will be collected using new dedicated disposable polyethylene bailers. Groundwater sampling will be performed in accordance with the SOP outlined in Appendix E, Groundwater Sampling Procedures. Sampling QA/QC protocols to be followed, including the collection of duplicate and blank samples, are also presented in Appendix E.

Groundwater samples will be submitted to a NYSDOH ASP-approved laboratory for analysis of Target Compound List (TCL) total VOCs utilizing EPA SW-846 Method 8260.

2.10 HYDRAULIC CONDUCTIVITY TESTING

After development, each newly installed monitoring well will undergo in-situ hydraulic conductivity slug testing. Testing will be performed to estimate the horizontal hydraulic permeability of the upper bedrock water bearing zone (MW-1 through MW-3 and MW-5 through MW-9) and the overlying fill/glacial till (MW-4). This information will be used to estimate groundwater flow rates and assess potential source(s) of TCE. The SOP for hydraulic conductivity testing is presented in Appendix E.

2.11 DECONTAMINATION

All non-disposable equipment will be decontaminated prior to and after the field activities. All disposable sampling equipment will be discarded between samples. The purpose of equipment decontamination is to minimize the potential for compromising data validity by reducing the possibility of cross-contamination.

Detailed equipment decontamination procedures to be implemented as part of the SI activities are included in Appendix E.

The test pitting and drilling program will also include decontamination procedures to ensure that possible contaminants are not introduced to or transferred across the Site. Prior to excavating the first test pit, the equipment used in test pitting (i.e., bucket of backhoe) will be cleaned to remove possible contaminants. While working at the Site, the backhoe bucket will be decontaminated between test pit locations to prevent cross contamination. The backhoe will be decontaminated before leaving the Site at the completion of the test pitting program. The cleaning process will involve the use of a high-pressure steam cleaner. It is assumed that clean, potable water from the Congers/Clarkstown public water supply can be obtained on-Site. This water supply source will be used for all decontamination and well construction activities.

Prior to drilling the first boring, the equipment used in drilling and well installation will be cleaned to remove possible contaminants. All equipment, which will come in contact with the soil or rock, as well as water tanks, drill tools, iron casings, pumps and hoses, will undergo the initial cleaning procedure. All screen, riser pipe, top caps and bottom plugs will be decontaminated and sealed in plastic before beginning drilling at the first location. While working at the Site, the drilling equipment will be decontaminated between boring locations to prevent cross contamination. Decontamination of equipment used during the overburden drilling and bedrock drilling will take place at each drilling location. The drill rig and all drill tools will be decontaminated before leaving the Site at the completion of the well installations.

2.12 HANDLING OF INVESTIGATION DERIVED WASTES

Field activities will produce investigation-derived waste (IDW) which will require appropriate management. All drill cuttings will be field screened for VOCs prior to being spread on the ground near the respective boring. If field screening indicates possible contaminants present in the drill cuttings, appropriate measures will be taken to properly containerize (i.e., open-topped 55-gallon drums [55 1A2]) and dispose of the cuttings. The IDW requiring management includes the following:

- Groundwater;
- Decontamination fluids and sediments which may settle out of such fluids; and
- Personnel protective equipment (PPE) and associated debris resulting from the field activities.

The management of these materials is discussed below.

2.12.1 Groundwater

Groundwater generated during the drilling, development and sampling of on-Site monitoring wells will be containerized in appropriate 55-gallon drums pending receipt of analytical results. If analytical results indicate VOC concentrations below New York State groundwater standards, the groundwater will be discharged on to the ground surface at a point downgradient of the well and allowed to infiltrate. Groundwater in excess of these standards will be transported for off-Site treatment and/or disposal at a permitted facility.

2.12.2 Decontamination Fluids

Decontamination fluids associated with test pitting and drilling activities will be containerized in appropriate 55-gallon drums and temporarily stored on-Site. Upon completion of field activities, this material will be properly characterized and, after receiving the analytical results and necessary approvals

from Wilsonart and NYSDEC, will be discharged onto the ground surface at the Site or transported off-Site for treatment and/or disposal at a permitted facility.

2.12.3 PPE and Associated Debris

Used PPE and other associated debris (*e.g.*, disposable sampling equipment) will be containerized in appropriate 55 gallon drums and stored temporarily on-Site. At the conclusion of field activities, these materials will be appropriately characterized and after receiving the necessary approvals from Wilsonart and the NYSDEC, will be transported off-Site for disposal at an appropriate facility.

2.13 SURVEYING

The location and elevation of each monitoring well and monitoring point will be surveyed relative to a pre-established Site datum. The ground level elevation will be surveyed to the nearest 0.1-foot, and the measuring point (M.P.) of the PVC and top of protective casing elevations to 0.01 foot. Additionally, the wells will be located in relative position to existing ground features such as paved roads, permanent structures, bench marks and property lines.

2.14 DATA VALIDATION

Validation of the TCL analytical data will be performed in accordance with EPA Region II validation guidelines, modified as appropriate for the NYSDEC's ASP. This validation will be performed by personnel meeting the qualifications of the NYSDEC for data validations.

The data validation will include the review and evaluation of all laboratory deliverables. The basic review will cover sample request forms, chains-of-custody forms methodology summaries, laboratory chronicles and items listed below:

Volatile Organics

- Deliverable Requirements
- Case Narrative
- Holding Times
- Surrogate Recoveries and Summary
- Method Blank Summary and Data
- GC/MS Tuning and Mass Calibration
- Organic Analysis Data Sheets (Form 1)
- Quantitation Reports
- Mass Spectral Data
- EPA/National Institute of Standards (NIST) Mass Spectral Library Search for Tentatively Identified Compounds (TICs)

- Initial Calibration Data (GC/MS)
- Continuing Calibration Data (GC/MS)
- Internal Standard Areas and Retention Times

2.15 HEALTH AND SAFETY PLAN

Earth Tech has prepared a Site specific Health and Safety Plan (HASP). It is included as Appendix H. This Site-specific HASP has been prepared by Earth Tech in accordance with the regulatory requirements of 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response". Earth Tech will also adopt the Generic Community Air Monitoring Plan guidelines provided by the New York State Department of Health (Appendix I).

The purpose of the HASP is to summarize the project organization and responsibilities; establish Standard Operating Procedures (SOPs) for preventing accidents, injuries, and illnesses; identify hazards, discuss the personal protective equipment that may be used at the Site; identify personnel health and safety training requirements; summarize the monitoring techniques to be used; establish emergency procedures; describe the medical surveillance program; identify that appropriate first aid equipment is available; provide for accident reporting; and establish a schedule for safety inspections.

The HASP is primarily designed to provide a measure of protection for on-Site workers during invasive work activities, which would most likely be the only receptor to the unlikely release of airborne contaminants due to test pitting and / or drilling at the Site. Previous work performed by Earth Tech did not indicate any potential airborne hazards during drilling activities at the Site. An amendment to the HASP has been made to establish action levels for community respiratory protection. A subsection of Chapter 9 of the HASP has been prepared to protect the community (i.e., homeowners to west of railroad tracks and south of Site and commercial/light industrial tenants north and east of the Site) via continuous real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter during invasive activities at the Site. In addition, Earth Tech will document and establish response actions to help confirm that investigative work activities have not spread contamination off-Site through the air (Appendix H).

3.0 QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

A Quality Assurance/Quality Control (QA/QC) program will be implemented during this investigation to insure that policies and procedures will be followed that will result in the achievement of several data quality objectives. The overall objective of the QA/QC program is to identify procedures for defensible sampling, chain-of-custody, laboratory analysis and instrument calibration. Detailed procedures are included in Appendix J.

A Data Usability Summary Report (DUSR) will be prepared by a qualified Earth Tech Quality Assurance officer capable of conducting full data validation in general conformance with NYSDEC's guidance policy (copy included in Appendix J).

4.0 EXPOSURE ASSESSMENT

Earth Tech will complete a qualitative human exposure assessment as part of the investigation to identify if people can be exposed to contaminants that may be present at the Site. The exposure assessment will utilize environmental conditions identified during the subsurface investigation. From this, all potential exposure pathways and scenarios will be determined.

5.0 PROJECT REPORT

Data evaluation and report preparation consists of compilation, integration and evaluation of information collected during the subsurface investigation. Data evaluation will be conducted continuously during the field investigation. The results of well drilling, water level data and laboratory tests will be integrated to develop an understanding of the Site geology, hydrogeology, groundwater flow system and mechanisms of contaminant migration at and adjacent to the Site. A final report will be prepared for submittal to the NYSDEC. The report will document all investigation activities and will discuss the rationale and methods of study for each phase of investigation. The report will include all new data, data analysis and calculations, methodology, water quality results, a surveyed map of the Site including locations and elevations of all wells, contour maps of the water table, and chain of custody documentation as well as any field notes.

The report will include at a minimum:

- a base map depicting the surveyed locations of all environmental sampling points;
- a description of all activities performed and the methods used to conduct the investigation;
- a thorough description of site geologic and hydrogeologic conditions, correlated to historical data;
- a summary of analytical results and comparison to regulatory standards;
- a Data Usability Summary Report (DUSR);
- a discussion of the nature and extent of soil and groundwater impacts, if any;
- a qualitative human exposure assessment;
- conclusions regarding the results of the investigation; and
- a request for an affirmative determination by NYSDEC that a "Covenent to Not Sue" is necessary.

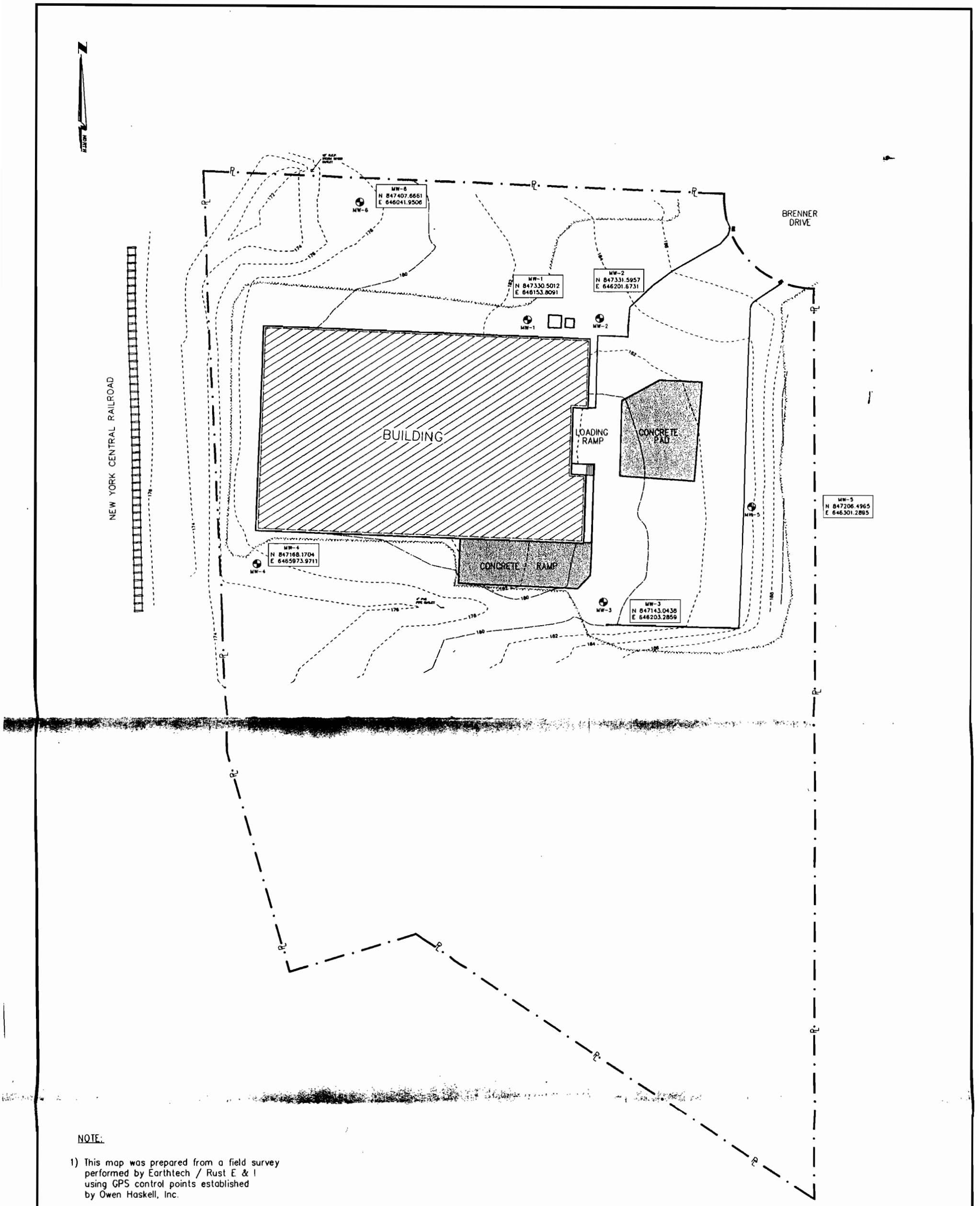
TABLES

Table 1
Summary of Chemical Inventory
Wilsonart International, Inc.
Congers, New York

Date/Reference	Hazardous Material (Type)	Quantity Stored	EPA Waste No.
January 23, 1975 (Inventory) Ralph Wilson Plastics Co.	<u>WA-200</u> (LOKWELD-200 Solvent) - Toluene (10%) - MEK (40%) -Lactol or Heptane (50%) <u>WA-500</u> (LOKWELD Contact Adhesive) - Acetone (30-60%) - Toluene (15-19%) - Hexane (40-70%) <u>WA-100</u> (LOKWELD-100 Solvent) - Kentone (Acetone; MEK) (25-30%) - Aromatics [Toluene (15%), Xylene (5%)] (10-19%) - Aliphatics (46-53%) <u>WA-800</u> (LOKWELD CONTACT ADHESIVE) - Acetone (34%) - Toluene (15-19%) - Hexane (50%) <u>WA-801</u> (LOKWELD 801 Contact Adhesive) - Acetone (25%) - Methanol (6%) - Toluene (16%) - Hexane (46-53%)	18 1-quart cans 210 1-gallon cans 860 5-gallon cans 330 55-gallon drums 30 1-quart cans 210 1-gallon cans 120 5-gallon cans 55 55-gallon drums 18 1-quart cans 18 1-gallon cans 180 5-gallon pails 165 55-gallon drums 240 5-gallon pails 1,320 55-gallon drums 180 5-gallon pails 825 55-gallon drums	
June 3, 1983 (Toxic Materials Storage Registration Form) Ralph Wilson Plastics Co.	Contact Adhesive/Solvents	80 55-gallon drums 300 pails	
September 1984 (Hazardous Material Inventory Statement) Ralph Wilson Plastics Co.	Contact Adhesive Contact Solvent Liquid Cementings	78 55-gallon drums 500 5-gallon pails 6,125 1-gallon cans 3,240 1-quart cans 864 1-pint cans 18 55-gallon drums	A99 A99 A99 A99 A99 A99 NA1193
February 26, 1988 Tier 2 (Chemical Inventory and Location Form) Ralph Wilson Plastics Co.	Toluene Acetone Hexane 1,1,1-Trichloroethane	10,001-50,000 pounds Stored in 55-gallon drums Stored in 55-gallon drums Stored in 55-gallon drums Stored in 55-gallon drums	

FIGURES

L:\WORK\32969\CADD\FIGURE 1.DWG PLOT DATE: MAY 2000



NOTE:

1) This map was prepared from a field survey performed by Earthtech / Rust E & I using GPS control points established by Owen Haskell, Inc.
2) The horizontal positions are reported in feet; NAD 1983 State Plane of New York East.
3) The elevations are reported in feet; NGVD 1929 vertical datum.
4) Existing ground surface contour interval: 2 feet.
5) Property boundary shown is approximate. Its use is intended for engineering purposes only.

0 30 60 120
SCALE IN FEET

LEGEND

MW-1 MONITORING WELL LOCATION

APPROXIMATE PROPERTY BOUNDARY

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

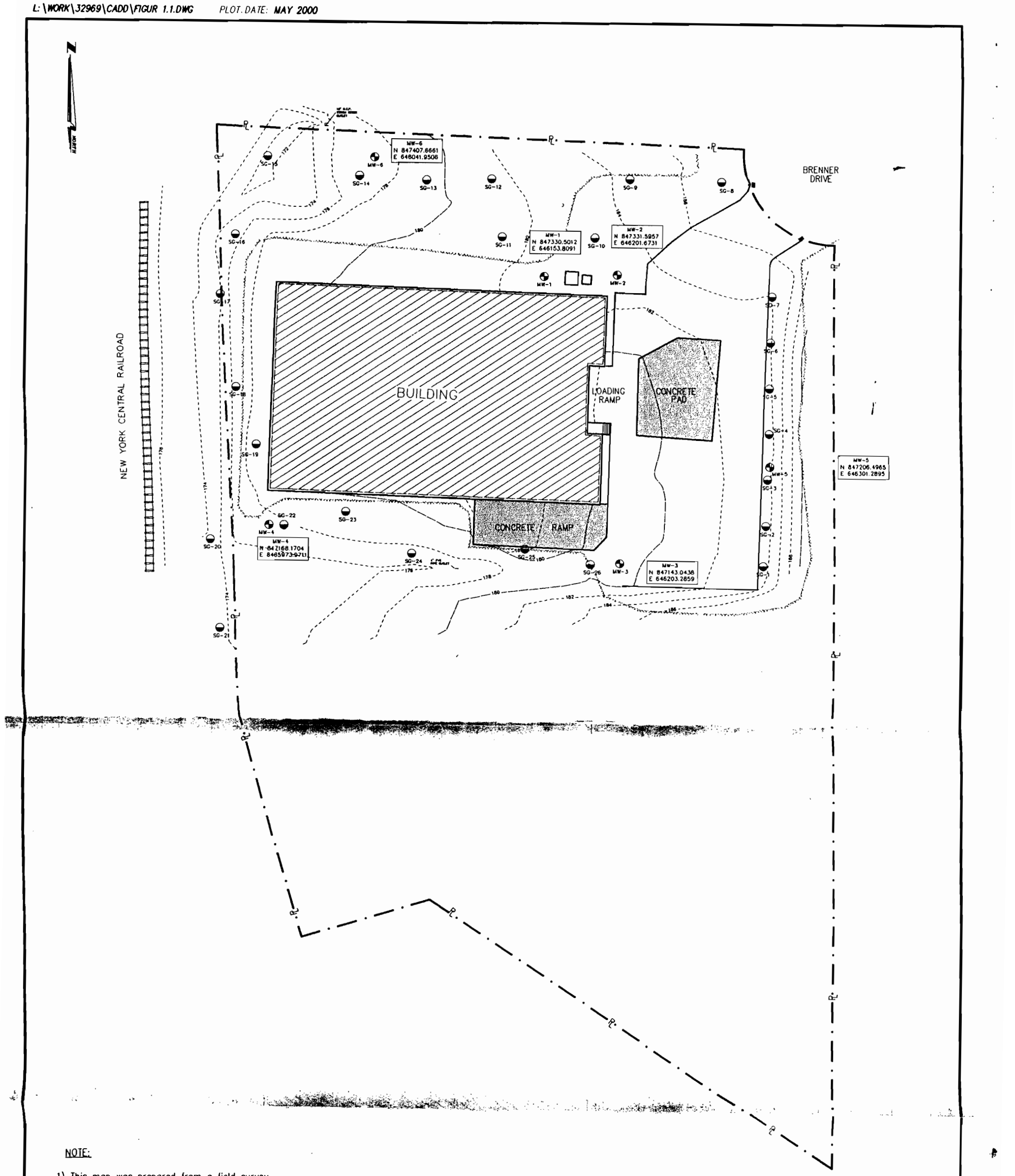
WILSONART INTERNATIONAL

CONGERS, NEW YORK

MAY, 2000 39693

FIGURE 1
SITE MAP

L:\WORK\32969\CADD\FIGUR 1.1.DWG PLOT. DATE: MAY 2000



NOTE:

1) This map was prepared from a field survey performed by Earthtech / Rust E & I using GPS control points established by Owen Haskell, Inc.
2) The horizontal positions are reported in feet; NAD 1983 State Plane of New York East.
3) The elevations are reported in feet; NGVD 1929 vertical datum.
4) Existing ground surface contour interval: 2 feet.
5) Property boundary shown is approximate. Its use is intended for engineering purposes only.

LEGEND

- MW-1 — MONITORING WELL LOCATION
- SG-1 — PASSIVE SOIL LOCATION
- ℄ — APPROXIMATE PROPERTY BOUNDARY

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

WILSONART INTERNATIONAL

CONGERS, NEW YORK

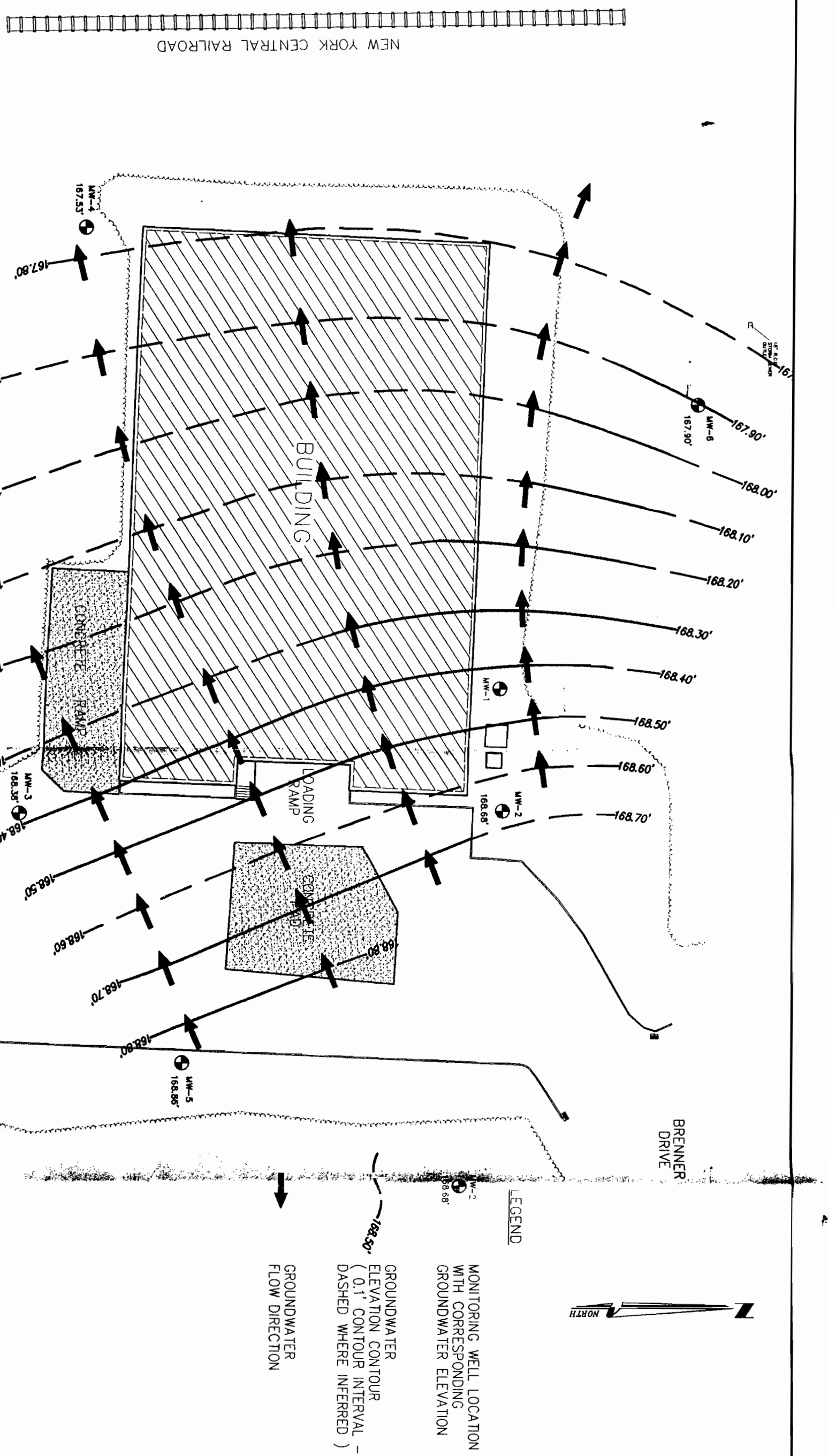
MAY, 2000 39693

FIGURE 2
SITE MAP
WITH 1998 MONITORING POINT LOCATIONS

L:\WROK\32969\CADD\502-F-02.DWG PLOT DATE: 11-13-98

NOTE:

1) This map was prepared from a field survey performed by Earthtech / Rust E & I using GPS control points established by Owen Haskell, Inc.
2) The horizontal positions are reported in feet; NAD 1983 State Plane of New York East.
3) The elevations are reported in feet; NGVD 1929 vertical datum.

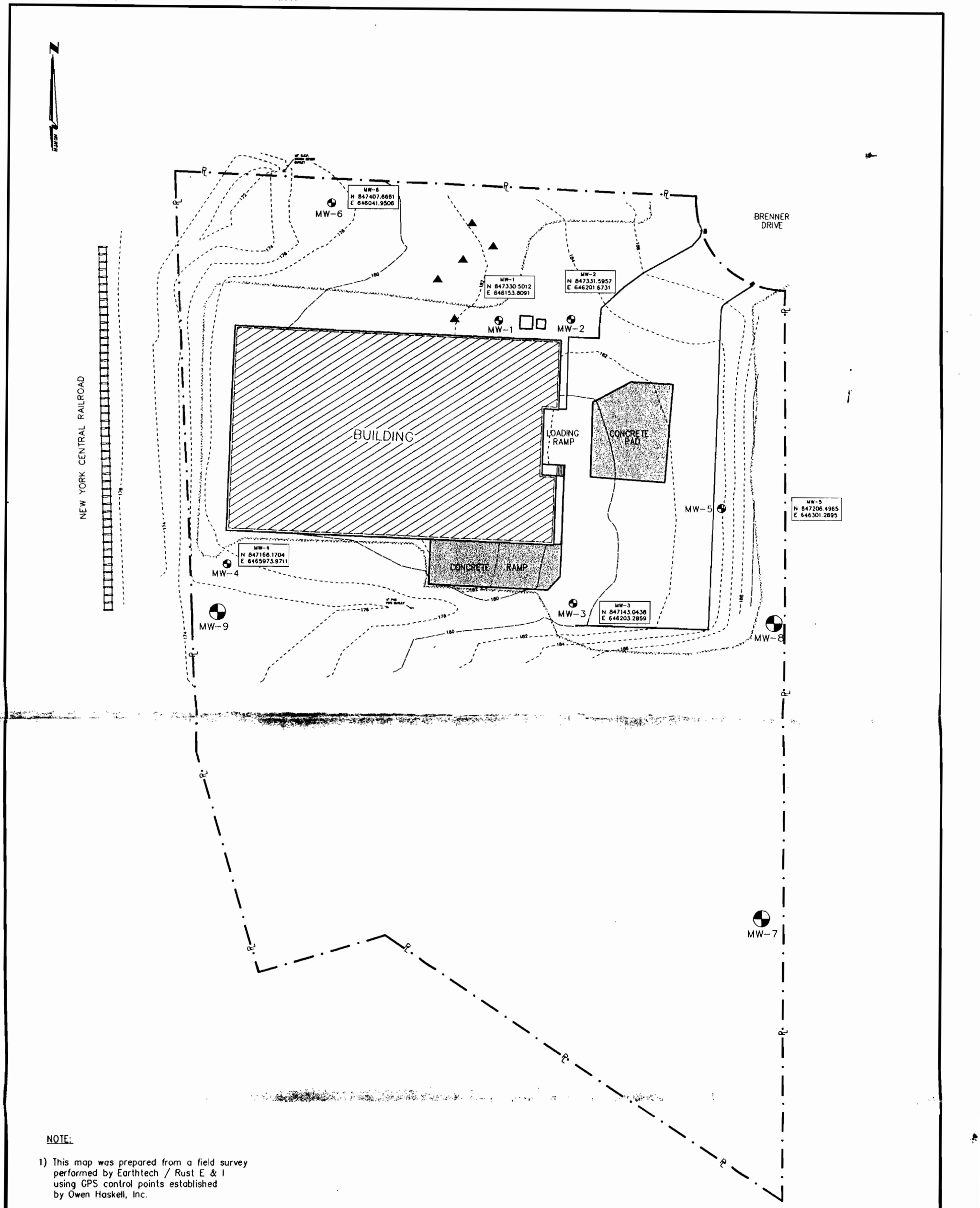


EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

WILSONART INTERNATIONAL
CONGERS, NEW YORK
NOV. 1998 203502

FIGURE 3
GROUNDWATER CONTOUR MAP
(OCTOBER 21, 1998)

L:\WORK\32969\CADD\FIGURE 2.DWG PLOT DATE: MAY 2000



NOTE:

1) This map was prepared from a field survey performed by Earthtech / Rust E & I using GPS control points established by Owen Haskell, Inc.
2) The horizontal positions are reported in feet; NAD 1983 State Plane of New York East.
3) The elevations are reported in feet; NGVD 1929 vertical datum.
4) Existing ground surface contour interval: 2 feet.
5) Property boundary shown is approximate. Its use is intended for engineering purposes only.

LEGEND

- ▲ PROPOSED TEST PIT LOCATION
- MW-7 PROPOSED BEDROCK MONITORING WELL LOCATION
- MW-1 MONITORING WELL LOCATION
- —℄— APPROXIMATE PROPERTY BOUNDARY

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

WILSONART INTERNATIONAL

CONGERS, NEW YORK

MAY, 2000 39693

FIGURE 4
SITE MAP
WITH PROPOSED MONITORING POINT LOCATIONS

APPENDIX A

UST Removal Records

WILSONART
GRAND DECORATIVE LAMINATE

RALPH WILSON PLASTICS CO.
600 GENERAL BRUCE DRIVE
P.O. BOX 6110
TEMPLE, TX 76503-6110. (817) 778-2711
TLX II: 910-890-5880

November 6, 1987

Mr. Henry Adams
Commissioner
New York State Dept. Environmental Conservation
Division of Water
50 Wolf Road, Room 326
Albany, New York 12233

Dear Mr. Adams:

Please find enclosed a completed underground tank notification form reflecting the removal of our two tanks at this location. The tanks were removed October 14, 1987 and soil samples showed no contamination.

If there are any further questions, please call.

Sincerely,

Zoe Rascoe

Ms. Zoe Rascoe
Environmental Engineer

lo

Enclosure

TOXIC M[illegible]RIALS STORAGE REGISTRATION FORM

Official Use Only

Fac. Ref. No. *

Receipt No. ___

Amt. of Fee ___

Principal Property Tax Code 14* District		*15*Section		*16* Block		*17* Lot	

2*Facility Name	*3* No. *4* Street	*5* Comm.	*6* State	*7* Zip	Phone No.
Ralph Wilson Plastics Co. Div. of Dart & Kraft	1 Brenner Drive	Congers	N.Y.	10920	914-268-4171
32*Facility Owner same	*33*No. *34*Street "	*35*Comm. "	*36*State "	*37*Zip "	Phone No. "
42*Facility Operator same	*43*No. *44*Street "	*45*Comm. "	*46*State "	*47*Zip "	Phone No. "
52*Land Owner same	*53*No. *54*Street "	*55*Comm. "	*56*State "	*57*Zip "	Phone No. "
62*Tank Owner same	*63*No. *64*Street "	*65*Comm. "	*66*State "	*67*Zip "	Phone No. "

70*Are chemical drums or containers stored at this site? Yes X No ___ 80 drums

*71*Empty Drums ___ *72*Full or Part Full X *73*Waste Material ___ *74*New Material X *75*Average No. Being Stored 300 pails

*76*Type of Materials: New Oil Products ___ Waste Oil ___ Organic Solvents ___ Other Contact adhesive and solvents

702			703		706	707								716	717		718						719		720				721			701
TANK NO.	ABOVEGROUND	UNDERGROUND	INDOORS	OUTDOORS	CAPACITY (GALLONS)	GASOLINE	NO. 2 FUEL OIL	NO. 6 FUEL OIL	KEROSENE	WASTE OIL	OTHER OIL	ORGANIC SOLVENTS	INDUSTRIAL WASTES	OTHER MATERIALS (SPECIFY)	YEAR INSTALLED AT THIS LOCATION	INSTALLED NEW YES	INSTALLED NEW NO	PLAIN STEEL	FIBERGLASS	BUFFHIDE	STIP-3	DOUBLE WALLED	OTHER	IN USE	ABANDONED	DISPENSER: SUBMERSIBLE	DISPENSER: SUCTION	DISPENSER: GRAVITY	DISPENSER: OTHER	FILL: PUMPED	FILL: GRAVITY	FILL: OTHER	OFFICAL USE
1		X		X	12,000									Diesel Fuel	1974	X		X						X			X				X		
2		X		X	6,000									Diesel Fuel	1974	X		X						X			X				X		

I certify that information on this application and all attachments have been reviewed and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in this application, I believe that the information is true, accurate, and complete. I understand that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Date	Print Name	Signature	Title
6/3/83	AUSTIN T. McGRATH	Austin T. McGrath	Office Mgr.

APPENDIX B

Rockland County Department of Health Violations (February 1985)

☑ Routine Inspection
☐ Re-Inspection
☐ Complaint
☐ Spill Investigation
☐ Field Inspection

RCHD - ARTICLE XVIII
HAZARDOUS MATERIAL STORAGE
INSPECTION REPORT

☑ Permit to Operate Req.
FILE CODE 7-C-2
OTHER

Page 1 of

FACILITY NAME Ralph Wilson Plastics
OPERATOR Ralph Wilson Plastics Co
FACILITY ADDRESS 1 Brenner Dr Congers
DATE 2-1-85
TIME 10:40

Note: The items circled below are violations of Article XVIII of the Rockland County Sanitary Code and must be corrected immediately unless otherwise stated.

Item #	Description
1.	Facility for storage of hazardous material doing business without cert. to operate (X.a, X.b).
2.	Unauthorized transfer of const. or operation permit (XI).
(3.)	Emergency plans, floor plans, haz. material inventory statement not submitted to RCHD or maintained on premises (XXI.c, X.c, XXI.a).
4.	Storage facility installed or modified w/o permit (IX, XII.b.3, XII.d.3, XII.f.3, XIII.a.1, XIV.a.2, XIV.a.3, XVI.a.1).
5.	Storage facility constructed or modified w/o Professional approval, or not in accordance with manufacturer's recommendation. (XII.a.1, XII.a.2, XII.b.2, XIII.c, XIII.d.1, XIV.a.1, XVI.a.2, XVI.a.3).
6.	Improper discharge of hazardous material (VII, XII.b.1, XII.e, XIV.b.2, XIX.b).
7.	Tanks not taken out of service in prescribed manner (XII.b.4, XII.f.1(I), XII.f.1(II), XII f.1(III), XII.f.2, XIII.b.3).
8.	Required testing of tank systems not performed (XII.c.1, XII.c.2, XII.c.3, XII.c.4, XII.c.5, XIII.b.1, XIV.b.1).
9.	Results of tank testing not provided to RCHD (XII.c.4, XIII.b, XIV.b.1).
10.	Inventory records not kept in an approved manner (XII.d.1, XVII.b.3, XVII.b.4).
11.	Leakage of hazardous material not reported to RCHD (XII.d.2, XIII.d.2, XVII.b.3, XIX.a)
12.	Transfer operations not performed in safe manner (XV.b.1, XV.b.2, XV.b.3).
13.	Transfer facilities not properly designed (XV.a.1, XV.a.2).
(14.)	Portable containers or tanks not properly stored or handled (XVII.a.1, XVII.a.2, XVII.a.3, XVII.a.4, XVII.b.1, XVII.b.2).
15.	Bulk (dry) material not properly stored (XVIII.a, XVIII.b, XVIII.c, XVIII.e, XVIII.f).
16.	Road salt not properly stored (XVIII.d.)
(17.)	Required posting or labeling not present or satisfactory (XXI.a, XXI.b).
18.	RCHD not provided access to facility (XXII.a, XXII.b, XXII.c).
19.	Underground gasoline tanks not equipped with vapor recovery device -6 NYCRR 229 (see attached form).
20.	Waste material hauled by non-permitted hauler (RCSS Art.3, Sec 1, Sec. 2).
21.	Cross-connection endangering water system (RCSS-Art.2, Sec.3).
22.	Other

Inspected by: Michael J. Mahoney
(Signature)

Report received by:
(Signature)

Date 2-1-85

Rockland County Health Department Article XVIII
Hazardous Material Storage
INSPECTION CONTINUATION SHEET

☑ Routine Inspection
☐ Re-Inspection
☐ Complaint
☐ Field Inspection
☐ Spill Investigation

File Code: 1
Other:
Page 2 of

Name of Facility	Name of Individual Receiving Report	
Ralph Wilson Plastics Co	Austin McGrath	
Address	Date of Inspection	Time of Inspection
1 Brenner	2-1-95	10.40

Storage Loc. ID	Item No.	Remarks
		V.I.C
	(3)	a) Floor plans must be revised detailing building showing locations of doorways general warehouse area, general office area, exact storage location — storage area "B" should indicate non flammable storage area
		b) V.C Hazardous material inventory must be revised. Chemical name of products (for example contact solvent containing 1,1,1 Trichloroethane, etc etc) Location of area B and chemical stored
		MAXIMUM quantity stored @ given time
		WEED Killer must be listed, propane
	(17)	Warning placard to all entrances of storage areas required
		Submitted, and other modification listed
	—	ABOVE MUST be completed by Feb 20, 95

Inspection By: (Signature)	Report Received By: (Signature)	Date
Michael Mahoney		2-1-95

DATE OF NEXT INSPECTION: After Feb 20

Rockland County Health Department Article XVIII
Hazardous Material Storage
INSPECTION CONTINUATION SHEET

☐ Routine Inspection
☐ Re-Inspection
☐ Complaint
☐ Field Inspection
☐ Spill Investigation

File Code: I
Other:
Page 3 of 3

Name of Facility	Name of Individual Receiving Report	
Welch Wilson Plastic Co	Austin McGrath	
Address	Date of Inspection	Time of Inspection
1 Brenner Dr	2-1-85	10:40

Consers

Storage Loc. ID	Item No.	Remarks
	(14)	Chemicals stored on cement surface cracked areas must be properly sealed
		Area where wall meets floor must be sealed
		Above work must be completed by May 1-1985
		OTHER - Basel Inventory records very good; broken down to +or- gallon

Inspection By: (Signature)	Report Received By: (Signature)	Date
Mahoney		2-1-85

DATE OF NEXT INSPECTION: 2-1-85

APPENDIX C

HTI – Chemical Inventory
(February 1997 to August 1999)

HUDSON™
TECHNOLOGIES, INC.
THE REFRIGERANT LEADER

275 North Middletown Road
Pearl River, NY 10965
Phone: (914) 735-6000 • Toll Free: (800) 853-2244
Fax: (914) 368-2540
http://www.hudsontech.com

July 25, 2000

Mr. Paul Maxwell
Wilsonart International, Inc.
2400 Wilson Place
PO Box 6110
Temple, Texas 76503-6110

Re: 100 Brenner Drive

Dear Mr. Maxwell:

I am in receipt of your letter of July 21, 2000.

Please be advised that at various times and in varying quantities, the following chemical substances were used and/or stored on the above premises during Hudson's occupancy thereof:

- Dichlorodifluoromethane (R-12);
- Tetrafluoroethane (R-134a);
- Chlorodifluoromethane/2 methyl propane/1 chloro-1,1-difluoroethane mixture (R-406a);
- Chlorodifluoromethane (R-22);
- Chlorodifluoromethane & Chloropentafluoroethane mixture (R-502);
- 2,2 dichloro-1,1,1-trifluoroethane (R-123);
- Welding gases consisting of Acetylene, Argon, Oxygen and Carbon Dioxide;
- Liquid Nitrogen;
- Small containers of various and miscellaneous cleaning solutions.

Yours very truly,

Stephen P. Mandracchia
Executive Vice President

SPM/
Via FAX (254) 207-2384 and regular mail

APPENDIX D

Summary of Groundwater Quality

Comparison of Water Quality Data vs.
New York State Department of Environmental Conservation
Guidance Values for Drinking Water

Hudson Technologies Inc
100 Brenner Drive

Job # N1556
Congers,NY

Petroleum Compound	Guidance Value	MW-1 8/12/98	MW-2 8/12/98	MW-3 8/12/98
Benzene	0.7	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL
Total Xylenes	15	BDL	BDL	BDL
Acetone	50	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL
Chloroform	5	BDL	3.3	BDL
1,1-Dichloroethane	5	[illegible] 5.2	BDL	BDL
1,1-Dichloroethene	5	[illegible] 5.4	[illegible] 9.8	[illegible] 14.
1,2-Dichlorobenzene	5	BDL	BDL	BDL
Dichlorodifluoromethane	5	BDL	BDL	BDL
N-Butylbenzene	5	BDL	BDL	BDL
n-Propylbenzene	5	1.9	BDL	BDL
Sec Butylbenzene	5	4.6	BDL	BDL
Isopropylbenzene	5	1.6	BDL	BDL
4-Isopropyltoluene	5	BDL	BDL	BDL
Napthalene	10	1.4	1.2	BDL
1,2,4 Trimethylbenzene	5	3.4	BDL	BDL
1,3,5 Trimethylbenzene	5	BDL	BDL	BDL
Trichlorofluoromethane	5	BDL	2.6	6.0
Trichloroethene	5	[illegible] 10	[illegible] 320	[illegible] 990
1,1,1 Trichloroethane	5	2.2	[illegible] 38	[illegible] 66
Tetrachloroethene	5	BDL	1.7	3.0
MTBE	50	1.8	3.6	2.0

Notes:

1. All measurements recorded in micrograms-per-liter (ug/L).
2. Samples analyzed in accordance with EPA method 8260 plus MTBE.
3. BDL = Below Detection Limits (detection limits varied).
4. The present guidance values were adopted by NYSDEC in September of 1990.
5. Analytical measurements exceeding guidance values are in bold type.

Summary of Ground Water Data
Wilsonart - Congers, New York
October 21, 1998

Compound	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-6 Field Dup.
1,1-dichloroethene	6	<5	<5	<5	<5	<5	<5
1,1-dichloroethane	6	<5	<5	<5	<5	7	7
1,1,1-trichloroethane	<5	12	63	<5	20	<5	<5
trichloroethene	<5	95	494	<5	160	9	8

Note: All results expressed in ug/l = parts per billion (ppb).

APPENDIX E

Standard Operating Procedures

SURFACE WATER SAMPLING PROCEDURES

Summary

Surface waters, if encountered, may be sampled by direct submersion of the sample container. The order of surface water samples should be collected in a downstream to upstream direction. If however, the sample location does not lend itself to easy access, then an extendable pond sampler may be used to collect samples by attaching the sample container or pre-cleaned sampling beaker made of appropriate material (glass, stainless steel or Teflon) to the pond sampler. Volatile samples should be collected by submerging the VOA vial and capping underwater if possible, otherwise care must be taken when using a separate container for collection so as not to agitate the water during collection or transfer into the VOA vials.

Procedure

1. Assemble the pond sampler. Make sure that the sampling beaker and the bolts and nuts that secure the clamp to the pole are tightened properly.

2. With proper protective garment and gear, take grab samples by slowly submerging the pre-cleaned beaker with minimal surface disturbance.

3. Retrieve the pond sampler from the surface water with minimal disturbance.

4. Remove the cap from the sample bottle and slightly tilt the mouth of the bottle below the dipper/device edge.

5. Empty the sampler slowly, allowing the sample stream to flow gently down the side of the bottle with minimal entry turbulence. VOA vials will be filled first, in order to obtain the least disturbed sample. VOA vials will be filled completely with no head-space and/or bubbles.

6. Continue delivery of the sample until the bottle is almost completely filled.

7. All recovered samples will be preserved (if required), labelled, and placed on ice. Complete the Chain-of-Custody documents and record in the field log book.

8. Decontaminate the sampling beaker or attach another pre-cleaned beaker prior to sampling at the next location.

SEDIMENT SAMPLING PROCEDURES

Summary

A simple way in which to collect a sediment sample is with a disposable plastic and/or stainless steel scoop, trowel, coring device or otherwise required for the Project. This method is most appropriate for shallow sediment samples to a depth of 0-6 inches. Disposable plastic and/or pre-cleaned stainless steel is preferred over the more common chrome-plated, which should be avoided if chromium is of concern. The procedure detailed below is for visibly stained soil, but applies to non-stained soil as well.

Procedure

1. Samples will be collected using disposable plastic or dedicated stainless steel trowels, spatulas, coring devices (i.e., auger or sediment tube) or otherwise required for the Project. Any non-dedicated equipment will be decontaminated between samples and/or sample locations. The order of sediment samples should be collected in a downstream to upstream direction.

2. Prior to sample collection, the area in question will be inspected to determine the extent of staining by inserting the blade of a shovel or pick axe to the maximum depth possible, and if conditions permit, removing and inspecting a vertical cross section.

3. If staining is limited to the top few inches, the sample will be defined by collecting the top few inches of stained material over a horizontal area large enough to provide a sufficient quantity of soil for subsequent laboratory analysis. The surface area and depth of the collected sample will be recorded.

4. Screen each sample with a photoionization detection (PID) meter and collect the VOA sample at a discrete interval.

5. If the stained area is six inches or more in depth, the top inch or two of material will be removed and a sufficient quantity of subsurface material, from a depth of 2 inches down, will be collected for analysis. The areal and depth dimensions of the collected sample will be recorded, as well as the depth of any visible, remaining stained soil. Repeat the process until the required depth has been attained.

6. Samples (by either above procedure) will be collected, in such a manner, to ensure that the sample (stained soil) is not diluted by the incorporation of unstained soil. In the event that this is not possible, the proportions of each soil type (i.e., stained vs. non-stained) will be recorded.

7. Approximately 24 ounces of material will be collected at each location.

   Grab Sampling: All VOC samples will be collected as discrete grab samples without compositing or mixing in the field.

   Compositing: See Method of Cone and Quarter.

8. Secure a Teflon lined cap onto the container(s), and carefully/clearly label the sample container(s).

9. Place the sample container(s) on ice in a cooler for transport to the laboratory. Complete all chain-of-custody documents and record in the field log book.

10. All sample locations will be delineated with a wooden stake with the sample location identification clearly labeled on the stake.

11. All recovered sample material, excluding that reserved for laboratory analyses, will be handled as per other investigation-derived waste.

12. Decontaminate equipment after use and between sample locations.

Method of Cone and Quarter

Scope and Purpose

This procedure describes the requirements for compositing individual, non-aqueous grab samples to form one composite sample using the method of cone and quarter. Cone and quarter can also be used to ensure that a grab sample, not destined for VOC analysis, has been adequately homogenized.

NOTE: Samples destined for VOC analysis should be collected as discrete grab samples without compositing or mixing in the field.

Equipment

- Stainless steel mixing bowl/Plastic sheeting
- Stainless steel hand trowel(s)/shovel(s)
- Disposable plastic and/or pre-cleaned stainless steel scoop/trowel/coring device/etc.
- Buckets/Containers
- Gloves
- Sample Containers

Procedure

Equal volumes/quantities of individual grab samples which will comprise the composite are placed on a clean plastic sheet or stainless steel mixing bowl. The final amount of composite sample to be collected is dependent on the laboratory analyses to be performed.

The grab samples are thoroughly mixed together into a single pile (i.e., cone) using a shovel, hand trowel or gloved hand by continually mixing the material and shaping it into a cone. Material at the cone base is then repeatedly placed at the top of the cone while maintaining the cone shape. Large non-analyzable materials (stones, twigs, debris, etc.) which fall to the base of the cone by gravity are removed from the sample. The process is continued until the grab samples have been completely incorporated into one sample and non-analyzable materials removed.

Following "coning", the sample is divided into four approximately equal smaller piles. The "coning" mixing process is then briefly repeated in each of these four new piles. Equal aliquots from each of these new smaller piles are collected and mixed to form the preliminary composite sample. Coning is again repeated briefly and aliquots of this final composite are transferred to the respective sample containers.

Responsibilities

It shall be the field team leader's responsibility to ensure that all composite samples specified in the site work plan are adequately prepared by following the procedures presented in this SAP.

SPLIT-SPOON SAMPLING PROCEDURES

Summary

A standard method of soil sampling per ASTM Designation D-1586 "Standard Method for Penetration Test and Split Barrel Sampling of Soils" will be utilized to obtain representative samples for characterization, laboratory testing and as a measure of the resistance of soil to sampler penetration.

Procedure

1. Ensure that all down-hole drilling tools (i.e., split-spoon, drilling rods, augers) have been properly decontaminated prior to advancement of borehole.

2. Measure the sampling equipment lengths and openings to ensure that they conform to specifications. Confirm the weight of the hammer (140 lbs.) by verbal confirmation or visual means.

3. Lower the sampler to the desired depth at the bottom of the auger column and check the depth against length of the rods and the sampler.

4. Attach the drive head sub and hammer to the drill rods without the weight resting on the rods.

5. Lower the weight and allow the sampler to settle up to 6 inches. If it settles more, consider use of another sampler.

6. Mark three 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the sampler resting on the bottom of the hole, drive the sampler with the 140 lb. hammer falling freely over its 30 inch fall until 18 inches have been penetrated or 100 blows applied.

7. Record the number of blows per 6 inches. Determine the "N" value by adding the blows for the last 12 inches.

8. Upon retrieval the split-spoon should be opened, its contents logged, and then immediately transferred into a sample bottle using a decontaminated spatula or spoon. If the sample is to be chemically analyzed in the laboratory it should be placed in the proper container. A separate sub-sample should be placed into a clean glass jar and its lid sealed with aluminum foil for subsequent screening with a photoionization detection meter.

9. Document all properties and sample depths and locations on the boring log form.

10. All recovered samples (excluding those reserved for chemical analysis) should be labelled and stored until the project has been completed, at which time the samples will be disposed of accordingly.

11. All recovered samples requiring chemical analysis should be homogenized, if possible, by the method of cone and quarter and will be labelled, carefully and clearly, addressing all the categories or parameters and placed on ice. Complete all chain-of-custody documents and record in the field log book.

12. Decontaminate all sampling equipment after use and between sample locations.

BOREHOLE PLUGGING/ABANDONMENT PROCEDURES

Summary

Boreholes that will not be further utilized will be backfilled and sealed (plugged) prior to abandonment to prevent downhole contamination. Sealing can be achieved by backfilling the borehole with bentonite or with a cement/bentonite grout. The grout is usually introduced from bottom to top using either a tremie pipe or the drill rods.

Procedures

1. Identify the equipment to be used for the preparation, mixing and pumping the grout. Ensure the volume of the tub or drum to be used for mixing has been measured adequately. Ensure that the pump to be used has adequate pressure to enable complete return to surface.

2. Identify the source of the water to be used for the grout, and determine its suitability for use. In particular, water with high sulphate, or chloride levels or heated water should not be used. These types of waters can cause operational difficulties or modify the set up for the grout.

3. Calculate and document the volume of grout needed to seal the borehole by multiplying borehole diameter area (based on auger head diameter plus 10%) by the borehole depth.

4. The grout is mixed to a smooth consistency. Cement/bentonite grout slurry will generally be mixed to the following composition:

Portland Type II Cement:	(94-lbs.)
Quick Gel (or equivalent) Bentonite Powder:	(3 to 5 lbs.)
Water:	(7 to 8 Gallons)

5. If grouting is performed by tremie methods, the tremie line or pipe is inserted to within 2 feet of the bottom of the borehole.

6. Attach the grout pump discharge line to the tremie line an begin pumping grout. Grout is pumped until it returns to the surface inside the drill casing. The auger or drill casing is incrementally removed and the grout inside the casing is topped-off until all the drill casing is extracted from the borehole. Restore the surface near the borehole and level the ground to the pre-existing grade.

7. Record all grouting activities, including the type and amount of materials used, equipment used and grouted intervals in the field notebook.

NOTE:
On occasion, there may be some settling of the grout that takes place over several days. If this settling occurs, use the natural soils from the immediate vicinity to achieve the level at grade.

MONITORING WELL DEVELOPMENT PROCEDURES

Summary

Monitoring wells/piezometers are generally developed following installation to improve the hydraulic properties of the sand pack and to remove any sediment within the well and adjacent to the screen/sand pack. Well development should continue until the water is relatively sediment free (<50 NTU).

Procedure

1. Select an appropriate well development method depending on water level depth, well productivity, and sediment content of the water. Well development options include:

   - bailing;
   - surging;
   - inertial pumping;
   - powered suction-lift pumping; and
   - air-lift development;

2. Decontaminate all equipment prior to use and between wells.

3. Assemble and install the equipment in the monitoring well. Take appropriate precautions to prevent the introduction of contaminants on the equipment during installation. Assemble and operate pumps in accordance with manufacturer's instructions.

4. Repeatedly remove water from the well until the discharged water is relatively sediment free.

5. Monitor the effectiveness of development at regular intervals (after each well volume is removed) using a portable turbidity meter. For each volume of groundwater removed, record sample turbidity, pH, temperature and conductivity, and any other project-specific field parameters.

6. Discontinue well development when the turbidity of the discharged water reaches a predetermined value (e.g., 50 NTU) or when the turbidity level, pH, temperature, and conductivity stabilize indicating that formation water is being removed and that additional purging will most likely not reduce the turbidity level in the water column.

7. Handle development waters as appropriate for the site. Options include containerizing for later off-site disposal; containerizing for disposal elsewhere on-site; or disposing of water onto the ground near the well. The final disposal will be determined by the client or the regulatory agency providing oversight. If the last option is chosen, discharge the water directly downgradient from the well in such a way it does not directly run off the site (e.g., not into a ditch, sewer or stream).

WATER LEVEL MEASUREMENT PROCEDURES

Summary

Water levels in monitoring wells and piezometers are measured using an electronic water level detector or hand held tape.

Procedure

1. Decontaminate the water level probe and the portion of cable that enters the water column, or the tape, following standard decontamination procedures.

3. Test the water level meter to ensure that the batteries are charged.

4. Place plastic sheeting on the ground around the well casing to ensure that the measuring equipment doesn't contact the ground.

5. Remove the protective casing cover and monitoring well cap and place them on the plastic.

6. Lower the probe slowly into the monitoring well until the audible or visual alarm indicates water.

8. With the measuring graduations on the water level meter cable, measure water level depth to the nearest 100th of a foot from the pre-designated and surveyed measuring point (MP) on the top of the well casing. If an MP is not available, take measurement from the highest point on the monitoring well casing.

10. Repeat the measurement for confirmation, record the depth to water in the field notebook, and note the reference point from which the measurement was taken.

12. Remove the probe from the monitoring well slowly, drying the cable and probe with a clean paper towel.

13. Replace the monitoring well cap and lock the protective casing cap in place.

GROUNDWATER SAMPLING PROCEDURES

Summary

Collection of groundwater samples must be performed with precision and care to ensure that samples are representative of actual groundwater conditions and to yield reliable laboratory analytical results.

Procedure

1. Spread plastic sheeting on the ground around the well.

2. Unlock and carefully remove the well cover to avoid having any foreign material enter the well.

3. Monitor the interior of the riser pipe with a photoionization detector for the presence of volatile organic compounds (VOCs).

4. Sound the well to determine the depth. Using an electronic water level detector, measure the water level from below the top of casing. Determine the volume of water in the well based on the water column and diameter of the well. Decontaminate the end of the probe between wells by washing with liquinox and water, and rinsing with deionized water.

5. Purge the well using either a dedicated, pre-cleaned, bottom-filling, check-valved bailer and new dedicated 1/8 inch nylon line or with an inertial lift or powered suction lift technique equipped with dedicated sample tubing.

6. Purge the well of approximately 3 to 5 well volumes (measured in a 5 gallon bucket), starting with removal of the water from the top of the well if using a bailer.

7. If the well purges to dryness and recharges rapidly (within 15 minutes), continue to remove water as it recharges until the required volumes are attained. If the well purges to dryness and is slow to recharge, terminate purging.

8. For each volume of groundwater removed during purging, record sample turbidity, pH, temperature and conductivity, and any other project-specific field parameters.

9. Place a small quantity of purge water in a clear clean glass jar and allow it to sit for a few minutes. Examine the water in the jar for a visible miscible layer or sheen, and note any unusal odors, and/or color. If it is suspected that a sheen or other non-aqueous film was present on the surface of the water column prior to initiating purging, then decontaminate the dedicated bailer, notify the project manager of the condition, and confirm the sampling technique to be used.

10. After well purging is completed and the well has sufficiently recharged, collect samples using the same dedicated sampling device as used for purging (i.e., bailer or lift pump). Fill sample containers with a minimum of sample agitation. Do not use the lift pump to fill the sample containers. Draw a full colume of water up to the pump intake then crimp the tubing tightly to form a vacuum and disconnect the tubing from the pump. Remove the tubing from the well while carefully coilling the tube to avoide contact with potential sources of conatimants. Fill the sample jars from the bottom of the tube by releasing the crimp and allowing the sample to drain slowly into the glassware.

11. Perform groundwater sampling within three hours of purging. In the case of wells that recharge slowly, sample as soon as adequate recharge has occurred. If a well does not contain or yield sufficient volume for all required laboratory analytical testing (including quality control), prioritize sample analyses.

12. Collect samples in the general order of the volatilization sensitivity of the parameters. The preferred collection order for common groundwater parameters is as follows:

- Volatile organic compounds;
- Semi-volatile organic compounds;
- Field parameters; and,
- Total metals.

13. In cases where total metals are a contaminant of concern, and the monitoring well produces samples with a high sediment load, it may be appropriate to collect the total metals sample first. This will avoid entrainment of sediments in the sample, which could influence the analytical data. Therefore, the metal samples will be collected prior to the volatile organic samples.

14. Clearly label all samples with a waterproof marker (pen for VOCs), and follow Earth Tech's Sample Labeling, Handling and Shipping Procedures.

HYDRAULIC CONDUCTIVITY TESTING PROCEDURES

Summary

Hydraulic conductivity (K) tests (slug or bail tests) are performed on monitoring wells to determine the in-situ hydraulic conductivity of the hydrostratigraphic unit screened. Slug and bail tests involve inducing a near instantaneous change in the water level in the well, and measuring the rate of recovery of the water level toward the pre-test equilibrium level. The appropriateness of the specific type of test (slug or bail) and methods for analyzing the resultant data (Hvorslev, Bouwer-Rice, Cooper-Bredeheft-Papadoplos, Nyugen-Pindar) are specific to the final construction parameters of each monitoring well and the composition of geologic materials encountered. After installation and determination of the variables, Earth Tech will decide which methods are most approriate to use for each well.

During the slug test, either a 5-foot aluminum rod or a known volume of deionized water will be quickly introduced into the well casing to cause the water level to rise in the well. During the bail tests, the same 5-foot aluminum rod or a dedicated precleaned PVC bailer will be rapidly removed from the well to lower the water. Procedures and equipment requirements are expected to vary depending on the rapidness of the water level response.

Procedure - For use with In-Situ, Inc. Hermit Model SE 1000C Data Logger and Pressure Transducer

- Record appropriate initial data in field notebook, including date of test, well identification, well construction details (i.e., screen length, screen diameter, riser diameter and screen depth), type of test and field personnel.

- Clean pressure transducer and cable, and the slug and line, following standard decontamination procedures before initiating tests at each well.

- Measure and record the depth to water relative to a pre-established measuring point (usually the top of the well casing). Only monitoring wells which have fully recovered to static level conditions are to be tested. Depth to water should be recorded as a depth below the measuring point (bmp).

- Connect the pressure transducer to the data logger and lower the transducer into the well four to ten feet below the water surface. If using a solid slug or a bailer to introduce the slug or to bail, then the transducer should be set ten feet below the water level in the well. If using a distilled water slug, the transducer should be set four to five feet below the water level. *Note: It is important that the pressure transducer not be subjected to pressures greater than the pressure transducer rating.*

- Secure the position of the transducer by clamping the transducer cable to the well casing using a rubber covered clamp. If the edges of the well casing are sharp, cover them with cloth or plastic to protect the transducer cable.

- Set up the data logger. Check the battery and enter coefficients for the transducer to be used (scale, offset, linearity, coefficient, delay, and number of transducer).

- Enter test data (select test number, check clock, set reference level (stable water level).

- To initiate test, depress START key and press ENTER. View the data being recorded as the test is going on by depressing the DATA key. If data indicates that well recovery is reasonable, allow the test to run until well recovery returns to baseline and then stop the test. If well recovery does not appear to be reasonable, attempt to determine the cause and conduct another test if necessary.

- If another test is to be performed, replace the bailer or solid object and let the well re-equilibrate or allow the well to re-equilibrate prior to introducing the next slug. Change settings as necessary and repeat the test.

Procedure - Manual Collection of Test Data

Hydraulic conductivity test data can be collected manually with the use of a water level measuring device. This method is less desirable than using a data logger because initial test data is usually missed and it is difficult to collect closely spaced measurements in a formation which recovers rapidly. However, manual data collection may be the preferred method for very slowly recovering formations, where hour measurement intervals are appropriate. The following methods shall be used when performing manual collection of K-test data:

- Establish a schedule according to which water level measurement will be measured. Measurement intervals should be close during the initial potion of the test and increase over time. Create a table in the field notebook to record times and water level measurements.

- Prepare water level meter or steel tape and chalk so that you will be ready to take a measurement immediately after the slug or bail is initiated.

- Perform the slug or bail as described above.

- Collect water level measurements according to the schedule in your field notebook. Continue taking measurements until the water level has recovered to at least 80% of the pre-test level.

FIELD EQUIPMENT CALIBRATION PROCEDURES

Calibration

Field equipment that may be used during collection of environmental samples at the Site includes a pH meter, conductivity meter, turbidimeter, thermometer, dissolved oxygen meter and a photoionization detector (HNU PI-101 or equivalent). Calibration and standardization of the pH, specific conductivity, turbidity and dissolved oxygen meters is summarized below:

- The pH meter is calibrated in accordance with EPA Method 150.1. It is fully re-calibrated (three points) at least two times daily, and it is checked with pH 7 buffer every ten samples, two hours, or every time it has been turned off for more than two hours and then turned on again, whichever occurs first.

- The specific conductance meter is calibrated in accordance with EPA Method 120.1. It is calibrated at the beginning and in the middle of the work day.

- The turbidimeter is calibrated in accordance with EPA Method 180.1. It is calibrated at least twice daily following the manufacturer's operating instructions over a linear, non-drifting range of interest.

- The dissolved oxygen meter is calibrated following the manufacturer's instructions at least daily, and whenever the instrument has been turned off.

- Temperature is measured with a thermometer, or with a platinum electrode that has been factory calibrated and coupled to the pH meter.

The PID used for soil screening and health and safety surveys is calibrated following the manufacturer's instructions, at the beginning of the day, whenever the instrument is shut-off for more than two hours and at the field representative's discretion.

Field Testing QC

Field QC check control limits (pH, specific conductance and turbidity) are detailed below. In addition, field determinations of pH, specific conductance, and turbidity, are obtained in duplicate for every 20 aqueous samples collected.

- pH: If the pH QC sample (pH 10.0 buffer after initial calibration with pH 4.0 and 7.0 buffers) exceeds $\pm$ 0.5 pH units from the true value, the source of the error is determined and the instrument re-calibrated. If a continuing calibration check with pH 7.0 buffer is off by $\pm$ 0.5 pH unit, the instrument is re-calibrated.

- Specific conductance: QC samples must be within +10% of the true values. The specific conductance QC sample is a 0.01 M or 0.1 M potassium chloride solution.

- Turbidity: QC samples must be within + 10% of the true values. The turbidity QC sample is a commercially prepared polymer standard (Advanced Polymer System Inc. or equivalent).

- Temperature: Temperature measurements are performed with a factory calibrated thermometer or thermocouple.

SAMPLE LABELING, HANDLING AND SHIPPING PROCEDURES

Sample Identification/Labeling

All samples will be assigned a unique identification code which identifies the sample type, and location. Additional identification codes are applied as needed. Examples of the codes used for each sample type are identified below.

Environmental Samples

A. Examples of Soil Boring Samples:

SB-7 (soil boring location) 20' (depth of top of 2' sample)
Sample ID = SB7-20

B. Examples of Soil Samples from Monitoring Wells:

MW-7 (monitoring well soil boring location) 10' (depth of top of 2' sample)
Sample ID = MW7-10

C. Examples of Groundwater Samples:

MW-8 (groundwater monitoring well location)
Sample ID = MW-8

Quality Assurance/Quality Control Samples

Matrix Spike/Matrix Spike Duplicate Samples - QA/QC samples will include a matrix spike (MS) and matrix spike duplicate (MSD) sample at a frequency of not less than 5% (one MS/MSD pair per every 20 samples collected) for each matrix (aqueous and soil). They will receive the following code:

Example: MW-1SMS or MW-1SMSD
SB-7MS or SB-7MSD

Field Duplicate Samples - Field duplicate samples are sent blind to the laboratory. The sample location where the blind field duplicate was collected is marked both in the field notebook and on the copy of the chain-of-custody record retained by the sampling team. A blind field duplicate sample will be collected at a frequency of one per every 20 samples for each matrix (aqueous and soil). They will be given the following code

Example: FD-1

Equipment Blanks - Equipment blanks are not required when dedicated sampling equipment is used.

If non-dedicated sampling equipment is used during the investigation, field blanks will be analyzed at a frequency of not less than 5% (one field blank per every 20 samples collected). In either case, they receive the following code:

Example: EB-*mm/dd-#* (where *mm/dd* represents the date the field blank was collected and # represents the order collected, if more than one equipment blank is collected on any given day.)

Trip Blanks - Trip blanks are used to monitor potential sample volatile organic contamination during shipment to and from the laboratory. It also provides information on laboratory water quality since the laboratory provides the trip blank water. One trip blank will submitted for analysis for each day volatile organic samples are collected. A trip blank will be included in each cooler that contains volatile organic samples, therefore all volatile organic samples and containers will be shipped to and from the laboratory in a minimum number of coolers to minimize the number of trip blanks required.

Example: TB -*mm/dd* (where *mm/dd* represents the date the trip blank was collected)

All sample containers will be labeled prior to sample collection. A non-removable label on which the following information is recorded with a permanent water-proof marker (pen for VOCs) will be affixed to each sample container for shipment to the laboratory:

- project name/location;
- sample identification code;
- date and time the sample was collected (except for field duplicates); and,
- analysis requested.

Containers, Preservation, and Holding Times

All sample containers used will be of traceable quality purchased and supplied by the laboratory. All samples will be collected and preserved, and all analytical holding times, will conform to the NYSDEC Analytical Services Protocols (October, 1995).

Chain-of-Custody Protocol and Shipping Requirements

A chain-of-custody record will be initiated by Earth Tech upon sample collection and by the laboratory providing the sample containers. The laboratory record traces the path of the initial sample bottles and preservation at the laboratory to the field for sample collection. The Earth Tech chain of custody is initiated at the point of sample collection and documents their return to the laboratory for analysis.

The Earth Tech Project Manager or designated representative will notify the laboratory of the anticipated schedule of upcoming field sampling activities. This notification will include information concerning the number and type of samples, as well as the anticipated date(s) of shipment of samples to the laboratory.

The laboratory will be responsible for supplying insulated containers (typically coolers) for storing and shipping the samples. Each sample shipping cooler has a unique identification number marked on the outside and inside, and is sealed with two adhesive tags assigned with unique identification numbers assigned by the laboratory. The seal number may be recorded on the chain-of-custody form. Separate numbered seal tags are provided for return shipment.

All sample bottles within each shipping container are individually labeled with an adhesive identification tag provided by the laboratory. In the event that laboratory tags are not available, Earth Tech sample identification tags are used.

Field samplers receiving the sample containers check each cooler for the integrity of the seals. Coolers with both seals broken are returned to the laboratory with the containers unused. Field samplers break the seals and inspect the contents for breakage.

Once the sample containers are filled, they are immediately placed in the cooler with sealed bags of ice ("wet ice") or synthetic ice packs ("blue ice") to maintain the samples at 4°C (±2°C). The field sampler indicates the Client Name, Project Number, Site Location, Sampler, Earth Tech Contact, Laboratory Contact, Lab Identification, Date Report Required, Sample Identification, Date, Time, Sample Matrix, Collection Vessel, Lowering Device, Number of Sample Containers, Preservative and an indication of whether the sample is a Composite or Grab sample in the spaces provided on the appropriate chain-of-custody form for each sample. The Comment column of the chain of custody form is used to record specific considerations associated with sample acquisition, such as the analyses to be performed.

The identification numbers of each cooler shipped are written on the chain-of-custody form and the respective shipping manifest (if applicable). The chain-of-custody forms are signed and placed in a sealed plastic Ziploc™ bag in the cooler. The completed shipping containers are closed, and two paper seals are affixed to the latch and lid. The seals must be broken to open the cooler and if the seals are broken before receipt at the laboratory the possibility of tampering is plainly indicated.

The cooler is shipped to the laboratory via an overnight courier or hand delivered under appropriate chain-of-custody procedures. Whenever possible, the samples will be shipped within 24 hours of collection. Samples will not be shipped later than 48 hours following collection. When the laboratory receives the coolers, it will check the custody seals prior to opening the cooler and sign the chain of custody form following inspection of the cooler's contents, thus accepting custody of the samples.

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EQUIPMENT CLEANING AND DECONTAMINATION PROCEDURES

Heavy Equipment Decontamination

Items such as drill rigs, well casings, auger flights, and backhoes present potential sources of contamination of environmental samples. Therefore, all equipment and material associated with sampling events must be decontaminated prior to use and prior to the equipment leaving the site. Equipment will first be steam-cleaned with potable water, and rinsed thoroughly with potable water.

Cleaning of Field Sampling Equipment

All non-dedicated hand sampling equipment (including trowels, spatulas and spoons, and also split-spoons) used to collect samples for chemical analyses will be decontaminated using the following procedures:

- Non-phosphate detergent wash;
- Tap water rinse; and
- Distilled/deionized water rinse.

If equipment is to be stored for future use, allow it to air dry, and then wrap it in aluminum foil (shiny-side out) or seal in plastic bags.

Cleaning of Pumps and Pumping Equipment

In general, all suction-lift pumps and pumping equipment that have come in contact with the water column during well purging will be equipped with dedicated and pre-cleaned tubing. If submersible pumps are used, then use the following cleaning procedure:

- Wash the exteriors of the pump, wiring, and cables with non-phosphate detergent;
- Rinse with potable water;
- Pump a minimum of 25 gallons of potable water through the pump housing and through the pump tubing if a dedicated pre-cleaned discharge hose is not used for each well; and,
- Perform a final rinse by pumping 5 gallons of distilled/deionized water through the pump tubing if a dedicated pre-cleaned discharge hose is not used for each well.

Daily Field Report

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Owner: _____ Report No.: _____

Page _____ of _____

Project: _____ Date: _____

Project: No.: _____ Weather: A.M. _____ P.M. _____

Temp.(°F): High _____ Low _____ Rain _____

Contractor(s) _____

Contractor Super(s) _____

Number and Function of Contractors' Personnel, Hours Worked (Identify Subcontractors Separately)

Contractor	No. of People

Major Constr. Equip. Description	Size/Capacity	No.	No. in Use

Visitors _____ Representing _____

_____ _____

Daily Notations: _____

Signature: _____

White Copy - Library File Yellow Copy - Owner Pink Copy - Employee's Field File

Daily Field Report

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Project No.: _____ Report No.: _____

Date: _____ Page: _____ of _____

Signature _____

White Copy - Library File Yellow Copy - Owner Pink Copy - Employee's Field File

Chain of Custody Record

EARTH TECH

A tyco INTERNATIONAL LTD COMPANY

Custody Seal #	Rust E&I Cooler #

Project Number	Project Name/Client
Sample Custodian: (Signature)	

Item No.	Sample Description (Field ID Number)	Date	Time	Grab	Comp.	PID Reading (ppm)	Label Number	Analysis Required	Matrix: Sample Type	Matrix: Sample Container
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Disposed of by: (Signature)	Items:	Date / Time
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Disposed of by: (Signature)	Items:	Date / Time

Send Lab Results To:	Remarks:	Check Delivery Method:	Laboratory Receiving Notes:
	Federal Express Airbill No.: Lab:	☐ Samples delivered in person ☐ Common carrier	Custody Seal Intact? Temp. of Shipping Container: Sample Condition:

Rev 10/98 White Copy - Lab Yellow Copy - File Pink Copy - Client 1514/Earth.Sct

TEST PIT LOG

EARTH TECH, INC.
12 METRO PARK ROAD
ALBANY, NEW YORK 12205 (518) 458-1313

NORTHING: _____

EASTING: _____

DATE STARTED: _____ TIME: _____ JOB NO.: _____

DATE FINISHED: _____ TIME: _____ TEST PIT NO.: _____

CLIENT: _____ SITE: _____

SURFACE ELEVATION: _____ EXCAVATOR: _____

DATUM: _____ EQUIPMENT: _____

WATER ELEVATION: _____ INSPECTOR: _____

DEPTH	SAMPLE NUMBER	DESCRIPTION OF SOIL	REMARKS
0			
5			
10			
15			
20			
25			
30			

Earth Tech, Inc. Albany, NY (518) 458-1313	**Test Boring Log**	Boring No.
PROJECT:		Sheet 1 of
CLIENT:		Job No.
DRILLING CONTRACTOR:		Meas. Pt. Elev.:
PURPOSE:		Ground Elev.:

DRILLING METHOD:		SAMPLE	CORE	CASING	Datum:
DRILL RIG TYPE:	TYPE				Date Started:
GROUNDWATER DEPTH:	DIAM.				Date Finished:
MEAS. PT.:	WEIGHT				Driller:
DATE OF MEAS.:	FALL				Inspector:

Depth (Feet)	Sample Number	Blow Count	Unified Classif-ication	Graphic Log	GEOLOGIC DESCRIPTION	REMARKS
5						
10						

Earth Tech, Inc. Albany, NY (518) 458-1313	**Test Boring Log**	Boring No.
PROJECT:		Sheet 2 of
CLIENT:		Job No.

Depth (Feet)	Sample Number	Blow Counts	Unified Classif-ication	Graphic Log	Geologic Description	Remarks

Earth Tech, Inc.
12 Metro Park Road
Albany, New York 12205

CORE LOG

		Hole No.:	Job No.:
		Sheet 1 of	Date Started:
Project:	Drilling Contractor:		Date Finished:
Client:	Driller:		Total Depth:
Purpose:	Geologist:		Collar Elev.:
Location:	Length of Casing:		S.W.L.:
Hole Location:	Casing Size:	Core Size:	Inclination/Bearing:

FORMATION / MEMBER / Zone/Unit	Graphic Log	Depth Scale	Lithologic Description (include in order: ROCK TYPE, color, grain size, texture, bedding, fracture & minerals,	Bedding Angle	Percent Recovery

Earth Tech, Inc. 12 Metro Park Road Albany, New York 12205	**CORE LOG**	Hole No.:	Job No.:
		Sheet of	
Project:	Client:		

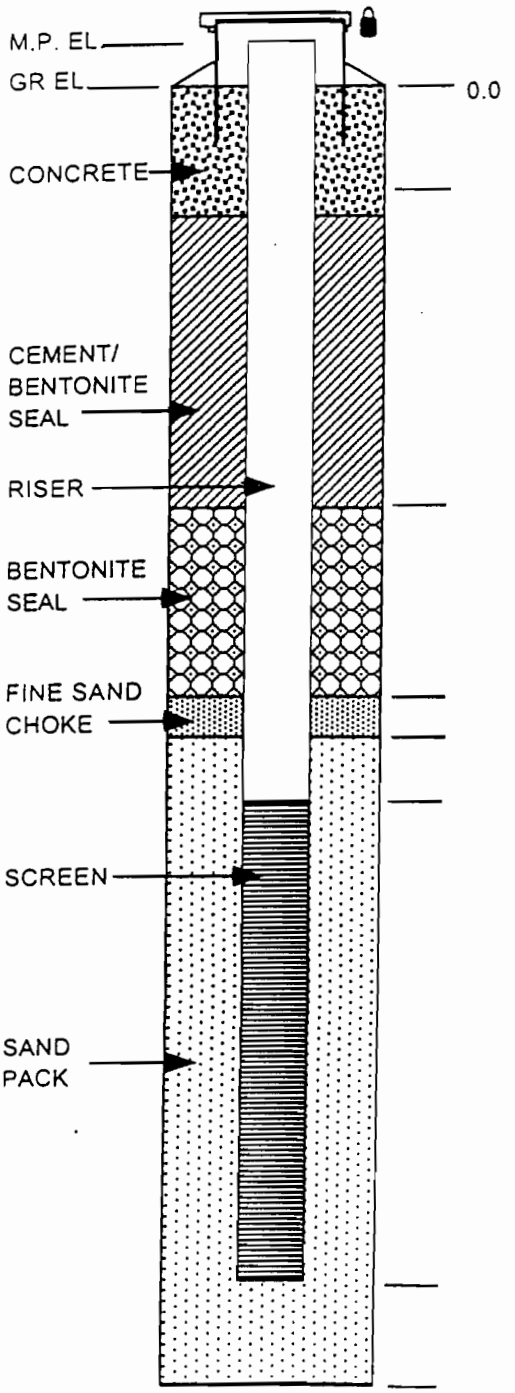
FORMATION / MEMBER / Zone/Unit	Graphic Log	Depth Scale	Lithologic Description (include in order: ROCK TYPE, color, grain size, texture, bedding, fracture & minerals.	Bedding Angle	Percent Recovery

MONITORING WELL COMPLETION LOG WELL NO. _____

Earth Tech, Inc.
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project _____
Client _____
Location _____
Project No. _____
Date Drilled _____
Date Developed _____

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector _____
Drilling Contractor _____

Type of Well _____
Static Water Level _____ Date _____
Measuring Point (M.P.) _____
Total Depth of Well _____

Drilling Method
Type _____ Diameter _____
Casing _____

Sampling Method
Type _____ Diameter _____
Weight _____ Fall _____
Interval _____

Riser Pipe Left in Place
Material _____ Diameter _____
Length _____ Joint Type _____

Screen
Material _____ Diameter _____
Slot Size _____ Length _____
Stratigraphic Unit Screened _____

Filter Pack
Sand _____ Gravel _____ Natural _____
Grade _____
Amount _____ Interval _____

Seal(s)
Type _____ Interval _____
Type _____ Interval _____
Type _____ Interval _____

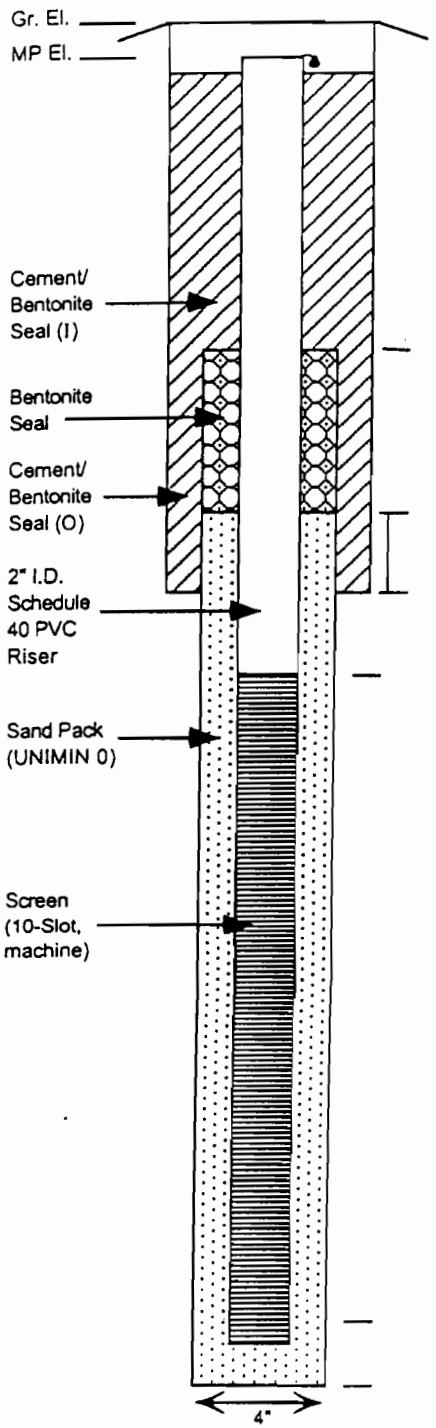
Locking Casing ☐ Yes ☐ No
Notes:

MONITORING WELL COMPLETION LOG WELL NO. _____

Earth Tech, Inc.
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project _____
Client _____
Location _____
Project No. _____
Date Drilled _____
Date Developed _____

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector _____
Drilling Contractor _____

Type of Well _____
Static Water Level _____ Date _____
Measuring Point (M.P.) _____
Total Depth of Well _____
Total Depth of Boring _____

Drilling Method
Type _____ Diameter _____
Casing _____

Sampling Method
Type _____ Diameter _____
Weight _____ Fall _____
Interval _____

Riser Pipe Left in Place
Material _____ Diameter _____
Length _____ Joint Type _____

Screen
Material _____ Diameter _____
Slot Size _____ Length _____
Stratigraphic Unit Screened _____

Filter Pack
Sand _____ Gravel _____ Natural _____
Grade _____
Amount _____ Interval _____

Seal(s)
Type _____ Interval _____
Type _____ Interval _____
Type _____ Interval _____

Locking Casing ☐ Yes ☐ No

Notes:

EARTH TECH

WELL DEVELOPMENT LOG

PROJECT INFORMATION

Project Name: _____

Project No.: _____

Date: _____

Personnel: _____

WELL INFORMATION

Well I.D.: _____

Screen diameter (inches): _____

Screen length (feet) _____

Riser diameter (inches) _____

Depth to Water (ft) : _____

Well Depth (initial): _____

Well Volume: (gals) _____

DEVELOPMENT INFORMATION

Time Start: _____ Time Finish: _____

Method: _____

Volume Removed (gals.): _____

Well Depth (final): _____

Sand/Silt Accumulation: _____

GW QUALITY PARAMETERS

Gallons	Time	DTW	Color	Odor	pH	Conductivity	Turbidity	Temp (C)	Observations

Notes:

EARTH TECH
A TYCO INTERNATIONAL LTD. COMPANY

WELL SAMPLING LOG

PROJECT INFORMATION

Project Name: _____
Project No.: _____
Date: _____
Personnel: _____

WELL INFORMATION

Well I.D.: _____
Well Condition: _____
Depth to Water (ft BMP): _____
Well Depth (initial) (ft BMP): _____
Well Volume: _____

SAMPLING INFORMATION

Time Start: _____ Time Finish: _____
Method: _____
Volume Purged (gals.): _____

FIELD PARAMETERS

Time	pH	Conductivity	Turbidity	Temp (C)	Odor	Color	Dissolved Oxygen	Observations

Notes:

APPENDIX F

Leachfield Location Map

(1)

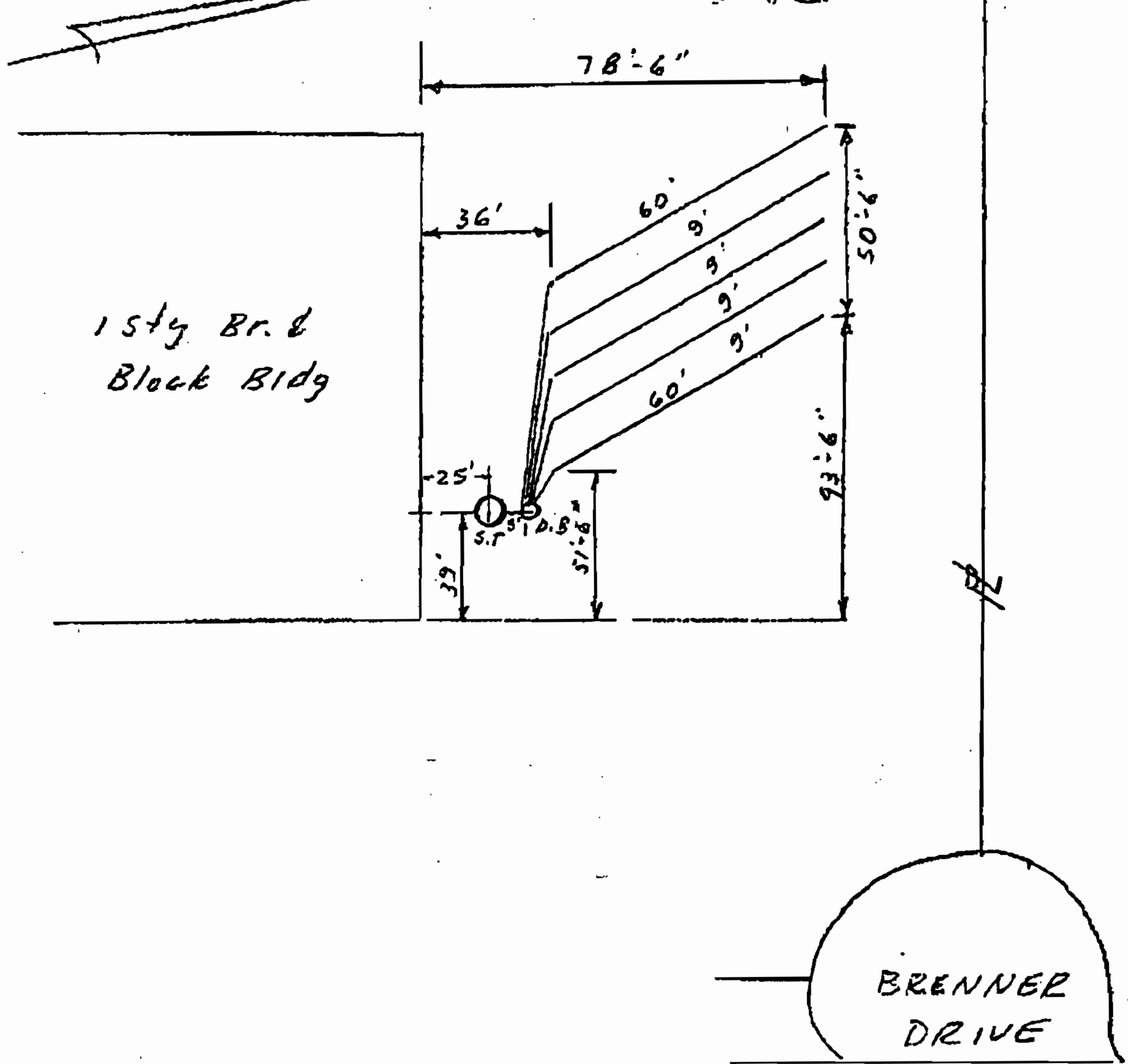
12/11/68

Rockland County Health Dept.
Sanatorium Plaza
West Haverstraw, N.Y.
Att Mr. E. Van Hook

Dear Mr Van Hook

Below is a sketch of location of septic system installed at Wilson Plastics, Congers N.Y. The system was installed under my supervision & in accordance with the approved plans.

Very truly yours,
[signature]
C.S. # 31752



APPENDIX G

Historical Boring Log Data

Environmental Products & Services, Inc.

Subsurface Log

Hole No.: MW-1
Sheet 1

Date Started: 8/5/98
Date Finished: 8/5/98

Client: Hudson Tech Inc.
100 Brenner Dr
Location: Congers, NY

Method of investigation: 4" Air Hammer

Branch: Newburgh
Project No.: N1556
P. Manager: Robert Hulihan

Drilling Co.: EP&S
Geologist: Robert Hulihan

Driller: Jeff Ludlow
D.Helper: Chet Brunelle
Drill Rig: CT-150

Weather: Sunny 85° F

Depth (ft.)	Sample No.	Sample Depth (ft.)	Blows per 6"	"N"	Recovery (ft.)	Sample Description	Field Analytical Reading	Well Details	Groundwater and Other Observations
						Light red brown silt, little gravel, tight, dry			
5						Large boulder (Gneiss)			
10									
15						Dark red brown silt, gravel, tight, dry			
20						Large boulder (Gneiss)			
25									Groundwater at 25'
30						Bottom of Well 30.0'			
35									

Sample Types:
S=Split Spoon
R= Rock Core
T= Shelby Tube:
O =
* - ASTM D1586

Backfill Well Key
Cement
Native Fill
Sand
Bentonite

Environmental Products & Services, Inc.

Subsurface Log

Hole No.: MW-2
Sheet 1

Date Started: 8/5/98
Date Finished: 8/5/98

Client: Hudson Tech Inc.
100 Brenner Dr
Location: Congers, NY

Method of investigation: 4" Air Hammer

Branch: Newburgh
Project No: N1556
Manager: Robert Hullihan

Drilling Co.: EP&S
Geologist: Robert Hullihan

Driller: Jeff Ludlow
D.Helper: Chet Brunelle
Drill Rig: CT-150

Weather: Hot 90° F

Depth (ft.)	Sample No.	Sample Depth (ft.)	Blows per 6"	"N"	Recovery (ft.)	Sample Description	Field Analytical Reading	Well Details	Groundwater and Other Observations
0						Dark red silt, gravel, tight, dry			
5									
10						Clusters of large boulders (Gneiss)			
15						Dark red silt, gravel, tight, dry			
20									
25						Clusters of large boulders (Gneiss)			
30									Groundwater at 29'
35						Bottom of Well 30.0'			

Sample Types:
S=Split Spoon. _____ T= Shelby Tube: _____
R= Rock Core _____ O = _____

* ASTM D1586

Backfill Well Key
Cement — Native Fill
Sand — Bentonite

Environmental Products & Services, Inc.

Subsurface Log

Hole No.: MW-3
Sheet 1

Date Started 8/5/98
Date Finished: 8/5/98

Client: Hudson Tech Inc. 4
100 Brenner Dr
Location: Congers, NY

Method of investigation: 4" Air Hammer

Branch: Newburgh
Project No.: N1556
Manager: Robert Hullihan

Drilling Co: EP&S
Geologist: Robert Hullihan

Driller: Jeff Ludlow
D.Helper Chet Brunelle
Drill Rig: CT-150

Weather: Hot 90° F

Depth (ft.)	Sample No.	Sample Depth (ft.)	Blows per 6"	"N"	Recovery (ft.)	Sample Description	Field Analytical Reading	Well Details	Groundwater and Other Observations
						Dark red silt, little gravel, tight, dry			
						more gravel w/depth			
5									
						Clusters of large boulders (Gneiss)			
10									
						Dark red silt, little gravel, tight, dry			
15									
						Alternating layers of cobbles & boulders (Gneiss)			
20									
25									Groundwater at 25'
						Dark red silt, little gravel, tight, wet			
30						Bottom of Well 30.0'			
35									

Sample Types:
S=Split Spoon
R= Rock Core
T= Shelby Tube:
O =

* ASTM D1586

Backfill Well Key
Cement
Native Fill
Sand
Bentonite

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-4
PROJECT: Brenner Drive CONGERS, N.Y.		Sheet 1 of
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 20350Z.10100
DRILLING CONTRACTOR: PARRATT-WOLFF, INC.		Meas. Pt. Elev. 179.35'
PURPOSE: LIMITED SUBSURFACE INVESTIGATION		Ground Elev. 177.6'
DRILLING METHOD: [redacted] Hollow STEM AUGER	SAMPLE / CORE / CASING	Datum: amsl
DRILL RIG TYPE: IR A-300	TYPE: SS / -- / HSA	Date Started: 10.15.98
GROUNDWATER DEPTH: 11.04'	DIAM.: 2" O.D. / -- / 4¼" I.D.	Date Finished: 10.16.98
MEAS. PT.: PVC	WEIGHT: 140#	Driller: Glen Lansing
DATE OF MEAS.: 10.16.98	FALL: 30"	Inspector: Mark Williams

Depth (Feet)	Sample Number	Blow Count	Unified Classification	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
0	S-1	3			Br Cy$ s, mF(+)S, tfG; med. dense; moist to dry	Rec.= 1.8' Moist to Dry HNu H.S.= 8.2 ppm / 12.1 ppm
1		5				
		10				
2		8				
	S-2	3			Br-RdshBr $&C s(-), FS, lmF(+)G; occ. gneiss rk frag; med. dense; moist to dry.	Rec.= 0.9' Moist to Dry HNu H.S.= 5.8 ppm
3		6				
		10				
4		8				
	S-3	7			RdshBr Cy$ s(-), FS, lmF(+)G; occ. small rk pieces; med. dense; moist	Rec.= 1.2' Moist HNu H.S.= 5.8 ppm
5		6				
		5				
6		6				
	S-4	4			RdshBr Cy$ s(-), FS, l(+)mfG; occ. dk Grsh ss rk frag.; wnite Qtzite FK frags; cbl @ end of spoon	Rec.= 0.5' Moist to Dry HNu H.S.= 3.2 ppm
7		4				
		5				
8		6				
	S-5	5			Br-LtGrysh Br $&C s(+), mF(+)S, l(+)mfG; sbrded to sbang.; firm to med. dense; moist	Rec.= 0.9' Moist HNu H.S.= 3.1 ppm / 7.2 ppm
9		4				
		5				
10		3			(GLACIAL TILL)	

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-4
PROJECT: HUDSON TECHNOLOGIES, INC. Brenner Drive		Sheet 2 of
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 203502.1010C

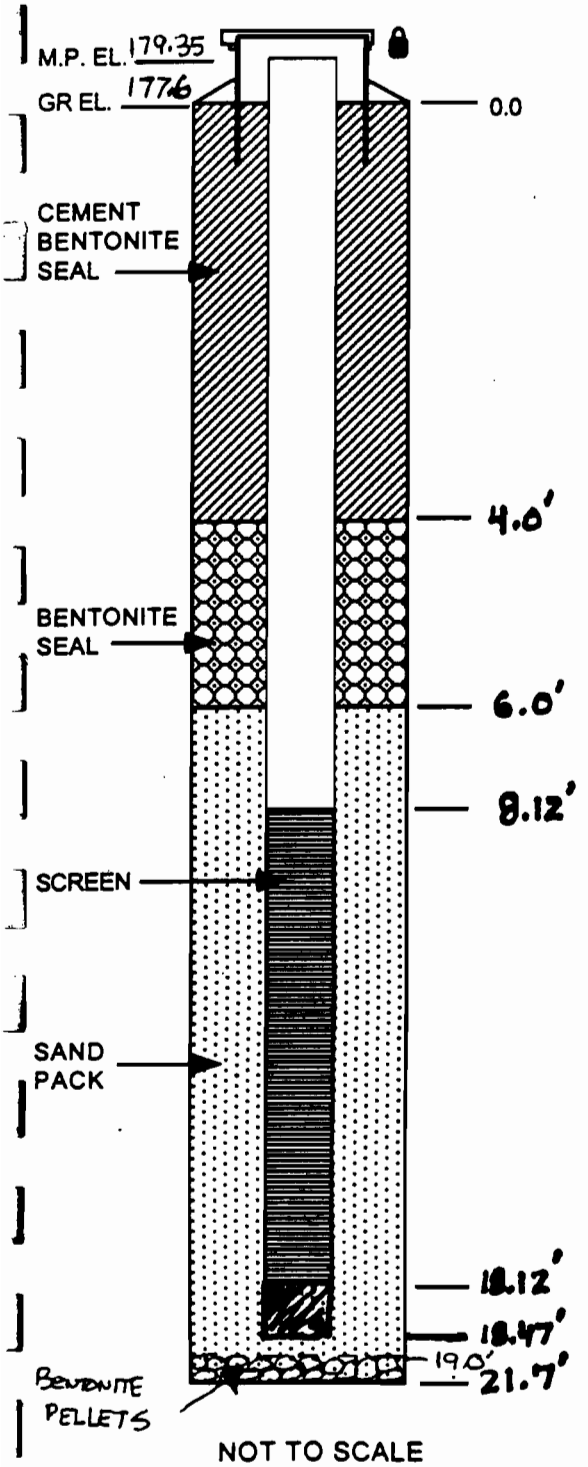
Depth (Feet)	Sample Number	Blow Counts	Unified Classification	Visual Log Description	Geologic Description	Remarks
	S-6	5			Br-RdshBr Cy$ s(+), mfS, 1(+) mfG; wet @ 11.03' [cmf(+)S, s(+)Cy$, 1 mfG - firm]; med. dense; moist to wet	Rec.= 1.3' MOIST TO WET HNu H.S. = 3.3ppm
		9				
		10				
12		14				
	S-7	8			Same.	Rec.= 1.45' WET HNu H.S.= 2.2ppm
		14				
		18				
14		14				
	S-8	3			RdshBr-BrCy$s, fS, 1mfG; occ. rk. frag; firm to med. dense; wet.	Rec. = 0.1' WET HNu H.S.=0.2ppm
		3				
		6				
16		10				
	S-9	11			BrCy$a, mf(+)S, 1(+)mfG, sbrdd to subang.; med. dense; wet	Rec.= 1.55' WET HNu H.S.= 0.3ppm
		9				
		8				
18		8				
	S-10	3			BrCy$a(+), cmf(+)S, s(+)mfG; occ. to freq. rk. frags; med. dense; wet.	Rec.= 1.15' WET HNu H.S.= 0.2ppm
		6				
		9				
20		8				
		9			BrCy$a, mf(+)S, s mfG; freq. rk frag; med. dense to v. dense; wet.	Rec.= 1.8' WET HNu H.S.= 0ppm
		12				
		13				
		50/0.3'			(GLACIAL TILL) 21.7'	★ SOIL SAMPLE SUBMITTED FOR LABORATORY ANALYSIS [EPA METHOD 8260 plus dichlorodifluoromethane]
22					BEDROCK [UPPER TRIASSIC BRUNSWICK FORMATION]	

MONITORING WELL COMPLETION LOG WELL NO. MW-4

Rust Environment & Infrastructure
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project HUDSON TECHNOLOGIES, INC. BREMER DRIVE
Client WILSONART INTERNATIONAL, INC.
Location CONGERS, N.Y.
Project No. 203502.10100
Date Drilled 10.16.98
Date Developed 10.16.98

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector M.A. WILLIAMS
Drilling Contractor PARRATT-WOLFF, INC.

Type of Well GROUNDWATER MONITORING
Static Water Level 11.04' Date 10.16.98
Measuring Point (M.P.) TOP OF PVC
Total Depth of Well 18.47' BGS

Drilling Method
Type Hollow Stem Auger Diameter 4 1/4" I.D.
Casing STEEL

Sampling Method
Type SPLIT-SPOON Diameter 2" O.D.
Weight 140# Fall 30"
Interval CONTINUOS (0-21.7')

Riser Pipe Left in Place
Material Schedule 40 PVC Diameter 2" I.D.
Length 9.89' Joint Type Flush, Threaded

Screen
Material Schedule 40 PVC Diameter 2" I.D.
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened OVERBURDEN (GLACIAL TILL)

Filter Pack
Sand X Gravel _____ Natural _____
Grade 0 Unimin
Amount 220 # Interval 6.0 - 19.0'

Seal(s)
Type BENTONITE (28#) Interval 4.0 - 6.0'
Type CEMENT-BENTONITE Interval 3.0 - 4.0'
Type CONCRETE Interval 0 - 3.0'

Locking Casing ☒ Yes ☐ No
Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

WELL DEVELOPMENT LOG

PROJECT INFORMATION

Project Name: WILDCNART INTERNATIONAL, INC.
Project No.: 203502.10100
Date: 10.16.98
Personnel: M.A. WILLIAMS

WELL INFORMATION

Well I.D.: MW-4
Screen diameter (inches): 2" I.D.
Screen length (feet) 10'
Riser diameter (inches) 2" I.D.
Depth to Water (ft) : 11.04' (BMP)
Well Depth (initial): 18.47 (BGS)
Well Volume: (gals) 1.5 gallons

DEVELOPMENT INFORMATION

Time Start: 16:45 Time Finish: 18:15
Method: HAND BAILER
Volume Removed (gals.): 18
Well Depth (final): 18.47' BGS
Sand/Silt Accumulation: NA

GW QUALITY PARAMETERS

Gallons	Time	DTW	Color	Odor	pH	Conductivity	Turbidity	Temp (C)	Observations
1.5	1645		Brown	none	7.36	275	>999	15.2	
4.5	1700		Brown	none	7.11	305	>999	15.1	
9	1712		Brown	none	6.97	345	>999	14.9	
12	1734		Brown	none	6.93	347	>999	14.8	
15	1746		Brown	none	6.95	350	>999	14.8	
18	1815		Brown	none	6.95	345	>999	14.8	

Notes:

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-5
PROJECT: Brenner Drive CONGERS, N.Y.		Sheet 1 of 3
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 20350Z.10100
DRILLING CONTRACTOR: PARRATT-WOLFF, INC.		Meas. Pt. Elev. 183.74'
PURPOSE: LIMITED SUBSURFACE INVESTIGATION		Ground Elev. 183.96'

DRILLING METHOD: AIR ROTARY (HOLLOW STEM AUGER)		SAMPLE	CORE	CASING		Datum: amsl
DRILL RIG TYPE: IR A-300	TYPE	SS	--	HSA	AIR	Date Started: 10.14.98
GROUNDWATER DEPTH: 14.70'	DIAM.	2" O.D.	--	4¼" I.D.	4"	Date Finished: 10.14.98
MEAS. PT.: PVC	WEIGHT	140#				Driller: Glen Lansing
DATE OF MEAS.: 10.16.98	FALL	30"				Inspector: Mark Williams

Depth (Feet)	Sample Number	Blow Count	Unified Classification	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
0	S-1	3			Br-RdshBr Cy$ l, FS; occ. organics to 0.65' - 0.65'+; RdshBr - BrshRd Cy$ s(-), fS, l(+) mfG; freq. $ stone/SS rk frag; firm to med. dense; moist	Rec.=1.1' Moist HNu H.S.=0.6ppm
1		4				
		5				
2		11				
	S-2	38			2.2 - 2.65'; Br mF(+)S, l$ (occ. Cy$); occ. cemented $ stone/SS rk. pieces/frags; no odr/no stning	Rec.=0.97' MOIST HNu H.S.=1.1ppm
3		37				
		50/0				
4	S-3	50/0.2'			RdshBr Cy$ t(-), fS; v. dense (GLACIAL TILL) 4.2'	Rec.=0.2' DRY HNu H.S.=1ppm
					RdshBr $ t, fS; occ. Rdsh Br $ stone rk frag;	--SWITCH TO AIR ROTARY DRILLING TECHNIQUES
5						
6						
7						
8						
9						
10					[BEDROCK]	

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-5
PROJECT: HUDSON TECHNOLOGIES, INC. Brenner Drive		Sheet 2 of 3
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 203502.10100

Depth (Feet)	Sample Number	Blow Counts	Unified Classification	Visual Log Description	Geologic Description	Remarks
10	S-4	100/0			RdshBr-DkRdBr $ stone & fine SS rk frags noted; dry.	Rec.=0' Dry HNu H.S.=0ppm
13	S-5	50/0			RdshBr $ stone chps observed; weak.	Rec.=0' Dry = HNu H.S.=0ppm
15	S-5a				RdshBr $ stone/fine SS rk chps observed.	Rec.=0.1' Moist to WET HNu H.S.=0ppm
20	S-6				Same; weak; occ. wet @ 24.5' BGS.	HNu H.S.=0ppm
25					(BEDROCK)	

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-5
PROJECT: HUDSON TECHNOLOGIES, INC. Brenner Drive		Sheet 3 of 3
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 203502.10100

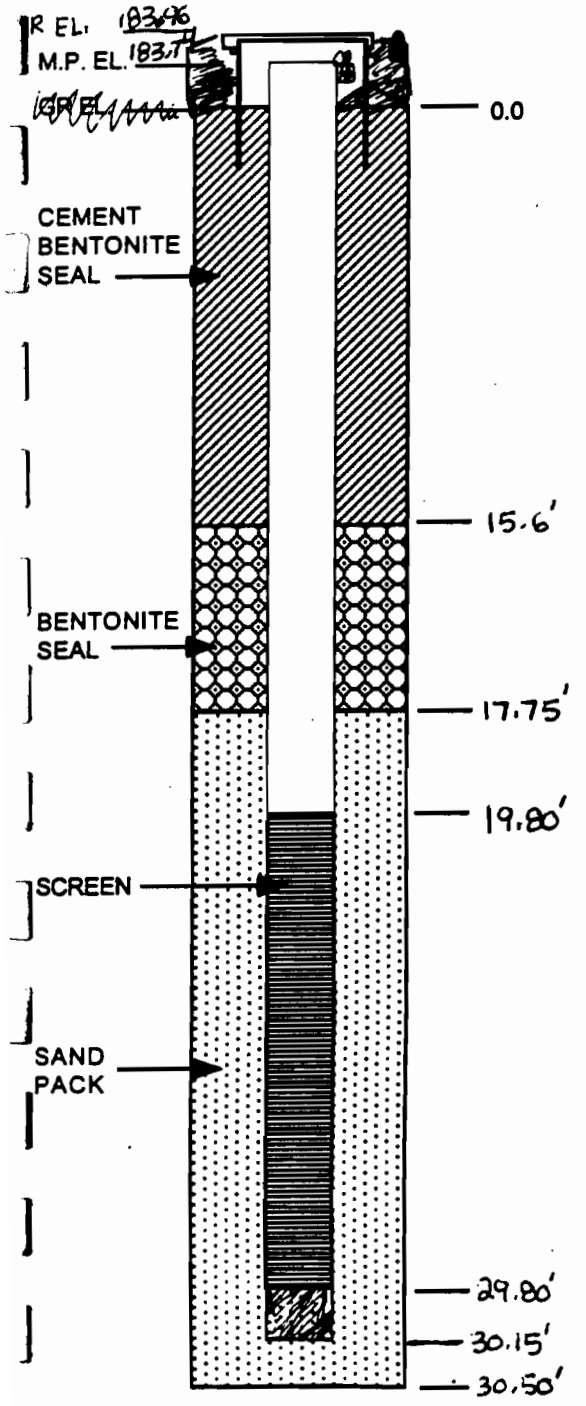
Depth (Feet)	Sample Number	Blow Counts	Unified Classification	Visual Log Description	Geologic Description	Remarks
25'	S-7	100/0			Rdsh Br & stone & fine SS rk chips noted in return.	
	S-8	100/0			Same, (BEDROCK) 30.5'	
					TOTAL DEPTH OF BORING	* SOIL SUBMITTED FOR LABORATORY ANALYSIS [EPA METHOD 8260 plus dichlorodifluoromethane

MONITORING WELL COMPLETION LOG WELL NO. MW-5

Rust Environment & Infrastructure
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project HUDSON TECHNOLOGIES, INC. BREWER DRIVE
Client WILSONART INTERNATIONAL, INC.
Location CONGERS, N.Y.
Project No. 203502.10100
Date Drilled 10.14.98
Date Developed 10.16.98

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector M.A. WILLIAMS
Drilling Contractor PARRATT-WOLFF, INC.

Type of Well GROUNDWATER MONITORING
Static Water Level 14.70 ' Date 10.16.98
Measuring Point (M.P.) TOP OF PVC
Total Depth of Well 30.14' BGS

Drilling Method
Type Hollow Stem Auger / AIR ROTARY Diameter 4¼" I.D. / 4" I.D.
Casing STEEL

Sampling Method
Type SPLIT-SPOON Diameter 2" O.D.
Weight 140# Fall 30"
Interval 0-2', 2-4', 4-4.2', 10', 13', 15', 21.5' & 26.5'

Riser Pipe Left in Place
Material Schedule 40 PVC Diameter 2" I.D.
Length 19.58' Joint Type Flush, Threaded

Screen
Material Schedule 40 PVC Diameter 2" I.D.
Slot Size 0.010" Length 10 '
Stratigraphic Unit Screened UPPER BEDROCK (Upper Triassic Brunswick Silstone)

Filter Pack
Sand X Gravel _____ Natural _____
Grade 0 Unimin
Amount 125 # Interval 17.75'-30.50'

Seal(s)
Type BENTONITE 25# Interval 15.6-17.75'
Type CEMENT-BENTONITE Interval 3.0-15.6'
Type CONCRETE Interval 0-3.0'

Locking Casing ☒ Yes ☐ No
Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

WELL DEVELOPMENT LOG

PROJECT INFORMATION

Project Name: WILSONART INTERNATIONAL, INC.
Project No.: 203502.10100
Date: 10.16.98
Personnel: M.A. WILLIAMS

WELL INFORMATION

Well I.D.: MW-5
Screen diameter (inches): 2" I.D.
Screen length (feet) 10'
Riser diameter (inches) 2" I.D.
Depth to Water (ft) : 14.70' (BMP)
Well Depth (initial): 30.14' (BGS)
Well Volume: (gals) 2.5 gallons

DEVELOPMENT INFORMATION

Time Start: 14:00 Time Finish: 15:03
Method: HAND BAILER
Volume Removed (gals.): 20 gallons
Well Depth (final): 30.15' BGS
Sand/Silt Accumulation: 0.01'

GW QUALITY PARAMETERS

Gallons	Time	DTW	Color	Odor	pH	Conductivity	Turbidity	Temp (C)	Observations
5	1415		Brownish RED	none	7.02	277	>999	15.6	
10	1437		Brownish RED	none	5.91	263	172	16.3	
15	1448		Brownish RED	none	6.62	267	419	15.9	
20	1503		Brownish RED	none	6.65	265	179	15.9	

Notes:

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**					Boring No. MW-6
PROJECT: Brenner Drive CONGERS, N.Y.						Sheet 1 of 3
CLIENT: WILSONART INTERNATIONAL, INC.						Job No. 20350Z.10100
DRILLING CONTRACTOR: PARRATT-WOLFF, INC.						Meas. Pt. Elev. 179.45'
PURPOSE: LIMITED SUBSURFACE INVESTIGATION						Ground Elev. 177.3'
DRILLING METHOD: AIR ROTARY HOLLOW STEM AUGER		SAMPLE	CORE	CASING		Datum: amsl
DRILL RIG TYPE: IR A-300	TYPE	SS	--	HSA	Air	Date Started: 10.15.98
GROUNDWATER DEPTH: 11.19'	DIAM.	2" O.D.	--	4¼" I.D.	4''	Date Finished: 10.15.98
MEAS. PT.: PVC	WEIGHT	140#				Driller: Glen Lansing
DATE OF MEAS.: 10.16.98	FALL	30"				Inspector: Mark Williams

Depth (Feet)	Sample Number	Blow Count	Unified Classification	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
0	S-1	4			Rdsh Br Cy $ s(-), FS, t(-)f G; occ. gneiss cbl/bldr frag; med. dense to dense; occ. mtld; moist	Rec.= 1.4' Moist to DRY HNu H.S.= 0 ppm
1		13				
		16				
2		19				
	S-2	15			Br-Rdsh Br $ s(-), FS, tfG; occ. cbl/rk frag; v. dense; moist to dry.	Rec.= 1.7' Moist to DRY HNu H.S.= 0 ppm
3		31				
		40				
4		24				
	S-3	18			Rdsh Br - Br Cy $ s(-), FS, t(-)f G; occ. gneiss & Brunswick rk. frags; med. dense to dense; moist	Rec.= 2.0' Moist HNu H.S.= 0 ppm
5		16				
		15				
6		9				
	S-4 ★	14			Br Cy $ s(-), FS, tmf(-)G; freq. Rdsh Br $ stone/SS rk frag [7.0'+]; med. dense to dense; dry;	Rec.= 1.35' Dry HNu H.S.= 0 ppm
7		15				
		16				
8		13				
	S-5 ★	16			Rd Br - Br Cy $ s(-), FS, tf(-) mf(-)G; occ. cbl/rk frag; med. dense to dense; dry.	Rec.= 0.85' DRY HNu H.S.= 0 ppm
9		25			Br Cy $ s(-), FS, tmf(-)G; freq. cbl/rk frags; dense; dry.	
		20				
10		20			(GLACIAL TILL)	

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-6
PROJECT: HUDSON TECHNOLOGIES, INC. Brenner Drive		Sheet 2 of 3
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 20350Z.1010

Depth (Feet)	Sample Number	Blow Counts	Unified Classification	Visual Log Description	Geologic Description	Remarks
	S-6	26 16 14 12			Br cmf(+)S, s(+)Cy$, tr FG; occ. to freq. cbl/rk frags. last 0.2' was Br cmFS, s$&C, tr FG	Rec = 1.45' Moist HNu ht.s. = 0 ppm
12	S-7	17 15 17 13			Same; wet; lower 0.65' is Rdsh Br $ &C1, FS, 1C FG; occ. rk frag; dense; dry.	Rec = 1.2' Dry (wash is wet) HNu ht.s. = 0 ppm
14	S-8	50/0.1'			14.1' Rdsh Br $ stone rk chps noted	-- switched to AIR ROTARY DRILLING TECHNIQUES
20	S-9				Rdsh Br $ stone & fine SS rk chps NOTED.	CUTTINGS
25'					(BEDROCK)	

RUST E&I Albany, NY (518) 458-1313	**Test Boring Log**	Boring No. MW-6
PROJECT: HUDSON TECHNOLOGIES, INC. Bremner Drive		Sheet 3 of 3
CLIENT: WILSONART INTERNATIONAL, INC.		Job No. 203502.1010

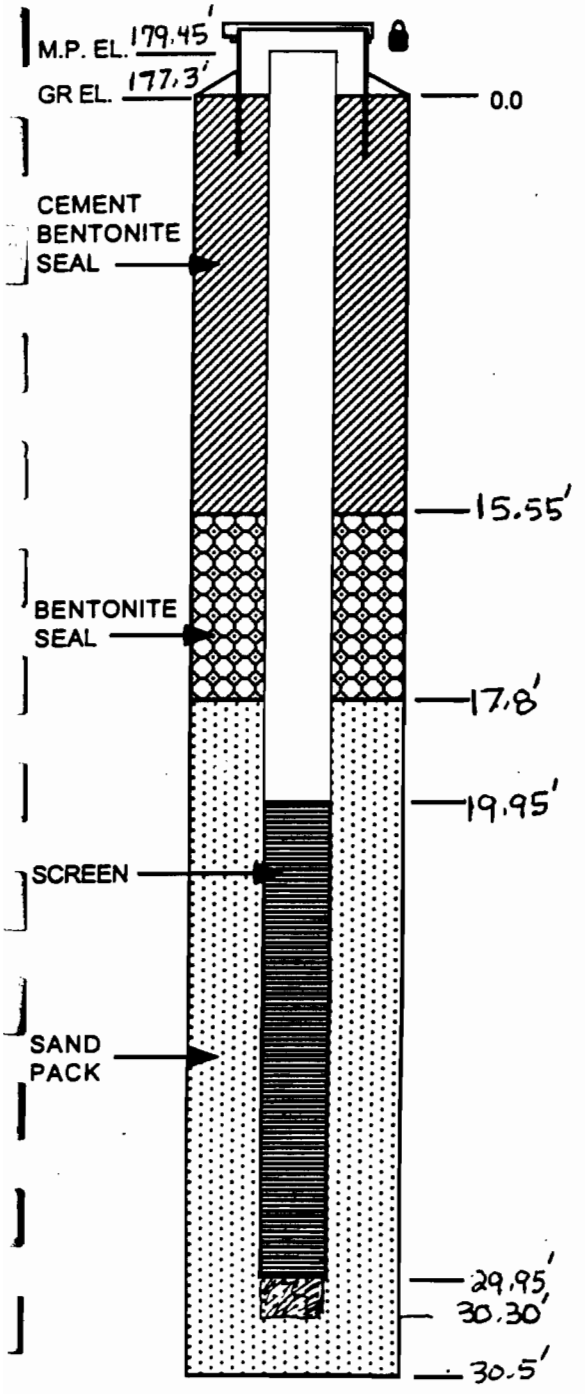
Depth (Feet)	Sample Number	Blow Counts	Unified Classif-ication	Visual Log Description	Geologic Description	Remarks
25'						
	S-10				Rdsh Br $ stone/fine ss rk chps noted, weak.	
30					(BEDROCK) 30.5'	★ = SOIL SAMPLE SUBMITTED FOR LABORATORY ANALYSIS [EPA METHOD 8260 plus dichlorodifluoromethane]
					TOTAL DEPTH OF BORING = 30.5' BGS	

MONITORING WELL COMPLETION LOG WELL NO. MW-6

Rust Environment & Infrastructure
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project HUDSON TECHNOLOGIES, INC. Brenner Drive
Client WILSONART INTERNATIONAL, INC.
Location CONGERS, N.Y.
Project No. 203502.10100
Date Drilled 10.15.98
Date Developed 10.16.98

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector M.A. WILLIAMS
Drilling Contractor PARRATT-WOLFF, INC.

Type of Well GROUNDWATER MONITORING
Static Water Level 11.19' Date 10.16.98
Measuring Point (M.P.) TOP OF PVC
Total Depth of Well 30.28' BGS

Drilling Method
Type Hollow Stem Auger / AIR ROTARY Diameter 4¼" I.D. / 4" I.D.
Casing STEEL

Sampling Method
Type SPLIT-SPOON Diameter 2" O.D.
Weight 140# Fall 30"
Interval 0-2', 2-4', 4-6', 6-8', 8-10', 10-12', 12-14', 20', 25', 30'

Riser Pipe Left in Place
Material Schedule 40 PVC Diameter 2" I.D.
Length 22.27' Joint Type Flush, Threaded

Screen
Material Schedule 40 PVC Diameter 2" I.D.
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened UPPER BEDROCK (Upper Triassic Brunswick Silt Sto.

Filter Pack
Sand X Gravel _____ Natural _____
Grade 0 Unimin
Amount 220 # Interval 19.95' - 29.95'

Seal(s)
Type BENTONITE (40#) Interval 15.55-17.8'
Type CEMENT-BENTONITE Interval 3-15.55'
Type CONCRETE Interval 0-3'

Locking Casing ☒ Yes ☐ No
Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

WELL DEVELOPMENT LOG

PROJECT INFORMATION

Project Name: WILSONART INTERNATIONAL, INC.
Project No.: 203502.10100
Date: 10.16.98
Personnel: M.A. WILLIAMS

WELL INFORMATION

Well I.D.: MW-6
Screen diameter (inches): 2" I.D.
Screen length (feet) 10'
Riser diameter (inches) 2" I.D.
Depth to Water (ft) : 11.19' (BMP)
Well Depth (initial): 30.28' (BGS)
Well Volume: (gals) 3.5 gallons

DEVELOPMENT INFORMATION

Time Start: 15:10 Time Finish: 16:35
Method: HAND BAILER
Volume Removed (gals.): 25 gallons
Well Depth (final): 30.30' BOS
Sand/Silt Accumulation: ~0.02'

GW QUALITY PARAMETERS

Gallons	Time	DTW	Color	Odor	pH	Conductivity	Turbidity	Temp (C)	Observations
3.5	1510		Brownish RED	NONE	7.30	940	>999	14.3	
7	1525				7.25	940	>999	13.7	
10.5	1540				7.09	950	>999	13.5	
14	1550				6.98	950	>999	13.3	
17.5	1600				7.03	940	>999	13.0	
25	1635				7.01	940	>999	13.1	

Notes:

APPENDIX H

Health and Safety Plan

Health & Safety Plan

Prepared for:
Wilsonart International, Inc.
2400 Wilson Place
Temple, Texas 76503-6110

Prepared by:
Earth Tech, Inc.
12 Metro Park Road
Albany, New York 12205

May, 2000
Revised: August 2000

SIGNATURE PAGE
EARTH TECH, INC.

Prepared by Mark A. Williams	Environmental Geologist / Site Safety Officer / Project Manager	August 21, 2000
Reviewed by Robert L. Rafferty	Region Environmental Health & Safety Professional	August 21, 2000

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APPENDICES

1.0 INTRODUCTION

This site-specific Health and Safety Plan (HASP) has been prepared by Earth Tech, Inc. (Earth Tech) for Wilsonart International, Inc. in accordance with the regulatory requirements of 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response".

The purpose of this HASP is to summarize the project organization and responsibilities; establish Standard Operating Procedures (SOPs) for preventing accidents, injuries, and illnesses; identify hazards, discuss the personal protective equipment that may be used at the site; identify personnel health and safety training requirements; summarize the monitoring techniques to be used; establish emergency procedures; describe the medical surveillance program; identify that appropriate first aid equipment is available; provide for accident reporting; and establish a schedule for safety inspections.

The HASP will be implemented by the Site Safety Officer (SSO) during site work. Compliance with this HASP is required of all personnel who enter this site. Assistance in implementing this plan can be obtained from the Earth Tech Region Environmental Health & Safety Professional (REHSP), and the Corporate Environmental Health & Safety Director (CEHSD).

Using the HASP Modification Form presented in Appendix C, the content of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be approved by the REHSP or CEHSD.

1.1 SCOPE OF WORK

- Test Pitting/Subsurface Soil Sampling
- Surface Water/Sediment Sampling
- Soil Borings/Monitoring Well Installation
- Monitoring Well Development/Groundwater Sampling

1.2 PROJECT PERSONNEL

Name / Firm	Title	Work Phone	Home Phone
Mark Williams Earth Tech	Designated Lead/Project Manager	518-437.8368	518-274.8326
John Gansfuss Earth Tech	Project Advisor	518-435-7227	
Dale Prokopchak, CIH, CSP Earth Tech	Corporate Environmental Health & Safety Director	804-515-8556	
Robert Rafferty Earth Tech	Region Environmental Health & Safety Professional	518-437-8374	518-399-3859
Senior Person on Site Earth Tech	Site Safety Officer	518-437.8368	518-274.8326

2.0 ASSIGNMENT OF HASP RESPONSIBILITY

The following describes the health and safety designations and general responsibilities that will be implemented for the Wilsonart investigation activities.

2.1 CORPORATE ENVIRONMENTAL HEALTH & SAFETY DIRECTOR (CEHSD)

The CEHSD is responsible for the development of company safety protocols and procedures necessary for field operations and is also responsible for the resolution of any outstanding safety issues that arise during the site work.

2.2 REGION ENVIRONMENTAL HEALTH & SAFETY PROFESSIONAL (REHSP)

The REHSP has overall responsibility for review and approval of this HASP. The REHSP shall approve any changes to this plan due to modification of procedures or newly proposed site activities.

Health and safety-related duties and responsibilities will be assigned only to qualified individuals by the Project Manager. Before personnel may work on site, a current medical examination and acceptable health and safety training must be approved by the division Safety Representative or the REHSP.

2.3 PROJECT MANAGER

The Project Manager (PM) is responsible for having a project-specific HASP prepared, reviewed and approved prior to the start of on-site activities. In addition, the PM is responsible for assigning a qualified Site Safety Officer (SSO) and project team members. (Refer to Earth Tech General Health & Safety Standard T.00.020, Hazardous Waste Site Training, Appendix A - Site Safety Officer Qualifications).

2.4 SITE SAFETY OFFICER

The REHSP shall direct the site health and safety efforts through a Site Safety Officer (SSO) as needed. The SSO will be responsible for implementing the HASP. The SSO may direct or participate in on-site activities as appropriate when this does not interfere with primary SSO responsibilities. The SSO has stop-work authorization, which he/she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situations, such as detrimental weather conditions. Authorization to proceed with work will be issued by REHSP in conjunction with the Project Manager after such action.

2.5 SUBCONTRACTORS

Subcontracts may be issued for various tasks including soil boring and monitoring well installation. Other subcontracts may be issued for additional tasks; however, none are anticipated. Subcontractors shall comply with the requirements outlined in this HASP and in accordance with OSHA 29 CFR 1910 and 29 CFR 1926; but, in all cases, subcontractors shall be responsible for site safety related to or affected by their own field operations (i.e., heavy equipment operations).

3.0 SITE LOCATION AND DESCRIPTION

3.1 LOCATION

The facility is located at 1 Brenner Drive, Congers, Rockland County, New York. It is located along the western side of Brenner Drive and bounded by an active branch of the CONRAIL railway to the west, commercial/industrial development to the north and east, and undeveloped land and residential development to the south. The total Property area, which is owned by Wilsonart International, Inc., encompasses approximately 4.81 acres (Figure 1). The facility is currently inactive and unoccupied.

3.2 SITE DESCRIPTION

For the purposes of conducting this investigation under NYSDEC's Voluntary Cleanup Program (VCP), Wilsonart elects to define the "Site" as the entire 4.81-acre parcel (Tax Map No. 128, Block A, Lot 5.08). Based on previous groundwater monitoring conducted at the property, the direction of groundwater flow, within the Site boundary, is westward.

4.0 HAZARD ASSESSMENT

4.1 WASTE DESCRIPTION/CHARACTERIZATION

The following chemical information is presented in order to identify the types of materials that may be encountered at the former Congers warehouse facility. Detailed information on these materials was obtained from:

- ACGIH, Threshold Limit Values and Biological Exposure Indices for 1994-95.
- Chemical Data Sheets.
- NIOSH Pocket Guide to Chemical Hazards - 1994.

Based on the review of groundwater analytical results from previous investigations at the site, the following list of chemicals and compounds may be encountered during the Subsurface Investigation at the site. Chemical Data Sheets for each compound listed below, providing information such as the chemical's characteristics, health hazards, protection, exposure limits, and first aid procedures are presented in Appendix A. These chemicals include:

1. ***Trichloroethene (TCE);***
2. ***1,1,1-Trichloroethane (TCA);***
3. ***1,1-Dichloroethane (1,1-DCA);***
4. ***1,1-Dichloroethene (1,1-DCE);***
5. ***1,2,4 Trimethylbenzene;***
6. ***n-propylbenzene;***
7. ***Sec butylbenzene;***
8. ***Isopropylbenzene;***
9. ***Trichlorofluoromethane; and***
10. ***Tetrachloroethene***

Waste Types:	Liquid	X	Solid		Gas	X
	Sludge		Semi-Solid		Other	
Characteristics:	Corrosive		Flammable			
	Explosive		Volatile	X		
	Radioactive		Inert			
	Other	**Materials bound in bedrock or dissolved in bedrock groundwater; no free product anticipated.**				

Exposure limits for the chemicals of potential concern are presented in Table 4-1 and the tasks, hazards, and control measures are shown in Table 4-2.

Table 4-1
Exposure Limits

COMPOUND	TLV-TWA PPM	TLV-STEL PPM	PEL-TWA PPM	IONIZATION POTENTIAL
Trichloroethene	50	100	50	9.45
1,1,1-Trichloroethane	350	450	350	11.00
1,1-Dichloroethane	100	NE	100	11.06
1,1-Dichloroethene	NE	NE	100	10.00
1,2,4 trimethylbenzene	0.5	2.5	1	8.27
n-propylbenzene	0.5	2.5	1	9.24
Sec butylbenzene	0.5	2.5	1	9.24
Isopropylbenzene	0.5	2.5	1	9.24
Trichlorofluoromethane	NE5	1000	1000	
Tetrachloroethene	25	100	100	9.32

References: American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLV) for 1994-1995

TLV - Threshold Limit Value
STEL - Short-Term Exposure Limit
PEL - Permissible Exposure Limit
NE - Ionization Potential
IP - Ionization Potential
IDLH - Immediately Dangerous to Life & Health
TWA - Time Weighted Average

Table 4-2
Task Specific Hazard Assessment Table

TASK	HAZARD	CONTROL MEASURES
Test Pitting Soil Borings / Well Installation	Backhoe/Drill Rig (Heavy Equipment) Dermal Contact Inhalation Thermal Stress	Hard Hat, General Awareness, Access Controls, PPE, Respiratory Protection, Work/Rest Cycles, Fluids and Continuous Monitoring
Equipment Decontamination Well Development Groundwater Sample Collection	Dermal Contact Inhalation Thermal Stress Slip, Trip, Fall	PPE, Respiratory Protection, Work/Rest Cycles, Fluids, Access Controls and General Awareness
Groundwater Hydraulic Characterization	Dermal Contact Inhalation	Access Controls, PPE, Respiratory Protection and General Awareness

4.2 DEGREE OF HAZARD

On-site hazards include physical and chemical hazards. No radiological, biological, or laboratory wastes are suspected on-site.

4.2.1 CHEMICAL HAZARDS

The contaminants of concern at the sites can affect the body if they are inhaled, come in contact with the eyes or skin, or are ingested. These compounds may be released during soil sampling, monitoring well installations, monitoring well development, and well sampling activities. The primary concern is for skin exposure to contaminated soils and potential inhalation of organic vapors or dust released during soil

intrusive activities. Exposure to these substances by inhalation (in the Breathing Zone (BZ)) is not anticipated due to the relatively low levels found in the soil and water from previous studies.

Atmospheric monitoring, however, will be conducted during all phases of on-site field activities to determine the need for upgrading to appropriate levels of respiratory protection, as found in Section 9.2. Exposure by skin absorption is a low to moderate possibility, but can be prevented by use of proper protective equipment and good hygiene practices. Table 4-1 presents exposure levels for contaminants of concern.

4.2.2 PHYSICAL HAZARDS

Primary physical hazards at the site are those associated with drilling operations. Hazards that could be encountered during subsurface activities include falls and trips, injury from lifting heavy objects, falling objects, eye injuries, head injuries, and pinched or crushed hands and feet. Fire hazards may also be present due to the use of gasoline-powered heavy equipment. During drilling operations, matting and planking may be needed around the drill rig to provide stability for the drill rig. The drilling contractor will make this decision. Earth Tech employees shall not operate subcontractor equipment or handle subcontractor materials and tools, with the exception of subcontractor sampling tools. Also see Section 11.3 Safe Work Practices.

Depending on seasonal weather conditions, there is potential for workers on-site to be affected by heat stress or cold exposure. The SSO will monitor for heat stress or cold exposure in accordance with Section 12.6 of this HASP.

Test pitting, soil boring activities and monitoring well installation provide potential for encountering buried hazards such as utilities. It shall be the subcontractor's responsibility to obtain "clearance" from the local utilities prior to initiating intrusive activities. Overhead electrical lines shall also be identified. If encountered, soil intrusive activities will be halted and the REHSP will be notified.

If dusty conditions exist during soil boring activities, the work zone area will be kept wet by spraying the work zone (WZ) with water to provide dust control.

Noise related to soil boring operations during soil boring and monitoring well installations is expected to be minimal; however, as a precaution, hearing protection will be worn.

Soil, sediment, and surface water sampling activities present the potential for slips and falls associated with wet surfaces and soft unstable sediment surfaces. The sampling does not represent any significant drowning hazard; however, a lifebelt and lanyard may be worn by the sampler as determined by the SSO. Life preservers are required if sampling is conducted from a boat.

4.2.3 ADDITIONAL PRECAUTIONS

No additional precautions are anticipated at this time.

4.2.4 NATURAL HAZARDS

Natural hazards such as weather, poisonous plants, bites from poisonous or disease-carrying animals and insects (i.e., snakes, ticks), cannot always be avoided. Refer to Section 12.0 for precautions and emergency procedures.

4.2.5 CONFINED SPACE ENTRY

Confined space entry is not anticipated and is, therefore, not addressed in this HASP. If confined space entry is necessary, work will be halted and the REHSP will be notified.

4.2.6 SPILL CONTAINMENT

Field activities associated with this site are unlikely to require spill containment and are, therefore, not addressed in this HASP.

5.0 TRAINING REQUIREMENTS

5.1 BASIC TRAINING REQUIRED

Personnel who are required to work in areas where the potential for toxic exposure exists shall complete training and have site experience conforming to the requirements of 29 CFR 1910.120(e). In keeping with 29 CFR 1910.20, medical records and exposure records will be available to workers or his/her designated representative upon request.

Training includes a 40-hour course, which describes procedures for working at hazardous waste sites. The procedures include a safety and health program, medical surveillance, decontamination, site characterization and analysis, protective clothing and monitoring equipment, site control work documentation, emergency response, engineering and administrative control to reduce exposure, and site safety evacuation procedures.

Contractors/subcontractors shall provide written documentation that these training/experience requirements have been met. Personnel shall also be trained in the contents of Appendix B, "Respiratory Protection Program".

5.2 SITE-SPECIFIC TRAINING

Site-specific training will be conducted by the SSO for on-site personnel and visitors to minimize exposure to potential of on-site hazards. Site-specific training will address the activities, procedures, monitoring, and equipment for the field operations.

This training at a minimum will include the following:

1. Site description and history.
2. Project activities, including coordination with other contractors.
3. Hazard evaluation.
4. On-site safety responsibilities.
5. Site control and work zones.
6. Personnel training.
7. Medical monitoring.
8. Atmospheric monitoring.
9. Personal protection, clothing, and equipment.
10. Decontamination procedures.
11. Emergency procedures.
12. Review of site-specific material safety data sheets (MSDSs).
13. Safe work practices.
14. Other elements covered in this site-specific HASP.

This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safe operations. Training must include emergency preparedness, location of assembly areas, proper entry and exit procedures for exclusion zone (EZ), warning systems, location of emergency equipment, and route to the hospital.

5.3 SAFETY BRIEFINGS

Project personnel will be given briefings by the SSO on a daily or as-needed basis to further assist site personnel in conducting their activities safely. Briefings will be provided when new activities are to be

conducted, changes in work practices must be implemented due to new information made available, or if site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices when performance deficiencies are identified during routine daily activities or as a result of safety audits.

5.4 SAFETY AUDITS

The REHSP or CEHSD or designee, as necessary, may conduct safety audits of field operations and subcontractor performance to review for compliance with health and safety policies and procedures. Health and safety audit findings will be documented and corrective action taken.

5.5 FIRST AID AND CPR

At least two individuals shall be trained and qualified to administer first aid and cardiopulmonary resuscitation (CPR).

The SSO will identify the individuals possessing this training in order to ensure that emergency treatment is available during every workshift from a person qualified in first aid and CPR. These courses will be consistent with requirements of the American Red Cross and/or American Heart Association.

6.0 MEDICAL SURVEILLANCE PROGRAM

All Earth Tech personnel and subcontractors performing field work at the former Congers warehouse facility will be required to have passed a pre-assignment and/or periodic medical examination that is consistent with 29 CFR 1910.120(f). Medical examinations shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine. A release for work will be confirmed by the REHSP before an employee can begin hazardous site activities.

Additional medical testing may be required by the REHSP in consultation with the company physician and CEHSD if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

Contractors/subcontractors will maintain the medical records for their own employees, but shall also provide the SSO with written documentation certifying that each employee at the site has met the requirements of the Medical Surveillance Program. This documentation will be provided before the first day of work for each employee assigned to the site. The pre-assignment and annual examinations are essentially the same in content and are at the examining physician's discretion. At the end of employment or if deemed necessary after an employee's involvement in project-specific site work, he/she may have to complete a medical examination. This examination may be limited to obtaining an internal medical history of the period since the last full examination (consisting of medical history, physician examination, and laboratory tests).

6.1 JOB EXPOSURE REPORT

A Job Exposure Report must be completed at the end of the project for each Earth Tech employee who participated in on-site field activities. The Job Exposure Report will be included in the Subsurface Investigation Report.

7.0 SITE CONTROL MEASURES

The purpose of the site control measures discussed in this section are to maintain order at the sites and to minimize chemical and physical hazards to on-site personnel, visitors, and the public. Site control zones will include an EZ, a contamination reduction zone (CRZ), and a support zone (SZ). In addition, temporary activity-specific WZ s will be established at specific locations.

7.1 SITE ACCESS

Site access is restricted to the general public at most areas where work will be performed inside the Property. The exterior areas are less secured but access to the public is not generally a problem as access is restricted by the facility gate and the railway. Work areas will need to be posted and taped off to restrict access, if necessary.

7.2 EXCLUSION ZONE

The EZ is the area containing or suspected of containing contaminated materials. Since investigation activities will be conducted throughout the project site, each investigative area boundary shall be delineated as the EZ.

7.2.1 WORK ZONES

Temporary activity-specific WZ s shall be established at each sampling activity. While completing soil borings and monitoring well installations the WZ shall be established and marked by safety rope or tape. The WZ shall be a radius large enough to encompass the drill rig and allow sufficient space for safe work practices. A CRZ shall be placed at the WZ perimeter at an upwind location. A portable eye wash unit, fire extinguisher, towels, plastic garbage bags, decontamination supplies, and a first aid kit (sufficient to accommodate the field team) shall be placed in this CRZ. These supplies may be located in the vehicle parked adjacent to the WZ.

A temporary WZ shall be established at each sampling location where surface soil samples are to be collected. These WZ areas shall be established by laying about 5 square feet of plastic sheeting next to the sampling location for the placement of equipment and supplies. A portable eye wash, first aid kit (sufficient to accommodate the field team), towels, plastic garbage bags, fire extinguisher, and decontamination supplies are also required in this area, which may be located in the truck.

7.3 PERSONNEL DECONTAMINATION

Personnel decontamination areas will be established on-site. Personnel will decontaminate and/or dispose of soiled protective clothing (i.e., disposable boots and gloves, etc.) in the CRZ established next to the temporary WZ. A fixed personnel decontamination area will be established adjacent to the fixed equipment decontamination pad where, after equipment decontamination, personnel can decontaminate and dispose of protective clothing and equipment before exiting the EZ. Refer to Section 10 for further decontamination procedures.

7.4 EQUIPMENT DECONTAMINATION PAD

To prevent off-site transport of contamination, the drill rig and associated equipment and vehicles will be decontaminated at a decontamination pad prior to exiting the EZ. This location will be selected by the SSO and Field Team Leader prior to start-up of field activities at the project site. Drill equipment (augers, rods, etc.) will be steam-cleaned at the decontamination pad as necessary. Decontamination

liquids will be allowed to infiltrate into the soil. Refer to Section 10.0 for further decontamination procedures.

Sampling equipment such as stainless steel hand augers, bowls, and spoons may be decontaminated at each sampling location. During decontamination, isopropanol rinses will be collected for later disposal at an approved location. Other decontamination liquids will be allowed to infiltrate into the soil at each location. Refer to Section 10 for further decontamination procedures.

7.5 SUPPORT ZONE

The SZ is considered the uncontaminated area and will be identified by the SSO before field activities begin. It will contain the Command Post which will provide for team communications and emergency response. A mobile telephone will be located in this area. Appropriate sanitary facilities, safety, medical, and support equipment will be identified. No potentially contaminated personnel or materials are allowed in the SZ except for appropriately packaged/decontaminated and labeled samples.

7.6 SITE VISITORS

Visitors are required to report to the SSO prior to accessing the sites, although none are anticipated. The SSO will document decisions regarding their access to the sites. If granted limited access, visitors must provide the SSO with documented compliance with Section 5.0 of this HASP, comply with other applicable sections, and satisfy additional conditions placed on them as deemed appropriate by the SSO to ensure visitor safety. Visitors must sign in and out daily under the SSO's direction for the duration of their approved visit. Under no circumstances will visitors be allowed to interfere with, or participate in operations within the scope of the field investigation. All visitors shall be escorted throughout the sites by appropriately trained personnel.

As needed, the SSO will establish a designated Level D area as an observation point during intrusive activities. This designated area will be located to offer proximate viewing of site operations, and positioned such that visitors in no way may inhibit site access, logistics, or general operations. Further, the SSO will locate the viewing areas such that visitors present are at minimal risk of exposure to site hazards.

8.0 PERSONAL PROTECTIVE EQUIPMENT

8.1 GENERAL

The level of protection to be worn by field personnel will be defined and controlled by the SSO. Personal protective equipment for general operations will be consistent with the requirements of 29 CFR 1910 Subpart I, "Personal Protective Equipment". Basic levels of protection for hazardous waste operations will be selected in accordance with the provisions of 29 CFR 1910.120(g)(3), "Personal Protective Equipment Selection", and Appendix A, "General Description and Discussion of the Levels of Protection and Protective Gear". Modification to basic protective equipment ensembles may be necessary for specific operations. In these cases, further definition will be provided by review of specific hazards, conditions, and proposed operational requirements, and by conducting air monitoring at the particular operation. Protection may be upgraded or downgraded, as deemed appropriate by the SSO and verified by the REHSP.

8.2 ANTICIPATED LEVELS OF PROTECTION FOR SITE OPERATIONS

Surface Soil Sampling/Test Pitting	Level D
Surface Water/Sediment Sampling	Level D
Soil Boring/Monitoring Well Installation	Level D
Monitoring Well Development / Groundwater Sampling	Level D

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 9.2 of this HASP.

Level D personal protective clothing and equipment includes:

- Disposable Tyvek coveralls. (Polyethylene Coated Tyvek required in sampling areas when splashing by contaminated soils or water is a possibility).
- Hardhat (when overhead hazards exist).
- Safety glasses or goggles.
- Steel toe, steel shank boots.
- Disposable latex gloves - required when handling and collecting soil, water, sediment, and tissue samples.
- Outer neoprene gloves - required when handling and collecting soil, water, sediment, and tissue samples.
- Disposable outer boots - required.
- Noise protection - as warranted.

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator National Institute for Occupational Safety & Health (NIOSH), Mining Safety and Health Administration (MSHA) approved fitted with acid gas/organic vapor/HEPA (High Efficiency Particulate Air Filter) cartridges.
- Disposable Tyvek coveralls. (Polyethylene Coated Tyvek required in sampling areas when splashing by contaminated soils or water is a possibility).

- Disposable latex inner gloves.
- Nitrile outer gloves.
- Hard hat (when overhead hazard exists).
- Steel toe, steel shank boots.
- Disposable outer boots.

Level B protective clothing and equipment includes the above Level C clothing with the addition of a self-contained breathing apparatus (SCBA) or supplied air-line respirator in place of an air-purifying respirator. If action levels are exceeded and based on evaluation of the conditions, and Level C protection is not sufficient and Level B respiratory protection is deemed necessary, work activities will be halted and arrangements for Level B equipment will be implemented.

The use and care of respiratory protection will be in accordance with the protocols described in Appendix B.

9.0 AIR MONITORING AND ACTION LEVELS

9.1 GENERAL

It will be necessary to monitor the atmospheric conditions during on-site field sampling activities (i.e., test pitting) to determine the possible need to upgrade the personal protection of on-site workers and downwind perimeter of the work area. Atmosphere at the sample extraction point, soil cuttings, and fluids produced during drilling shall be monitored. In addition, air monitoring will be performed in the worker's BZ.

Real-time air monitoring will be performed for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area during active test pitting and drilling operations at the Site. In general, VOC and particulate monitoring, response levels and actions will be consistent with the NYSDOH Community Air Monitoring Plan (CAMP), which is provided in Appendix I of the Subsurface Investigation Work Plan. Periodic air monitoring may be performed for VOCs at the perimeter during non-intrusive activities (i.e., surface water sampling, groundwater sampling, etc.).

9.1.1 Test Pitting Operations

The activities shall be conducted in Level D personal protective equipment (see Section 9.1). The excavation subcontractor shall be responsible for implementing safety procedures associated with OSHA 29 CFR 1926 Subpart P, Excavations.

During the test piting activities, continuous air monitoring shall be conducted in the immediate work zone around the trench using a PID or FID. Real-time air monitoring will be performed for VOCs and particulates (i.e., dust) at the downwind perimeter during test pitting operations at the Site. In general, VOC and particulate monitoring, response levels and actions will be consistent with the NYSDOH CAMP (Appendix I). In the event action levels (refer to Section 9.2) are exceeded at the perimeters, the trench shall be backfilled immediately.

Site personnel engaged in test pit excavation may encounter contaminated soils, water, or dust; and toxic or explosive vapors, or gases. Such occurrences may lead to exposure via inhalation, ingestion, or skin absorption.

Field crews in the immediate proximity of the backhoe/trackhoe face risk of injury caused by operator error and equipment malfunction. Personnel within the range of the backhoe/trackhoe bucket's reach must maintain ongoing communication with the operator to avoid accidental impact. Routine or emergency movement of tire- or track-mounted equipment presents added risk to nearby personnel. Failure of backhoe/trackhoe hydraulic systems can also present unanticipated risks. Personnel shall not enter the trenches under any circumstances.

Open excavation present hazards compounded by potentially collapsing sidewalls coupled with proximate location of heavy equipment. Personnel standing near excavations must avoid sidewalls by a minimum of 15 feet unless properly secured with life lines. (Life lines shall be secured to a stationary anchor point.) Due to closure proximity to heavy equipment, personnel shall also exhibit caution when viewing excavations from the operating end of trenching activities. When practical, the field crew should avoid logging and other observatory actions while excavations are in progress. No member of the field crew shall be allowed to enter any open excavation. Consequently, no tasks are expected to involve confined space entry.

Samples for PID screening shall be collected from the pit using the backhoe bucket. The bucket will be brought out of the trench by the operator and placed off to the side of the pit (at least 15 feet from a side wall) where the material will be collected by personnel.

9.1.2 Soil Boring Operations/Monitoring Well Installations

Soil boring and monitoring well installation activities will be initiated in Level D personal protection with the contingency to upgrade the level of protection based on the action levels. Real-time air monitoring will be performed for VOCs and particulates (i.e., dust) at the downwind perimeter during drilling operations at the Site. In general, VOC and particulate monitoring, response levels and actions will be consistent with the NYSDOH CAMP (Appendix I).

Air monitoring will be performed continuously throughout soil boring and well installation activities. A Flame Ionization Detector (FID) or Photoionization Detector (PID) shall be used to monitor the worker's BZ and the geologic samples upon retrieval. Drill cuttings and fluids produced during drilling shall also be monitored. Any soil cuttings or fluids produced during drilling shall also be monitored using a PID and/or FID. All readings will be recorded in a field book and will be attached to the Subsurface Investigation Report.

9.1.3 Surface Water/Sediment Sample Collection, Monitoring Well Development and Groundwater Sample Collection

Surface water / sediment sample collection, monitoring well development and groundwater sample collection activities shall be initiated in Level D personal protection with the contingency to upgrade the level of protection based on the action levels. Periodic perimeter air monitoring (i.e., VOCs) may be performed during these tasks.

The PID/FID shall be used to continuously monitor the worker's BZ and the well casing. Prior to initiating development, testing, or sampling activities, the field team will stand upwind of the well casing and remove the well cap, stand back, and allow the well casing to vent for about 5 minutes. If action levels are not exceeded in the worker's BZ, development, testing, and/or sampling activities may proceed.

9.2 ACTION LEVELS

Instrumentation will include a photoionization detector (PID) equipped with a 10.2 eV or 11.7 eV lamp and/or a flame ionization detector (FID). The action levels in this HASP will apply to site work during the duration of activities at the Site.

Instrument	Action Levels	Level of Respiratory Protection/Action
PID/FID	Continuous sustained readings to 1 ppm above background (typically to 0.2 ppm) in BZ	Level D
PID/FID*	Continuous sustained readings of 1 ppm to 5 ppm above background	Level C (based on identification of contaminant)
PID/FID	Continuous readings at 5 to 250 ppm above background in BZ	Level B (if applicable)

If visible dust is detected while working in Level D, upgrade to Level C respiratory protection is required. However, engineering controls, such as wetting the WZ area with water to control dust, will be implemented when feasible.

* In the event any action levels are exceeded, work activities shall be halted, and an attempt will be made to identify the contaminants present using colorimeter indicator tubes so that correct respiratory protection can be selected and action levels may be adjusted higher or more conservatively. The SSO shall notify the REHSP immediately prior to upgrading the level of respiratory protection.

9.3 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

9.3.1 PERSONAL AND PERIMETER MONITORING

Personal air monitoring will not be conducted unless Level D action levels are exceeded in the EZ. The determination to perform personal air monitoring will be determined by the REHSP after discussions with SSO and NYSDOH personnel. If a personal air monitoring program is deemed necessary, work activities will be halted and a monitoring plan will be developed.

Real-time air monitoring will be performed for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area during active test pitting and drilling operations at the Site. In general, VOC and particulate monitoring, response levels and actions will be consistent with the NYSDOH's, which is provided in Appendix I of the Subsurface Investigation Work Plan. Periodic air monitoring may be performed for VOCs at the perimeter during non-intrusive activities (i.e., surface water sampling, groundwater sampling, etc.).

9.3.2 INSTRUMENT CALIBRATION AND MAINTENANCE

Instrument calibration and maintenance shall be performed according to manufacturer's specifications and documented on Field Instrument Calibration Logs or Field Log Books. PID calibration shall be completed along with a PID calibration check on a daily basis. Records of instrument calibrations shall be included in the final Subsurface Investigation Report.

10.0 DECONTAMINATION PROCEDURES

The SSO shall determine the level of decontamination necessary based on the evaluation of specific work activities and the potential degree of contamination. Temporary CRZs shall be established at each sampling location.

10.1 EQUIPMENT

The backhoe and/or drill rig, associated equipment, and vehicles will be decontaminated at a location on-site selected by the SSO prior to start-up of field activities in the EZ. Excavation and/or drilling equipment (augers, rods, etc.) will be steam-cleaned between sampling locations. These decontaminations will be performed on the ground away from the test pit/soil boring location.

Non-disposable sampling equipment will be decontaminated before use, between samples, and before leaving the sampling location.

Equipment that cannot be immersed in soap solution (i.e., Liquinox) and water will be wiped clean and rinsed with distilled water.

10.2 PERSONNEL

Personnel will perform decontamination in the personal decontamination area. Decontamination of personnel in Level D will consist of removal and disposal of coveralls (when worn) disposable boots, and gloves. Decontamination of personnel using Level C protective equipment will consist of:

- Washing boots, waders, or other non-disposable protective equipment (i.e., hard hat, safety glasses/goggles, etc.) suspected of being contaminated using soap solution followed by potable or distilled water rinse.
- Removal and disposal of boot covers and waders if worn.
- Removal and disposal of coveralls.
- Removal and disposal of outer gloves.
- Removal, cleaning, and storage of respiratory equipment.
- Removal and disposal of inner gloves.

10.3 CONTAMINATION PREVENTION

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

PERSONNEL

- Know the limitations of all personal protective equipment being used.
- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly. Do not sit or lean on potentially contaminated surfaces.
- Make sure all personal protective equipment has no cuts or tears prior to donning.
- Fasten all closures on suits, covering with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants.

- Do not carry cigarettes, gum, food, or candy into contaminated areas.
- On-site personnel are encouraged to shower at the end of their work day.

SAMPLING/MONITORING

- Cover instruments with clear plastic, leaving openings for sampling ports, and sensor points.
- Bag sample containers prior to placement of sample material into containers.

HEAVY EQUIPMENT

- Care should be taken to limit the surface area of equipment that comes into contact with contamination.

GENERAL

- If contaminated tools are to be placed on noncontaminated equipment for transport to the decontamination pad, plastic should be used to keep the equipment clean.
- Spoils from sampling work should be placed so as not to be in the expected paths of individuals.

10.4 DISPOSAL PROCEDURES

Waste materials and other field equipment/supplies shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site.

11.0 GENERAL SAFE WORK PRACTICES AND COMMUNICATIONS

11.1 SAFETY EQUIPMENT

Basic emergency and first aid equipment will be available at the SZ and/or the CRZ, as appropriate. This shall include communications equipment, first aid kit (sufficient to accommodate field team), emergency eye wash, and other safety-related equipment. Fire extinguishers will be provided, inspected, and available on-site.

11.2 COMMUNICATIONS

WALKIE TALKIES - Hand-held units shall be used as much as possible by field teams for communication between downrange operations and the Command Post base-station.

TELEPHONES - A mobile telephone will be located in the Command Post area in the SZ for communication with emergency support services/facilities.

HAND SIGNALS - Hand signals will be used by downrange field teams in conjunction with the buddy system. These signals are very important when working with heavy equipment. They shall be known by the entire field team before operations commence and reviewed during site-specific training.

SIGNAL	MEANING
• Hand gripping throat	Out of air; can't breathe
• Grip partner's wrist	Leave area immediately; no debate
• Hands on top of head	Need assistance
• Thumbs up	OK; I'm all right; I understand
• Thumbs down	No; negative

11.3 SAFE WORK PRACTICES

The following safe work practices will be implemented during site operations:

- Only properly trained and equipped personnel will be allowed to work in potentially contaminated areas.
- The number of personnel and equipment in the sampling areas will be kept to a minimum, consistent with safe site operations.
- Workers shall adhere to the "buddy system" while working downrange and in designated EZs. Radio contact shall be maintained between pairs on-site in order to assist each other in case of emergencies.
- Workers shall not exit EZs until soiled equipment and clothing have been removed and decontaminated or properly disposed of.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer, ingestion, and inhalation of potentially contaminated materials is prohibited.
- As necessary, personnel will thoroughly wash their hands and faces upon leaving the investigation areas.
- Contact with potentially contaminated materials and surfaces shall be avoided. Personnel shall comply with contamination control measures.
- Personnel with facial hair or other facepiece seal obstructions will not be permitted to work where respirators are required.

- Work shall only be conducted if adequate illumination is provided, i.e., visual observation is not impaired due to loss of daylight conditions.

DRILLING

While the drilling subcontractor is responsible for safe means and methods of operating their drill rigs, (refer to Section 2.5 of this HASP), personnel working near drill rig operations shall be aware of the following safe work practices:

- Drillers shall inform personnel working with drill rig activities, (i.e., soil boring operations) as to the location of the emergency stop device.
- No drilling within 20 feet in any direction of overhead power lines will be permitted. The locations of all underground utilities must be identified and marked prior to initiating any subsurface activities. In the event the drill rig would come in contact with an electrical source, do not touch any part of the equipment or attempt to enter or leave it. Do not touch any person who may be in contact with electrical current. If rescue is attempted, only use a dry, clean rope or unpainted wooden pole.
- Personnel must develop hand signals with equipment operators.
- A remote sampling device must be used to sample drill cutting if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.
- Drillers, helpers, and samplers must secure all loose clothing when in the vicinity of drilling operations.
- "All" compressed gas cylinders must be stored and used in an upright position, properly secured and protected from damage, and segregated and labeled as empty, full, or in use.

12.0 EMERGENCY PREPAREDNESS

12.1 EMERGENCY COORDINATOR

The Site Emergency Coordinator shall be the SSO. The SSO shall verify appropriate emergency contacts before beginning work on-site.

EMERGENCY PHONE NUMBERS:

Police Department:	Rockland County 911
Fire Department:	Rockland County 911
Hospital:	Nyack Hospital
Hospital Address:	200 Sickles Avenue Nyack, New York
Ambulance:	911

NATIONAL OR REGIONAL SOURCES OF ASSISTANCE:

Corporate Environmental Health & Safety Director 804-515-8556
Region Environmental Health & Safety Professional 518-437-8374
EPA (RCRA-Superfund Hotline) 800-424-9346
CHEMTREC (24 HOURS) 800-424-9300
Bureau of Explosives (24 Hours) 202-293-4048
Centers for Disease Control (Biological Agents) 404-633-5313
National Response Center (NRC) 800-424-8802
DOT (Office of Hazardous Operations) 202-426-0656
DOT (Regulatory Matters) 202-426-2075
U.S. Coast Guard (Major Incidents) 800-424-8802
Pesticide Health Hotline 800-858-7378
Continuum Healthcare (Earth Tech Medical Provider) Dr. Elayne Theriault 800-229-3674

HOSPITAL ROUTE:

The nearest emergency room facility is located at the Nyack Hospital in Nyack, approximately 5.4 miles south-southeast of the Site. The travel time is anticipated to be 13 minutes at posted speed limits. Exit the Site via Brenner Drive and travel south 0.9 miles to the intersection with Lake Road E. Turn left and travel east 0.4 miles on Lake Road E. to the southbound entrance to US-9W. Travel south on Route 9W for 2.2 miles. At this juncture, the road becomes North Highlands Avenue and US-9W. Proceed southward for another 1.7 miles until encountering Sickles Avenue. Turn left at intersection with Sickles Avenue. Hospital emergency room entrance located at northern side of Sickles Avenue.

A hospital route map and written description depicting the route to the hospital from the investigation areas is presented in Appendix D.

Once the SZ is established, and before field activity start-up, the Site Emergency Coordinator (i.e. the SSO) shall drive the route to the hospital, post directions and/or a map to the hospital, and set up the first aid station including a 10-pound Type A/B/C fire extinguisher.

12.2 IMPLEMENTATION

The Site Emergency Coordinator (SSO) shall implement the emergency action procedures whenever conditions at the site warrant such action. The Site Emergency Coordinator (SSO) will be responsible for coordinating the evacuation, emergency treatment, and emergency transport of site personnel as necessary, and for notification of emergency response units and the appropriate management staff. In the event an evacuation is necessary, the SSO will take a role count at the designated gathering location with the use of the daily sign in and out sheet. The following conditions may require implementation of emergency action procedures:

- Fire or explosion on-site.
- Serious personal injury.
- Release of hazardous materials, including gases or vapors at levels greater than the maximum use concentrations of respirators.
- Unsafe working conditions, such as inclement weather.

12.3 FIRE OR EXPLOSION

If an actual fire or explosion has taken place, emergency steps will include 1) evacuation of work area and venting, and 2) notification of the fire department and other appropriate emergency response groups if necessary.

12.4 PERSONAL INJURY

Emergency first aid will be administered on-site as appropriate. Then the individual will be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility if needed.

12.5 OVERT CHEMICAL EXPOSURE

Typical response procedures include:

Skin contact:	Use copious amounts of cleaner and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the crz and/or sz. Eyes should be rinsed for 15 minutes upon chemical contamination.
Inhalation:	Move to fresh air and/or, if necessary, decontaminate/transport to hospital.
Ingestion:	Decontaminate and transport to emergency medical facility.
Puncture Wound or Laceration:	Decontaminate and transport to emergency medical facility. The SSO will provide medical data sheets to medical personnel as requested.

12.6 ADVERSE WEATHER CONDITIONS

In the event of adverse weather conditions, the SSO will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.

- Treacherous weather-related working conditions (i.e. mud, ice, rain).
- Limited visibility.
- Potential for electrical storms.

12.6.1 HEAT STRESS

The SSO shall visually monitor personnel to note for signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel 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 commercial mixes such as Gatorade.
- Establish a work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- Breaks are to be taken in a cool rest area (77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

12.6.2 COLD EXPOSURE

If field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling of the body core, resulting in coma and death. Areas of the body which have high surface area-to-volume ratio 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°F with a 15-mile per hour (mph) wind is equivalent to chilling still air to -18°F. Refer to Table 12-1 Windchill Index.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases 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.

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 incipient 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: Tissue is cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you may never know you have been injured until it is too late.

Table 12-1
Windchill Index

	ACTUAL THERMOMETER READING (F):									
Wind Speed In mph	50	40	30	20	10	0	-10	-20	-30	-40
	EQUIVALENT TEMPERATURE (F):									
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
>40 mph (little added effect)	Little Danger (For properly clothed person)				*Increased Danger* (Danger from freezing of exposed flesh)			**Great Danger**		

Source: Fundamentals of Industrial Hygiene, Third Edition, Plog, B.A., Benjamin, G.S., Kerwin, M.A., National Safety Council, 1988.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water between 39°C and 41°C (102°F to 105°F). Give a warm drink--not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws. Then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

After thawing, the victim should try to move the injured areas a little, but no more than can be done alone (without help).

- Do **not** rub the frostbitten part (this may cause gangrene).
- Do **not** use ice, snow, gasoline, or anything cold on frostbite.
- Do **not** use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do **not** place the body part near a hot stove.

Systemic 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°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and, finally, 5) death.

Effects arising from cold exposure will be minimized by providing workers with insulated clothing when the equivalent chill temperature is less than 30°F as defined and presented in the ACGIH booklet in Table

5. Furthermore, field activities will generally be curtailed or halted if the equivalent chill temperature is below -20°F. The ultimate responsibility for delaying work at a site due to inclement weather rests with the SSO.

12.7 POISON IVY

If personnel come in contact with poison ivy, the individual should immediately wash the affected area with Ivy Cleaner provided in the first aid kit. If a rash develops, it should be treated at a medical facility as soon as possible.

12.8 ES AND TICKS

12.8.1 SNAKE BITE PREVENTION AND FIRST AID

On project sites, precautions against the possible presence of snakes should be taken when walking through overgrown vegetation and when moving debris (i.e. lumber, scrap metal, etc.). If someone is bitten by a snake, and the snake bite occurs in a location that is within a 1-hour drive of a medical facility, a conservative approach is safest. Keeping the victim quiet, lying or sitting, and reassuring him/her is all that is required. He/she should be transported safely (no speeding) to the nearest medical facility. For the reassurance of both the victim and the first aider, a snakebite is not nearly as dangerous as popular mythology would suggest. In North America, death from snakebite to healthy adults is very rare. Many bites, even from known poisonous snakes, do not result in a significant amount of venom being injected. Even when significant envenom occurs, symptoms develop slowly over many hours and can be controlled with appropriate treatment. Field treatments advised against include ice, cutting and suction around the wound, and tourniquets. Studies indicate that ice leads to increased tissue destruction. Cutting and sucking out the wound can be shown to offer some help if it is done with the correct technique and equipment and if the victim has received a large dose of venom. In light of the damage that can be done, the risk of such a procedure is too high. It is best to transport the person immediately to a medical facility.

12.8.2 Tick Bite Prevention and First Aid

Routinely check for ticks after being outdoors. Remove ticks as soon as possible before they embed. To minimize exposure, wear light-colored clothing so ticks can be detected. Tuck pants into boots or socks and wear long sleeved shirts. Apply tick/insect repellent to clothing.

When a tick is found embedded, remove it by grasping it with a tweezers as close to the skin as possible and gently pull it straight out. Do not twist or jerk the tick because the head may remain embedded. Once the tick is removed, wash the bite area and your hands with soap and water and apply an antiseptic to the bite. Save the tick in a jar labeled with the date and the place where the tick was acquired. A physician may find this information and the tick specimen helpful in diagnosis if an infection results.

12.9 ACCIDENT/INJURY REPORTING AND RECORDKEEPING

The SSO shall maintain logs and reports covering health and safety aspects of the project throughout the duration of work activities. In the event of an on-site accident resulting in an exposure or injury, the SSO shall immediately complete a Supervisor's Incident Report (SIR) and send a copy to the REHSP. The SSO shall be responsible for maintaining on-site, the routinely completed records and forms presented in Appendix C of this HASP.

13.0 HASP ACCEPTANCE

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

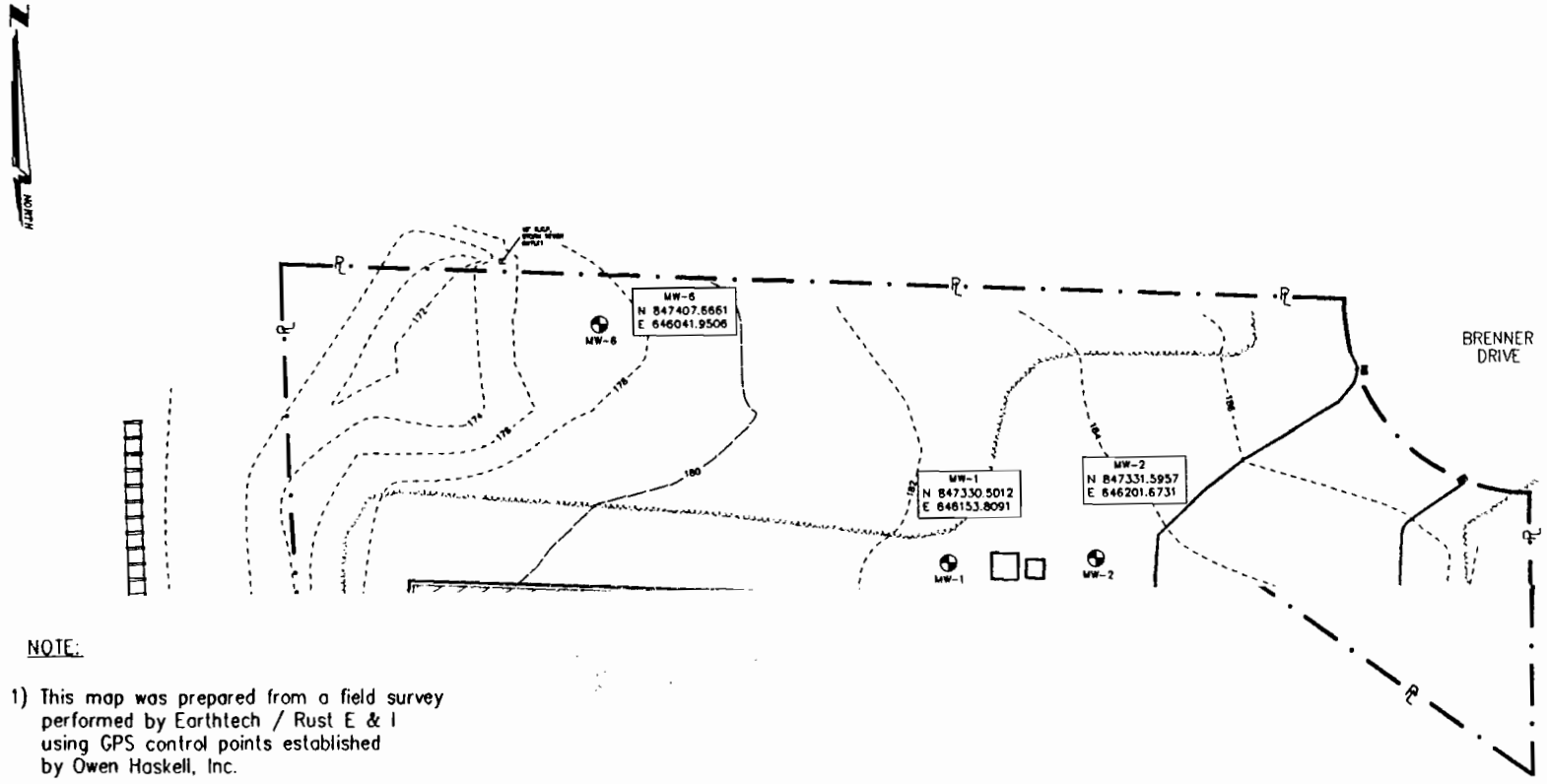
I have read and understand this Health and Safety Plan. I will comply with the provisions contained therein.

Site/Project: ***Wilsonart International, Inc. – Congers, New York***

Printed Name	Signature	Date

FIGURES

L:\WORK\32969\CADD\FIGURE 1.DWG PLOT DATE: MAY 2000



NOTE:

1) This map was prepared from a field survey performed by Earthtech / Rust E & I using GPS control points established by Owen Haskell, Inc.

2) The horizontal positions are reported in feet; NAD 1983 State Plane of New York East.

3) The elevations are reported in feet; NGVD 1929 vertical datum.

4) Existing ground surface contour interval: 2 feet.

5) Property boundary shown is approximate. Its use is intended for engineering purposes only.

0 30 60 120

SCALE IN FEET

LEGEND

MW-1 MONITORING WELL LOCATION

APPROXIMATE PROPERTY BOUNDARY

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

WILSONART INTERNATIONAL

CONGERS, NEW YORK

MAY, 2000 39693

FIGURE 1
SITE MAP

APPENDICES

APPENDIX A

Chemical Data Sheets

Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 312
Trichloroethylene

Issued: 7/79 Revision: F, 9/92

Section 1. Material Identification

Trichloroethylene (C_2HCl_3) Description: Derived by treating tetrachloroethane with lime or other alkali in the presence of water, or by thermal decomposition of tetrachloroethane followed by steam distillation. Stabilizers such as epichlorohydrin, isobutanol, carbon tetrachloride, chloroform, benzene, or pentanol-2-triethanolamine are then added. Used as a degreasing solvent in electronics and dry cleaning, a chemical intermediate, a refrigerant and heat-exchange liquid, and a diluent in paint and adhesives; in oil, fat, and wax extraction and in aerospace operations (flushing liquid oxygen). Formerly used as a fumigant (food) and anesthetic (replaced due to its hazardous decomposition in closed-circuit apparatus).

Other Designations: CAS No. 79-01-6; acetylene trichloride; Algylen; Anamenth; Benzinol; Cecolene; Chlorylen; Dow-Tri; ethylene trichloride; Germalgene; Narcogen; Triasol; trichloroethene; TCE; 1,1,3-trichloroethylene.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*(73) for a suppliers list.

R 1
I 2
S 2*
K 3
* Skin absorption

NFPA

HMIS
H 2†
F 2
R 0
PPE‡
† Chronic Effects
‡ Sec. 8

Cautions: TCE is irritating and toxic to the central nervous system (CNS). Inhalation of high concentrations have lead to death due to ventricular fibrillation. Chronic exposure may lead to heart, liver, and kidney damage. The liquid is absorbed through the skin. Although it has a relatively low flash point, TCE burns with difficulty.

Section 2. Ingredients and Occupational Exposure Limits

Trichloroethylene, < 100% [contains stabilizers (Sec. 1)].

1991 OSHA PELs
8-hr TWA: 50 ppm (270 mg/m^3)
15-min STEL: 200 ppm (1080 mg/m^3)

1990 IDLH Level
1000 ppm

1990 NIOSH REL
10-hr TWA: 25 ppm (~135 mg/m^3)

1992-93 ACGIH TLVs
TWA: 50 ppm (269 mg/m^3)
STEL: 200 ppm (1070 mg/m^3)

1990 DFG (Germany) MAK
Ceiling: 50 ppm (270 mg/m^3)
Category II: Substances with systemic effects
Half-life: 2 hr to shift length
Peak Exposure Limit: 250 ppm, 30 min average value; 2 peaks/shift

1985-86 Toxicity Data*
Human, inhalation, TC_{Lo}: 160 ppm/83 min caused hallucinations and distorted perceptions.
Human, lymphocyte: 5 mL/L caused DNA inhibition.
Rabbit, skin: 500 mg/24 hr caused severe irritation.
Rabbit, eye: 20 mg/24 hr caused moderate irritation.
Mouse, oral, TD_{Lo}: 455 mg/kg administered intermittently for 78 weeks produced liver tumors.

* See NIOSH, *RTECS* (KX4550000), for additional irritation, mutation, reproductive, tumorigenic and toxicity data.

Section 3. Physical Data

Boiling Point: 189 °F (87 °C)
Freezing Point: -121 °F (-85 °C)
Viscosity: 0.0055 Poise at 77 °F (25 °C)
Molecular Weight: 131.38
Density: 1.4649 at 20/4 °C
Refraction Index: 1.477 at 68 °F (20 °C/D)
Odor Threshold: 82 to 108 ppm (*not an effective warning*)

Vapor Pressure: 58 mm Hg at 68 °F (20 °C); 100 mm Hg at 32 °F (0 °C)
Saturated Vapor Density (Air = 0.075 lbs/ft^3; 1.2 kg/m^3): 0.0956 lbs/ft^3; 1.53 kg/m^3
Water Solubility: Very slightly soluble; 0.1% at 77 °F (25 °C)
Other Solubilities: Highly soluble in organic solvents (alcohol, acetone, ether, carbon tetrachloride, & chloroform) and lipids.
Surface Tension: 29.3 dyne/cm

Appearance and Odor: Clear, colorless (sometimes dyed blue), mobile liquid with a sweet chloroform odor.

Section 4. Fire and Explosion Data

Flash Point: 90 °F (32 °C) CC | **Autoignition Temperature:** 788 °F (420 °C) | **LEL:** 8% (25 °C); 12.5% (100 °C) | **UEL:** 10% (25 °C); 90% (100 °C)

Extinguishing Media: A Class 1C Flammable Liquid. Although it has a flash point of 90 °F, TCE burns with difficulty. For small fires, use dry chemical, carbon dioxide, water spray, or regular foam. For large fires, use water spray, fog, or regular foam. **Unusual Fire or Explosion Hazards:** Vapor/air mixtures may explode when ignited. Container may explode in heat of fire. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing provides only limited protection against TCE. Apply cooling water to sides of container until well after fire is out. Stay away from ends of tanks. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: TCE slowly decomposes in the presence of light and moisture to form corrosive hydrochloric acid. Hazardous polymerization cannot occur. **Chemical Incompatibilities:** Include alkalis (sodium hydroxide), chemically active metals (aluminum, beryllium, lithium, magnesium, sodium, potassium, and titanium), epoxides, and oxidants (nitrogen tetraoxide, perchloric acid). Contact with 1-chloro-2,3-epoxy propane or the mono and di 2,3-epoxypropyl ethers of 1,4-butanediol + 2,2-bis-4(2',3'-epoxypropoxy)-phenylpropane can, in the presence of catalytic quantities of halide ions, cause dehydrochlorination of TCE to explosive dichloroacetylene. **Conditions to Avoid:** Exposure to light, moisture, ignition sources, and incompatibles. **Hazardous Products of Decomposition:** Thermal oxidative decomposition of TCE (above 300 °C) or exposure to ultraviolet light can produce carbon dioxide (CO_2) and toxic dichloro acetylene (explosive), chlorine, hydrogen chloride, and phosgene gas.

Section 6. Health Hazard Data

Carcinogenicity: The following agencies have rated TCE's carcinogenicity: IARC (Class 3, limited animal evidence & insufficient human data), Germany MAK (Class B, justifiably suspected of having carcinogenic potential), & NIOSH (Class X, carcinogen defined with no further categorization). **Summary of Risks:** TCE vapor is irritating to the eyes, nose, and respiratory tract and inhalation of high concentrations can lead to severe CNS effects such as unconsciousness, ventricular arrythmias, and death due to cardiac arrest. Mild liver dysfunction was also seen at levels high enough to produce CNS effects. Contact with the liquid is irritating to the skin and can lead to dermatitis by defatting the skin. Chronic toxicity is observed in the victims increasing intolerance to alcohol characterized by 'degreasers flush', a transient redness of the face, trunk, and arms. The euphoric effect of TCE has led to craving, and habitual sniffing of its vapors.

Continue on next page

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1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 311
Methyl Chloroform

Issued: 11/75 Revision: F, 3/92 Errata: 6/92

Section 1. Material Identification

Methyl Chloroform ($C_2H_3Cl_3$) **Description:** Derived by catalytic addition of hydrogen chloride to 1,1-dichloroethylene or by re-fluxing chlorine monoxide with carbon tetrachloride and chloroethane. Available in technical and solvent grades which differ only in the amount of stabilizer added to prevent metal parts corrosion. Used as a solvent for oils, waxes, tars, cleaning precision instruments, and pesticides; as a component of inks and drain cleaners; in degreasing metals, and textile processing. In recent years, methyl chloroform has found widespread use as a substitute for carbon tetrachloride.

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* Sec. 8

Other Designations: CAS No. 71-55-6, α-trichloroethane; Inhibisol; 1,1,1-trichloroethane; Strobane.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.
Cautions: Methyl chloroform is a skin, eye, and respiratory tract irritant and can become narcotic with an anesthetic effect at high concentrations.
* Data on skin absorption via methyl chloroform is conflicting.[133] Some studies show definite absorption where others don't.

Section 2. Ingredients and Occupational Exposure Limits

Methyl chloroform, ca 92 to 97%*

1990 OSHA PELs
8-hr TWA: 350 ppm (1900 mg/m³)
15-min STEL: 450 ppm (2450 mg/m³)

1990 IDLH Level
1000 ppm

1990 NIOSH REL
15-min Ceiling: 350 ppm (1900 mg/m³)

1991-92 ACGIH TLVs
TWA: 350 ppm (1910 mg/m³)
STEL: 450 ppm (2460 mg/m³)

1990 DFG (Germany) MAKs
TWA: 200 ppm (1080 mg/m³)
Half-life: 2 hr to shift length
Peak Exposure Limit: 1000 ppm/30 min (average value)/2 per shift

1985-86 Toxicity Data†
Human, oral, TD_{Lo}: 670 mg/kg produced diarrhea, nausea, and vomiting
Human, inhalation, LC_{Lo}: 27 g/m³/10 min; toxic effects not yet reviewed
Man, eye: 450 ppm/8 hr produced irritation
Rat, inhalation, TC_{Lo}: 2100 ppm/24 hr for 14 days prior to mating and from 1 to 20 days of pregnancy produced specific developmental abnormalities of the musculoskelatal system

* Methyl chloroform usually contains inhibitors (3 to 8%) to prevent corrosion of aluminum and some other metals. Typical inhibitors are nitromethane, butylene oxide, secondary butyl alcohols, ketones, and glycol diesters.
† See NIOSH, *RTECS* (KJ2975000), for additional irritation, mutation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 165 °F (75 °C)
Freezing Point: -22 °F (-30 °C)
Vapor Pressure: 100 mm Hg at 68 °F (20 °C)
Vapor Density (air = 1): 4.55
Corrosivity: Readily corrodes aluminum and its alloys
Refraction Index: 1.43765 at 69.8 °F (21 °C)
Viscosity: 0.858 cP at 68 °F (20 °C)
Molecular Weight: 133.42
Density: 1.3376 at 68/39.8 °F (20/4 °C)
Water Solubility: Insoluble
Other Solubilities: Soluble in acetone, alcohol, ether, benzene, carbon tetrachloride, and carbon disulfide
% in Saturated Air: 16.7% at 77 °F (25 °C)
Relative Evaporation Rate (butyl acetate = 1): 12.8
Appearance and Odor: Colorless liquid with a sweetish, chloroform-like odor. The odor threshold is 44 ppm.

Section 4. Fire and Explosion Data

Flash Point: None (in conventional CC tests)	**Autoignition Temperature:** 932 °F (500 °C)	LEL: 7% v/v	UEL: 16% v/v

Extinguishing Media: *Noncombustible liquid* whose *vapor* burns in the presence of excess oxygen or a strong ignition source. For small fires, use dry chemical or carbon dioxide (CO_2). For large fires use fog or regular foam. If these materials are unavailable, a water spray may be used but be aware that water reacts slowly with methyl chloroform to release hydrochloric acid.
Unusual Fire or Explosion Hazards: Vapors are heavier than air and may travel to a strong ignition source and flash back. Air/vapor mixtures may explode when heated. Container may explode in heat of fire. Exposure to open flames or arc welding can produce hydrogen chloride and phosgene.
Special Fire-fighting Procedures: Methyl chloroform's burning rate is 2.9 mm/min. Since fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing provides limited protection. Wear clothing specifically recommended by the manufacturer for use in fires involving methyl chloroform. Apply cooling water to container sides until after fire is extinguished. Stay away from ends of tanks. Isolate area for 1/2 mile if fire involves tank, truck, or rail car. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Methyl chloroform is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization can occur in contact with aluminum trichloride.
Chemical Incompatibilities: Methyl chloroform is incompatible with sodium hydroxide, nitrogen tetroxide, oxygen (liquid or gas), strong oxidizers, and chemically active metals like aluminum, zinc, and magnesium powders; reacts violently with caustics to form dichloroacetylene; reacts slowly with water to form hydrochloric acid; forms shock sensitive mixtures with potassium; and polymerizes in contact with aluminum trichloride.
Conditions to Avoid: Exposure to moisture, strong ignition sources, and arc-welding units, and contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition (temperatures >500 °F, contact with hot metals, or under UV rays) of methyl chloroform can produce carbon dioxide (CO_2) and toxic dichloroacetylene, hydrogen chloride, and phosgene gases.

Section 6. Health Hazard Data

Carcinogenicity: The IARC (Class 3, inadequate evidence),[164] NTP,[142] and OSHA[164] do not list methyl chloroform as a carcinogen.
Summary of Risks: Methyl chloroform is considered one of the least toxic of the liquid chlorinated hydrocarbons. It is irritating to eyes, skin, and respiratory tract. Although low in systemic toxicity, methyl chloroform is an anesthetic capable of causing death at high concentrations (>15,000 ppm), generally in poorly ventilated, enclosed areas. Quick and complete recovery is observed after prompt removal of unconscious persons from area of exposure. Like many other solvents, methyl chloroform sensitizes the heart to epinephrine (blood pressure-raising hormone) and may induce cardiac arrhythmias and arrest.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Target Organs: Skin, eyes, central nervous (CNS) and cardiovascular (CVS) systems.

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(518) 377-8854

Section 1. Material Identification

1,1-Dichloroethane (CH_3CHCl_2) Description: Derived by various methods; by direct chlorination of ethane, as a side product of chloral manufacture, by treating ethylene and chlorine with calcium chloride, by action of phosphorus chloride on acetaldehyde, and the reaction of hydrogen chloride and vinyl chloride at 20 to 55 °C in the presence of an aluminum, ferric, or zinc chloride catalyst. Found as an air contaminant in submarines and space craft. Its largest industrial use is in the production of 1,1,1-trichloroethane. Also used as a cleansing agent, degreaser, solvent for plastics, oils, and fats, grain fumigant, chemical intermediate; in insecticide sprays, rubber cementing, fabric spreading, paint and varnish removers, in ore flotation, vinyl chloride production, and as a coupling agent in anti-knock gasoline. Formerly used as an anesthetic.

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* Sec. 8

Other Designations: CAS No. 75-34-3; assymetrical dichloroethane; chlorinated hydrochloric ether; ethylidene chloride; ethylidene dichloride.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: 1,1-Dichloroethane is volatile and highly flammable. It is irritating to the eyes and respiratory tract and inhalation of high concentrations causes an anesthetic effect.

Section 2. Ingredients and Occupational Exposure Limits

1,1-Dichloroethane, reagent grade (99.7%). Impurities consist of ethyl chloride (0.02%), trichloroethylene (0.08%), butylene oxide (0.08%), ethylene dichloride (0.01%), and unknown (0.14%).

1991 OSHA PEL
8-hr TWA: 100 ppm (400 mg/m^3)

1990 IDLH Level
4000 ppm

1990 NIOSH REL
8-hr TWA: 100 ppm (400 mg/m^3)

1991-92 ACGIH TLVs*
TWA: 200 ppm (810 mg/m^3)
STEL: 250 ppm (1010 mg/m^3)

1990 DFG (Germany) MAK
100 ppm (400 mg/m^3)
Half-life: < 2hr
Peak Exposure Limit: 200 ppm/30 min. average value/maximum of 4 peaks per shift

1985-86 Toxicity Data†
Mouse, oral, TD_{Lo}: 185 g/kg administered intermittently for 78 wk produced uterine tumors.
Rat, oral, LD_{50}: 725 mg/kg; toxic effects not yet reviewed.‡
Rat, inhalation, TC_{Lo}: 6000 ppm/7 hr administered during 6 to 15 days of pregnancy caused developmental abnormalities of the musculoskeletal system.

* Notice of intended change to 100 ppm/405 mg/m^3.
†See NIOSH, *RTECS* (KI0175000), for additional reproductive, tumorigenic and toxicity data.
‡ Considered a possible error since subsequent studies at higher concentrations failed to produce comparative results.[133]

Section 3. Physical Data

Boiling Point: 135 °F (57.3 °C)
Melting Point: -143 °F (-96.98 °C)
Vapor Pressure: 230 mm Hg at 77 °F (25 °C)
Saturated Vapor Density (air = 1.2 kg/m^3 or 0.075 lbs/ft^3): 2.076 kg/m^3 or 0.129 lbs/ft^3
Refraction Index: 1.4166 at 68 °F (20 °C)
Surface Tension: 24.75 dyne/cm at 68 °F (20 °C)

Molecular Weight: 98.97
Specific Gravity: 1.174 at 68 °F (20/4 °C)
Water Solubility: Slightly, 0.5%
Other Solubilities: Very soluble in alcohol and ether, soluble in acetone, benzene, and fixed and volatile oils.
Relative Evaporation Rate (BuAc=1): 11.6
Odor Threshold: 49 to 1359 ppm; odor is not sufficient to warn against overexposure

Appearance and Odor: Colorless, mobile, oily liquid with a chloroform odor and a saccharin taste.

Section 4. Fire and Explosion Data

Flash Point: 17 °F (-8.33 °C) CC* | **Autoignition Temperature:** 856 °F (493 °C) | **LEL:** 5.6% v/v | **UEL:** 11.4% v/v

Extinguishing Media: A Class 1B Flammable Liquid. For small fires, use dry chemical, carbon dioxide (CO_2), or "alcohol-resistant" foam. For large fires, use fog or "alcohol-resistant" foam. Water may be ineffective unless used as a "blanket".
Unusual Fire or Explosion Hazards: Vapors may travel to an ignition source and flash back. Container may explode in heat of fire.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing will provide only limited protection. If possible without risk, move container from fire area. Apply cooling water to sides of containers until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if this is impossible, withdraw from area and let fire burn. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire. Do not release runoff from fire control methods to sewers (explosion) or waterways.

* 22 °F (-5.5 °C), OC[148]

Section 5. Reactivity Data

Stability/Polymerization: 1,1-Dichloroethane is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Incompatible with strong oxidizers and forms acetaldehyde in contact with caustics. 1,1-Dichloroethane will attack some forms of plastics, rubber, and coatings.
Conditions to Avoid: Exposure to heat and ignition sources and contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition of 1,1-dichloroethane can produce carbon dioxide (CO_2), irritating hydrogen chloride (HCl) and toxic phosgene ($COCl_2$) fumes.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list 1,1-dichloroethane as a carcinogen. However, the National Cancer Institute has recommended caution due to analogy to other chloroethanes such as 1,2-dichlorothane which are shown to cause cancer in animals.
Summary of Risks: 1,1-Dichloroethane is irritating to the eyes and respiratory system. It causes varying degrees of central nervous system (CNS) disturbance depending on the concentration and duration of exposure. Liver and kidney toxicity is controversial.

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(518) 377-8854

Material Safety Data Sheets Collection

Sheet No. 708
Vinylidene Chloride

Issued: 4/90

Section 1. Material Identification

Vinylidene Chloride Description: Prepared from ethylene chloride. Also prepared from vinyl chloride by successive chlorination and dehydrochlorination steps. Used primarily as a co-monomer in producing vinylidene copolymers (Saran®, Velon®) for films and coatings. Also used in producing methyl chloroform, vinyl chloride resins, plastics, chloracetyl chloride; in adhesives; as a component of synthetic fibers; a chemical intermediate in vinylidene fluoride synthesis; and for 1,1,1-trichloroethane. A common constituent in our environment, measurable quantities of vinylidene chloride are found in poorly ventilated areas with a high concentration of plastics. It is a notable contaminant in recycled air environments such as nuclear submarines and spacecraft.
Other Designations: CAS No. 0075-35-4; $C_2H_2Cl_2$; 1,1-DCE; 1,1-dichloroethene; *asym*-dichloroethylene; VDC; vinylidene dichloride.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*[73] for a suppliers list.
Comment: At temperatures above 32 °F/0 °C and especially in the presence of oxygen or other suitable catalysts, vinylidene chloride polymerizes to a plastic. Therefore, commercial products may contain small proportions of inhibitors to preserve the monomer.

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S 2
K 4

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R 2
PPG*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Vinylidene chloride, ca 100%

OSHA PEL
8-hr TWA: 1 ppm, 4 mg/m³

ACGIH TLVs, 1989-90
TLV-TWA: 5 ppm, 20 mg/m³
TLV-STEL: 20 ppm, 79 mg/m³

NIOSH REL, 1987
None established

Toxicity Data*
Mouse, skin, TD_{Lo}: 4840 mg/kg has tumorigenic effects on skin, appendages, lungs, thorax, and respiration
Rat, inhalation, LC_{50}: 6350 ppm/4 hr
Human, inhalation, TC_{Lo}: 25 ppm produces changes in behavior (general anesthetic), the liver, kidney, ureter, and bladder

* See NIOSH, *RTECS* (YZ8061000), for additional mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 89.1 °F/31.7 °C at 760 mm Hg
Melting Point: -188.5 °F/-122.5 °C
Vapor Pressure: 591 mm Hg at 77 °F/25 °C
Vapor Density (Air = 1): 3.4
Molecular Weight: 96.94 g/mol
Specific Gravity (H_2O = 1 at 39 °F/4 °C): 1.2129 at 68 °F/20 °C
Water Solubility: Sparingly soluble (0.04 % wt/vol in water at 68 °F/20 °C)

Appearance and Odor: Colorless, volatile liquid with a mild, sweet odor that resembles chloroform. Most persons can detect vinylidene chloride at 1000 ppm, but others can detect it at less than 500 ppm. Neither odor is adequate to warn of excessive exposure.

Section 4. Fire and Explosion Data

Flash Point: -19 °F/-28 °C	Autoignition Temperature: 1058 °F/570 °C	LEL: 5.6% v/v	UEL: 11.4% v/v

Extinguishing Media: Use dry chemical, alcohol foam, or carbon dioxide. Use water to cool fire-exposed containers.
Unusual Fire or Explosion Hazards: Vinylidene chloride is a very flammable and volatile liquid with a burning rate of 2.7 mm/min. This material is a very dangerous fire hazard and moderately explosive when exposed to heat or flame. It may explode spontaneously since the vapor forms explosive mixtures with air. At elevated temperatures, polymerization may take place and containers may rupture.
Special Fire-fighting Procedures: Since vinylidene chloride may be poisonous if inhaled or absorbed through the skin, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode with a fully encapsulating suit. Keep unnecessary people away from the hazard area. Vapors may travel to an ignition source and flash back. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Vinylidene chloride is self-reactive. If stored between -40 °F/-40 °C and 77 °F/25 °C in air without an inhibitor, this material rapidly absorbs oxygen and forms a violently explosive peroxide. The heat of polymerization is -185 cal/g (inhibited). When unstable, vinylidene chloride decomposes into chlorine, hydrogen chloride, phosgene, and formaldehyde. Hazardous polymerization can occur if exposed to sunlight, air, copper, aluminum, or heat.
Chemical Incompatibilities: This material reacts violently with chlorosulfonic acid, nitric acid, and oleum; and vigorously with oxidizing materials.
Hazardous Products of Decomposition: Thermal oxidative decomposition of vinylidene chloride can produce highly toxic fumes of chlorine (Cl_2) and hydrogen chloride (HCl).

Genium Publishing Corp.
One Genium Plaza
Schenectady, NY 12304-4690
(518) 377-8854

2,4,5-Trimethylaniline MSDS No. 1005

Date of Preparation: 4/96

Section 1 - Chemical Product and Company Identification 48

Product/Chemical Name: 2,4,5-Trimethylaniline
Chemical Formula: $C_9H_{13}N$; $C_6H_2(CH_3)_3NH_2$
CAS Number: 137-17-7
Synonyms: 1,2,4-trimethyl-5-aminobenzene; benzenamine, 2,4,5-trimethyl; pseudocumidine; psi-cumidine
Derivation: Produced by nitration of pseudocumene, followed by reduction.
General Use: Used in the manufacture of dyes and in organic synthesis.
Vendors: Consult the latest *Chemical Week Buyers' Guide.* (73)

Section 2 - Composition / Information on Ingredients

2,4,5-Trimethylaniline, ca 100 %wt

OSHA PEL	ACGIH TLV	NIOSH REL	DFG (Germany) MAK
None established	None established	None established	None established

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

2,4,5-Trimethylaniline exists as white crystals. There is very little health hazard data on this compound specifically. By analogy to aniline, central nervous system, cardiac, and kidney effects may occur. 2,4,5-Trimethylaniline has produced lung and liver cancer in laboratory animals but has not been known to cause cancer in humans.

Wilson Risk Scale	
R	1
I	0
S	0
K	0

HMIS	
H	2
F	0
R	0

PPE*
*Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, ingestion.
Target Organs: Central nervous system, cardiovascular system, liver, kidneys.
Acute Effects
Inhalation: Effects may include headache, dry throat, confusion, dizziness, ringing in the ears, weakness, disorientation, fatigue, drowsiness, possible convulsions, cardiac arrythmias, painful urination, blood in the urine, and possible kidney insufficiency.
Eye: No effects reported.
Skin: No effects reported.
Ingestion: Effects would be similar to those via inhalation.
Carcinogenicity: IARC lists 2,4,5-trimethylaniline as Group 3 (not classifiable as to carcinogenicity in humans) and the DFG lists it as MAK-A2 (unmistakably carcinogenic in animal experimentation only). The NTP and OSHA do not list 2,4,5-trimethylaniline as a carcinogen. Liver and lung tumors have occurred in laboratory animals.
Medical Conditions Aggravated by Long-Term Exposure: Central nervous system, cardiac, and kidney disorders.
Chronic Effects: Cancer shown in laboratory animals; it is not known if the same may occur in humans.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.
Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain or irritation persist.
Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water followed quickly by a thorough soap and water wash. For reddened or blistered skin, consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treatment is symptomatic and supportive.

Conditions to Avoid: Exposure to excessive heat.
Hazardous Decomposition Products: Thermal oxidative decomposition of 2,4,5-trimethylaniline can produce carbon and nitrogen oxide(s).

Section 11 - Toxicological Information

Toxicity Data:*

Tumorigenicity:
Rat, oral: 7000 mg/kg/101 weeks continuously caused lung and liver tumors.
Mouse, oral: 17,000 mg/kg/2 years, continuously caused liver tumors.

Mutagenicity:
S. typhimurium: 10 µg/plate (-S9) caused mutation.
Rat, fibroblast: 148 mg/L caused mutation.

* See NIOSH, *RTECS* (BZ0520000), for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: Data not found.
Environmental Fate: Data not found.

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101): Not listed

Section 15 - Regulatory Information

EPA Regulations:
RCRA Hazardous Waste (40 CFR 261.33): Not listed
CERCLA Hazardous Substance (40 CFR 302.4): Not listed
SARA Toxic Chemical (40 CFR 372.65): Not listed
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed
OSHA Regulations:
Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not listed

Section 16 - Other Information

References: 73, 103, 124, 136, 197, 202, 209

Prepared By.....M Gannon, BA
Industrial Hygiene Review.....DJ Wilson, CIH
Medical Review.....R Teichman, MD

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Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 316
Benzene

Issued: 11/78 Revision: E, 8/90

Section 1. Material Identification 32

Benzene (C_6H_6) Description: Derived by fractional distillation of coal tar, hydrodealkylation of toluene or pyrolysis of gasoline, catalytic reforming of petroleum, and transalkylation of toluene by disproportionation reaction. Used as a fuel; a chemical reagent; a solvent for a large number of materials such as paints, plastics, rubber, inks, oils, and fats; in manufacturing phenol, ethylbenzene (for styrene monomer), nitrobenzene (for aniline), dodecylbenzene (for detergents), cyclohexane (for nylon), chlorobenzene, diphenyl, benzene hexachloride, maleic anhydride, benzene-sulfonic acid, artificial leather, linoleum, oil cloth, varnishes, and lacquers; for printing and lithography; in dry cleaning; in adhesives and coatings; for extraction and rectification; as a degreasing agent; in the tire industry; and in shoe factories. Benzene has been banned as an ingredient in products intended for household use and is no longer used in pesticides.
Other Designations: CAS No. 0071-43-2, benzol, carbon oil, coal naphtha, cyclohexatriene, mineral naphtha, nitration benzene, phene, phenyl hydride, pyrobenzol.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(73) for a suppliers list.

R 1
I 4
S 2*
K 4
*Skin absorption

NFPA

HMIS
H 3
F 3
R 0
PPG†
† Sec. 8

Cautions: Benzene is a confirmed *human carcinogen* by the IARC. *Chronic low-level exposure may cause cancer (leukemia) and bone marrow damage, with injury to blood-forming tissue.* It is also a dangerous fire hazard when exposed to heat or flame.

Section 2. Ingredients and Occupational Exposure Limits

Benzene, ca 100%*

1989 OSHA PELs
(29 CFR 1910.1000, Table Z-1-A)
8-hr TWA: 1 ppm, 3 mg/m³
15-min STEL: 5 ppm, 15 mg/m³

(29 CFR 1910.1000, Table Z-2)
8-hr TWA: 10 ppm
Acceptable Ceiling Concentration: 25 ppm
Acceptable Maximum Peak: 50 ppm (10 min)†

1989-90 ACGIH
TLV-TWA: 10 ppm, 32 mg/m³

1988 NIOSH RELs
TWA: 0.1 ppm, 0.3 mg/m³
Ceiling: 1 ppm, 3 mg/m³

1985-86 Toxicity Data‡
Man, oral, LD_{Lo}: 50 mg/kg; no toxic effect noted
Man, inhalation, TC_{Lo}: 150 ppm inhaled intermittently over 1 yr in a number of discrete, separate doses affects the blood (other changes) and nutritional and gross metabolism (body temperature increase)
Rabbit, eye: 2 mg administered over 24 hr produces severe irritation

* OSHA 29 CFR 1910.1000, Subpart Z, states that the final benzene standard in 29 CFR 1910.1028 applies to all occupational exposures to benzene except in some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.
† Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift.
‡ See NIOSH, *RTECS* (CY1400000), for additional irritative, mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 176 °F (80 °C)
Melting Point: 42 °F (5.5 °C)
Vapor Pressure: 100 mm Hg at 79 °F (26.1 °C)
Vapor Density (Air = 1): 2.7
Evaporation Rate (Ether = 1): 2.8
Molecular Weight: 78.11
Specific Gravity (15 °C/4 °C): 0.8787
Water Solubility: Slightly (0.180 g/100 g of H_2O at 25 °C)
% Volatile by Volume: 100
Viscosity: 0.6468 mPa at 20 °C

Appearance and Odor: A colorless liquid with a characteristic sweet, aromatic odor. The odor recognition threshold (100% of panel) is approximately 5 ppm (unfatigued) in air. Odor *is not* an adequate warning of hazard.

Section 4. Fire and Explosion Data

Flash Point: 12 °F (-11.1 °C), CC	Autoignition Temperature: 928 °F (498 °C)	LEL: 1.3% v/v	UEL: 7.1% v/v

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish benzene fires. Water may be ineffective as an extinguishing agent since it can scatter and spread the fire. Use water spray to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.
Unusual Fire or Explosion Hazards: Benzene is a Class 1B flammable liquid. A concentration exceeding 3250 ppm is considered a potential fire explosion hazard. Benzene vapor is heavier than air and can collect in low lying areas or travel to an ignition source and flash back. Explosive and flammable benzene vapor-air mixtures can easily form at room temperature. Eliminate all ignition sources where benzene is used, handled, or stored.
Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective equipment. Structural firefighter's protective clothing provides limited protection. Stay out of low areas. Be aware of runoff from fire control methods. Do not release to sewers or waterways. Runoff to sewer can create pollution, fire, and explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Benzene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Benzene explodes on contact with diborane, permanganic acid, bromine pentafluoride, peroxodisulfuric acid, and peroxomonosulfuric acid. It ignites on contact with dioxygen difluoride, dioxygenyl tetrafluoroborate, iodine heptafluoride, and sodium peroxide + water. Benzene forms sensitive, explosive mixture with iodine pentafluoride, ozone, liquid oxygen, silver perchlorate, nitryl perchlorate, nitric acid, and arsenic pentafluoride + potassium methoxide (explodes above 30 °C). A vigorous or incandescent reaction occurs with bromine trifluoride, uranium hexafluoride, and hydrogen + Raney nickel [above 410 °F (210 °C)]. Benzene is incompatible with oxidizing materials.
Conditions to Avoid: Avoid heat and ignition sources.
Hazardous Products of Decomposition: Thermal oxidative decomposition of benzene can produce toxic gases and vapors such as carbon monoxide.

Genium Publishing Corp.
One Genium Plaza
Schenectady, NY 12304-4690
(518) 377-8854

Material Safety Data Sheet Collection

Cumene

MSDS No. 395

Date of Preparation: 9/78 Revision: B, 4/96

Section 1 - Chemical Product and Company Identification 48

Product/Chemical Name: Cumene
Chemical Formula: $C_6H_5CH(CH_3)_2$; C_9H_{12}
CAS Number: 98-82-8
Synonyms: benzene, isopropyl; benzene, (1-methylethyl); cumol; isopropylbenzene; isopropylbenzol; (1-methylethyl) benzene; 2-phenylpropane; propane, 2-phenyl
Derivation: Produced by alkylation of benzene with propylene using phosphoric acid as a catalyst or via distillation from coal tar naptha fractions or petroleum.
General Use: Used as a solvent, catalyst for acrylic and polyester-type resins, raw material for peroxides and oxidation catalysts, thinner for paints and lacquers, component of high octane aviation fuel; in production of acetone, phenol, and α-methyl styrene.
Vendors: Consult the latest *Chemical Week Buyers' Guide.* (73)

Section 2 - Composition / Information on Ingredients

Cumene, ca 100% vol
Trace Impurities: sulfur (2 ppm max); olefinic materials (200 to 700 ppm)

OSHA PEL
8-hr TWA: 50 ppm (245 mg/m^3), *skin*

NIOSH REL
10-hr TWA: 50 ppm (245 mg/m^3), *skin*

DFG (Germany) MAK
TWA: 50 ppm (245 mg/m^3), *skin*

ACGIH TLV
TWA: 50 ppm (246 mg/m^3), *skin*

IDLH Level
900 ppm

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Cumene exists as a colorless liquid with a sharp, penetrating odor. It causes eye, skin, and respiratory tract irritation. Dizziness, headache, and incoordination may occur. Chronic exposure can cause liver damage. It is highly flammable and may form explosive mixtures with air. Handle cautiously.

Wilson Risk Scale	
R	1
I	3
S	2*
K	3

*Skin absorption

HMIS	
H	2*
F	3
R	1

*Chronic effects
PPE†
†Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, eye and skin contact/absorption.
Target Organs: Eyes, skin, respiratory system, central nervous system (CNS), liver.
Acute Effects
Inhalation: Respiratory tract irritation. High concentrations can cause dizziness, incoordination, headache, and possible unconsciousness.
Eye: Can cause conjunctival irritation.
Skin: Can cause redness and irritation. Cumene can be absorbed through the skin to cause systemic effects.
Ingestion: May cause gastrointestinal tract irritation. CNS effects as via inhalation can occur.
Carcinogenicity: IARC, NTP, and OSHA do not list cumene as a carcinogen.
Medical Conditions Aggravated by Long-Term Exposure: Liver disorders.
Chronic Effects: In one study, 48% of 102 workers exposed to cumene vapors over 7 to 10 yrs had increased bilirubin and alterations of enzymatic activity, lipid metabolism, and liver function as well as impairment of voluntary movements resulting in fragmented or jerky motions. Repeated skin contact can cause dermatitis.
Other: If cumene is allowed to oxidize to the hydroperoxide, exposure can cause red blood cell hemolysis. Otherwise, cumene (isopropylbenzene) does not cause blood and bone marrow damage as does benzene. Most cumene is metabolized in the liver and excreted in urine as 2-phenylpropan-1-ol, 2-phenylpropan-2-ol, phenylpropionic acid, and methylbenzyl carbinol.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.
Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain or irritation persist.
Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water followed by a thorough soap and water wash. For reddened or blistered skin, consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water to dilute. *Do not* induce vomiting due to risk of aspiration into lungs.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.
Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove cumene from your shoes and clean personal protective equipment.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using cumene, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance and Odor: Colorless; sharp, gasoline odor.
Odor Threshold: 0.008 to 0.132 ppm
Vapor Pressure: 3.2 mm Hg at 68 °F (20 °C); 10 mm Hg at 100.94 °F (38.3 °C)
Formula Weight: 120.19
Specific Gravity (H_2O=1, at 4 °C): 0.862 at 68 °F (20 °C)
Water Solubility: Insoluble
Octanol/Water Partition Coefficient: Log kow = 3.66
Henry's Law Constant: 0.0116 atm -m^3/mole
Bulk Density: 7.19 lb/gal at 77 °F (25 °C)
Other Solubilities: Soluble in alcohol, acetone, benzene, carbon tetrachloride, and ether.
Boiling Point: 306 °F (152 °C)
Freezing Point: -140.8 °F (-96 °C)
Ionization Potential: 8.75 eV
Viscosity: < 32.6 SUS
Refractive Index: 1.4915 at 68 °F (20 °C)
Surface Tension: 28.2 dyne/cm at 68 °F (20 °C)
Critical Temperature: 684.9 °F (362.7 °C)
Critical Pressure: 31.2 atm

Section 10 - Stability and Reactivity

Stability: Cumene may accumulate static electricity. It forms peroxides upon exposure to air.
Polymerization: Hazardous polymerization does not occur.
Chemical Incompatibilities: Oxidizing agents; violent reaction with nitric acid, fuming sulfuric acid, and chlorosulfonic acid.
Conditions to Avoid: Exposure to heat, ignition sources, and incompatibles.
Hazardous Decomposition Products: Thermal oxidative decomposition of cumene can produce carbon oxide(s).

Section 11 - Toxicological Information

Toxicity Data:*

Acute Oral Effects:
Rat, oral, LD_{50}: 1400 mg/kg caused gastritis.
Eye Effects:
Rabbit, eye: 500 mg/24 hr caused mild irritation.
Skin Effects:
Rabbit, skin: 100 mg/24 hr caused moderate irritation.
Acute Inhalation Effects:
Human, inhalation, TC_{Lo}: 200 ppm caused somnolence, irritability, and an antipsychotic effect.
Rat, inhalation, LC_{Lo}: 8000 ppm/4 hr
Mouse, inhalation, LC_{50}: 10 g/m^3/7 hr caused multiple liver effects, changes in kidney tubules and glomeruli, and changes in the spleen.

* See NIOSH, *RTECS* (GR8575000), for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: *Daphnia magna*, LC_{50} = 0.6 ppm/48 hr; fathead minnow (*Pimephales promelas*), LC_{50} = 6.32 mg/L/96 hr; red-winged blackbird (*Agelaius phoeniceous*), oral, LD_{50} = 96 mg/kg
Environmental Fate: If released to soil, cumene may volatilize or biodegrade via *Pseudomonas aeruginosa*. However, adsorption to soil is strong and cumene is not expected to leach to groundwater. In water, biodegradation is rapid. Volatilization is also significant with a half-life of 5 to 14 days depending upon turbulence, windspeed, current velocity, depth, diffusion, and temperature. Bioconcentration is not expected to be significant (BCF = 35.5). In air, cumene reacts with photochemically-produced hydroxyl radicals having a half-life of 25 hr (polluted air) or 49 hr (average air). The half-life by reaction with ozone is 3 years.

Section 13 - Disposal Considerations

Disposal: Cumene is a good candidate for liquid injection, rotary kiln, and fluidized-bed incineration. It can be removed from waste gases via absorption in an aqueous solution of sodium sulfite. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 309
Fluorotrichloromethane

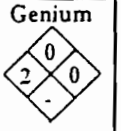
Issued: 11/77 Revision: D, 9/92

Section 1. Material Identification

Fluorotrichloromethane (CCl_3F) Description: Derived from hydrogen fluoride and carbon tetrachloride in the presence of fluorinating agents such as antimony *tri-* and *penta-*fluoride. Used as a solvent, a degreasing agent, a chemical intermediate, a blowing agent; in fire extinguishers, electric insulation, and the production of polymeric resins. Formerly used in aerosol propellants (banned in the US in 1978).

R 1
I 1
S 2
K 0

Genium



HMIS
H 2
F 0
R 0
PPE*
* Sec. 8

Other Designations: CAS No. 75-69-4, Algofrene Type 1, Arcton 11, Electro-CF 11, Eskimon 11, FC-11, fluorocarbon No. 11, Freon 11, Freon MF, Frigen 11, Genetron 11, Halocarbon 11, Isceon 131, Isotron 11, Ledon 11, monofluorotrichloromethane, NCI-C04637, trichloromonofluoromethane, Ucon refrigerant 11.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: FC-11 may be narcotic in high concentrations. Contact with tissue may cause frostbite. *Do not* release FC-11 to the environment because FC-11 depletes the ozone.

Section 2. Ingredients and Occupational Exposure Limits

Fluorotrichloromethane, ca 100%

1991 OSHA PEL
Ceiling: 1000 ppm (5600 mg/m^3)

1990 IDLH Level
10,000 ppm

1990 NIOSH REL
Ceiling: 1000 ppm (5600 mg/m^3)

1992-93 ACGIH TLV
Ceiling: 1000 ppm (5620 mg/m^3)

1990 DFG (Germany) MAK
Ceiling: 1000 ppm (5600 mg/m^3)
Category IV: Substances eliciting very weak effects
Peak Exposure Limit: 2000, 60 min, momentary value (level which the concentration should never exceed), 4 peaks/shift

1985-86 Toxicity Data*
Human, inhalation, TD_{Lo}: 50000 ppm/30 min caused conjunctiva irritation, fibrosing alveolitis, and other changes of the liver.
Rat, inhalation, LC_{Lo}: 10 pph/20 min caused general anesthesia.

* See NIOSH, *RTECS* (PB6125000), for additional toxicity data.

Section 3. Physical Data

Boiling Point: 74.7 °F (23.7 °C)
Freezing Point: -168 °F (-111 °C)
Vapor Pressure: 796 mm Hg at 77 °F (25 °C)
Vapor Density (Air = 1): 5.04 at 77 °F (25 °C)
Relative Evaporation Rate (BuAc = 1): 63
Refractive Index: 1.3865 at 18.5 °C/D
Viscosity: 0.439 cP at 70 °F (21 °C)
Octanol/Water Partition Coefficient: Log K_{ow}=2.53

Molecular Weight: 137.38
Specific Gravity: 1.494 at 63.0 °F (17.2 °C)
Water Solubility: 1 g/L at 25 °C
Other Solubilities: Alcohol, ether, and other organic solvents
Critical Temperature: 388 °F (198 °C)
Critical Pressure: 43.2 atm (635 lbs/sq in, absolute)

Appearance and Odor: Clear, colorless gas with a faint ethereal odor; liquid at temperatures below 74.7 °F (23.7 °C).

Section 4. Fire and Explosion Data

Flash Point: Nonflammable	**Autoignition Temperature:** None reported	**LEL:** None reported	**UEL:** None reported

Extinguishing Media: For small fires, use dry chemical or carbon dioxide (CO_2). For large fires, use water spray, fog, or foam.
Unusual Fire or Explosion Hazards: Fire may produce highly toxic decomposition products (Sec. 5). Containers may explode in the heat of fire. FC-11 is 4 to 5 times heavier than air and may accumulate in low lying areas creating a potential health hazard.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. If feasible and without risk, move containers from fire area. Otherwise, cool fire-exposed containers until well after the fire is out. Stay away from the ends of tanks. In case of tank discoloration due to fire or rising sound from venting safety device, *withdraw immediately*. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: FC-11 is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: FC-11 reacts violently with aluminum, barium, or lithium. It attacks some forms of plastic, rubber, and coatings. Other incompatibilities include sodium, potassium, calcium, zinc, and magnesium.
Conditions to Avoid: Contact with incompatibles and heat and ignition sources
Hazardous Products of Decomposition: Thermal oxidative decomposition of FC-11 can produce toxic fluoride, chloride, hydrogen chloride, hydrogen fluoride, carbonyl fluoride, phosgene, and CO_2 fumes.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list fluorotrichloromethane as a carcinogen.
Summary of Risks: At extremely high concentrations, fluorotrichloromethane causes narcosis (unconsciousness) and death from respiratory depression or cardiac sensitization. Sudden death has been reported following intentional sniffing of aerosols containing FC-11. Dizziness is an early warning that a dangerous concentration is being reached. At low concentrations, FC-11 may cause eye, nose, and throat irritation. The decomposition products (Sec. 5) of FC-11 are highly toxic. A 10 to 90% mixture of FC-11 and FC-12 caused more severe respiratory problems in humans than FC-11 or FC-12 singly. Contact with tissues may cause frostbite.
Medical Conditions Aggravated by Long-Term Exposure: Cardiovascular disease.
Target Organs: Cardiovascular, pulmonary and central nervous systems, skin.

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Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:
Sheet No. 313
Perchloroethylene
Issued: 11/78 Revision: E, 9/92

Section 1. Material Identification

Perchloroethylene (C_2Cl_4) Description: By chlorination of hydrocarbons and pyrolysis of the carbon tetrachloride that is formed, or by catalytic oxidation of 1,1,2,2-tetrachloroethane. Used in dry cleaning and textile processing, metal degreasing, insulating fluid and cooling gas in electrical transformers, production of adhesives, aerosols, paints, and coatings; as a chemical intermediate, a solvent for various applications, extractant for pharmaceuticals, a pesticide intermediate, and an antihelminthic (parasitic worm removal) agent in veterinary medicine.
Other Designations: CAS No. 127-18-4, Ankilostin, carbon dichloride, Didakene, ethylene tetrachloride, Perchlor, Perclene, Perk, Tetracap, tetrachloroethylene.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

R 1
I 3
S 2*
K 0
* Skin absorption

NFPA
0 / 2 0 / -

HMIS
H 2†
F 0
R 0
PPE‡
† Chronic effects
‡ Sec. 8

Cautions: Perchloroethylene is a central nervous system depressant, causes liver and kidney damage (from acute or chronic exposures), and is considered an IARC Class 2B carcinogen (animal sufficient evidence, human inadequate data).

Section 2. Ingredients and Occupational Exposure Limits

Perchloroethylene, < 99%. Impurities include a small amount of amine or phenolic stabilizers.

1991 OSHA PEL
8-hr TWA: 25 ppm (170 mg/m³)

1990 IDLH Level
500 ppm

1990 NIOSH REL
NIOSH-X Carcinogen
Limit of Quantitation: 0.4 ppm

1992-93 ACGIH TLVs
TWA: 50 ppm (339 mg/m³)
STEL: 200 ppm (1357 mg/m³)

1990 DFG (Germany) MAK
TWA: 50 ppm (345 mg/m³)
Category II: substances with systemic effects
Half-life: < 2 hr
Peak Exposure Limit: 100 ppm, 30 min average value, 4/shift

1985-86 Toxicity Data*
Man, inhalation, TC_{Lo}: 280 ppm/2 hr caused conjunctival irritation and anesthesia.
Human, lung: 100 mg/L caused unscheduled DNA synthesis.
Rat, oral, LD_{50}: 3005 mg/kg; caused somnolence, tremor, and ataxia.
Rat, inhalation, TC_{Lo}: 200 ppm/6 hr given intermittently over 2 years produced leukemia and testicular tumors.
Rabbit, eye: 162 mg caused mild irritation.
Rabbit, skin: 810 mg/24 hr caused severe irritation.

* See NIOSH, *RTECS* (KX3850000), for additional irritation, mutation, reproductive, tumorigenic, & toxicity data.

Section 3. Physical Data

Boiling Point: 250 °F (121.2 °C)
Freezing Point: -8 °F (-23.35 °C)
Vapor Pressure: 13 mm Hg at 68 °F (20 °C)
Surface Tension: 31.74 dyne/cm at 68 °F (20 °C)
Viscosity: 0.84 cP at 77 °F (25 °C)
Refraction Index: 1.50534 at 68 °F (20 °C)
Molecular Weight: 165.82

Density: 1.6311 at 59 °F (15/4 °C)
Water Solubility: 0.02% at 77 °F (25 °C)
Other Solubilities: Miscible with alcohol, ether, benzene, chloroform, and oils.
Odor Threshold: 47 to 71 ppm (poor warning properties since olfactory fatigue is probable)
Evaporation Rate: 0.15 gal/ft²/day at 77 °F (25 °C)
Saturated Vapor Density (Air = 0.075 lb/ft³ or 1.2 kg/m³): 0.081 lb/ft³ or 1.296 kg/m³

Appearance and Odor: Colorless liquid with an ether-like odor.

Section 4. Fire and Explosion Data

Flash Point: Nonflammable	**Autoignition Temperature:** Nonflammable	**LEL:** None reported	**UEL:** None reported

Extinguishing Media: For small fires, use dry chemical, carbon dioxide (CO_2). For large fires, use water spray, fog, or regular foam.
Unusual Fire or Explosion Hazards: Vapors are heavier than air and collect in low-lying areas.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Apply cooling water to sides of container until well after fire is out. Stay away from ends of tanks. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Perchloroethylene is stable up to 932 °F (500 °C) in the absence of catalysts, moisture, and oxygen but deteriorates rapidly in warm, moist climates. It is slowly decomposed by light. Amine or phenolic stabilizers are usually added. Hazardous polymerization cannot occur. **Chemical Incompatibilities:** Slowly (faster in presence of water) corrodes aluminum, iron, and zinc. It is incompatible with chemically active metals (i.e., barium, beryllium, and lithium (explodes with lithium shavings), strong oxidizers, sodium hydroxide, caustic soda, potash, and nitric acid. Perchloroethylene forms an explosive mixture with dinitrogen tetraoxide and reacts with activated charcoal at 392 °F (200 °C) to yield hexachloroethane and hexachlorobenzene. **Conditions to Avoid:** Contact with moisture and incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition of perchloroethylene can produce carbon dioxide and toxic chlorine, hydrogen chloride, and phosgene gas (also produced by contact with UV light).

Section 6. Health Hazard Data

Carcinogenicity: Perchloroethylene is listed as a carcinogen by The IARC (Group 2B, animal sufficient evidence, human inadequate data),[164] NTP (Class 2, reasonably anticipated as a carcinogen, with limited human evidence and sufficient animal evidence),[159] NIOSH (Class-X, carcinogen defined with no further explanation),[164] and DFG (MAK-B, justifiably suspected of having carcinogenic potential)[164]. There is some controversy regarding human carcinogenicity because even though there is an increased number of cancers of the skin, colon, lung, urogenital tract, and lympho-sarcomas; the dry cleaning workers studied were also exposed to other chemicals. **Summary of Risks:** Perchloroethylene is stored in the fatty tissue and slowly metabolized with the loss of chlorine. The half-life of its urinary metabolite (trichloroacetic acid) is 144 hours. Perchloroethylene exerts the majority of its toxicity on the central nervous system causing symptoms ranging from light-headedness and slight 'inebriation' to unconsciousness. Liver damage is possible after severe acute or minor long-term exposure. It has a synergistic effect with toluene.

Continue on next page

APPENDIX B

Respirator Protection Program for Wilsonart Congers, New York Investigation

APPENDIX B

RESPIRATOR PROGRAM FOR WILSONART –CONGERS, NEW YORK INVESTIGATION

The following respirator program is in accordance with OSHA 29 CFR 1910.134 Respiratory Protection Program requirements. This program governs the selection and use of respirators on-site.

Respirators for Earth Tech employees will be provided by Earth Tech. The respirator protection program will be administered by, and is the responsibility of, the REHSP and/or SSO for the site. Subcontractors (i.e., drillers) will furnish their own respirators and medical surveillance for their employees. The REHSP and/or SSO will be responsible for ensuring that they are in compliance with this respirator program.

The respirators will be selected according to the hazard and level of protection determined by monitoring action levels and the decision of the REHSP and/or the SSO. The respirators and levels are:

Level Respirator

B Positive Pressure-Pressure Demand SCBA or Supplied Air Respirator with 5-minute escape bottle. Level B is 5 to 250 ppm above background in (BZ).

C Full-face air purifying respirator with combination dust (HEPA) and organic vapor/acid gas cartridge. Level C is 1 ppm to 5 ppm above background in BZ based on identification of contaminant present. The full facepiece respirator with combination dust and organic vapor/acid gas cartridge will be appropriate for the dust conditions and organics that may be encountered.

D No respirator required. Continuous reading of background (0.2 ppm) to 1 ppm in the worker's BZ.

The respirator users will be fit tested with the size, style, and make of the respirator they will be using on-site. The fit test will be recorded and these Fit Test Records will be maintained in the Command Post.

Employee respirator training is provided on an annual basis and at site-specific training sessions. This training includes:

- A discussion of the nature of the respiratory hazards and the dangers if the respirator is not used properly.
- The reasons that respirators are required for protection, along with any engineering controls that may be used.
- Instruction in the selection, use, sanitary care, maintenance, proper storage, and limitation of the full facepiece respirator with combination cartridge, and the SCBA.
- Practice in proper fitting, wearing, adjusting, and checking face seal of the respirator.
- An opportunity to handle the respirator.
- Instruction on how to recognize and cope with emergency situations requiring respiratory protection.
- Explanation of the requirements for a self-contained breathing device for work in unknown concentrations and Immediately Dangerous to Life or Health (IDLH) atmosphere and for fire fighting.
- Explanation of the medical surveillance program and how it relates to respirator use.

- Explanation of the requirements for maintaining a tight seal, why beard and facial hair is prohibited, and why use of contact lenses while wearing respirators is prohibited.

Respirators will be assigned to individual workers. Each individual shall be responsible for cleaning and maintaining their assigned respirator. They will be cleaned and disinfected before being reassigned. Respirators will be cleaned after each day of work according to manufacturer's instruction. The cleaning will be done at the Command Post. Used cartridges will be disposed of and replaced with new ones.

After cleaning, the respirators will be inspected and checked for defects such as excessive dirt, cracks or other distortions, scratches, incorrectly mounted lens, broken or worn cartridge holders on the facepiece, breaks, loss of elasticity, broken buckles, and excessively worn serrations on head harness that may cause slippage on the head straps or head harness.

Further checks include:

a) A check of the tightness of the connections.
b) A check of the facepiece, valves, connecting tube, and canisters.
c) A check of the regulator and warning devices on SCBA for proper functioning.
d) For air purifying:

(1) Check the exhalation valve after removing its cover for:
- Foreign material, such as detergent residue, dust particles, or human hair under the valve seat
- Cracks, tears, or distortion in the valve material
- Improper insertion of the valve body in the facepiece
- Cracks, breaks, or chips in the valve body, particularly in the sealing surface
- Missing or defective valve cover
- Improper installation of the valve in the valve body.

(2) Check the air purifying elements for:
- Incorrect cartridges, canister, or filter for the hazard
- Incorrect installation, loose connections, missing or worn gaskets, or cross threading in holder
- Expired shelf life of cartridge or canister
- Cracks, dents, or breaks in the cartridge or canisters case
- Evidence of prior use of cartridge or canister, such as broken seal tape foil or other sealing material.

(3) Check the corrugated breathing tube for:
- Broken or missing end connectors, gaskets, or O-rings
- Missing or loose hose clamp
- Deterioration (done by stretching hose and looking for cracks).

e) For air supplied respirators, check the air supply system for:

(1) Integrity and condition of air supply lines and hoses, including attachments and end fitting
(2) Correct operation and condition of all regulators, valves, or other air-flow regulators

(3) If SCBA, that the cylinder is sufficiently charged for the intended use, preferably fully charged (mandatory on an emergency device). The emergency SCBA will have a tag for logging in the monthly inspections.

Monitoring of the work area will be performed and the results will be used to select the appropriate level of protection. Refer to air monitoring section of the HASP (Section 9.0).

This program will be re-evaluated and revisions and updates added regularly.

Persons will not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The Earth Tech Medical Director will determine what health and physical conditions are pertinent.

Only those respirators jointly approved by NIOSH/MSHA shall be used. All component parts (i.e., canister, replacement straps, etc.), will be of the same make.

APPENDIX C

Health & Safety Field Forms

- Supervisor's Report of Incident
- Job Exposure Report
- Field Modification Form
- Record of Amendments
- Daily Safety Meeting Record (or Document in Field Log Book)
- Calibration and Maintenance Log (or Document in Field Log Book)
- Ambient/Area Air Monitoring Sheet (or Document in Field Log Book)
- First Aid Log

Supervisor's Incident Report

Date of this report: ____/____/____

Region: _____ **Office/Division:** _____

TYPE OF INCIDENT. Inspection:_____ Accident:_____ Injury:_____ Spill:_____ Fire:_____Other:_____
Agency: _____ Inspector's Name: _____ Type Inspection: _____
Agency Address: _____ Phone: _____

EMPLOYEE INFORMATION:
Employee's Name: _____ Social Security No.: _____
Address: _____ Phone: _____
Date of Birth: _____ Number of Minor Dependents: _____ Marital Status: Single _____ Widowed _____ Married _____ Divorced _____
Date of Hire: _____ Wage Rate: $_____ Hourly: _____ Annually: _____ Job No.: _____
Employee Hours on Date of Incident: _____ Employee Hrs. on Project: _____ Days/Wk.: _____ Hrs./Day: _____
Employee's Occupation When Incident Occurred?: _____ Years of Experience in This Occupation?: _____

INCIDENT INFORMATION:
Date of Incident: _____ Time: _____ Witness(s): _____
Date Reported to Supervisor: _____ Was Incident Believed to be Result of Employment?: Yes _____ No ____
If on Job Site, Name of Job: _____ Location on Job Site Where Incident Occurred: _____
Address Where Incident Occurred: _____
If First Aid Applied, by Whom: _____
Type of Injury and Part of Body Affected: _____
Name/Address Medical Provider: _____
Brief Description of Incident: _____

Employee Activity at Time of Incident: _____

Description of Property Damaged: _____

OSHA 200 LOG INFORMATION:

Is incident OSHA recordable?: Yes ☐ No ☐
Does incident involve fatality?: Yes ☐ No ☐
Does incident involved lost time/restricted activity?: Yes ☐ No ☐
Does incident involve medical treatment?: Yes ☐ No ☐
Does incident involve first aid only?: Yes ☐ No ☐
Current Status: _____

Employee's Supervisor: _____ Project Manager: _____

See reverse side for instructions.

Health and Safety Plan
Field Modification Form

Page No _____ of _____

Project: _____

Project Location _____

Project No _____

Site Safety Officer: _____

Field Modification to HASP: _____

Prepared By: _____
Site Safety Officer — Date

Accepted By: _____
Field Manager — Date

Accepted By: _____
Contractor Representative (If Applicable) — Date

Approved By: _____
EARTH TECH Region Environmental — Date
Health and Safety Manager or Alternate HASP Reviewer

NOTE: Field Modifications to HASPs must be discussed with the EARTH TECH REHSM or CEHSD with subsequent written approval. Secure approval through fax.

Written Certification Hazard Assessment

Project Site: _____

Project No _____

Location: _____

Project Manager: _____

Project Tasks (List): _____

_____

_____

Hazard Assessment Certified By: _____

Date(s): _____

1. Site-Specific Hazard Assessment. List tasks and physical and/or chemical hazards associated with task (i.e., vapors, pinch points, nuisance dusts, electrical, radiation, fall, etc.).

Task _____	Hazards _____
Task _____	Hazards _____
Task _____	Hazards _____
Task _____	Hazards _____
Task _____	Hazards _____

2. PPE Selected For Each Task. List tasks and selected PPE.

Task _____	PPE _____
Task _____	PPE _____
Task _____	PPE _____
Task _____	PPE _____
Task _____	PPE _____

3. A detailed listing of personal protective equipment (PPE) and task-specific procedures can be found in the site-specific HASP or Technical Standard T.00.022, "Preparation of Site-Specific Health & Safety Plans." If the task is not listed in either document, contact your office Safety Representative or Region Environmental, Health & Safety Manager.

NOTE: Retain in the office and/or project files.

Site Safety Meeting

Page _____ of _____

Project: _____ Date: _____

Project Number: _____ Time: _____

Meeting Conducted By: _____ _____

Name Signature

Summary Of Items Discussed: _____

Personnel Present

	Name	Representing	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

NOTE: Place in project files.

Health and Safety
Instrument Calibration Log

INSTRUMENT: _____

Date Calibrated	Known Standard	Actual Instrument Reading	Adjustments Made	Calibrated By	Comments

COMMENTS: _____

NOTE: Place in project files and/or Instrument Maintenance file.

Atmospheric Monitoring Log
Field Health and Safety

Page _____ of _____
Date ____/____/____
Circle: Sun Mon Tue Wed Thu Fri Sat

Site: _____ Project No.: _____
Site Safety Officer: _____
Action Levels: D ☐ → C ☐ → B ☐ → (Stop work, call in for instructions)
(Check box and write in levels for upgrade)
Task/Equipment: _____
Weather: _____

Time	OVA PPM	HNu PPM	O_2 %	LEL %	H_2S PPM	Comments: Duration of Readings, Upgrades, Location, etc.

Additional Comments: _____

Signature: _____

NOTE: Place in project files.

First Aid Log

Site/Division Location: _____

Date	Employee Name	Injury	Treatment	Care Provider

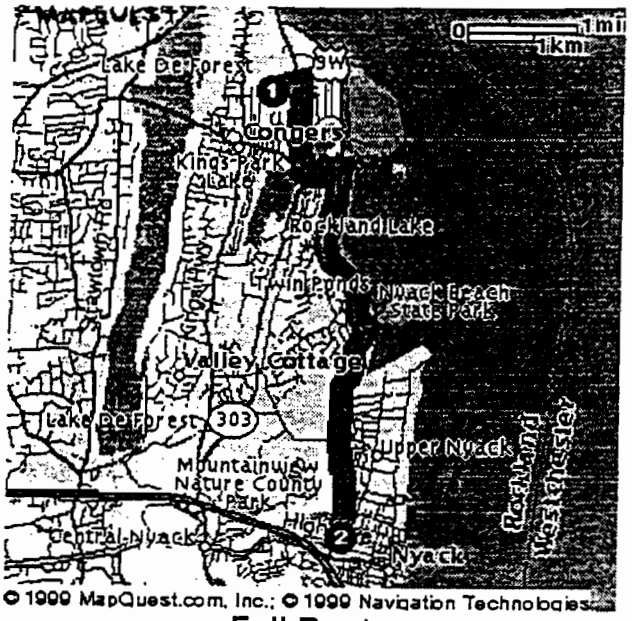
NOTE: This log is to be maintained by the Division Office Administrator and/or Site Manager.

APPENDIX D

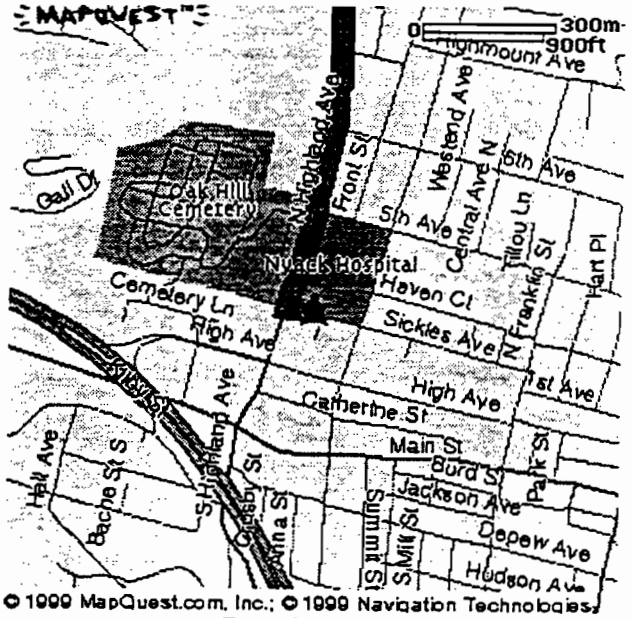
Hospital Route Map

Starting From:	Arriving At:	Distance:	Approximate Travel Time:	
1 Brenner Drive Congers, NY 10920-1307	200 Sickles Avenue Nyack, NY 10960	5.4 miles	13 mins	Reverse Driving Directions

	Directions	Miles
1.	Start out going Northeast on BRENNER DR towards NY-303 by turning left.	0.3
2.	Turn RIGHT onto NY-303.	0.9
3.	Turn LEFT onto LAKE RD E.	0.4
4.	Turn RIGHT onto S US-9W.	2.2
5.	S US-9W becomes N HIGHLAND AVE/US-9W.	1.7
6.	Turn LEFT onto SICKLES AVE.	0.0



Full Route



Destination

APPENDIX I

NYSDOH Generic Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

H:\Southern\gCAMPr1.doc

APPENDIX J

NYSDEC Data Usability Summary Report Guidance Policy

WORK ELEMENT V - Quality Assurance/Quality Control Activities

Data Validation Scope of Work - NYSDEC RI/FS Program

Data validation is the systematic process by which the data quality is determined with respect to data quality criteria that are defined in project and laboratory quality control programs and in the referenced analytical methods. The data validation process consists of an assessment of the acceptability or validity of project data with respect to stated project goals and requirements for data usability. Ideally, data validation establishes the data quality in terms of project data quality objectives. Data validation consists of data editing, screening, checking, auditing, certification, review, and interpretation. The purpose of data validation is to define and document analytical data quality and determine if the data quality is sufficient for the intended use(s) of the data. In accordance with DEC requirements, all project data must be of known and acceptable quality. Laboratories will be required to submit results which are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of data.

Duties and Qualifications of a Data Validator

The following qualifications and requirements are established for all Engineers/Contractors functioning as data validators. These qualifications and requirements should apply whether the Engineer/Contractor is: a) retained directly through contracts executed by this agency, b) retained as a subcontractor to a Engineer functioning under contracts executed by this agency, or c) retained by a responsible party functioning under the guidance and direction of an order on consent. Engineer/Contractor functioning as a data validator shall be independent of the laboratory generating the data.

The Engineer/Contractor functioning as a data validator should be able to demonstrate that all staff members involved in the data validation process have: a) a bachelors degree in chemistry or natural sciences with a minimum of 20 hours in chemistry or equivalent, b) one (1) year experience or equivalent in the implementation and application of the protocol(s) used in generating the data for which they are responsible. The successful completion of an EPA data validation training course or equivalent, as evidenced by a certificate of completion, may be substituted for the analytical experience requirement. In addition, these same staff members must have a minimum of one (1) year experience evaluating CLP data package for contract and protocol compliance.

The Engineer must provide the resume of the proposed third party data validator along with a recent data validation report prepared by that validator for review and approval by the Division of Hazardous Waste Remediation Quality Assurance Officer.

Consistent with the Division's Quality Assurance Program Plan, all laboratory data generated in support of any investigation, remediation or monitoring activity carried out under the Division's program responsibility shall be developed under the administrative and operational control of a Quality Assurance Project Plan (QAPjP). To this end the QAPjP shall become an integral part of the Project Work Plan and those portions that pertain to the development and production of analytical data shall define the task of the laboratory charged with developing and producing this data. The QAPjP, as part of the Project Work Plan shall include the following information:

1) The number and types of samples that are to be analyzed.

2) The sample holding times that must be observed and the time from which these holding times shall be measured.

3) The list of analytes to be identified and quantified during the analytical process.

4) The site specific limits of concern for each of the analytes listed in each of the matrices to be sampled.

5) The matrix specific method detection limits that must be obtained for each of the analytes and matrices listed (this value should be in the neighborhood of 1/5 the site specific limit of concern).

6) The analytical protocols that shall be employed including any special handling or cleanup procedures that may be required.

7) The frequency and types of any required quality control samples e.g., trip blanks, rinse blanks, replicates, matrix spikes, matrix spike duplicates, and matrix spike blanks.

8) The identification of any critical samples and any special analytical treatment that they may require.

9) The required deliverables and supporting documentation where these differ from or are not a part of the required analytical protocols.

In order to facilitate the data validation process, copies of the project Work Plan, Quality Assurance Project Plan (addressing the above referenced nine points of information), together with the project required deliverables and supporting documentation, and laboratory subcontract shall be submitted to the firm contracted to carry out the data validation portion of the standby contract.

Task I. Completeness

The Validator shall review the data package to determine completeness. A complete data package will consist of the following eight (8) components:

1) All sample chain of custody forms.

2) The case narrative(s) including all sample/analysis summary forms.*

3) Quality Assurance/Quality Control summaries including all supporting documentation.

4) All relevant calibration data including all supporting documentation.

5) Instrument and method performance data.

6) Documentation showing the laboratory's ability to attain the contract specific method detection limits for all target analytes in all required matrices.

7) All data report forms including examples of the calculations used in determining final concentrations.

8) All raw data used in the identification and quantitation of the contract specified target compounds.

* These forms appear as an addendum to the NYSDEC CLP forms package and will be required for all data submissions regardless of the protocol requested.

All deficiencies in the requirement for completeness shall be reported to the Engineer immediately. The laboratory shall be contacted by the consultants QAO and shall be given ten (10) calendar days to produce the documentation necessary to remove the deficiencies.

Task II. Compliance

The Validator shall review the submitted data package to determine compliance with those portions of the work plan that pertain to the production of laboratory data. Compliance is defined by the following criteria.

1) The data package is complete as defined in Task 1 above.

2) The data has been produced and reported in a manner consistent with the requirements of the QAPjP and the laboratory subcontract.

3) All protocol required QA/QC criteria have been met.

4) All instrument tune and calibration requirements have been met for the time frame during which the analytes were completed.

5) All protocol required initial and continuing calibration data is present and documented.

6) All data reporting forms are complete for all samples submitted. This will include all sample dilution/concentration factors and all premeasurement sample cleanup procedures.

7) All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.

The data validation task requires that the Validator conduct a detailed comparison of the reported data with the raw data submitted as part of the supporting documentation package. It is the responsibility of the Validator to determine that the reported data can be completely substantiated by applying protocol defined procedures for the identification and quantitation of the individual analytes. To assist the Validator in this determination the following documents are recommended; however, the EPA Functional Guidelines will be used for format only. The specific requirements noted in the Project Quality Assurance Project Plan are prerequisite, for example, holding times or special analytical project needs, to those noted in the Functional Guidelines.

a) The particular protocol(s) under which the data was generated e.g., NYSDEC Contract Laboratory Protocol; EPA SW-846; EPA Series 500 Protocols.

b) Data validation guidance documents such as:

i) "Functional Guidelines for Evaluation Inorganic Data" (published by EPA Region 2).

ii) "Functional Guidelines for Evaluation Organics Analyses" Technical Directive Document No. HQ-8410-01 (published by EPA).

iii) "Functional Guidelines for Evaluating Pesticides/PCB's Analyses" Technical Directive Document No. HG-8410-01 (published by EPA).

NOTE: These documents undergo periodic revision. It is assumed that the selected firm will have access to the most current applicable documents and guidelines.

The Validator shall submit a final report covering the results of the data review process. This report shall be submitted to the Project Manager or his designee and shall include the following:

1) A general assessment of the data package as determined by the accomplishment of Tasks I-II above.

2) Detailed descriptions of any and all deviations from the required protocols. (These descriptions must include references to the portions of the protocols involved in the alleged deviations).

3) Any and all failures in the Validator's attempt to reconcile the reported data with the raw data from which it was derived. (Again, specific references must be included). Telephone logs should be included in the validation report.

4) A detailed assessment by the Validator of the degree to which the data has been compromised by any deviations from protocol, QA/QC breakdowns, lack of analytical control, etc., that occurred during the analytical process.

5) The report shall include, as an attachment, a copy of the laboratory's case narrative including the DEC required sample and analysis summary sheets.

6) The report shall include an overall appraisal of the data package.

7) The validation report shall include a chart presented in a spread sheet format, consisting of site name, sample numbers, date submitted to laboratory, year of CLP or analytical protocol used, matrix, fractions analyzed, e.g., volatiles, semi-volatiles, Pest/PCB, Metals, CN. Space should be provided for a reference to the NYSDEC CLP when non-compliance is involved and a column for an explanation of such violation (See following form).

Group #	*Date*	*ASP Proto No.*	*Sample No.*	*Matrix*	*VOA Compli-ancy*	*BNA Compli-ancy*	*Pest/PCB Compli-ancy*	*Metals Compli-ancy*	*CN*	*Total Phenols*	*Page # in the CLP*	*Non-Compliance*

Data Usability Summary Report (DUSR)

Background:

The purpose of the DUSR is to provide a thorough data evaluation by an experienced environmental scientist and/or the project Quality Assurance Officer.

Since it is recommended that Data Validation Reports be prepared by an independent third party (i.e., independent of the project management consulting firm and the analysis laboratory), the DUSR is an appropriate alternative when data quality and usability are not expected to be a significant issue. In these cases, the DUSR is an appropriate alternative since it is more cost effective and time efficient than data validation.

The DUSR and data deliverables will be reviewed by the NYSDEC Quality Assurance Unit. In most cases, we expect this review will result in agreement or minor differences which should be easily reconciled. If data validation is found to be necessary (e.g., pending litigation), it can be done at a later date by an independent third party on the data deliverable package.

Preparation of a DUSR on a NYSDEC ASP Category B or CLP Deliverables Package

The Environmental Scientist preparing the DUSR should submit a resume to the NYSDEC Quality Assurance Unit documenting relevant experience in environmental sampling and analysis methods and data review and statement of Bachelors Degree in Natural Science or Engineering.

The DUSR is prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with the analytical method protocols include all sample chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, the Field Sampling Notes should also be reviewed and any quality control problems should