REMEDIAL INVESTIGATION
FIELD INVESTIGATION PLAN

FORMER EMCA SITE
SITE NO. 360025
MAMARONECK, NEW YORK

Prepared For:

ROHM & HAAS COMPANY

P.O. BOX 584

BRISTOL, PA 19007

DRAFT FINAL

SEPTEMBER 1999

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1.0 INTRODUCTION

Rohm and Haas Company has retained URS Greiner Woodward Clyde (URSGWC) to conduct additional environmental remedial investigations at the former EMCA site in Mamaroneck, New York. This field investigation plan (FIP) specifies the field investigation activities that are proposed for obtaining additional information with regard to site environmental concerns. As requested by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), URSGWC also has completed a health and safety plan (HASP), a field sampling plan (FSP) and a quality assurance project plan (QAPP) for this project. The HASP is provided in Appendix A, the FSP is in Appendix B, and the QAPP has been submitted as a separate document dated June 1999.

1.1 Site Description and History

The EMCA property is a 0.6-acre site located in a mixed residential/industrial area in Mamaroneck, New York (Figure 1). EMCA formerly owned by Rohm and Haas, Company, manufactured high conductivity paste used in circuits by the electronics industry. Manufacturing at the EMCA site began in 1960 and ceased in 1988. The site is generally covered with low rise buildings and open parking areas. Rohm and Haas transferred site ownership to UA Columbia Cablevision (UACC) who later merged with Cablevision of Westchester, the current site owner. Cablevision of Westchester currently occupies the office buildings and uses the site as a hub for their fleet of service vehicles.

During the property transfer, UACC retained Goldberg-Zoino and Associates of New York (GZANY) to perform a preliminary remedial investigation. GZANY conducted a field investigation that included advancing several soil borings and installing eight monitoring wells. Based on their investigation, GZANY identified soil and water contamination at the site.

EMCA/Rohm and Haas then retained Woodward-Clyde Consultants (WCC) to review GZANY's data, conduct follow-up investigations and evaluate risks associated with site contamination. Based on these efforts, WCC concluded there is no significant risk to human health or the environment, and that remediation of groundwater and site soils is not warranted.

URS Greiner Woodward Clyde	Former ECMA Site Site Plan	**Figure 1**

j:\35673.00\db\gis\sitelocation.apr SITEPLAN
6/18/1999

However, as part of the real property transfer, Rohm and Haas agreed to retain responsibility for environmental concerns that could be raised by NYSDEC.

Based on the site history and environmental site data existing at the time, NYSDEC listed the former EMCA property as a NYSDEC Class 2 Inactive Hazardous waste site. In March 1999, Rohm and Haas signed a Consent Order with the NYSDEC, agreeing to conduct additional investigations to further evaluate the nature and extent of site contamination.

On April 27, 1999, Rohm and Haas met on site with NYSDEC, NYDOH, Cablevision of Westchester, and URSGWC to discuss the upcoming remedial investigations and to assess current site conditions. The meeting attendees walked the site and found three of the former wells (GZ-3, GZ-6, and GZ-9). Well GZ-9 had been cut down below ground surface and paved over. There was evidence of asphalt staining inside GZ-9 and it is likely that surface runoff drains into the well. Therefore, only two of the nine former wells (GZ-3 and GZ-6) are believed to be suitable for resampling. The remaining six wells could not be found and are assumed to have been covered during previous repaving activities.

Geologic conditions at the site are characterized by unconsolidated deposits composed of predominantly medium to fine sand with localized zones of coarse sand, gravel, silt, and clay. The deepest site boring was advanced to 32 feet below ground surface and bedrock is assumed at an approximate depth of 40 feet (as per WCC's risk assessment report). Groundwater conditions consist of a water table aquifer encountered at a depth of approximately 5 feet below ground surface. Groundwater generally flows to the north – towards the Sheldrake River.

1.2 Summary of Site Contamination

Based on the results of the previous investigations, it was determined that low levels of groundwater and soil contamination exist at the site.

Two groundwater samples, which were collected and analyzed for dissolved metals, revealed concentrations of barium, copper, lead, silver, and zinc, albeit at levels below New York State groundwater standards. Nonetheless, the NYSDEC requested that additional groundwater samples be collected and analyzed for filtered and unfiltered metals during the subsequent

Remedial Investigation. Therefore, these same five metals, which were previously detected, will be analyzed for in the future.

Some volatiles also were detected in the groundwater at the site: these compounds and the maximum concentrations detected were benzene [74 micrograms per liter (µg/L)], tetrachloroethene (380 µg/L), and trichloroethene (258 µg/L). As noted in the WCC risk assessment, the concentrations of total Target Compound List (TCL) volatiles were higher in the upgradient site wells than in the downgradient wells. As such, the current data indicate there is a potential off site, upgradient source for the volatiles

The primary contaminant detected in these media and linked to the former EMCA operations is Freon 113. This compound was detected at a maximum concentration of 18,208 µg/L.

1.3 Objectives

The intent of this investigation will be to obtain data for defining the level of concern with regard to remnant Freon 113 contamination, metals, and volatile organic compounds. This remedial investigation will be designed to refine the current understanding of groundwater flow direction, to evaluate the presence of other organic/metal contaminants and their source(s), and to support discussion of exposure and potential impact to human and environmental receptors. In addition, data collected during this investigation will be used in the determination of the necessity, if any, for on site remedial action.

2.0 FIELD INVESTIGATIONS

URSGWC personnel and the following subcontractors will conduct Field investigations: Advanced Drilling and Technology (ADT) for Geoprobe work and Richard Sporaco, L.S. for survey work. URSGWC will contact Underground Facilities Protection Organization for locating underground utilities. Onsite utility interference and logistics (e.g., cordoning off drill sites in parking areas) will be coordinated with Ms. Carolyn Kihm of Cablevision of Westchester.

2.1 Health and Safety

URSGWC will provide a Site Health and Safety Officer for the work described the HASP (Appendix A). The HASP will cover the activities of URSGWC personnel, as well as the activities of subcontractor personnel as they relate to the health and safety hazards associated with potential exposures to hazardous materials found at the site. The presence of a URSGWC Health and Safety Officer and the implementation of a HASP developed by URSGWC is not intended to relieve the subcontractor of the responsibility for the health and safety of its employees. The subcontractor shall review the HASP and ensure that it meets the health and safety requirements of its employees for the operations they are contracted to perform. The subcontractor is responsible for ensuring that its employees abide by the provisions of the HASP and that all equipment brought onto the site by the subcontractor meets the requirements of all federal, state, and local regulations regarding employee health and safety.

2.2 Soil Gas Sampling

In the previous WCC evaluation volatilization of contaminants through the soil was identified as an exposure pathway. Therefore, in order to address this concern, a soil gas survey is proposed. Soil gas concentrations will be measured in the field at the locations identified on Figure 2. At the soil gas sampling locations, the URSGWC field representative will manually drive a probe approximately 2 to 3 feet into the vadose soil zone. Soil gas will be analyzed by inserting a stainless-steel probe into the hole and sealing the top around the probe using modeling clay. The probe will be directly connected to a calibrated flame ionization detector (FID), and direct soil gas readings will be taken and recorded. URSGWC will obtain a soil gas sample for subsequent laboratory analysis from location SG-05 and from either SG-03 or SG-04 (whichever has the highest FID response). In addition, one ambient air sample will be collected for laboratory analysis. The samples will be analyzed for Freon in accordance with TO14 protocol (Table 2). Refer to the FSP presented in Appendix B for details of the soil gas monitoring and sampling programs.

2.3 Soil Sampling

Direct contact has been identified as a potential exposure pathway for metals. As such, one grab soil sample will be collected from 0 to 6-inches below the existing asphalt and sub-base layers at boring location SG-05 (Figure 2) using a stainless steel scoop and bucket auger as described in Section B2.4 of the field sampling plan. In addition, one composite sample will be collected from surface soils 0 to 6-inches below turf from grassed areas on Fayette and/or Ogden Avenues. The soil samples will be analyzed for Target Analyte List metals (refer to Table 2). Refer to the FSP presented in Appendix B for soil sampling techniques.

2.4 Well and Piezometer Installation

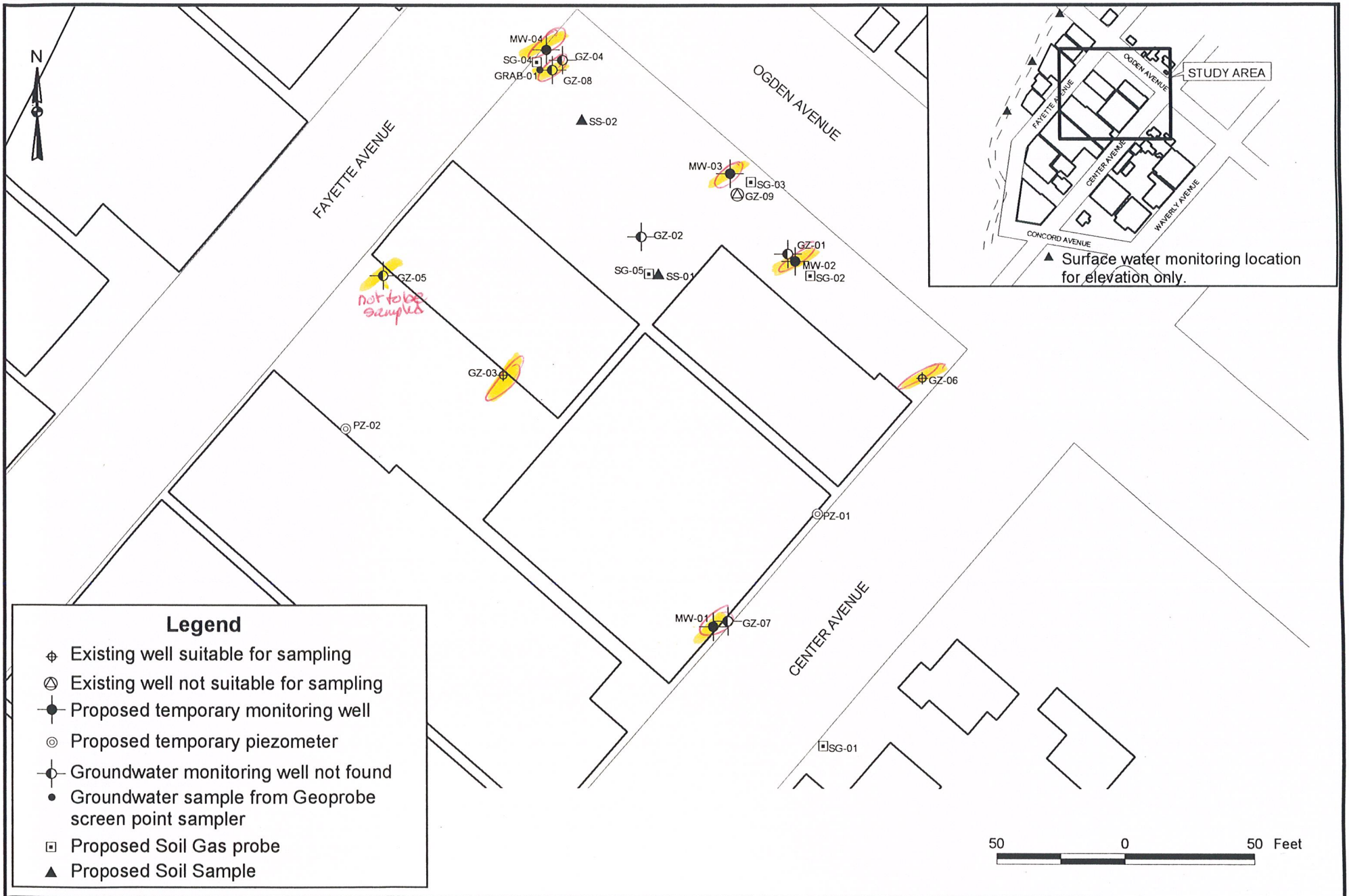
Four temporary Geoprobe wells (mill-slot well points) will be installed to replace former wells that could no longer be found. In addition, two temporary piezometers will be installed for obtaining groundwater levels to provide supplementary data for interpreting groundwater gradient and flow direction. The proposed well and piezometer locations are shown in Figure 2.

The intent of the replacement well installation program is to provide wells at the same approximate location and depth as the former site wells to monitor water table conditions. As indicated in Figure 2, replacement wells will not be installed at two of the former well locations (GZ-2 and GZ-5). The previous studies have adequately characterized contamination near GZ-2 and GZ-5 and these locations are not critical for identifying existing conditions.

The wells will be installed in small diameter boreholes advanced using the Geoprobe. The field geologist will provide a soil log for each location with visual interpretation of the soils (from water table to bottom of well) and other pertinent site information.

Upon completion, temporary 1-inch inside diameter (ID) Schedule 40 polyvinyl chloride (PVC) monitoring wells will be installed in the open borehole to the approximate depths listed in Table 1. Screens will be 10 to 15 feet in length with 0.010-inch machined slots. Clean silica sand will be placed as needed to fill the borehole annulus to above the well screen. Bentonite grout will then be placed above the screened interval, and a 4-inch steel surface casing with locking cap and lock will be installed into the grout.

J:\35673.00\db\GIS\maps.apr PROPOSED LOCATIONS
9/2/1999



URS Greiner Woodward Clyde

Former ECMA Site
Proposed Well Locations

Figure 2

Temporary piezometers will be installed in open Geoprobe boreholes. The piezometers will consist of slotted ¾-inch ID Schedule 40 PVC, only (sand and grout will not be installed). The piezometers will be installed at a depth of approximately 15 feet below existing ground surface. A 4-foot long stake with flagging tape will be placed adjacent to the piezometer to assure the piezometer is clearly visible. At completion of the investigation the temporary piezometers will be removed and the boreholes will be filled with clean sand.

In addition to the Geoprobe wells, one deeper groundwater sample near former well GZ-08 (from approximately 30 feet below ground surface) will be collected using an approximately 3-foot-long Geoprobe screen point sampler. The screen point sampler allows the collection of a groundwater grab sample without installing a well.

2.5 Well Development

Each monitoring well (including the four new temporary Geoprobe monitoring wells and the two existing monitoring wells) will be developed by pumping until the discharge water is relatively sediment free and the water quality parameters (pH, temperature, and specific conductivity) have stabilized. Any development equipment inserted into the well will first be decontaminated to minimize the possibility of introducing contaminants during the development procedures. All development water will be discharged directly to unpaved or grass covered ground. The volume of water removed, pH, temperature and specific conductivity measurements will be recorded on the Well Development/Purging Log (Figure 3).

Minimal development efforts will be conducted for the temporary piezometers to ensure that the observed groundwater elevations are accurate. Approximately 1 to 3 liters of groundwater will be removed from each temporary piezometer during development.

2.6 Groundwater Sampling

Prior to groundwater sampling, all wells will be purged in accordance with the FSP presented in Appendix B. Then a round of groundwater samples will be collected from both the new, and the existing monitoring wells for a total of six samples. All groundwater samples will be analyzed for TCL volatiles and Freon 113. In addition, groundwater samples collected from

TABLE 1
PROPOSED WELL INSTALLATION DEPTHS
FORMER EMCA SITE

FORMER WELL ID	PROPOSED REPLACEMENT WELL ID	PROPOSED REPLACEMENT WELL SCREEN DEPTH (ft bgs)
GZ-01	MW-02	3 - 13.5
GZ-04	MW-04	4 - 19
GZ-07	MW-01	6 - 16
GZ-09	MW-03	4.5 - 14.5

WELL DEVELOPMENT/PURGE LOG

URS Greiner

PROJECT TITLE: _____ WELL NO.: _____

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

			WELL ID.	. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	_____	1"	0.0
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	_____	2"	0.2
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	_____	3"	0.4
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	_____	4"	0.7
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	_____	5"	1.0
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ___)	=	---	6"	1.5
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=	_____	8"	2.6

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											
DISSOLVED OXYGEN (mg/L)											

COMMENTS:

FIGURE 3

wells MW-01 and MW-04 will be analyzed for barium, copper, lead, silver, and zinc. MW-01 was selected to evaluate upgradient "background" concentrations. MW-04 was selected since it appears to be downgradient of the site.

Table 2 summarizes the groundwater samples to be collected. Quality assurance and quality control (QA/QC) procedures associated with the sampling and analytical program will be as specified in the QAPP. The laboratory (H2M Labs, of Melville, NY) will be required to meet the Analytical Services Protocol 1995 requirements and provide appropriate deliverables (i.e., hard copy and electronic format).

Data validation for the sampling and analysis will include a limited review of holding times and completeness of all required deliverables; a review of QC results (surrogates, spikes, and duplicates) to determine if the data are within the protocol required limits and specifications; and a determination that all samples were analyzed using established and agreed upon protocols.

The field and laboratory data will be assessed and a Data Usability Summary Report will be submitted, complete with data review and recommendations on data usability and corrective actions for noncompliant data.

2.7 Survey

An engineering survey will be conducted to provide for horizontal and vertical control of the new Geoprobe wells and piezometers. For the well and piezometer locations, the vertical elevations will be recorded at the ground surface adjacent to the wells and on the north side of the top of well risers (the PVC well pipes). Existing wells GZ-3, GZ-6 and GZ-9 also will be surveyed at that time. In addition, horizontal/vertical control will be established for three points along the Sheldrake River so that surface water elevations can be obtained (Figure 2). The Sheldrake River locations will be used to supplement groundwater contour mapping.

An assumed horizontal control will be established relative to existing surface structures (e.g. roads, buildings, etc.). This information will be used to provide relative position of the wells and piezometers.

TABLE 2
SUMMARY OF ANALYTICAL PARAMETERS
REMEDIAL INVESTIGATION
FORMER EMCA SITE, MAMARONECK, NEW YORK

			QA/QC Samples			
Parameter	Method Number / Reference[1, 2]	Estimated Number of Samples	MS/MSD/MD/MSB	Rinse Blanks	Trip Blanks	Total No. of Samples
I. Groundwater						
Groundwater (Geoprobe)						
Target Compound List (TCL)						
Volatiles + Freon 113 + TICs	ASP 95-1	7	1/1/0/1	0	2	12
Metals (5) - total	ASP CLP-M	2	1/0/1/0	0	0	4
Metals (5) - dissolved	ASP CLP-M	2	1/0/1/0	0	0	4
II. Soils						
Soils (Geoprobe)						
Target Analyte List						
Metals (5) - total	ASP CLP-M	2	1/0/1/0	0	0	4
III. Air						
Soil Gas Sampling						
Target Compound List (TCL)						
Volatiles + Freon 113 + TICs	TO-14A	3	0/0/0/0	0	0	3

NOTES:

[1] NYSDEC Analytical Services Protocol, 10/95 edition.

[2] Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd Edition, January 1997.

Metals include barium, copper, lead, silver, and zinc.

0.2 L/min for 30 min

An assumed vertical control will be established relative to existing structures (i.e., finish floor elevation of the existing building). This information will provide measuring point elevations at each well/piezometer and the designated surface water locations that will be used for evaluating groundwater elevations and flow direction.

2.8 Water Level Measurements

Water level measurements will be recorded to obtain data for evaluating groundwater gradients and flow direction. Water levels will be measured upon completion of well installation and prior to well sampling approximately one week apart. Water level depths and the time the measurements are taken will be recorded for each of the onsite wells. In addition, elevation of surface water at the three surface water measurement locations on the Sheldrake River also will be recorded.

3.0 REPORTING

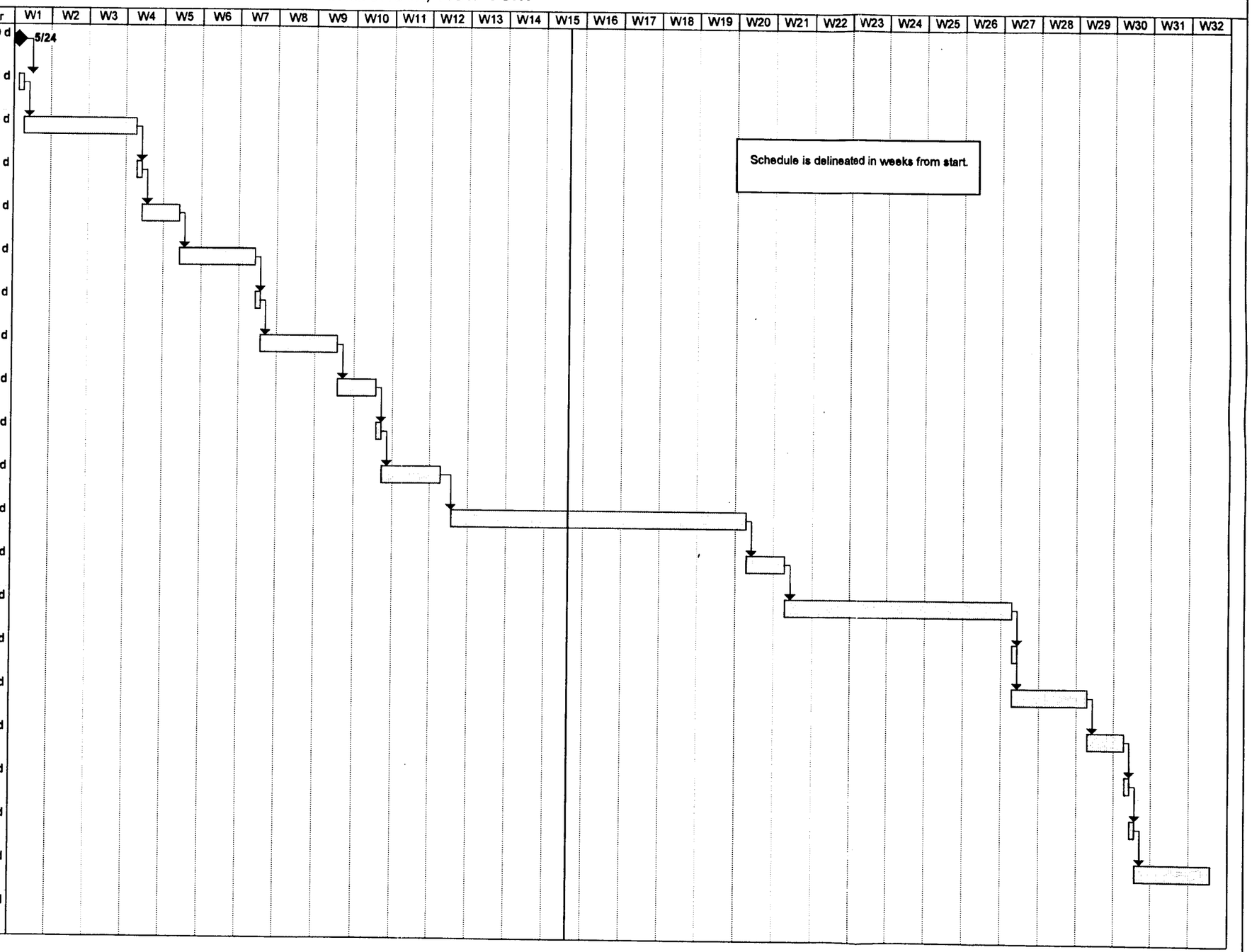
A summary of the field investigations will be provided in a remedial investigation report. The report will identify findings of the field investigations (including chemistry and groundwater flow), evaluate the levels of contamination with respect to NYSDEC criteria, evaluate possible sources of contamination and provide recommendations with regard to site closure. Additionally, the remedial investigation report will discuss hazardous materials usage and spill events at adjacent properties that may have impacted groundwater quality at the site. URSGWC will coordinate with the NYSDEC for assistance in identifying potential off site sources in the remedial investigation report.

4.0 SCHEDULE

Field investigations are scheduled to be conducted during the first week of August 1999. A total of five days in the field is anticipated for these efforts. Refer to Figure 4 for a summary of the project schedule.

Figure 4
Proposed Schedule for Former ECMA Site
Mamaroneck, New York

ID	Task Name	Dur
1	Notice to Proceed	0 d
2	Kick-off Meeting	1 d
3	Prepare Draft Work Plans	15 d
4	Submit Draft Work Plans to Rohm and Haas	1 d
5	Rohm and Haas Review	5 d
6	Revise and prepare Final Draft Work Plans	10 d
7	Submit Final Draft Work Plans to Rohm and Haas and NYSDEC	1 d
8	NYSDEC Review	10 d
9	Revise and update Work Plans as per NYSDEC comments	5 d
10	Submit Final Work Plans to Rohm and Haas and NYSDEC	1 d
11	NYSDEC Approves Work Plans	7 d
12	Investigation Setup/Mobilization	38 d
13	Conduct Field Investigations	5 d
14	Prepare Investigation Reports	30 d
15	Submit Draft Report to Rohm and Haas	1 d
16	Rohm and Haas Review	10 d
17	Revise and prepare Final Draft Report	5 d
18	Submit Final Draft Report to Rohm and Haas and NYSDEC	1 d
19	Meeting with NYSDEC	1 d
20	Revise and update Report as per NYSDEC	10 d
21	NYSDEC issues Proposed Remedial Action Plan, holds public comment period, issues Record of Decsion, unknown duration	0 d



APPENDIX A

HEALTH AND SAFETY PLAN

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Offices in Principal Cities Nationwide

URS Greiner Woodward Clyde

HEALTH & SAFETY PLAN

Project Name: Former EMCA Site (Rohm & Haas) **Project & Task #:** 35673-00

Site Location: Mamaroneck, NY

HASP Author: Richard Fudeman **Date:** 6/9/99

Approval: SJSherman, CIH **Date:** 18 June 99

Description of Site and Pertinent History: The former EMCA Site is a 0.6-acre property and was used for the manufacture of a high conductivity paste used for circuits by the electronics industry from 1968 to 1988. The site is located in a mixed industrial/residential area.

□ Active Site ■ Inactive Site □ Abandoned Site

ANTICIPATED HAZARDS:

Chemical
- □ explosive/flam/ign
- ■ carcinogen
- □ radioactive
- □ corrosive
- ■ volatile
- □ reactive
- □ medical waste/pathogen
- □ acute toxicity
- □ other _____

Physical
- □ noise
- □ confined spaces
- ■ trenching/excavation/drilling
- □ heights
- □ water hazards
- ■ heat/cold stress
- ■ vehicular/heavy equipment
- □ electrical
- □ unknown drums/containers

Planned Site Activities: Soil and groundwater sample collection by Geoprobe.

FIELD TEAM:
(All personnel entering the Exclusion Zone meet the training and medical surveillance requirements of OSHA 29CFR1910.120.)

Name	Responsibilities
Joel Siegel	Project Geologist/Site Health and Safety Officer

HEALTH & SAFETY PLAN

KNOWN CHEMICAL HAZARD SUMMARY:

Compound	PEL or TLV	Route of Exposure	Acute Exposure Symptoms	Odor Description	Good Warning Properties?	Monitoring Methods
See attached.						

Current Material Safety Data Sheets (MSDSs) must be attached for materials used by field team, e.g., preservatives, other supplies (See Attachment 1.)

SITE LAYOUT Attach Site Map or sketch.

Site Access Control and Egress Considerations:

See attached.

SPECIAL CONSIDERATIONS:

- HASP read by all team members? Yes, with each new site worker.
- Morning safety meetings held? Yes.
- Hospital/emergency info reviewed? Yes, with each new site worker.
- PPE/respiratory protection available per HASP? Yes.
- Site work during daylight hours only? Yes.
- Heat/cold stress considered? Yes, see attached.
- No work during electrical storms? Yes.
- NO EAT/DRINK/SMOKE/CHEW UNTIL DECONNED.
- All personnel know location/operation of drill rig kill switches? Yes, review with each new site worker.
- Animal/insect/poison ivy considerations? Yes.

PERSONAL PROTECTIVE EQUIPMENT:

Task	Protective Clothing	Gloves	Respirator	Other	Other
All	Level D/D+	Latex/PVC	Available/ Combin. Cart	Safety Glasses	
Other PPE details:					

HAZARD CHARACTERISTICS OF CONTAMINANTS OF CONCERN

1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113): Freon 113 is a mild skin irritant and has a low hazard rating via inhalation and oral routes. It is relatively non-toxic, however, it may act as a narcotic at high concentrations (greater than 1,000 ppm). Freon 113 is not retained in the body and adverse effects tend to be reversible. A major concern of the compound is that its vapors are 4 to 5 times heavier than air and can displace oxygen in the personal breathing zone. The ACGIH TVL-TWA and OSHA PEL are both 1,000 ppm. The ACGIH STEL is 1,250 ppm.

BENZENE: Benzene poisoning occurs most commonly through inhalation of the vapor, though benzene can penetrate the skin and cause toxicity in this manner. It is strongly irritating to eyes and the respiratory system. Acute exposure to high concentrations (greater than 500 ppm) is characterized by the narcotic action of benzene on the central nervous system. Death can ensue due to respiratory failure. Chronic benzene exposure is associated with leukemia. The compound has been shown to be an experimental mutagen, carcinogen, and teratogen. ACGIH has established a TLV-TWA of 0.5 ppm and a STEL of 2.5 ppm. OSHA has established a PEL of 1 ppm and a STEL of 5 ppm.

TETRACHLOROETHENE (PCE): PCE is moderately toxic via inhalation, oral, and dermal routes. It irritates the eye, skin, and mucous membranes and affects the central nervous system. Headaches, nausea, dizziness, and confusion are symptoms or exposure. Experimentally, the compound has shown to be a carcinogen and mutagen. ACGIH has established a TLV-TWA of 25 ppm and a STEL of 100 ppm. OSHA has established a PEL of 100 ppm and a Ceiling of 200 ppm.

TRICHLOROETHENE (TCE): TCE is a central nervous system depressant and a strong irritant of the respiratory tract. The primary route of exposure is inhalation leading to low or moderate toxicity. The compound also absorbs through the skin as another potential route for exposure. It is an experimental mutagen, carcinogen, and teratogen. Injury to the cardiovascular system, gastrointestinal system, the liver, and the kidneys have been observed due to chronic exposure to TCE. ACGIH has established a TLV-TWA of 50 ppm and a STEL of 100 ppm. OSHA has established a PEL of 100 ppm and a Ceiling of 200 ppm.

Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel which limits the dissipation of body heat and moisture can cause heat stress. The Site HSO is responsible for monitoring heat stress in the field team personnel.

The following prevention, recognition, and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress, and to apply the appropriate treatment.

A. Prevention

1. Provide plenty of liquids. Available in the Support Zone will be a 50% solution of fruit punch in water, or the like, or plain water.

2. Provide cooling devices. A portable, pump-activated sprayer and containers of tap water will be available in the Contamination Reduction Zone to reduce body temperature, cool protective clothing, and/or act as a quick-drench shower in case of an exposure incident.

3. Adjustment of the work schedule. During the hot summer days, labor intensive tasks which pose a high potential risk of heat stress can be performed during the coolest part of the day.

B. Recognition and Treatment

Any person who observes any of the following forms of heat stress, either in themselves or in another worker, will report this information to the Site HSO immediately after implementing treatment, if possible.

1. Heat Rash (prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts, accompanied by intense itching and tingling.

Treatment: Remove source of irritation and cool the skin with water or wet cloths.

2. Heat Syncope (fainting):

Cause: Sun rays beating down on victim's head and prolonged upright position can lead to mild dehydration and contraction of the blood vessels resulting in a temporary deficiency of blood to the brain.

Symptoms: Brief loss of consciousness.

Treatment: Worker should assume a horizontal position and drink ½ liter to one liter of fluid (not alcohol). Elevate the legs and cover the head.

3. Heat Cramps (heat prostration):

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Move the worker to the Contamination Reduction Zone. Remove protective clothing. Provide fluids orally. Decrease body temperature and allow a period of rest in a cool location.

4. Heat Exhaustion (heat toxemia, sunstroke):

Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes. A serious condition.

Symptoms: Muscular weakness, tiredness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility: Move the worker to the Contamination Reduction Zone. Remove

protective clothing. Lie the worker down on his or her back, in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution using one teaspoon of salt in 12 ounces of water. Transport the worker to a medical facility.

5. Heat Stroke:

Cause: Same as heat exhaustion. An extremely serious condition.

Symptoms: Dry, red, hot skin, dry mouth, dizziness, nausea, headache, rapid pulse. Temperature continues to rise unless treatment is implemented.

Treatment: The basic principle is to lower the body temperature rapidly.

1. Move the victim out of the sun.
2. Remove clothes.
3. Soak victim completely with water, wet hair as well.
4. Place victim in front of a fan or in a breeze, if possible.
5. If ice is available, apply directly to the victim, especially under the arms and on the head.
6. Monitor body temperature with available thermometers. Temperature should start to decrease within minutes.
7. As temperature approaches 101°F, stop cooling measures and initiate transport to a hospital or declare an emergency response. The temperature should continue to fall, often to subnormal, during this period.

Other considerations in treating heat stroke are:

1. Rub skin briskly during cooling process.
2. If cardiac arrest occurs, perform CPR (ONLY IF CERTIFIED) and continue cooling.

3. If a seizure occurs, continue cooling; the seizure will stop.

4. No drugs of any kind are to be given to the victim.

D. Heat Stress - Predisposing Factors

Preventing heat stress is clearly preferred to treatment. The following factors increase the individual's risk of heat stress:

- Physically unfit
- Age
- Not accustomed to heat
- Sunburn
- Alcohol and drugs
- Dehydration
- Heavy or non-breathable clothing
- Not covering one's head

HEALTH & SAFETY PLAN

SITE MONITORING:

Task	Contaminants	Instrumentation	Limitations, Etc.	Action Level for PPE Upgrade and/or Work Stoppage
Air Monitoring	Volatiles	FID		> 5 ppm
Air Monitoring	Combustibles	LEL		> 10% LEL

SAMPLES:

Describe Planned Sampling Activities: Soil/groundwater sample collection using Geoprobe.

PPE During Sampling (list by task): Level D/D+, depends on a real-time air monitoring.

PPE During Sampling Handling/Packaging: Level D/D+

DECONTAMINATION:

Equipment Decon Solutions and Procedure: Soap and water wash, rinse with deionized water.

PPE Required During Equipment Decon? Level D/D+

Personal Decon: Soap and water washing of hands and face.

Disposal of Used PPE: Poly garbage bags for used PPE, temporarily stored onsite pending proper disposal.

Disposal of Decon Liquids: Temporarily stored onsite pending proper disposal.

HEALTH & SAFETY PLAN

EMERGENCY CONTACTS: Attach sketch of hospital route.

REPORT ALL INJURIES TO
HUMAN RESOURCES DEPARTMENT, ON ACCIDENT REPORT FORM
ASAP.

Fire/Police/EMS Phone #: 911/Non-Emergency-Fire 914-834-2101, Police – 914-777-1122, EMS – 914-777-7750

Local Hospital Name/Phone #: United Hospital Medical Center – 914-934-3000 – General 914-934-3030 – Emergency (See Attachment 2 for route to hospital.)

Client Contact: Rohm & Haas – Robert Master/215-785-7261

Agency Contact(s): NYSDEC – Kathleen McCue – 518-457-7924

Contacts:

Project Manager Name/Telephone: Robert Murphy/716-856-5636

Project Health & Safety Office Name/Telephone: Richard Fudeman/716-856-5636

Cellular Phone (if applicable): N/A

SITE EVACUATION PROCEDURES:

Flags will be positioned near drilling equipment to indicate wind direction. In the event of a sudden release of hazardous gases or vapors, or a fire, all personnel will move upwind or at 90 degrees away from the location of the release or fire, toward the site exit point. In the event of a sudden release or fire requiring immediate evacuation of the site, three quick blasts will be sounded on an air horn. Sounding the horn will be the responsibility of the supervising geologist.

ATTACHMENT 1

MATERIAL SAFETY DATA SHEETS FOR CHEMICALS USED ON SITE

BOUGHT ACCORDING TO SPECIFICATION -- VV-G-1690,GASOLINE,AUTOMOTIVE,LEADED,UNLEAD - GASOLINE,
MATERIAL SAFETY DATA SHEET
FSC: 9130
NIIN: 002646215
Manufacturer's CAGE: 81348
Part No. Indicator: A
Part Number/Trade Name: VV-G-1690,GASOLINE,AUTOMOTIVE,LEADED,UNLEAD

General Information

Item Name: GASOLINE,AUTOMOTIVE
Company's Name: BOUGHT ACCORDING TO SPECIFICATION
Record No. For Safety Entry: 028
Tot Safety Entries This Stk#: 030
Date MSDS Prepared: 01JAN85
Safety Data Review Date: 30NOV79
MSDS Serial Number: BDQLM
Specification Number: VV-G-1690
Hazard Characteristic Code: F2

Ingredients/Identity Information

Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM/500 STEL
ACGIH TLV: 300 PPM/500STEL;9192

Physical/Chemical Characteristics

Fire and Explosion Hazard Data

Flash Point: -40F

Reactivity Data

Health Hazard Data

Precautions for Safe Handling and Use

Control Measures

Transportation Data

Trans Data Review Date: 79334
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1

IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Label: FLAMMABLE LIQUID
AFI Basic Pac Ref: 7-7

Disposal Data

Disposal Data Review Date: 88179
Rec # For This Disp Entry: 01
Tot Disp Entries Per NSN: 001
Landfill Ban Item: YES
Disposal Supplemental Data: IN CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, CONSULT HEALTH AND SAFETY FILE FOR PRECAUTIONS.
1st EPA Haz Wst Code New: D001
1st EPA Haz Wst Name New: IGNITIBLE
1st EPA Haz Wst Char New: IGNITABILITY
1st EPA Acute Hazard New: NO

Label Data

Label Required: YES
Label Status: G
Common Name: VV-G-1690,GASOLINE,AUTOMOTIVE,LEADED,UNLEAD
Label Name: BOUGHT ACCORDING TO SPECIFICATION

ALLIED CHEMICAL -- NITRIC ACID,REAGENT GRADE - NITRIC ACID,REAGENT
MATERIAL SAFETY DATA SHEET
FSC: 6810
NIIN: 010916213
Manufacturer's CAGE: 1L164
Part No. Indicator: A
Part Number/Trade Name: NITRIC ACID,REAGENT GRADE

General Information

Item Name: NITRIC ACID,REAGENT
Company's Name: ALLIED CHEMICAL CORP
Company's Street: COLUMBIA RD & PARK AVE
Company's P. O. Box: 1087R
Company's City: MORRISTOWN
Company's State: NJ
Company's Country: US
Company's Zip Code: 07960
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Date MSDS Prepared: 01JAN85
Safety Data Review Date: 07OCT82
Supply Item Manager: 75
MSDS Serial Number: BGLMG
Specification Number: O-C-265
Hazard Characteristic Code: D4
Unit Of Issue: BT
Unit Of Issue Container Qty: 7 LB

Ingredients/Identity Information

Proprietary: NO
Ingredient: NITRIC ACID (SARA III)
Ingredient Sequence Number: 01
Percent: 70.5
NIOSH (RTECS) Number: QU5775000
CAS Number: 7697-37-2
OSHA PEL: 2 PPM/4 STEL
ACGIH TLV: 2 PPM/4 STEL; 9192

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS LIQUID,PUNGENT ODOR.
Boiling Point: 251.6F/122C
Vapor Pressure (MM Hg/70 F): 8
Vapor Density (Air=1): 1.58
Specific Gravity: 1.42
Evaporation Rate And Ref: <1(BUTYL ACETATE)
Solubility In Water: COMPLETE
Percent Volatiles By Volume: N/A

Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: IF INVOLVED IN A FIRE,USE WATER SPRAY.
Special Fire Fighting Proc: AVOID INHALE OF GAS.USE SELF-CNTND BRTHG APP.FUL PROTV EQUIP
Unusual Fire And Expl Hazrds: WILL INCREAS FLAMABILITY OF WOOD,ORGANICS. CAUSES EXPLOS W H*2S,METAL POWDERS,CARBIDES,TURPENTINE.

Reactivity Data

Stability: YES
Materials To Avoid: METALS,H*2S,WOOD,EXCELSIOR,PAPER PRODUCTS,SIMILAR ORGANICS.
Hazardous Decomp Products: POISONOUS OXIDES OF NITROGEN(GASEOUS)
Hazardous Poly Occur: NO

Health Hazard Data

Signs/Symptoms Of Overexp: SEVER BURNS TO EYES,SKIN.INHALE OF VAPOR DAMAGES RESPIR TRACT.SYMPTOMS MAY BE DELAYED.ING.MAY B FATL
Emergency/First Aid Proc: SKIN:FLUSH WITH PLENTY WATER.EYES:FLUSH W WATER 15 MIN.GET IMMEDIATE MEDICAL ATTENTION.IF INHALED:REMOVE TO FRESH AIR,GET IMMEDIATE MEDICAL ATTENTION.INGEST:HAVE VICTIM DRINK PLENTY WATER. DO NOT INDUCE VOMITING.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: FLUSH WITH PLENTY OF WATER AND NEUTRALIZE WITH ALKALINE MATL SUCH AS SODA ASH,LIME,ETC.PROVIDE ADEQUATE VENTILATION AS OXIDES OF NITROGEN AND CO*2 ARE GENERATED DURING NEUTRALIZATION.
Waste Disposal Method: DILUTE AND NEUTRALIZE.IF PERMITTED BY LOCAL,STATE AND FEDERAL REGULATIONS,FLUSH NEUTRAL RESIDUE TO SEWER WITH PLENTY OF WATER.CONTACT LOCAL AUTHORITIES FOR DISPOSAL COMPLIANCE.
Precautions-Handling/Storing: STORE IN WELL-VENTILATED PROPERLY DRAINED SITE AWAY FROM HEAT,SUN.ISOLATE FROM METALS,ORGANICS,WOOD,PAPER PRODUCTS. PROTECT FROM PHYSICAL DAMAGE.
Other Precautions: NITRIC ACID VAPOR AND OXIDES ARE INSIDIOUS.SYMPTOMS FROM INHALATION MAY BE DELAYED.DO NOT BREATH FUMES.SEE MCA CHEMICAL SAFETY DATA SHEET SD-5,FROM MANUFACT CHEM ASSO.IN WASHINGTON,D.C.

Control Measures

Respiratory Protection: USE SELF-CNTND OR CLEAN AIR SUPPLIED BREATHING APPARATUS.
Ventilation: LOCAL EXHAUST SUFFICIENT TO ELIMINATE ALL FUMES.
Protective Gloves: NEOPRENE
Eye Protection: CHEM SAFETY GOGGLES
Other Protective Equipment: NEOPREN APRON/SHOES,HARD HAT,NEOPREN CLOTHNG, FACE SHIELD.

Transportation Data

Trans Data Review Date: 82280
DOT PSN Code: KFD
DOT Proper Shipping Name: NITRIC ACID
DOT Class: 8
DOT ID Number: UN2031
DOT Pack Group: II
DOT Label: CORROSIVE
IMO PSN Code: KPF
IMO Proper Shipping Name: NITRIC ACID
IMO Regulations Page Number: 8195
IMO UN Number: 2031
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: RWF
IATA UN ID Number: 2031
IATA Proper Shipping Name: NITRIC ACID
IATA UN Class: 8
IATA Label: CORROSIVE
AFI PSN Code: RWF
AFI Symbols: 0
AFI Prop. Shipping Name: NITRIC ACID

AFI Class: 8
AFI ID Number: UN2031
AFI Pack Group: II
AFI Label: CORROSIVE
AFI Basic Pac Ref: 12-14

Disposal Data

Disposal Data Review Date: 88088
Rec # For This Disp Entry: 01
Tot Disp Entries Per NSN: 002
Landfill Ban Item: YES
Disposal Supplemental Data: IN CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, cONSULT HEALTH AND SAFETY FILE FOR PRECAUTIONS.
1st EPA Haz Wst Code New: D001
1st EPA Haz Wst Name New: IGNITIBLE
1st EPA Haz Wst Char New: IGNITABILITY
1st EPA Acute Hazard New: NO
2nd EPA Haz Wst Code New: D002
2nd EPA Haz Wst Name New: CORROSIVE
2nd EPA Haz Wst Char New: CORROSIVITY
2nd EPA Acute Hazard New: NO

Label Data

Label Required: YES
Label Status: F
Special Hazard Precautions: POISONOUS; MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN. CONTACT MAY CAUSE BURNS TO SKIN AND EYES. FIRE MAY PRODUCE IRRITATING OR POISONOUS GASES. RUNOFF FROM FIRE CONTROL OR DILUTION WATER MAY CAUSE POLLUTION.
Label Name: ALLIED CORP., ALLIED CHEMICAL,CSS DEPT.
Label Street: COLUMBIA RD & PARK AVE
Label P.O. Box: 1087R
Label City: MORRISTOWN
Label State: NJ
Label Zip Code: 07960
Label Country: US

OxyChem®

Responsible Care® A Public Commitment

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS NUMBER : M34514 **ISSUE DATE :** 03-08-96

PRODUCT NAME : MURIATIC ACID ALL GRADES

Manufacturer's Name and Address : Occidental Chemical Corporation, Occidental Tower
5005 LBJ Freeway, P.O. Box 809050
Dallas, TX 75380 (214) 404-3800

24 HOUR EMERGENCY TELEPHONE : 1-800-733-3665 OR 214-404-3228

TO REQUEST AN MSDS : 1-800-699-4970

CUSTOMER SERVICE : 1-800-752-5151

PRODUCT USE : Chemical Processing/Metal Cleaning

CHEMICAL NAME : Hydrogen Chloride

CHEMICAL FORMULA : HCl

SYNONYMS/COMMON NAMES : HCl Solution
Aqueous Hydrogen Chloride
Hydrochloric Acid

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS NUMBER / NAME
7732-18-5 Water

EXPOSURE LIMITS
PEL:Not Established
TLV:Not Established

PERCENTAGE
VOL ND
WT 64-91

COMMON NAMES:

Listed On(List Legend Below):
00 19 22 23 50

2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

7647-01-0 Hydrochloric acid

EXPOSURE LIMITS
PEL:5 ppm; 7 mg/m3, Ceiling
TLV:5 ppm; 7.5 mg/m3, Ceiling

PERCENTAGE
VOL ND
WT 9-36

COMMON NAMES:
HYDROGEN CHLORIDE

Listed On(List Legend Below):
00 01 02 13 18 21 22 45 50

LIST LEGEND
00 TSCA INVENTORY
01 SARA EXTR HAZ SUB, SECTION 302
02 SARA TOXIC CHEM, SECTION 313
13 PA ENVIROMENTAL HAZ SUBSTANCE
18 NY HAZARDOUS SUBSTANCES
19 PA REQUIREMENT- 3% OR GREATER
21 NJ SPECIAL HEALTH HAZ SUB
22 CANADIAN DOMESTIC SUB LIST
23 NJ REQUIREMENT- 1% OR GREATER
45 EPA/OSHA ACCIDENTAL RELEASE
50 PHILIPPINES INVENTORY (PICCS)

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

CORROSIVE. CAUSES SEVERE BURNS TO EYES, SKIN AND DIGESTIVE TRACT. SEVERELY IRRITATING TO RESPIRATORY TRACT, EYES AND SKIN. MAY CAUSE IRRITATION OF DIGESTIVE TRACT. MAY CAUSE DISCOLORATION OF TEETH.

Clear to light amber liquid with a pungent odor.

****

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY:

Inhalation, Ingestion.

TARGET ORGANS:

Eyes, Skin, Respiratory Tract, Gastrointestinal Tract.

IRRITANCY:

All routes of exposure.

SENSITIZING CAPABILITY:

None known.

REPRODUCTIVE EFFECTS:

None known.

3. HAZARDS IDENTIFICATION (Continued)

CANCER INFORMATION:

Not known to be carcinogenic.

SHORT-TERM EXPOSURE (ACUTE)

INHALATION:

Breathing gas, fog, mist or spray may result in coughing and a burning or choking sensation in the throat. If inhaled deeply, fluid may collect in the lungs (edema). Prolonged or repeated exposure to concentrations in excess of the exposure limits may cause discoloration of teeth.

EYES:

Contact rapidly causes severe irritation of the eyes and eyelids. If not quickly removed by thorough irrigation with water, there may be prolonged or permanent visual impairment or total loss of sight. Hydrogen chloride gas escaping from the aqueous solution is immediately irritating.

SKIN:

Contact may cause burns and tissue destruction.

INGESTION:

Can cause severe burns to the mucous membranes of the digestive tract.

REPEATED EXPOSURE (CHRONIC)

None known.

SYNERGISTIC MATERIALS:

None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing disorders affecting target organs.

4. FIRST AID MEASURES

EYES:

IMMEDIATELY FLUSH EYES WITH A DIRECTED STREAM OF WATER for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

Flush thoroughly with cool water under shower while removing contaminated clothing and shoes. Discard non-rubber shoes. Wash clothing before reuse. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

4. FIRST AID MEASURES (Continued)

INHALATION:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

NOTES TO PHYSICIAN:

No specialized procedures. Treat for clinical symptoms.

5. FIRE FIGHTING MEASURES

Flash Point: Non-Flammable

Method: Not Applicable

Autoignition Temperature: Not Applicable

FLAMMABLE LIMITS IN AIR, BY % VOLUME

- Upper: Non-Flammable
  Lower: Non-Flammable

EXTINGUISHING MEDIA:

Non-flammable / Non-combustible.

Use agents appropriate for surrounding fire.

Use water spray to keep fire-exposed containers cool.

FIRE FIGHTING PROCEDURES:

Keep unauthorized personnel removed and upwind. Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and full protective clothing.

FIRE AND EXPLOSION HAZARD:

This product is nonflammable and nonexplosive under normal conditions of use. At high temperatures this product can decompose to give off hydrochloric acid and gas.

Vapors are irritating to the eyes and nose. Liquid is corrosive to the skin

This product attacks most metals with the evolution of explosive hydrogen gas.

5. FIRE FIGHTING MEASURES (Continued)

SENSITIVITY TO MECHANICAL IMPACT:

Not sensitive.

SENSITIVITY TO STATIC DISCHARGE:

Not sensitive.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Evacuate unnecessary personnel.

Keep unprotected personnel upwind of the spill area.

Follow protective measures provided under Personal Protection in Section 8.

ENVIRONMENTAL PRECAUTIONS:

Contain spill with dike to prevent entry into sewers or waterways.

According to 40 CFR 302 Table 302.4 (CERCLA), environmental releases that exceed the RQ must be reported to the National Response Center by calling 800-424-8802 (202-426-2675) and the State Emergency Response Commission and the Local Emergency Planning Committee (40 CFR 355.40) as appropriate.

METHODS FOR CLEANING UP:

Large spills should be removed by vacuum truck. Smaller spills may be soaked up and neutralized with soda ash which should be placed in closed containers, labeled and stored in a safe place outdoors to await proper disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers.

7. HANDLING AND STORAGE

HANDLING:

Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the MSDS.

Avoid breathing vapor, use with adequate ventilation. Wear NIOSH/MSHA approved respiratory protection if there is potential for exposure above the exposure limits.

Keep away from sources of ignition because toxic, corrosive and explosive gases may be formed.

Wash thoroughly after handling.

Open container carefully to avoid spurting.

7. HANDLING AND STORAGE (Continued)

SPECIAL MIXING AND HANDLING INSTRUCTIONS:

DO NOT ADD WATER DIRECTLY TO PRODUCT, and do not mix with alkalies such as sodium hydroxide (caustic soda) or alkali metals, to avoid a possible violent reaction. The product may be added to water with mixing and dilution.

STORAGE:

Store in a cool, ventilated area away from incompatible materials (see Section 10).

Dike and vent storage tanks.

Do not store in unlined containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

General room ventilation plus local exhaust at points of emission to maintain levels of airborne contaminants below exposure limits.

PERSONAL PROTECTION

RESPIRATORY:

Wear a NIOSH/MSHA approved respirator following manufacturer's recommendations, where airborne contaminants may occur.

EYE/FACE:

Wear chemical safety goggles plus full face shield to protect against splashing when appropriate (ANSI Z87.1).

SKIN:

Wear chemical resistant gloves such as rubber, neoprene or vinyl.

Whenever there is a possibility of splash or contact wear a chemical resistant full body suit and boots.

OTHER:

Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Clear to light amber liquid with a pungent odor.

Odor Threshold: Not available

9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

Specific Gravity (Water=1): 1.05 to 1.18

Vapor Pressure: 14.6 to 80

Vapor Density (Air=1): 1.3 @ 20°C

Density: 8.75 to 9.83 lb/gal

Evaporation Rate: Not available

% Volatiles by Wt: Not applicable

Boiling Point: 140°F (60°C) to 221°F (105°C)

Freezing Point: -29°F (-34°C) to 5°F (-15°C)

Melting Point: Not available

Solubility in Water (% by wt.): 100

pH: 0.2% solution has a pH of 2

Octanol/Water Partition Coefficient: Not available

Thermal Decomposition Temperature: Not available

Other: Aqueous HCL solutions on boiling go to a constant boiling mixture that contains 20.24% HCL @ 110°C

VOC (% by wt.): Not applicable

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

X	STABLE
	UNSTABLE

REACTS WITH:

	AIR		OXIDIZERS	X	METALS
	WATER		ACIDS		OTHER
X	HEAT	X	ALKALIS		NONE

HAZARDOUS POLYMERIZATION:

	OCCURS
X	WILL NOT OCCUR

COMMENTS:

Avoid contact with alkali metals or other active metals and certain of their compounds. Do not add water directly to the product. The product may be added to water with mixing and dilution.

10. STABILITY AND REACTIVITY (Continued)

HAZARDOUS DECOMPOSITION PRODUCTS:

Generates toxic and irritating gases at high temperatures. Reacts with metals with the evolution of hydrogen which when mixed in air may result in fire or explosion if ignited. Chlorine gas may be released by mixing with strong oxidizers.

11. TOXICOLOGICAL INFORMATION

7647-01-0 Hydrochloric acid

ACUTE ORAL LD50 :	(rabbit)	900 mg/kg
ACUTE INHALATION LC50 :	(rat, 1 hr)	3124 ppm

12. ECOLOGICAL INFORMATION

7647-01-0 Hydrochloric acid

AQUATIC ECOTOX DATA

Fish:

LC50 (96 hr.)	(Mosquito fish)	282	mg/L
LC100 (24 hr.)	(Trout)	10	mg/L

Invertebrates:

LC50 (48 hr.)	(Starfish)	100 - 330	mg/L
LC50 (48 hr.)	(Shrimp)	100 - 330	mg/L
LC50 (48 hr.)	(Shore crab)	240	mg/L

Amphibians:

No data available

Plants:

No data available

TERRESTRIAL ECOTOX DATA

Wildlife:

No data available

Plants:

No data available

ENVIRONMENTAL FATE DATA

Biotic:

No data available

Abiotic:

Dissociates in water

12. ECOLOGICAL INFORMATION (Continued)

Hydrochloric acid can be acutely toxic in aquatic life through reduction in aqueous pH to toxic levels. Typically most aquatic species are intolerant of pH levels lower than 5.5 for any extended length of time. Reduction in aqueous pH levels may also cause the liberation of metals such as aluminum which will also contribute to exhibited toxicity. Hydrochloric acid will dissociate in water and undergo neutralization with carbonate and other naturally occurring buffering agents. Terrestrial organisms would be subject to severe burns if exposed to HCl during an accidental release. A large HCl release could lead to a persistent reduction in pH in a poorly buffered system lacking in carbonates or other naturally occurring acid neutralizers. Care should be taken to avoid accidental releases to aquatic or terrestrial ecosystems.

13. DISPOSAL CONSIDERATIONS

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all (clean-up) materials and any contaminated equipment in accordance with all applicable federal, state, and local regulations.

Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be done by a competent and properly permitted contractor.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: Hydrochloric Acid, Solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION NUMBER: UN1789

DOT PACKING GROUP: II

DOT HAZARDOUS SUBSTANCE(S): RQ 5,000 Lbs. (Hydrochloric Acid)

DOT MARINE POLLUTANT(S): Not Applicable

ADDITIONAL DESCRIPTION REQUIREMENT: Not Applicable

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III Hazard Categories for this product are indicated below. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40.CFR.370. Please consult those regulations for details.

Under Section 302 of the Superfund Amendments and Reauthorization Act of 1986, hydrogen chloride IN THE GAS PHASE is classified as an Extremely Hazardous Substance. This material contains hydrogen chloride in aqueous solution.

This product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372. See Section 2, List Legend 02.

TSCA:

All components of this product that are required to be on the TSCA inventory are listed on the inventory.

SARA/TITLE III HAZARD CATEGORIES:

Immediate(Acute) Health:	YES	Reactive Hazard	YES
Delayed(Chronic) Health:	NO	Sudden Release of Pressure	NO
Fire Hazard:	NO		

HMIS HAZARD RATINGS:

HEALTH HAZARD: 3 FIRE HAZARD: 0 REACTIVITY: 2

STATE REGULATIONS:

See Section 2. COMPOSITION/INFORMATION ON INGREDIENTS list legend for applicable state regulation.

Consult local laws for applicability.

INTERNATIONAL REGULATIONS:

Consult the regulations of the importing country.

CANADA:

WHMIS Hazard Class: D1B, E

16. OTHER INFORMATION

For additional non-emergency health, safety or environmental information telephone (716) 286-3042 or write to:

Occidental Chemical Corporation
Product Stewardship Department
360 Rainbow Boulevard South
P.O. Box 728
Niagara Falls, New York 14302-0728

MSDS LEGEND:

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service Registry Number

CEILING = Ceiling Limit (15 Minutes)

CEL = Corporate Exposure Limit

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit (OSHA)

STEL = Short Term Exposure Limit (15 Minutes)

TDG = Transportation of Dangerous Goods (Canada)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average (8 Hours)

WHMIS = Worker Hazardous Materials Information System (Canada)

* = See Section 3 Hazards Identification - Repeated Exposure(Chronic) Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any federal, state or local laws, rules, regulations or ordinances.

This Material Safety Data Sheet (MSDS) covers the following materials:

- MURIATIC ACID 20BE
- MURIATIC ACID 32% (20 DEG. BE')
- MURIATIC ACID, 18% BELLE
- MURIATIC ACID 20° BE' DEER PARK
- MURIATIC ACID 20° BE' COMMERICAL NIAGARA
- MURIATIC ACID 20° BE' WATER WHITE NIAGARA
- MURIATIC ACID 20° BE' HIGH GRADE EXCHANGE
- MURIATIC ACID 20 COMMERCIAL

16. OTHER INFORMATION (Continued)

- MURIATIC ACID 20° BE' WATER WHITE TACOMA
- MURIATIC ACID 22° BE' WATER WHITE TACOMA
- MURIATIC ACID, 18% NIAGARA
- MURIATIC ACID, 10% DEER PARK
- MUR ACD 20 WW-TAC (CAN)
- MUR ACD 22 WW-TAC (CAN)
- MUR ACID 20 COM NF (CAN)
- MUR ACD 20 WW-NIAG (CAN)

17. WARNING LABEL INFORMATION

SIGNAL WORD:

DANGER

HAZARD WARNINGS:

CORROSIVE.

CAUSES SEVERE BURNS TO EYES, SKIN AND DIGESTIVE TRACT.

SEVERELY IRRITATING TO RESPIRATORY TRACT, EYES AND SKIN.

MAY CAUSE IRRITATION OF DIGESTIVE TRACT.

MAY CAUSE DISCOLORATION OF TEETH.

PRECAUTIONS:

Keep container tightly closed and properly labeled.

Avoid breathing vapors.

Use with adequate ventilation to maintain exposure level below PEL.

Avoid contact with eyes, skin and clothing.

Wear chemical safety goggles plus full face shield to protect against splashing when appropriate (ANSI Z87.1).

Wash thoroughly after handling.

Avoid contact with metals.

Do not allow entry into sewers and waterways.

Wear chemical resistant clothing.

Material in contact with metals may liberate flammable hydrogen gas.

17. WARNING LABEL INFORMATION (Continued)

FIRST AID

EYES:

IMMEDIATELY FLUSH EYES WITH A DIRECTED STREAM OF WATER for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

Flush thoroughly with cool water under shower while removing contaminated clothing and shoes. Discard non-rubber shoes. Wash clothing before reuse. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

INHALATION:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF SPILL OR LEAK:

Get protective equipment.

Contain spill and pump into marked container for reclamation or disposal.

Avoid discharges to sewers and streams.

Spills of 5000 pounds or more must be reported to the National Response Center, 1-800-424-8802.

Use NIOSH/MSHA self-contained breathing apparatus and full protective equipment.

FIRE:

Material does not burn.

Use extinguishing medium as appropriate for surrounding fire.

Use NIOSH/MSHA self-contained breathing apparatus and full protective equipment.

Fire will liberate toxic gases.

HANDLING AND STORAGE:

Store in a cool, dry, well-ventilated area away from metals and strong alkalies, flammable substances and oxidizing materials.

17. WARNING LABEL INFORMATION (Continued)

Dike and vent storage tanks.

Do not store in unlined containers.

Do not add water directly to product, do not mix with alkalies or alkali metals.

DISPOSAL:

Submit to an approved chemical disposal service for disposal in accordance with government regulations.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This Product Contains:

CAS#	NAME
7732-18-5	Water
7647-01-0	Hydrochloric acid

HMIS RATING: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

LABEL NUMBER: 0396M34514

For Industrial Use Only

AIR PRODUCTS

Specialty G
Material Safe
Data She

94 JAN 27 01:51

EMERGENCY PHONE (800) 523-9374 IN PENNSYLVANIA (800) 322-9092	PRODUCT NAME ISOBUTYLENE	CAS #115-11-7
AIR PRODUCTS AND CHEMICALS, INC. BOX 538 ALLENTOWN, PA 18105 (215) 481-8257	TRADE NAME AND SYNONYMS Isobutylene	
	CHEMICAL NAME AND SYNONYMS Isobutylene, Isobutene, 2-Methylpropene	
ISSUE DATE AND REVISIONS 04/78, 06/85	FORMULA (iso) C_4H_8	CHEMICAL FAMILY Alkene

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

See last page.

SYMPTOMS OF EXPOSURE

Inhalation: Moderate concentrations which exclude an adequate supply of oxygen to the lungs cause dizziness, drowsiness and eventual unconsciousness. It also has a very mild anesthetic effect which might cause lack of coordination or lessened mental alertness.

Skin and Eye Contact: It is mildly irritating to mucous membranes. Due to its rapid rate of evaporation, isobutylene can cause tissue freezing or frostbite on contact.

TOXICOLOGICAL PROPERTIES

Isobutylene has a very mild anesthetic effect, however, the major health hazard is the exclusion of an adequate supply of oxygen to the lungs.

Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS REQUIRED IN ALL CASES OF OVEREXPOSURE TO ISOBUTYLENE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND MUST BE AWARE OF EXTREME FIRE AND EXPLOSION HAZARD.

Inhalation: Move exposed personnel to an uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Medical assistance should be sought immediately.

Skin Contact or Frostbite: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has caused blistering of the skin or deep tissue freezing.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES
Isobutylene is flammable over a wide range in air.

PHYSICAL DATA

BOILING POINT 19.6°F (– 6.9°C)	**LIQUID DENSITY AT BOILING POINT** 39.1 lb/ft³ (626 kg/m³)
VAPOR PRESSURE @ 70°F (21.1°C) = 39 psia (269 kPa)	**GAS DENSITY AT 70°F, 1 atm** 0.146 lb/ft³ (2.37 kg/m³)
SOLUBILITY IN WATER Insoluble	**FREEZING POINT** – 220.6°F (– 140.3°C)
APPEARANCE AND ODOR Colorless gas with an unpleasant odor similar to that which is emitted when burning anthracite coal.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) See last page.	**AUTO IGNITION TEMPERATURE** 869°F (465°C)	**FLAMMABLE LIMITS % BY VOLUME** LEL 1.8 UEL 9.6
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical		**ELECTRICAL CLASSIFICATION** Class 1, Group not specified

SPECIAL FIRE FIGHTING PROCEDURES
Keep cylinder(s) cool with water spray from a distance. If possible without risk, move cylinder(s) away from fire area. If possible without risk, stop the flow of gas to a fire. Allow gas fire to burn itself out. (Continued on last page.)

UNUSUAL FIRE AND EXPLOSION HAZARDS
Isobutylene is denser than air and can travel considerable distances to an ignition source and flash back. Cylinder(s) may explode or vent when exposed to fire.

REACTIVITY DATA

STABILITY Unstable		**CONDITIONS TO AVOID**
Stable	X	

INCOMPATIBILITY (Materials to avoid)
Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS POLYMERIZATION May Occur		**CONDITIONS TO AVOID**
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, call the "800" emergency phone number listed herein.

WASTE DISPOSAL METHOD
All Federal, State and Local regulations regarding health and pollution should be followed in waste disposal. Contact Air Products for specific recommendations. Do not dispose of unused quantities.

(Continued on last page.)

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.

VENTILATION
Hood with forced ventilation

LOCAL EXHAUST
To prevent accumulation above the LEL

MECHANICAL (Gen.)
In accordance with electrical codes

SPECIAL

OTHER

PROTECTIVE GLOVES
Plastic or rubber

EYE PROTECTION
Safety goggles or glasses

OTHER PROTECTIVE EQUIPMENT
Safety shoes, safety shower, eyewash "fountain."

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
DOT Shipping Name: Liquified petroleum gas DOT Hazard Class: Flammable gas
DOT Shipping Label: Flammable gas ID No.: UN 1075

SPECIAL HANDLING RECOMMENDATIONS
Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (< 250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional recommendations consult the Air Products Specialty Gas Catalog Safety and Technical Information Section or Compressed Gas Association Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

For additional recommendations consult the Air Products Specialty Gas Catalog Safety and Technical Information Section or Compressed Gas Association Pamphlet P-1.

SPECIAL PACKAGING RECOMMENDATIONS
Isobutylene is noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Earth-ground and bond all lines and equipment associated with the isobutylene system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which may not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

Specialty Gas Department
Air Products and Chemicals, Inc.
Box 538, Allentown, PA 18105
(215) 481-8257

AIR PRODUCTS

TIME WEIGHTED AVERAGE EXPOSURE LIMIT (Continued)

Isobutylene is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg. (ACGIH 1984–85)

FLASH POINT (Method Used) (Continued)

– 105°F (– 76°C) Closed Cup

SPECIAL FIRE FIGHTING PROCEDURES (Continued)

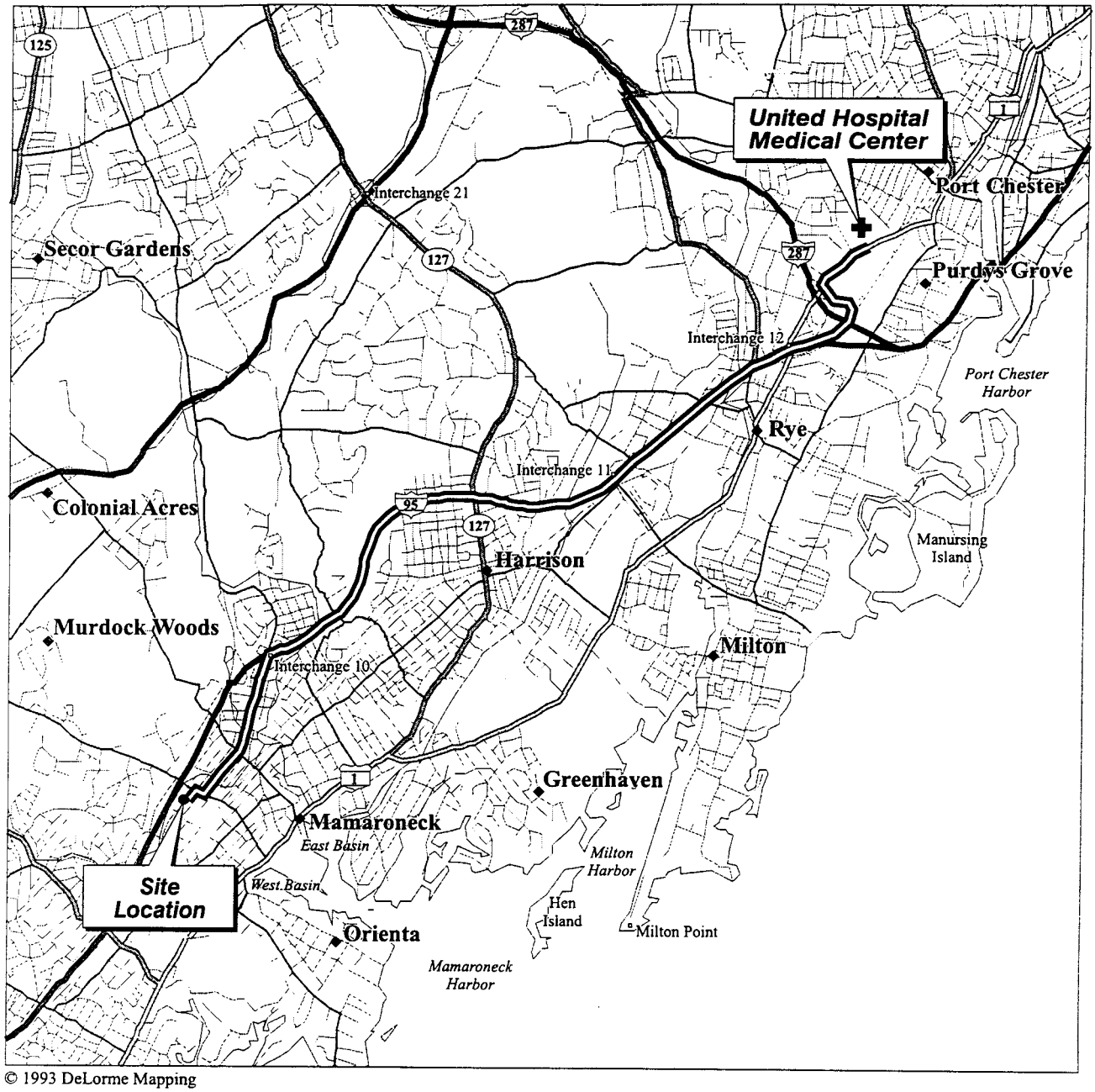
Ventilate low areas where flammable or explosive mixtures may form.

WASTE DISPOSAL METHOD (Continued)

Return the properly labeled shipping container to Air Products for disposal with valve(s) tightly closed, outlet seal(s) secured and valve protection cap in place. For emergency disposal assistance, call the "800" emergency phone number listed herein.

ATTACHMENT 2

ROUTE TO THE HOSPITAL



APPROXIMATE SCALE IN MILES

1 0 1

From site location head north on Fayette Avenue and turn right on Fenimore Road. Head south on Fenimore Road for one block and turn left on Center Avenue. Head north on Center Avenue. Center will merge into Mamaroneck Avenue. Head north on Mamaroneck Avenue and enter the I-95 at Interchange 10. Head north on I-95 for approximately 4 miles. Get off I-95 at Interchange 12. Bear to the right. Make a right on Boston Post Road heading north. The hospital will be immediately to your left once you get on Boston Post Road.

United Hospital Medical Center
406 Boston Post Road
Port Chester, New York 10573

General - (914) 934-3000
Emergency - (914) 934-3030

URS Greiner Woodward Clyde

ROUTE TO THE HOSPITAL
FORMER EMCA SITE

FIGURE 2

AG14040-35673.00-061499.GCM

APPENDIX B

FIELD SAMPLING PLAN

(FSP)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

(Following Text)

B1.0 INTRODUCTION

This Field Sampling Plan (FSP) is designed to provide detailed step-by-step procedures for the field activities outlined in the Field Investigation Plan (FIP) for the Environmental Site Investigation at the former EMCA site in Mamaroneck, New York. It will serve as the field procedures manual to be strictly followed by all URSGWC personnel and subcontractors. Adherence to these procedures will ensure the quality and defensibility of the data collected in the field. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the appropriate Health and Safety guidelines found in the Health and Safety Plan (HASP)- FIP, Appendix A; (2) the Quality Assurance/Quality Control measures outlined in the QAPP; (3) the scope of work and schedule outlined in the FIP.

B2.0 SUBSURFACE INVESTIGATION

B2.1 General Drilling Program

The subsurface investigation program will provide information which will assist in the implementation, operation, and monitoring of the field investigation program. Borings and monitoring wells are proposed as part of the sampling program (see the FIP).

Applicable investigation and monitoring well installation procedures, and the appropriate section where they are discussed is presented below:

- Geoprobe direct push procedures (Section B2.2);
- Soil gas sampling procedures (Section B2.3);
- Visual soil classification procedures (Section B2.4);
- Disposal of drill cuttings (Section B2.5);
- Plugging/abandonment of borehole procedures (Section B2.6);
- Monitoring well construction procedures (Section B2.7);
- Piezometer construction procedures (Section B2.8);
- Well development procedures (Section B2.9);
- Documentation (Section B2.10);

B2.2 Geoprobe Direct Push Procedures

A Geoprobe direct push unit will be used to obtain soil samples and install wells. A 2-inch by 4-foot macro-core sampler will be driven into the ground to the desired sample depth using the Geoprobe unit. Two procedures are presented for the collection of soil samples: one for non-analytical soil samples and one for analytical soil samples.

Procedure

1) Inspect the sampling equipment to ensure proper working condition.
2) Select additional components for the sampler as required (i.e., leaf spring core

retainer for clays, or a sand trap for non-cohesive sands).

3) Lower the sampler to the ground surface, or bottom of the hole previously made by the sampler, and check the depth against length of the rods and the sampler.
4) Attach the drive head assembly to the sample rods.
5) Push the sampler into the subsurface to the desired depth with a hydraulic press.
6) Rotate the sampling rods clockwise and remove the sampler.
7) Extrude the sample, describe the soil, and place spoils in a container or bag.
8) Document all soil descriptions and sample information in the sampling log book.
9) Place well/piezometer in the Geoprobe hole as described in Section B2.7.

B2.3 Soil Gas Sampling Procedures

Soil gas sampling will be conducted to evaluate relative concentrations of contaminants in the vadose soil zone and for collecting samples for laboratory analysis.

B2.3.1 Determination of Relative Concentrations

Procedure:

1) Drive a 3/8-inch diameter probe 2 to 3 feet into the ground using a slam bar. The hole should be slightly deeper than the desired sampling depth.

2) After the hole is made, carefully remove the slam bar to prevent collapse of the walls of the hole.
3) It is necessary to prevent plugging of the probe. Place a metal wire or cable, slightly longer than the probe, into the probe prior to inserting it into the hole. Insert the ¼-inch O.D. stainless steel probe into the hole and seal the top of the hole around the probe using clay.
4) The well volume must be evacuated prior to sampling. Connect a Gillian pump, adjusted to 3.0 L/min to the sample probe using a section of Teflon tubing as a connector. Turn the pump on, and a vacuum is pulled through the probe for approximately 15 seconds. A longer time is required for sampling wells of greater

depth.

5) After evacuation, connect the FID to the probe using a Teflon connector. When the reading is stable, or peaks, record the reading. For detailed procedures on field monitoring instruments consult the manufacturer's instructions.

6) Some readings may be above or below the range set on the field instrument. The range may be reset or the response recorded as a figure greater than or less than the range. Consider the recharge rate of the well with soil gas when sampling at a different range setting.

B2.3.2 Soil Gas Sample Collection for Laboratory Analysis

Procedure

1. Record the time, ambient air temperature and soil gas concentration with a FID. Record all data in the field log book.

2. The well volume must be evacuated prior to sampling. Connect a Gillian pump, adjusted to 3.0 L/min to the sample probe using a section of Teflon tubing as a connector. Turn the pump on, and a vacuum is pulled through the probe for approximately 15 seconds. A longer time is required for sampling wells of greater depth.

3. Connect the 6L SUMMA canister to the well. The SUMMA canister flow control valve will be preset to collect the sample at 1 L/min for 6 minutes. Following the 6 minute sampling interval, the valve will then be closed and the pressure differential will be recorded.

4. Record the time, air temperature, soil gas concentration and sample number.

B2.4 Shallow Soil Sampling Procedure

Shallow probe samples may be collected with a stainless steel hand auger. The depth of sampling will be defined in the scope of services to adequately address all site concerns. Typically, depth is soil matrix-dependent, and is generally limited to 5 feet or less. Soil samples may be collected from each site, as described in the project-specific scope of services/work plan.

Procedures

1) Using a pre-cleaned stainless-steel scoop, remove the grass layer over the soil. If the site is paved, cut a 3-inch diameter hole through the pavement using a portable concrete drill and a chisel, or Geoprobe.

2) Advance the stainless-steel, pre-cleaned bucket auger into the soil until the bucket is full (approximately 6 inches).

3) Using a stainless-steel pre-cleaned scoop, remove the contents from the bottom of the auger and place the contents into a stainless-steel mixing bowl.

4) Re-insert the bucket into the open hole and repeat the above procedure (steps 2 and 3) as many times as necessary until termination depth is reached.

5) Collect the sample for VOC analysis, then composite the remaining contents of the stainless-steel mixing bowl and place adequate volume into the appropriate pre-cleaned bottles.

6) Secure a Teflon-lined cap onto each bottle and place the sample on ice in a cooler for transport to the laboratory.

7) Label the sample bottles with the appropriate sample tag. Be sure to label the tag carefully and clearly, addressing all the categories or parameters. Complete all chain of custody documents and record in the field log book.

8) Decontaminate equipment after use and between sample locations.

9) Record all field data in the field notebook.

10) Repair sampling location with native soil or with Sakrete and water.

B2.5 Visual Soil Classification Procedures

Soils are to be classified for engineering purposes according to the Unified Soil Classification System (USCS) adopted by the United States Army Corps of Engineers and United States Department of the Interior Bureau of Reclamation. Soil properties which form the basis for the USCS are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and
- Plasticity and compressibility characteristics.

According to this system, all soils are divided into three major groups: coarse-grained, fine-grained, and highly-organic (peaty). The boundary between coarse-grained and fine-grained soils is taken to be the 200-mesh sieve (0.074 mm). In the field the distinction is based on whether the individual particles can be seen with the unaided eye. If more than 50% of the soil by weight is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50% of the visible grains are larger than the No. 4 sieve (3/16 inch). They are each divided further into four groups:

W: Well graded; fairly clean (<5% finer than 0.074 mm)

P: Poorly graded (gap-graded); fairly clean (<5% finer than 0.074mm)

C: Clayey (>12% finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A- line with plasticity index above 7.

M: Silty (>12% finer than 0.074 mm); nonplastic or silty fines. Fine fraction below

the A- line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50% (L), or higher than 50% (H).

The distinction between the inorganic clays (C), the inorganic silts (M), and organic silts and clays (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

Soil properties required to define the USCS classification of a soil are the primary features to be considered in field identification. These properties and other observed characteristics normally used to describe soils are defined below:

a. Color
b. Moisture conditions
c. Grain size
    (1) Estimated maximum grain size
    (2) Estimated percent by weight of fines (material passing No. 200 sieve)
d. Gradation
e. Grain shape
f. Plasticity
g. Predominant soil type
h. Secondary components of soil
i. Classification symbol

j. Other features such as:

- organic, chemical, or metallic content;
- compactness;
- consistency;
- cohesiveness near plastic limit;
- dry strength; and
- source - residual, or transported (aeolian, water borne, glacial deposit, etc.)
- evidence of contamination

B2.6 Disposal of Drill Cuttings

Disposal of drill cuttings will be performed in accordance with the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) HWR-89-4032, November 21, 1989.

All drill cuttings generated during soil boring and monitoring well installation will be disposed of on-site. If organic vapor readings exceed 5 parts per million (ppm), the cuttings will be placed into drums for hazardous waste characterization sampling. Based on previous sample results from site soils, it is not anticipated that containerization will be required.

B2.7 Plugging/Abandonment of Borehole Procedures

Once the temporary piezometers and temporary wells are removed, the resultant open boreholes be filled by pouring clean sand into the open hole. The boreholes will be tamped with a rod or tamping plate to prevent subsequent settling.

B2.8 Monitoring Well Construction Procedures

The well construction methodology described below is specific to the construction of

temporary Geoprobe wells. It allows for monitoring of groundwater elevation and acquisition of groundwater samples for laboratory testing.

Procedure:

1) Advance the Geoprobe boring to the desired depth.

2) Verify borehole depth using a weighted measuring tape.

3) Insert the 1-inch Schedule 40 polyvinylchloride (PVC) well screen (0.010-inch slot) and riser pipe to the bottom of the borehole. Cap the riser to prevent well construction materials from entering the well.

4) Add sand to the screen section of the well. The sand pack should extend at least two feet above the top of the screen section. Measure with a tape.

5) Slowly add bentonite pellets to the borehole. The bentonite seal should extend at least two feet above the top of the sand pack section.

6) If the bentonite seal is placed above the groundwater level within the borehole, add water to the borehole to hydrate the bentonite pellets. Allow the pellets to hydrate for at least 30 minutes.

7) Cut the well riser pipe to about 2 inches below existing grade.

8) Install a temporary 4" PVC casing over the well riser pipe and backfill with sand. The 4" PVC casing will be capped with a 4" PVC cap. At completion of the investigation, the protective casing and temporary wells will be removed and the boreholes will be filled with clean sand.

B2.9 Piezometer Construction Procedures

Procedures

1) Advance the Geoprobe boring to the desired depth.

2) Verify borehole depth using a weighted measuring tape.

3) Insert the 3/4-inch Schedule 40 polyvinylchloride (PVC) well screen (0.010-inch slot) and riser pipe to the bottom of the borehole. Cap the riser to prevent well construction materials from entering the well.

4) Place bentonite pellets at the ground surface to prevent surface runoff from entering the piezometer.

5) Clearly mark the location with a 4 foot long stake and flagging tape to prevent tripping hazard.

B2.10 Well Development Procedures

Following completion of drilling and well installation, each monitoring well will be developed by pumping until the discharged water is relatively sediment free and the water quality parameters (pH, temperature, and specific conductivity) have stabilized. Developing the well not only removes any sediment but also may improve the hydraulic properties of the sand pack. The effectiveness of the development measures will be closely monitored in order to keep the volume of discharged water to the minimum necessary to obtain sediment-free samples.

Procedure:

1) An appropriate well development method should be selected, depending on water level depth, well productivity, and sediment content of the water. Well development options include: (a) manual pumping; and (b) powered suction-lift or hydrolift pumping.

2) Equipment should be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.

3) Well development should proceed by repeated removal of water from the well until the discharged water is relatively sediment-free. All development waters will be

discharged directly to the ground at a rate which will allow for reinfiltration to occur. The volume of water removed, turbidity, pH, temperature and specific conductivity measurements will be recorded on the Well Development/Purging Log (Figure B-1).

4) Well development will be discontinued when the water quality parameters have stabilized and the discharge water is relatively clear.

B2.11 Documentation

A field notebook will be initiated at the start of onsite work and maintained by the Field Manager. The field notebook will include the following daily information regardless of what activity is being performed.

- Date
- Meteorological conditions
- Crew members
- Brief descriptions of proposed field activities
- Locations where work is performed
- Problems and corrective actions taken
- All field measurements or descriptions recorded
- Calibration of field equipment used
- All modifications of the FSP

Each subsurface boring will be logged in a bound field notebook during drilling by the supervising geologist. Field notes will include descriptions of subsurface materials encountered during drilling, sample numbers, and types of samples recovered from the borehole. Additionally, the geologist will note time and material expenditures for later verification of contractor invoices on the Daily Drilling Record (Figure B-2).

Upon completion of daily drilling activities, the geologist will complete the daily drilling record and initiate chain-of-custody for any samples recovered for geotechnical or chemical laboratory testing. Following completion of the drilling program, the geologist will transfer field

notes onto standard forms for the report.

The proper completion of the following forms/logs will be considered correct procedure for documentation during the drilling program:

- Test Boring Logs (Figure C-1)
- Monitoring or Recovery Well Construction Details (Figure C-2)
- Well Development/Purging Log (Figure C-3)
- Daily Drilling Record (Figure C-4)
- Field Log Book - weather-proof, bound field book

B3.0 GROUNDWATER WELL PURGING/SAMPLING

To collect representative groundwater samples, groundwater wells must be adequately purged prior to sampling. Low volume sampling equipment and procedures will be used to purge the wells and retrieve groundwater samples. Purging will require the removal of one to three volumes of standing water by pumping at a rate of less than one (1) liter per minute. Drawdown must not exceed ten percent of the standing water column. Sampling should commence immediately after purging.

B3.1 Well Purging Procedures

(1) The well cover will be unlocked and carefully removed to avoid having any foreign material enter the well. The interior of the riser pipe will be monitored for organic vapors using a flame ionization detector (FID). If a reading of greater than 5 parts per million (ppm) is recorded, the well will be vented until levels are below 5 ppm before purging begins.

(2) Using an electronic water level detector, the water level below top of casing will be measured. Knowing the total depth of the well, it will be possible to calculate the volume of water in the well. The end of the probe will be soap-and-water-washed and deionized-water-rinsed between wells.

(3) Calibrate field instruments (e.g., pH, specific conductance, FID).

(4) In all wells, a peristaltic pump will be used to purge the required water volume (i.e., until stabilization of pH, temperature, specific conductivity). Dedicated new discharge and intake tubing will be used for each well.

(6) Slowly install the well pump discharge line into the well and set the end of tubing to about the midpoint of the well screen.

(7) Set the pump to a relatively low discharge rate (less than 1 lpm).

(8) Purge well until the water quality parameters have stabilized. The stabilization criteria are: specific conductivity - 3% full scale range; pH - 0.10 pH unit; temperature - 0.2°C.

(9) Purging of three well volumes is not necessary if the indicator parameters are stable. However, at least one (1) well volume must be purged before sampling can begin.

(10) Indicator parameters must be measured periodically.

(11) Well purging data are to be recorded in the field notebook and on the Well Development/Purging Log.

B3.2 Groundwater Sampling Procedures

(1) After well purging is completed, a sample will be collected into the appropriate containers. The sampling order shall be TCL VOCs followed by TAL metals (if required). Use an in-line filter (0.45 μm) if filtered metals analyses if required.

(2) Direct the discharge tubing toward the inside wall of the sample container to minimize volatilization. Fill VOC sample containers so no headspace (air bubbles) are present. Preserve as needed and cap all sample containers.

(3) All sample bottles will be labeled in the field using a waterproof permanent marker.

(4) Samples will be collected into I-Chem Series 300 or equivalent sample bottles (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-

of-custody record will be initiated. The analytical laboratory will certify that the sample bottles are analyte-free prior to shipping.

(5) Remove pump tubing from well. Decontaminate all non-disposable equipment with a laboratory grade soap (i.e. Alconox) prior to and between each use. Rinse with deionized water after washing.

(6) Well sampling data are to be recorded in the field notebook and on the Well Development/Purging Log.

B3.3 Water Level Monitoring Procedures

Determination of groundwater surface elevations throughout a monitoring well network makes possible the construction of a potentiometric surface contour map and determination of groundwater flow patterns. In addition, surface water elevations will also be determined along the Sheldwake River.

Water levels in all monitoring wells will be measured using an electronic water level indicator or weighted tape. Initially, measurements will be taken following well devlopment until the well has recovered to anticipated static conditions. Water levels will also be measured prior to groundwater purging sampling. Water level measurement procedures are presented below:

Procedure

(1) Clean water level probe following the decontamination procedures (Section C5.0) and test water level meter to ensure that the batteries are charged.

(2) Lower probe slowly into the monitoring well until audible alarm indicates the top of the water column.

(3) Read the depth to the nearest hundredth of a foot, from the graduated cable using a set reference point on the riser pipe.

(4) Repeat the measurement for confirmation and record the water level.

(5) Remove the probe from the monitor slowly, drying the cable and probe with a clean "Chem Wipe" or paper towel.

(6) Replace monitoring well cap and lock protective cap in place.

(7) Decontaminate the water level indicator (Section C5.0) if additional measurements are to be taken.

Water level measurements in the Sheldwake River will be taken by measuring the distance between the top of survey lab and surface water with a measuring tape.

TABLE B-1
SAMPLE CONTAINER, PRESERVATION AND HOLDING TIME REQUIREMENTS

Parameter	Methods [1,2]	Container	Minimum Sample Volume	Preservation	Holding Time
Groundwater					
TCL Volatiles	ASP 95-1	Glass	3 x 40 Ml VOA	Cool to 4°C	7 days
TAL Metals (filtered and unfiltered)	ASP CLP-M	HDPE	500 mL	HNO3 to pH > 2, Cool to 4°C	6 mo. Mercury 26 days
Cyanide	ASP CLP-M	HDPE	500 mL	NaOH to pH > 12, Cool to 4°C	12 days
Hardness	130	HDPE	100 mL	HNO_3 to pH < 2, Cool to 4°C	6 mo.
BOD_5	405.1	HDPE or Glass	1 L	Cool to 4°C	24 hrs.
COD	410	HDPE	50 mL	H_2SO_4 to pH to < 2, Cool to 4°C	26 days
TSS	160.2	HDPE	100 mL	Cool to 4°C	5 days
TDS	160.1	HDPE	100 mL	Cool to 4°C	5 days
Air (Soil Gas)					
Volatile Organics	TO14	SUMMA	6-Liter	None	28 days
Soil					
TCL Volatiles	ASP 95-1	Glass	2 x 4 oz. VOA	Cool to 4°C	10 days

[1]New York State Department of Environmental Conservation Analytical Services Protocol (ASP), 10/95 edition.

[2]Methods for the Chemical Analysis of Water and Wastes, USEPA 600, March 1983.

B4.0 SURVEYING AND MAPPING

Project control surveying will provide for site topographic mapping and for location of sampling points. All surveying will be performed under the supervision of a New York State licensed land surveyor, following the requirements of the FIP and the HASP.

B4.1 Establishing Horizontal Primary Project Control

In order to determine the horizontal locations of site features, horizontal control will be established by surveying to/from existing site features and using an assumed coordinate system. This information will be used on all topographic and site maps.

Procedure:

1) Set and reference points on primary traverse.
2) Turn angles and measure distances.
3) Compute closures and adjust traverse.

B4.2 Establishing Vertical Primary Project Control

In order to determine site elevations, vertical control must be established by surveying to/from existing features (i.e. finish floor slab).

Procedure:

1) Set assumed project benchmarks.
2) Run level line project benchmark to site features defined in the FIP.
3) Reduce notes and prepare recovery sketches.

B5.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

To assure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/ data during the field investigations. Drilling equipment and heavy machinery will be steam cleaned prior to arrival onsite.

Procedures:

1) Thoroughly clean equipment with soap and tap water, until all visible contamination is gone.

2) Rinse with tap water, until all visible evidence of soap is gone.

3) Rinse with deionized water.

4) Air dry.

6) If equipment will not be used immediately, wrap in oil-free aluminum foil.

B6.0 SAMPLE LABELING

In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, sample labeling procedures listed below will be followed:

Procedure:

1) Affix a label to each sample container. The following information will be written on each label with permanent marker prior to wrapping label with cellophane tape:

- Site name
- Sample identification
- Project number
- Date/time
- Sampler's initials
- Sample preservation
- Analysis required

2) Each sample of each matrix will be assigned a unique alpha-numeric identification code. An example of this code and a description of its components is presented below:

Examples

1. MW1-GW

   MW1 =Monitoring Well 1
   GW = Groundwater

2. SB1 - 2'-4'

   SB1 = Soil Boring 1
   2' - 4' =Two-foot to four-foot soil sample

List of Abbreviations

Monitor Type

MW	= Monitoring Well
S	= Shallow
D	= Deep

Sample Type

SB	=	Soil Boring
GW	=	Groundwater
EB	=	Equipment Rinse Blank
HW	=	Hydrant Water (Decon Water/Drilling Water)
TB	=	Trip Blank
RB	=	Rinse Blank
MS	=	Matrix Spike
MSD	=	Matrix Spike Duplicate
MD	=	Matrix Duplicate

B7.0 SAMPLE SHIPPING

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with the samples.

The procedures used in this investigation follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure:

1) The chain-of-custody (COC) record (Figure B-5) should be completely filled out, with all relevant information.

2) The original COC goes with the samples. It should be placed in a ziplock bag and taped inside the sample cooler. The sampler should retain a copy of the COC.

3) Place 2-inches of inert cushioning material such as vermiculite or bubble-wrap in bottom of cooler.

4) Place bottles in cooler in such a way that they do not touch (use cardboard dividers or bubble-wrap).

5) Wrap VOA vials securely in bubble-wrap and tape. Place them in the center of the cooler.

6) Pack cooler with ice in doubled ziplock plastic bags.

7) Pack cooler with cushioning material.

8) Tape drain shut.

9) Wrap cooler completely with strapping tape at two locations securing the lid. Do not cover any labels.

10) Place lab address on top of cooler. For out-of-town laboratory, add the following: Put "This side up" labels on all four sides and "Fragile" labels on at least two sides. Affix numbered custody seals on front right and left of cooler. Cover seals with wide, clear tape.

11) Ship samples via overnight carrier the same day that they are collected, whenever possible.

WELL DEVELOPMENT/PURGE LOG URS Greiner

PROJECT TITLE: _____ WELL NO.: _____

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

			WELL ID.	. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	_____	1"	0.0
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	_____	2"	0.2
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	_____	3"	0.4
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	_____	4"	0.7
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	_____	5"	1.0
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ___)	=	---	6"	1.5
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=	_____	8"	2.6

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											
DISSOLVED OXYGEN (mg/L)											

COMMENTS:

FIGURE B-1

DAILY DRILLING RECORD

URS Greiner

PROJECT: _____ DATE: _____

CLIENT: _____ CONTRACTOR: _____

FROM	TO	PRODUCTIVE HOURS	ACTIVITY / COMMENTS
TOTAL PRODUCTIVE HRS.			LEVEL B / LEVEL C / LEVEL D (circle selection)

LABOR:		MATERIALS / SUPPLIES:	
UNITS	ACTIVITY	UNITS	ITEM

WEATHER:

_____ _____

URS ON-SITE COORDINATOR *CONTRACTOR REPRESENTATIVE*

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Figure B-2

URS Greiner Woodward Clyde

BORING LOG

BORING NO.:

PROJECT:					SHEET: OF
CLIENT:					JOB NO.:
BORING CONTRACTOR:					BORING LOCATION:
GROUNDWATER:				ENVIRONMENTAL SAMPLE	GROUND ELEVATION:
DATE	TIME	LEVEL	REFERENCE	Sample Type:	DATE STARTED:
					DATE FINISHED:
				Sample Analyses:	DRILLER:
					GEOLOGIST:
					REVIEWED BY:

DEPTH Meters	STRATA	SAMPLE				DESCRIPTION			REMARKS
		Number	Recovery	PID Readings (ppm)	Env. Sample Depth(m)	COLOR	MATERIAL DESCRIPTION	CLASS USCS	
1									
2									
3									
4									
5									
6									
7									
8									

COMMENTS: _____

PROJECT NO.: _____

BORING NO.: _____

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Figure B-3

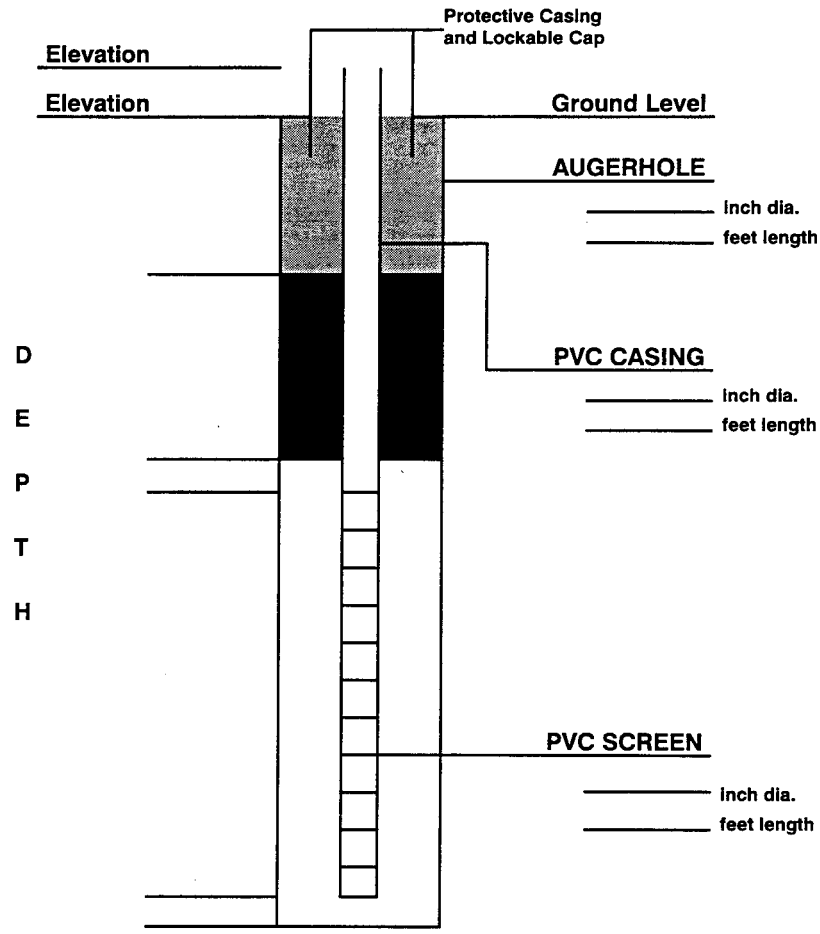
OVERBURDEN WELL CONSTRUCTION DETAILS

URS Greiner Woodward Clyde

DRILLING SUMMARY
Geologist:
Drilling Company:
Driller:
Rig Make/Model:
Date:

GEOLOGIC LOG

Depth (ft.)	Description



WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface:	Type:	Type: Setting:
Monitor:	Slot Size:	SEAL MATERIAL
		Type: Setting:

COMMENTS	LEGEND
	Cement/Bentonite Grout
	Bentonite Seal
	Silica Sandpack
	Well No.
Client: **Location:**	**Project No.**

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Figure B-4

CHAIN OF CUSTODY RECORD

URS Greiner

PROJECT NO. | SITE NAME

SAMPLERS (PRINT/SIGNATURE)

DELIVERY SERVICE: _____ AIRBILL NO.: _____

LAB _____

COOLER _____ of _____

PAGE _____ of _____

LOCATION IDENTIFIER	DATE	TIME	COMP/ GRAB	SAMPLE ID	MATRIX	TOTAL NO.# OF CONTAINERS	TESTS / BOTTLE TYPE AND PRESERVATIVE	REMARKS	SAMPLE TYPE	BEGINNING DEPTH (IN FEET)	ENDING DEPTH (IN FEET)	FIELD LOT NO.# (IRPIMS ONLY)

MATRIX CODES

AA - AMBIENT AIR; SE - SEDIMENT; SH - HAZARDOUS SOLID WASTE; SL - SLUDGE; WP - DRINKING WATER; WW - WASTE WATER; WG - GROUND WATER; SO - SOIL; DC - DRILL CUTTINGS; WL - LEACHATE; GS - SOIL GAS; WC - DRILLING WATER; WO - OCEAN WATER; WS - SURFACE WATER; WQ - WATER FIELD QC; LH - HAZARDOUS LIQUID WASTE; LF - FLOATING/FREE PRODUCT ON GW TABLE

SAMPLE TYPE CODES

TB# - TRIP BLANK; SD# - MATRIX SPIKE DUPLICATE; RB# - RINSE BLANK; FR# - FIELD REPLICATE; N# - NORMAL ENVIRONMENTAL SAMPLE; MS# - MATRIX SPIKE

(# - SEQUENTIAL NUMBER (FROM 1 TO 9) TO ACCOMMODATE MULTIPLE SAMPLES IN A SINGLE DAY)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY (SIGNATURE)	DATE	TIME

SPECIAL INSTRUCTIONS

Distribution: Original accompanies shipment, copy to coordinator field files

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Figure B-5