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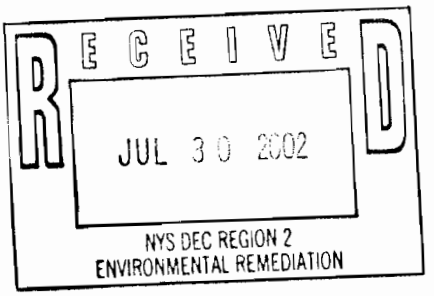

FYN PAINT & LACQUER CO., INC.
230 KENT AVENUE
BROOKLYN, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN

Prepared For

Fyn Paint & Lacquer Co., Inc.

July 2002

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water and Environmental Engineering Services
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FYN PAINT & LACQUER CO., INC.
230 KENT AVENUE
BROOKLYN, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN

INTRODUCTION

The Fyn Paint & Lacquer Co., Inc. is the subject of a Voluntary Cleanup Program (VCP), Index Number W2-0873-00-10 pursuant to the New York State Department of Environmental Conservation (NYSDEC) VCP. The purpose of the proposed Supplemental Remedial Investigation Work Plan (SRIWP) is to respond to the NYSDEC comments submitted in a letter dated May 30, 2002.

The proposed SRIWP includes the following:

- revisions of the Investigation Work Plan prepared by Fenley & Nicol and submitted to NYSDEC on January 30, 2001;
- additional investigation work to define the horizontal and vertical extent of contamination downgradient of the site;
- Site-Specific Health and Safety Plan;
- including a Community Air Monitoring Plan;
- soil-gas survey inside of Fyn Paint Building;
- schedule regarding the implementation of SRIWP following NYSDEC approval.

SITE LOCATION AND DESCRIPTION

The Fyn Paint & Lacquer Co., Inc. is located in an industrial/commercial area at the intersection of Kent Avenue and North Street in the Borough of Brooklyn, New York City. The Fyn Paint site consists of a one story industrial/warehouse building. The facility is currently

utilized as a paint and lacquer factory. The vicinity of the property consists of industrial and commercial properties.

The footprint of the building is approximately 55,000 ft^2 (square feet) on the first floor and approximately 3,500 ft^2 on the second floor. The building's heating system is provided by steam heat and the electrical service enters the building from Kent Avenue. A small basement (approximately 25 feet by 10 feet) is used for the heating oil tank controls for the sprinkler system and air compressor. A second basement approximately 20 feet by 15 feet contains the furnace. The site is connected to the New York City municipal sewer system.

GEOLOGY AND HYDROGEOLOGY

The Site is located in the Atlantic Coastal Plain physiographic province. The geology of this province is comprised of interbedded layers of sand, clay and marl. In Long Island the marine deposits are overlain by drift. The marine deposits are Cretaceous and Quaternary. The drift deposits are derived from glacial activity that occurred during the Pleistocene. The total thickness of the marine and glacial deposits in Kings County ranges from 0 foot in northwest Brooklyn to 1,100 feet thick in northeastern Brooklyn.

The ground-water resources that underlie western Long Island is composed of a series of unconsolidated deposits of sand, gravel and clay of late Cretaceous and Pleistocene age. The principal water-bearing units that provide usable quantities of water are the Upper Glacial Aquifer, the Jameco Aquifer, the Magothy Aquifer and the Lloyd Aquifer. Except for the Upper Glacial Aquifer and Jameco Aquifer, these units are vertically separated from each other by confining clay units.

The topography of the area is generally level. The vicinity of the Site is approximately 11 to 15 ft msl (feet above mean sea level). The ground surface at the Site consists of poured concrete and asphalt pavement. The shallow sediments beneath the Site consist of medium and coarse grained brown sand with some silt and trace gravel. In general, the subsurface beneath the area consisted of interbedded layers of sand, gravel, clay and silt to approximately 75 feet below ground surface. Bedrock beneath the Site is approximately 75 feet below ground surface. The regional direction of ground-water flow beneath the property is toward the west.

SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN

The following work plan was developed for the supplemental remedial investigation.

Task 1 – Soil Investigation

A total of 12 soil borings, will be drilled at the following locations as shown on figure 1.

- 2 soil borings along the eastern side of Fyn Paint building on Kent Avenue;
- 4 soil borings along the southern side of Fyn Paint building on North First Street;
- 2 soil borings along the western side of Fyn Paint building on River Street;
- 2 soil borings on south side of River Street in the vicinity of MW-4.

Each soil boring will be drilled by the geoprobe drilling method from grade to the ground water. During the drilling, soil samples will be collected continuously using a 4-foot macrocore sampling device. Each soil sample will be visually inspected by an LBG hydrogeologist, described on a geologic log and screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID).

The soil sample which will exhibit the highest head-space vapor concentration will be submitted to a New York State certified laboratory for analysis (NYSDEC ASP-95). It is expected that 1 sample per soil boring will be analyzed in laboratory for VOCs.

A total of 4 soil samples, one sample from a selected soil boring, will be analyzed for Target Compound List (TCL) and Target Analyte List (TAL) metals. It is expected that 1 sample from soil borings drilled on the eastern side of the Fyn Paint building, 2 samples from soil borings drilled on the southern side of Fyn Paint and 1 sample from soil borings drilled on the western side of Fyn Paint building will be analyzed for full span parameters.

Task 2 – Ground-Water Investigation

Three geoprobe soil borings will be completed as 4-inch diameter monitor wells using the hollow-stem auger method. The location of the proposed 4-inch diameter wells is shown on figure 1.

Each monitor well will be constructed with a 10 foot length of 4-inch diameter, 0.020–slot PVC well screen and 4-inch diameter, PVC riser pipe extending from the top of the well screen

to grade. Each screen will be installed at approximately 2 feet above the ground-water level. The annular space around the well screens will be filled with No. 2 sand from the bottom of the boring to 2 feet above the top of the screen. A 1 foot thick bentonite seal will be placed above the sand pack and the remaining annular space will be filled with sand.

Each well will be completed at grade with a bolt-down roadbox set in concrete and a locking plug. A geologic log and a construction diagram will be prepared for each monitor well.

Three geoprobe soil borings will be completed as 1-inch diameter microwell (figure 1). Each microwell will be constructed with a 5 foot length of 1-inch diameter, 0.020–slot PVC well screen. The top of well screen will be set approximately 2 feet above the ground water. Four-inch diameter PVC riser pipe will be extended from the top of the screen to grade. Each well will be equipped with a bolt-down roadbox and a locked plug. Geologic logs and construction diagrams will be prepared for each well.

Task 3 – Well Development and Survey

Following installation, all new monitor wells will be developed by pumping until the water is free of sediment. Each well top of casing will be surveyed and the elevations will be adjusted to the Brooklyn Topographic Datum on the basis of a previously established elevation on Monitor Well MW–3. During the survey the existing wells status will be inventoried and evaluated.

Task 4 – Ground-Water and/or Fluid-Level Measurements and Ground-Water Sampling

In approximately 2 weeks after completion, the ground water and/or fluid levels will be measured in all of the existing and new monitor wells. These measurements will be used to construct a ground-water elevation contour map and to determine the direction of ground-water flow based on the data obtained from the new monitor wells.

Ground-water samples will be collected from all of the existing and new monitor wells located onsite and offsite. The ground-water sampling will be conducted using the low-flow equipment and techniques which will minimize the turbulence and result in a stable turbidity. Prior to sampling, a minimum of three well water volumes will be removed from the monitor well and a ground-water sample will be collected after a stable pH, specific conductivity and temperature are achieved. Ground-water samples will be collected using the low-flow sampling techniques.

The ground-water samples collected from the onsite and offsite monitor wells will be delivered to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and hold a certificate of approval to be analyzed for VOCs and semivolatile organic compounds (SVOCs). Ground-water samples from 2 downgradient monitor wells located in the vicinity of Fyn Paint will be analyzed for TCL and TAL. All ground-water sampling data will be reported in parts per billion (ppb) or micrograms per liter (ug/l).

Task 5 – Indoor Air Sampling

Indoor air samples will be collected from inside of the Fyn Paint building. Each air sample will be analyzed by EPA Method TO-14 or TO–15.

Task 6 – Soil-Gas Survey and Sampling

A soil-gas sampling program around the perimeter of the Fyn Paint building is recommended in the NYSDEC May 6, 2002 letter. The letter also indicates that the sampling program should be done in conjunction with limited indoor air sampling as specified in Task 5.

Soil-gas sampling will be conducted at every 50 feet around the perimeter of the Fyn Paint property and a sample will be collected at a depth of 2 ft bg (feet below grade). Each sample will be analyzed for VOCs by EPA Method TO-14.

Task 7 – Preparation of Report

An investigation report summarizing the results of the additional work will be prepared and submitted to NYSDEC for review and approval.

The report will include the following:

- description of the field work procedure related to drilling of soil borings and installation of monitor wells (geologic logs and well construction diagrams);
- procedure of soil and ground-water sampling (low-flow ground-water sampling);
- description of soil-gas sampling and indoor sampling;
- results of soil and ground-water investigation (soil and ground-water quality summary tables and maps);
- results of soil-gas sampling and indoor air sampling;

- characterization and disposal of soil cuttings for soil boring drillings and purge water from ground-water sampling; and,
- conclusions and recommendations.

Task 8 – Schedule

The Supplemental Investigation work will start in 45 days after the NYSDEC approval of the SRIWP. The following schedule was developed for the implementation of the SRIWP.

•	Task 1	Soil investigation	10 days
•	Task 2	Ground-water investigation	10 days
•	Task 3	Well development and survey	5 days
•	Task 4	Ground-water measurements and sampling	10 days
•	Task 5	Indoor air sampling	10 days
•	Task 6	Soil-gas survey and sampling	10 days
•	Task 7	Report preparation	60 days

It is estimated that the completion of the SRIWP following the NYSDEC approval will take approximately 115 days.

LEGGETTE, BRASHEARS & GRAHAM, INC.

Dan C. Buzea, CPG
Vice President

dmd
July 29, 2002
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APPENDIX I

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APPENDIX I

SITE SPECIFIC HEALTH AND SAFETY PLAN
FYN PAINT & LACQUER CO., INC.
230 KENT AVENUE
BROOKLYN, NEW YORK 11211
SITE # U-00380-2, INDEX #W2-0873-00-10

Prepared For

Fyn Paint & Lacquer Co., Inc.

July 2002

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SITE SPECIFIC HEALTH AND SAFETY PLAN
FYN PAINT & LACQUER CO., INC.
230 KENT AVENUE
BROOKLYN, NEW YORK 11211
SITE # U-00380-2, INDEX #W2-0873-00-10

This Health and Safety Plan (HASP) is intended to provide a basic framework for the Voluntary Cleanup Program (VCP), Index Number W2-0873-00-10 by Fyn Paint & Lacquer Co., Inc. pursuant to the New York State Department of Environmental Conservation (NYSDEC) VCP. The procedures provided herein are intended as a guide for all Leggette, Brashears & Graham, Inc. (LBG) and subcontractor employees who will be involved in the performance of the project.

The primary objective of the HASP is to establish work-safety guidelines, requirements and procedures before field activities begin and during the field activities. The following information was prepared specifically for field operations by personnel to enforce and adhere to the established rules as specified in the HASP. The HASP will be provided to all personnel to aid in accomplishing the following objectives:

- monitoring the effectiveness of the HASP as it is conducted in the field by performing field operation audits;
- following up on any necessary corrective actions;
- interacting with regulatory agencies and/or client representatives regarding modifications of health and safety actions; and
- stopping work should conditions warrant such action.

All personnel will have had health and safety training in accordance with OSHA Interim Final Standard 29 CFR 1910 or as may be amended. A copy of LBG's Corporate Safety Policy and Drug and Alcohol Policy is attached in Appendix A.

1.0 ORGANIZATION AND RESPONSIBILITIES

The organization and responsibilities for implementing safe site-investigation procedures, and specifically for the requirements contained in this manual, are described in this section. A Contact, Site Safety Briefing, Air Monitoring sheets, and a site and hospital location map are to be completed for applicable sites. Blank forms are attached at the end of this document.

1.1 Project Manager

The LBG Project Manager will be responsible for the overall implementation and monitoring of the health and safety program by:

- ensuring appropriate protective equipment is available and properly used by all personnel, in accordance with the HASP;
- ensuring personnel health and safety awareness by providing them with proper training and familiarity with procedures and contingency plans;
- ensuring all personnel are apprised of potential hazards associated with the site conditions and operations;
- supervising and monitoring the safety performance of all personnel to ensure their work practices are conducted in accordance with the HASP;
- correcting any work practices or conditions that would expose personnel to possible injury or hazardous condition;
- communications with the onsite Health and Safety Officer (HSO);
- ensuring sufficient protective equipment is provided and used;
- promptly initiating emergency alerts; and,
- communicating with the client and/or regulatory agency representatives.

1.2 Onsite Health and Safety Officer

The LBG HSO will be onsite during all field activities. The HAO will be accountable for the direct supervision of personnel from the subcontractors and other LBG personnel with regard to:

- health and safety program compliance;
- maintaining a high level of health and safety consciousness among employees at the work site; and,
- reporting accidents within LBG jurisdiction and undertaking corrective action.

1.3 Field Personnel

All field personnel will report directly to the onsite HSO, and will be required to:

- be familiar with, and conform to, provisions of the HASP;
- ensure that they are well informed of potential hazards at the work site and exercise informed consent in their work;
- report any accidents or hazardous conditions to the onsite HSO; and,
- have complete familiarity with their job requirements and the health and safety procedures involved.

1.4 Reporting of Accidents and Unsafe Conditions

If an accident occurs, the HSO and the injured person(s) are to complete an Accident Report for submittal to the project manager, who will forward a copy to the principal-in-charge who should ensure that follow-up action is taken to correct the situation that caused the accident.

1.4.1 Disciplinary Actions for Safety Related Infractions

If an infraction of the Health and Safety Plan is discovered by the Project Manager or the onsite HSO, each case will be dealt with individually. The infraction will be investigated and a disciplinary meeting held with the offender. Disciplinary actions may include a performance deficiency evaluation entered into the employee's personnel file, correction of problem after the

disciplinary meeting or removal of the offender from the project. Repeated infractions will not be tolerated and will be dealt with accordingly.

1.4.2 Safety Inspections

Safety inspections will be conducted periodically by the Project Manager. The Project Manager will be familiar with the Health and Safety Plan before performing an onsite visit. While onsite, the Project Manager will evaluate the effectiveness of the plan and offer any suggestion for improvement. Although Project Managers are responsible for periodic safety inspections and evaluation of the Health and Safety Plan, the onsite HSO is responsible for daily observation and evaluation of Health and Safety Plan effectiveness.

1.4.3 Safety Meetings

Prior to the start of field activities, a meeting will be held to discuss the potential hazards at the site, with a review of the required protective clothing and procedures observed at this site. As needed, daily meetings will be held to discuss any changes in the hazards.

2.0 HAZARD EVALUATION

The exposure limits of chemical constituents which may be encountered are listed in table 1. These constituents would possibly be encountered in ground water and/or soil and comprise the major concerns for personal health. The protection of personnel and the public from exposure to these substances by inhalation, oral ingestion, dermal absorption or eye contact is included as a primary purpose of this plan.

The onsite HSO is responsible for determining the level of personal protection equipment required. The HSO will perform a preliminary evaluation to confirm personal protective equipment requirements once the site has been entered. When work-site conditions warrant, the onsite HSO will modify the level of protection to be utilized. The existence of a situation more hazardous than anticipated will result in the suspension of work until the Project Manager and client representative has been notified and appropriate instructions have been provided to the field team.

3.0 MONITORING REQUIREMENTS

A photoionization detector (PID) will be used to continuously monitor ambient air quality at the drilling or excavation sites. Records of these data will be maintained by the onsite HSO. During drilling operations, air quality will be monitored at each drilling or boring location, especially near the top of the boreholes as samples are taken. Work operations which involve handling of potentially hazardous substances will include continuous contaminant monitoring using the PID. In addition, field monitoring will be performed when work is initiated at different portions of the site, when a new operation is initiated and/or when potentially leaking drums or containers are going to be handled. When deemed necessary or desirable by the onsite HSO, area monitoring will be used in potentially hazardous zones. Area monitoring will be performed as plans and conditions dictate, and in accordance with the HASP and with the goal of accident and hazardous condition prevention in mind. Instrument calibration information is included in Appendix B.

For the compounds previously identified to be most prevalent, the lowest 8-hour exposure limit is listed on table 1.

3.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

3.2 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

- if organic vapor levels are approaching 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

3.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will be notified.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

4.0 LEVELS OF PROTECTION

The level of protection anticipated to perform work on this investigation is Level D, unless otherwise upgraded. Only protective equipment deemed suitable by the onsite HSO for use at the

work site will be worn. Any changes in protection levels shall be documented by the onsite HSO. Field personnel should exercise informed judgment on protective equipment requirements at active work sites or at work sites that have been repeatedly entered or occupied without apparent harm. In any case where doubt exists, the safest course of action must be taken. The protective equipment to be used by field personnel is listed below.

4.1 Level D

- hard hat;
- safety glasses, shatter-proof prescription glasses or chemical splash goggles;
- boots/shoes, leather or chemical-resistant, steel toe and shank;
- coveralls; and,
- chemical resistant gloves.

At a minimum, protective headgear, including protective hearing devices, eyewear and footwear will be worn at all times by personnel working around the drilling equipment. When work-site conditions dictate, protective gloves and chemical-resistant boots shall be required for those personnel handling contaminated soils.

Should levels of organic vapor in the ambient air greater than 5 ppm above background levels be detected by the PID in the work area, work will stop and all personnel will leave the work area. The New York State Department of Health (NYSDOH) recommends a level of 5 ppm above background as measured with a PID for VOCs related work. Once the PID readings in the ambient air are back to 0.0 ppm above background, field activities will resume.

4.2 Level C

- hard hat;
- boots, leather, steel toe and shank;
- outer boots, chemical resistant;
- chemical-resistant gloves (solvex);
- Tyvek or Saranex suit; and,
- Air purifying respirator with organic vapor cartridge and dust and mist filter.

Level C protection will be considered for PID consistent readings of 5 to 100 ppm above background in the breathing zone.

Respirators for all personnel will be available with both particulate and organic vapor protection cartridges. The onsite HSO will direct when the protective clothing and respirators will be utilized based on the conditions encountered at the work site.

4.3 Level B

- pressure-demand, self-contained breathing apparatus;
- standby escape pack;
- chemical resistant clothing (Saranex suit);
- outer gloves (Solvex);
- inner gloves (surgical);
- outer boots (chemical resistant);
- inner boots (leather, steel shank and toe); and,
- hard hat.

Level B will be considered for PID readings of 150 ppm above background in the breathing zone. In the event that the work space atmosphere contains in excess of 150 ppm of total ionizable compounds above background, colorimetric tubes or a portable gas chromatograph will be used to determine the levels of individual chemicals. The use of Level B equipment will be based on the specific compounds present and will include discussions with the regulatory authorities and/or the client representative.

Level A conditions will require specialized procedures to be formulated on a case-by-case basis.

5.0 SAFE WORK PRACTICES AND HYGIENE

In addition to the use of protective equipment, other procedures will be followed to minimize risk:

- all consumptive activities including eating, drinking or smoking are prohibited during the drilling, sampling and decontamination activities;

- an adequate source of potable water for emergency use will be available at the drilling sites (two liters per person per day);
- fire extinguishers will be available at the work sites for use on equipment or small fires when appropriate; and,
- an adequately stocked first-aid kit will be maintained at the work site at all times during operational hours.

5.1 Heat Stress

In order to avoid heat stress several preventative measures will be observed:

- Workers will drink a 16-ounce glass of water prior to work (in the morning and after lunch). Water will be contained in a cooler, maintained at a temperature below 60°F. Workers will be encouraged to drink approximately every 20 minutes during days of extreme heat.
- Workers will be encouraged to wear long cotton underwear under the heat-retaining protective clothing required by Level C.
- In extreme hot weather, field activities will be conducted in the early mornings and late afternoons.
- Rest breaks in cool or shaded areas will be enforced as needed.
- Toilet facilities will be made available to site workers, unless transportation is readily available to nearby toilet facilities.
- Good hygiene practices will be encouraged, stressing the importance of allowing the clothing to dry during rest periods. Anyone who notices skin problems should receive medical attention immediately.
- If there are support personnel available outside the work zone, they should observe the workers in the exclusion zone to monitor signs of stress, frequency of breaks, etc.

5.2 Cold Stress and Exposure

In order to avoid cold stress, several preventative measures will be observed;

- work will not take place when the temperature falls below -20°F. (The wind chill factor should be a major consideration);
- clothing should be worn in layers, so that personnel can adapt to changing conditions and various levels of physical stress;
- if possible, breaks should be taken in a heated vehicle or building, but care should be taken to remove outer clothing during the break;
- have on hand extra inner clothing in case perspiration builds up;
- keep insulated containers of warm liquids available for breaks outside of the exclusion zone;
- be aware of the signs of frostbite and take immediate remedial measures; and,
- take extra precautions around areas subject to ice buildup, such as sanding slippery surfaces.

6.0 WORK ZONE

To prevent unauthorized personnel from entering areas where active operations are being performed, the area enclosing the operation will be marked.

This zone will be entered in Level D protection. However, individual work sites within the zone may require higher levels of protection based on air monitoring results during the various activities. If this becomes the case, separate work sites will be established based on the level of protection required.

Field personnel are instructed to leave the area if monitoring shows readings above the permissible exposure limits. Before conducting field work in respirators, the Project Manager and client representative will be contacted. A determination will be made by the onsite HSO and Project Manager if work is to continue with respirators. Factors which may influence this decision include the level of observed or suspected hazards, period of time required to complete activity and weather conditions.

If it is necessary to upgrade personal protection then site control measures need to be implemented. This control will help prevent transporting contaminants off site and minimize exposures to onsite personnel. Site maps will be available which show special work zones.

Three work zones will be delineated. The exclusion zone is where the investigation will take place in the appropriate safety equipment. The contamination reduction zone is where the decontamination of personnel will take place. The support zone is the outer limit zone where equipment is stored and protective clothing is not required.

The buddy system will be observed in the exclusion and contamination reduction zones. Non-essential employees will remain at the clean support zone which will be delineated by a rope or barrier. No one will be permitted beyond that point unless certified and has read and signed the HASP. These zones will be set up with the clean zone being furthest upwind.

6.1 Confined Spaces

Confined spaces are those which, by design or circumstance, present difficulties for entry and exit, or which may serve to reduce ventilation or concentrate vapors. Typical confined spaces consist of excavations, trenches and vaults. Excavations or trenches over 5 feet in depth will be shored or benched according to OSHA regulations. If a vault is to be entered, mechanical ventilation will be initiated and air quality will be monitored.

6.2 VOC Project Work Zone Considerations

Typically VOC projects involve installation of wells, monitoring of wells, installation and operation of treatment systems and observation of tank and trench excavation work. Safety issues with respect to this type of work are attached in Appendix C.

7.0 DECONTAMINATION

An area will be set aside within the work zone for decontamination. The type of decontamination procedures used will be based on the level of protection required. Decontamination of Level D protective wear will consist of brushing heavily soiled boots to remove soils, rinsing gloves and safety glasses (and overboots, if worn) with water, and removing and storing coveralls in plastic bags before leaving the work zone, if heavily soiled or suspected of having

been in contact with site contaminants. For detailed decontamination, equipment and procedures, refer to Appendix D.

8.0 CONTINGENCY PLAN FOR EMERGENCIES

In the event of a safety or health emergency, appropriate corrective measures must immediately be taken to assist those who have been injured or exposed and to protect others from hazard. The onsite HSO will be notified of the incident immediately. If necessary, first aid will be rendered.

9.0 SAFETY TRAINING

All site workers, including site managers, will provide documentation to the onsite HSO that the field personnel have been trained in the proper use of protective clothing and equipment in accordance with 29 CFR Part 1910, including:

- purpose of wearing respirators;
- how the respirator works;
- limitations;
- fit testing;
- maintenance; and
- conditions of use.

All LBG personnel, client representatives, regulatory personnel and field personnel shall be made aware of the particular hazardous substances which could be encountered during this project.

10.0 MEDICAL SURVEILLANCE

The HSO will insure that each site worker involved in environmental sampling participates in an ongoing medical surveillance program, which includes baseline and annual follow-up exams.

TABLE

TABLE 1

Exposure Limits

COMPOUND	EXPOSURE STANDARDS			RECOGNITION QUALITIES		
	TLV/PEL (a) (ppm)	STEL (b) (ppm)	IDLH (c) (ppm)	Odor/Threshold (ppm)	LEL (d) (%)	Ionization Potential (eV)
Gasoline[1/]	300	500	1,400	–	1.4	–
Alachlor[2/]	–	–	–	No odor	–	–
Benzene[1/]	0.1	1	500	12	1.2	9.24
Butane	800	–	–	2,700	1.6	10.63
Chlorobenzene	75[3/]	–	1,000	Almonds	1.3	–
1,1-Dichloroethane	100	Ca[5/]	3,000	Chloroform	5.4	11.06
1,2-Dichloroethylene	200	–	1,000	Chloroform	5.6	9.65
EDB (Ethylene dibromide)[1/]	0.045	0.13	100	Sweet	–	9.45
EDC (Ethylene dichloride)[1/]	1	2	50	Chloroform	6.2	11.05
Ethylbenzene	100	125	800	Aromatic	0.8	8.76
Heptane	85	440	750	150	1.05	9.90
N-Hexane	50	–	1,100	Gasoline/130	1.1	10.18
Hexanes	100	510	–	Mild gasoline	–	–
Methyl ethyl ketone (MEK)	0.2[4/]	–	–	Characteristic odor	–	–
Octane	75	385	1,000	Gasoline/150	1.0	9.82
Pentane	120	610	1,500	Gasoline/1000	1.5	10.34
TBA (Tert-butyl alcohol)	100	150	1,600	Camphor	2.4	9.70
Tetrachloroethylene[1/]	Ca[5/]	Ca[5/]	150	Chloroform	–	9.32
Tetraethyl Lead	0.075*	–	40*	Sweet	1.8	11.10
Tetramethyl Lead	0.075*	–	40*	Fruity	–	8.50

TABLE 1
(continued)

Exposure Limits

COMPOUND	EXPOSURE STANDARDS			RECOGNITION QUALITIES		
	TLV/PEL (a) (ppm)	STEL (b) (ppm)	IDLH (c) (ppm)	Odor/Threshold (ppm)	LEL (d) (%)	Ionization Potential (eV)
Toluene	100	150	500	Sweet benzene like/2.9	1.1	8.82
1,1,2-Trichloroethane	Ca[5/]	10	100	Chloroform	6.0	11.00
Trichloroethylene	Ca[5/]	25	1,000	Chloroform	8.0	9.45
Vinyl Chloride	Ca[5/]	Ca[5/]	Not determined	Pleasant	3.6	9.99
Xylenes	100	150	900	Aromatic/1.1	0.9	8.56

Notes:

1/ Potential occupational carcinogen
2/ Alachlor manufacturer established internal exposure guideline of 10 ppb for 8-hour TWA
3/ OSHA guideline, NIOSH questions the adequacy of 75 ppm
4/ Ceiling REL, should not be exceeded at any time
5/ NIOSH recommends occupational exposures to carcinogens to be limited to the lowest feasible concentration
- = No published value
* mg/m3
(a) The more stringent of either: (1) Occupational Safety and Health Administration (OSHA) 1989 Permissible Exposure Limit (PEL), (2) American Conference Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), or (3) National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs), time-weighted average concentrations for up to a 10-hour work day.
(b) Short Term Exposure Limit - 15 minute exposure.
(c) Immediately dangerous to life and health.
(d) Lower Explosive Limit.

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FORMS

SITE SAFETY BRIEFING

Job Name: Supplemental Remediation Investigation Work Plan
Date: September 2002
Site Location: 230 Kent Avenue, Brooklyn, NY 11211
Index #W2-0873-00-10

SAFETY ISSUES (Circle appropriate information)

Tasks: Soil Boring Drilling, Ground-Water Monitoring Wells Installation, Trench Excavation

Protective Clothing/Equipment: Level D, Level C, Level B, Level A

Chemical Hazards: Acetone, Xylene, Toluene, Gasoline, Diesel Fuel, Heating Oil, Number 2 and 4 Oil

Physical Hazards: Car Traffic, Construction Equipment, Confined Space, Overhead Wires

Control Methods: Cones, Restricted Access, Traffic Control Personnel

Other: _____

Hospital Name/Address: _____

ATTENDEES

Print Name:	Sign Name:
_____	_____
_____	_____
_____	_____
_____	_____

Meeting conducted by: _____

AIR MONITORING

General Information

Name(s): _____ Background Level: _____

Date: _____ Weather Conditions: _____

Time: _____ _____

Project: 230 Kent Avenue
Brooklyn, NY 11211
Index #W2-0873-00-10

Equipment Calibration

PID _____ CGI _____

Sample No.	Time	Location	PID Reading (ppm)	Comments	CGI Reading	
					$\%O_2$	%LEL
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

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Air Monitoring Data

General Information

Name(s): Fyn Paint & Lacquer Co., Inc.

Project/Location: 230 Kent Avenue, Brooklyn, NY 11211
Index #W2-0873-00-10

Equipment Used: MINIRAM

Background Level: _____

Date	Weather	Total Time (min)	SA (mg/m^3)	TWA (mg/m^3)

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PLAN ACCEPTANCE FORM

PROJECT HEALTH & SAFETY PLAN

INSTRUCTIONS: This form is to be completed by each Leggette, Brashears & Graham, Inc. employee to work on the subject project work site and returned to the Office Safety Coordinator prior to site activities.

Client/Project: Fyn Paint & Lacquer Co., Inc., 230 Kent Avenue, Brooklyn, NY 11211

Date: _____

I represent that I have read and understand the contents of the above Plan and agree to perform my work in accordance with it.

_____	_____
Signed	Signed
_____	_____
Print Name	Print Name
_____	_____
Date	Date
_____	_____
Signed	Signed
_____	_____
Print Name	Print Name
_____	_____
Date	Date

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EXCLUSION ZONE LOG SHEET

LEGGETTE, BRASHEARS & GRAHAM, INC.
110 CORPORATE PARK DRIVE, SUITE 112
WHITE PLAINS, NEW YORK 10604

Client: Fyn Paint & Lacquer Co., Inc.

Location: 230 Kent Avenue, Brooklyn, New York 11211

Name	Date	Time In	Time Out	Elapsed Time

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CONTACT SHEET

Client:	Fyn Paint & Lacquer Co., Inc.
Project:	Fyn Paint & Lacquer Co., Inc.
Location:	North First Street and Kent Avenue
	Brooklyn, New York
	Index #W2-0873-00-10
Task:	
Client Contact:	Nicholas Ward-Willis, Esq. (Keane & Beane, P.C.)

Leggette, Brashears & Graham, Inc.

(914) 694-5711 (914) 694-5744 (fax)

Field Supervisor (HSO):	Jorma Weber
Project Manager:	Paul Woodell
Principal-in-Charge:	Dan C. Buzea

Local Police Headquarters:	90th Precinct, Long Island City, New York
	(718) 963-5311
Local Hospital:	Woodhull Hospital, 760 Broadway
	Brooklyn, New York 11206
	(718) 963-8000
Emergency Room:	(718) 963-8442
State Police:	State Government Police, New York Marshalls Bureau,
	80 Maiden Lane, Floor 17, New York, New York,
	(212) 825-5953
Miscellaneous:	New York State Department of Environmental Conservation
	(NYSDEC) Region 2, 1 Hunters Point Plaza, 47-40 21st Street,
	Long Island City, New York (718) 482-4900

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DIRECTIONS TO LOCAL HOSPITAL:

Woodhull Hospital
760 Broadway
Brooklyn, New York 11206

Total Distance: 2.1 miles
Total Estimated Time: 5 minutes

- Go north on Kent Avenue one (1) block
- Turn right onto Metropolitan Avenue
- Follow Metropolitan Avenue east for just under one mile
- Turn right onto Union Avenue
- Follow Union Avenue south for just over half a mile
- Turn left onto Broadway
- Follow Broadway southeast for just over half a mile to the intersection with Flushing Avenue
- Woodhull Hospital is on the southwest corner of the intersection between Broadway & Flushing Avenue

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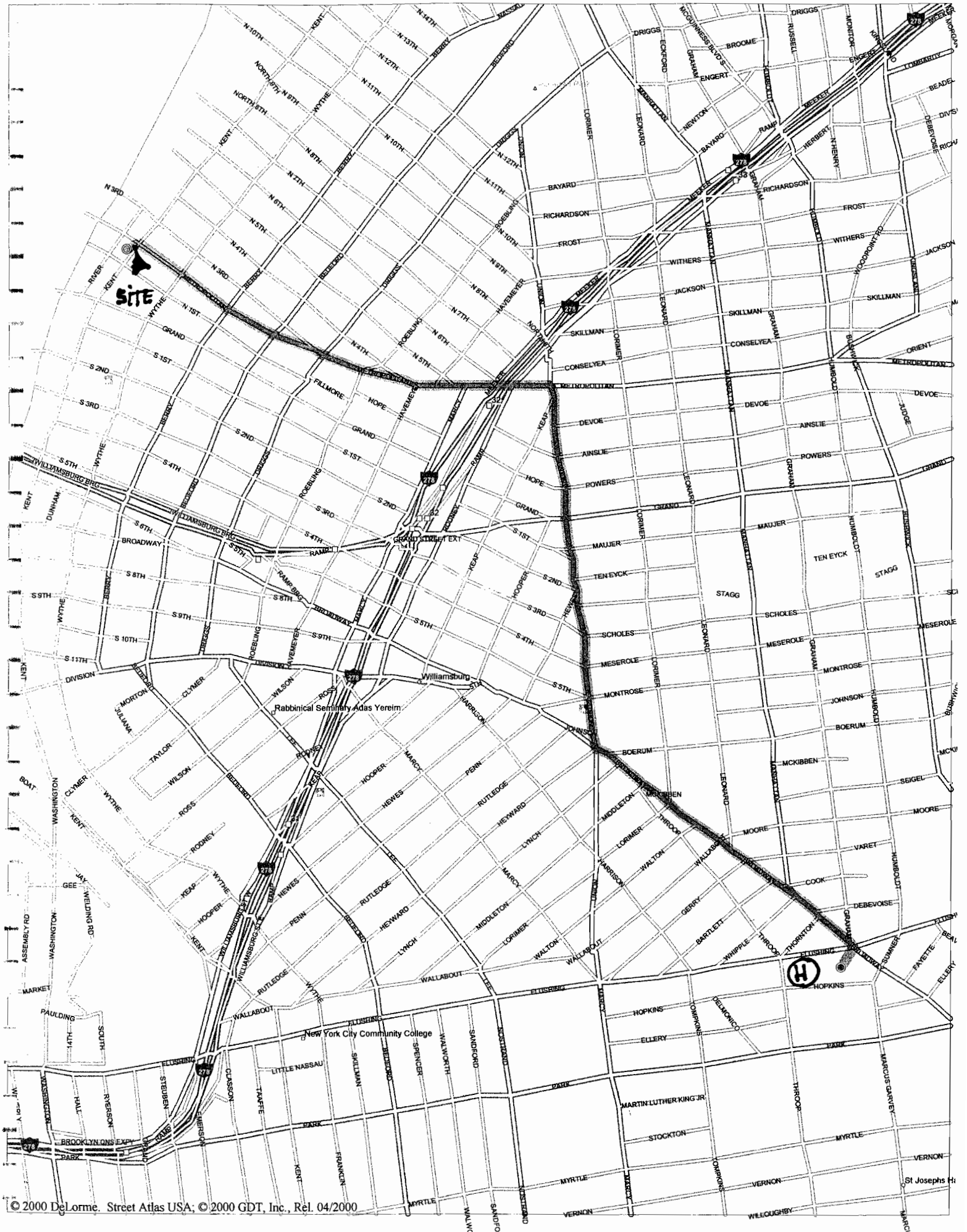
SITE
Rabbinical Seminary Adas Yereim
New York City Community College
Williamsburg
HOPKINS
GRAND STREET EXT
BROOKLYN QNS EXPY
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APPENDIX A

LEGGETTE, BRASHEARS & GRAHAM, INC.

SAFETY POLICY

Job safety is a common-sense part of everyone's life, but requires constant alertness to possible dangers. When we work on industrial sites, LBG employees are expected to observe the safety rules of our Client hosts.

You are the first line of defense for your own personal safety. In the field, appropriate clothing should be worn at all times. Where appropriate, work shoes with hard toes and/or ankle protection should be worn at all times. **Sneakers/tennis shoes should never be worn in the field, regardless of the circumstances.**

LBG provides hard hats that should be worn around any drilling operations and in any other "hard hat zones". Where required, safety glasses, goggles, protective gloves, respirators, and other safety clothing or equipment should be worn and disposed of as specified by the Project Safety Officer.

Periodically, LBG provides special safety seminars which satisfy the OSHA requirements for work on hazardous waste sites. In-house safety training is conducted on an ongoing basis and as dictated by case-by-case needs. There is a Corporate Safety Officer in the Trumbull, Connecticut headquarters and a designated Safety Officer in each regional office to whom questions and problems relating to job safety should be referred.

Any project that involves or may involve hazardous or toxic waste or any potentially dangerous condition requires the preparation, filing, use and compliance with a Health and Safety Plan (HASP). LBG has a petroleum related work HASP that can be readily adapted to most petroleum jobs and has numerous site-specific HASPS that comply with state and federal CERCLA requirements that can be used for guidance in developing site-specific HASPS.

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LEGGETTE, BRASHEARS & GRAHAM, INC.
GENERAL DRUG AND ALCOHOL POLICY

In any company, certain common-sense rules of conduct and performance must be established for the employees to follow in order to avoid any misunderstanding and to protect the right of all concerned. Breaches of acceptable conduct which include, but are not limited to, abusive language, insubordination, intoxication, moral turpitude, or substance abuse/possession can lead to disciplinary action or to dismissal.

While performing any service for LBG or LBG's clients, employees, agents, and subcontractors of LBG shall not: (1) be under the influence of alcohol or any controlled substance; (2) use, possess, distribute, or sell illicit or unprescribed controlled drugs, drug paraphernalia, or alcoholic beverages; or (3) misuse legitimate prescription drugs.

LBG may remove from active project status any of its employees any time there is a reasonable basis for suspicion of alcohol/drug use, possession, or impairment involving such employee, and at any time an incident occurs where drug or alcohol use could have been a contributing factor. In such cases, employee may only be considered for return to work after LBG certifies as a result of a for-cause test, conducted immediately following removal, that said employee is in compliance with this policy.

LBG reserves the right to require drug and alcohol testing for its employees, either for its own purposes or at the direction of Clients. Such testing may take place periodically, or for specific projects. The testing will be in compliance with Department of Transportation drug testing regulations.

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APPENDIX B

LEGGETTE, BRASHEARS & GRAHAM, INC.
AIR MONITORING EQUIPMENT OPERATION

Instrument Calibration

All applicable instruments will be calibrated daily before use. Readings will be recorded on the Air Monitoring form.

Background Readings

Before any field activities commence, the background levels of the site must be read and noted. Daily background readings must be conducted away from areas of potential contamination to obtain accurate results.

Air Monitoring Frequency

All site readings must be noted on the Air Monitoring form along with the date, time, background level, weather conditions, wind direction and speed, and the location where the background level was recorded.

OVM 580B Calibration

- Turn the OVM on by pressing the ON/OFF switch.
- With the OVM running, press the MODE/STORE switch and then press the -/CRSR switch when the OVM reads if "logging is desired".
- Keep pressing the -/CRSR switch until OVM will display "reset to calibrate".
- Enter the calibration mode by pressing the RESET switch. The OVM will then display "restore backup + = Yes".
- Press the -/INC switch and the OVM will display "zero gas reset when ready".
- Connect zero gas to OVM and press RESET switch. The OVM will display "Model 580B zeroing".
- After the OVM calibrates the zero gas, it will display "span gas reset when ready".
- Connect span gas to OVM and press RESET switch.
- When OVM displays "reset to calibrate", the OVM has calibrated the span gas.
- To exit calibration mode, press MODE/STORE switch.

HNU PI-101 Calibration

- Battery check--The function switch should be turned to BATT. The needle should be in the green region; if not, recharge the battery.
- Zero set--The function switch should be turned to STANDBY. In this position, the lamp is OFF and no signal is generated. The zero point should be set with the ZERO set control.
- Gas standard--The standard should be connected to the probe. The function switch should be turned to the range position of the standard and the meter reading should be noted. The SPAN control setting should be adjusted, as required, to read the parts per million (ppm) concentration of the standard. The zero setting should be rechecked.
- Lamp cleaning--If the span setting from calibration is 0.0 or calibration cannot be achieved, then the lamp must be cleaned.
- Lamp replacement--If the lamp output is too low or if the lamp has failed, it must be replaced.

MSA Explosimeter Model 2A Calibration Instructions

Before the calibration can be checked, the instrument and its aspirator sampling bulb must be in operating condition, as described in the instrument instruction manual.

- The flow control should be attached to the calibration gas tank.
- The hose should be connected to the flow control and to the instrument inlet fitting.
- The control valve should be opened.
- The meter reading should be recorded after it stabilizes. Note: It is not necessary for the aspirator bulb to be operated for the calibration sample to be obtained. If the instrument does not read within the acceptable range, the detector filament unit should be replaced and the calibration check procedure should be repeated.
- The flow control valve should be closed.
- The hose should be removed from the flow control and from the inlet fitting on the instrument.
- The flow control should be removed from the calibration gas tank.

APPENDIX C

LEGGETTE, BRASHEARS & GRAHAM, INC.
VOLATILE ORGANIC COMPOUNDS
PROJECT WORK ZONE CONSIDERATIONS

1.0 EXCAVATION

The following requirements, which apply to all types of excavation operations, except tunnels and shafts, are taken from the U.S. Department of the Interior, Bureau of Reclamation's Construction Safety Standards. They are not intended to be an exhaustive set of requirements, but rather, a summary of current practices that are being enforced at construction activities by Federal and state government agencies and private industry. The requirements were assembled in cooperation with the Associated General Contractors of America, the American National Standards Institute, labor unions, and other interested in improving safety.

1.1 Preliminary Inspection

Prior to excavation, the site should be thoroughly inspected to determine conditions that require special safety measures. The location of underground utilities, such as sewer, telephone, gas, water, and electric lines, must be determined and plainly staked. Necessary arrangements must be made with the utility company or owner for the protection, removal, or relocation of the underground utilities. In such circumstances, excavation will be done in a manner that does not endanger the employees engaged in the work or the underground utility. Utilities left in place should be protected by barricading, shoring, suspension, or other measures, as necessary.

1.2 Protection of the Public

Necessary barricades, walkways, lighting, and posting should be provided for the protection of the public prior to the start of excavation. Excavation operations on or near state, county, or city streets, accessways, or other locations where there is extensive interface with the public and/or motorized equipment will not start until all of the following actions have been taken:

- The contractor has contacted the authority having jurisdiction and obtained written permission to proceed with protective measures required.

- The contractor, using the authority's instructions and these standards, has developed an extensive and detailed standard operating plan.
- The plan has been discussed with affected employees, and applicable protective measures are in place and functioning.

1.3 Access and Lighting

Safe access will be provided for employees, including installation of walkways, stairs, ladders, etc. When operations are conducted during hours of darkness, adequate lighting will be provided at the excavation, borrow pits, and waste areas.

Where employees are required to enter excavations over 4 feet in depth, stairs, ladders, or ramps must be provided, so as to require no more than 25 feet of lateral travel. When access to excavations exceeds 20 feet vertically, ramps, stairs, or personnel hoists should be provided. Ladders extending from the bottom of the trench to at least 3 feet above the top must be placed within 25 feet of workers in the trench.

1.4 Personal Protective Equipment

PPE will be provided and used in accordance with the specific requirements set forth in the plan. Drillers and helpers must wear approved safety goggles or safety glasses with side shields, hearing protection, hard hats, and safety shoes.

1.5 Removal of Trees and Brush

Prior to excavation, trees, brush, boulders, and other surface obstacles that present a hazard to employees should be removed.

1.6 Slide Prevention and Trenching Requirements

All trench excavations over 5 feet in depth must be shored, shielded, or sloped to the angle of repose from the bottom of the trench, but never less than 3/4 horizontal to 1 vertical (i.e., 37 degrees from vertical), or supported by structures designed by a professional engineer. Excavations should be inspected following rainstorms or other hazardous events. Additional protection against possible slides or cave-ins shall be provided, as necessary.

1.7 Angle of Repose

The determination of the angle of repose and design of supporting systems should be based on a thorough evaluation of all pertinent factors, including depth of cut; possible variation in water content of the material; anticipated changes in the material from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, or overlying or stored material; and vibrations from sources such as traffic, equipment, and blasting. The angle of repose for all excavations, including trenching, should be determined by a professional engineer, but in no event should the slope be less than 3/4 horizontal to 1 vertical (i.e., 37 degrees from vertical) from the bottom of the excavation.

1.8 Support Systems

Materials used for support systems, such as sheeting, piling, cribbing, bracing, shoring, and underpinning, should be in good serviceable condition, and timbers should be sound and free of large or loose knots. The design of support systems should be based on calculations of the forces and their directions, with consideration for surcharges, the angle of internal friction of materials, and other pertinent characteristics of the material to be retained.

When tight sheeting or sheet piling is used; full loading due to the ground-water table should be assumed unless relieved by weep holes, drains, or other means. Cross braces and trench jacks should be placed in true horizontal position and secured to prevent sliding, falling, or kickouts. Additional stingers, ties, and bracing should be provided to allow for any necessary temporary removal of individual supports. Support systems should be planned and designed by a professional engineer competent in the field.

Backfilling and removal of trench support systems should progress together from the bottom of the trench. Jacks or braces should be released slowly. In unstable soil, ropes or other safe means will be used to remove the braces from the surface after workers have left the trench.

Special precaution must be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation or fill area. The use of compacted backfill as backforms on slopes that are steeper than the angle of repose of the compacted material in its natural state is prohibited.

1.9 Structural Foundations and Footings

Except in hard rock, excavations below the level of the base of any foundation, footing, or retaining wall will not be permitted unless the wall is underpinned and all necessary precautions are taken to ensure the stability of adjacent walls. If the excavation endangers the stability of adjacent buildings or structures, shoring, bracing, or underpinning designed by a qualified person will be installed. Such supporting systems must be inspected at least daily by qualified persons to ensure that protection is adequate and effectively maintained.

Small diameter footings that workers are required to enter, including bell-bottomed footings over 4 feet deep, must be provided with a steel casing or support system of sufficient strength to support the earth walls and prevent cave-ins. The casing or support system shall be provided for the full depth, except for the bell portion of bell footings.

Fixed or portable ladders must be provided for access. A lifeline, securely attached to a shoulder harness, should be worn by every employee entering the footing. The lifeline should be manned from above and should be separate from any line used to raise or lower materials.

1.10 Vertical Cuts and Slopes

Before a slope or vertical cut is undercut, the residual material must be adequately supported and the undercutting method and support system must be inspected.

When exposed to falling, rolling, or sliding rocks, earth, or other materials, employees working below or on slopes or cuts should be protected in the following manner:

- By effective scaling performed prior to exposure and at intervals necessary to eliminate the danger.
- By the installation of rock bolting, wire mesh, or equivalent support if the material continues to ravel and fall after scaling.
- By the installation of protective timber or wire mesh barricades at the slope of the cut and at necessary intervals down the slope. Wherever practical, benching sufficient to retain falling material may be used in lieu of barricades.
- By ensuring that personnel do not work above one another where there is danger of falling rock or earth. Personnel performing work on vertical cuts or slopes

where balance depends on a supporting system must wear appropriate safety equipment.

1.11 Ground Water

Ground water should be controlled. Freezing, pumping, draining, and other major control measures should be planned. Full consideration should be given to the existing moisture balance in surrounding soil and the effects on foundations and structures if it is disturbed. When continuous operation of ground-water control equipment is necessary, an emergency power source should be provided.

1.12 Surface Water

The accumulation of surface water in excavations must not be permitted and should be controlled by diversion ditches, dikes, dewatering sumps, or other effective means.

1.13 Excavated Materials

Excavated materials should be laced and retained at least 2 feet from the depth of the excavation, or at a greater distance when required to prevent hazardous loading on the face of the excavation.

1.14 Protective Devices

Guardrails, fences, barricades, and warning lights or other illumination systems will be maintained from sunset to sunrise on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Walkways or bridges that are protected by standard guardrails should be provided where employees are required or permitted to cross over excavations.

Wells, calyx holes, pits, shafts, and all similar hazardous excavations must be effectively barricaded or covered and posted. All temporary excavations of this type should be backfilled as soon as possible. When mobile equipment is permitted adjacent to excavations with steep slopes or cuts, substantial stoplogs or barricades should be installed.

1.15 Equipment Operation

Equipment that is operated on loading or waste areas must be equipped with an automatic backup alarm. Additionally, when employees are on foot or otherwise endangered by equipment in dumping or waste areas, a competent signalman should be used to direct traffic. The signalman must have no other assignment that interferes with signaling duties. If the equipment or truck cab is not shielded, the operator should stand clear of the vehicle during loading. Excavating or hoisting equipment should not be allowed to raise, lower, or swing loads over workers unless effective overhead protection is provided.

1.16 Drilling Operations

When drilling in rock or other dust-producing material, the dust should be controlled within the OSHA Permissible Exposure Limits (PELs). Except in shaft and tunnel excavation, dust control devices are not required on jackhammers as long as the operators wear approved dust respirators.

2.0 DRILLING SAFETY

2.1 Basic Requirements

Employees will not proceed with work on, or in the proximity of, hazardous equipment until they have been properly trained and have received a safety briefing. If drilling is at a hazardous substance site, the site-specific safety plan must be reviewed onsite and discussed in the safety briefing.

Potential hazards (e.g., overhead or underground power, oil, or gas lines in the immediate vicinity of the drilling location) must be removed, avoided by relocating the drill site, or adequately barricaded to eliminate the hazard.

The use of unsafe or defective equipment is not permitted. Equipment must be inspected regularly and, if found to be defective, must be immediately removed from use and either repaired or replaced.

Employees will be familiar with the location of first-aid kits and fire extinguishers. Telephone numbers for emergency assistance must be prominently posted and kept current.

2.2 General Requirements at Drilling Operations

2.2.1 Housekeeping

Good housekeeping conditions should be observed in and around the work area. Suitable storage places should be provided for all materials and supplies. Pipe, drill rods, etc., must be securely stacked on solid, level sills.

Work surfaces, platforms, stairways, walkways, scaffolding, and accessways will be kept free of obstructions. All debris will be collected and stored in piles or containers for removal and disposal.

2.2.2 Salamander Heaters

Salamanders will be used only with approved fuels (e.g., do not use gasoline). Salamander heaters must not be refueled or moved until they have been extinguished and permitted to cool. Heaters will be equipped with exhaust stacks and will not be set on or placed near combustible material. They should be equipped with metal stands that will provide adequate stability and permit at least a 2-inch clearance under the unit.

Burning salamanders must be attended at all times, with suitable fire extinguishers available to each attendant. If tarpaulins or other flexible materials and used to form a heating enclosure, they must be fire resistant and installed to prevent contact with the heater. Worn salamanders that have developed holes or have been otherwise damaged will be replaced and removed from service.

2.2.3 Lighting

In addition to providing required or recommended illumination intensities of at least 5 foot-candles, consideration should be given to the selection and placement of lighting equipment. Proper lighting should provided minimum glare, eliminate harsh shadows, and provide adequate illumination to perform work efficiently and safely.

Light bulbs should be of the heavy duty, outdoor, nonshattering type.

All lighting circuits, including drop cords, should be grounded and have ground fault interrupters. Lighting circuits will be inspected periodically, and defective wiring or fixtures will be removed from service.

2.2.4 Flammable Liquids

All highly flammable liquids should be stored and handled only in approved containers. Portable containers must be the approved red safety containers equipped with flame arresters and self-closing lids.

Approved hand pumps will be used to dispense gasoline from barrels. Gasoline must not be used for degreasing or to start fires. Also, gasoline containers should be clearly labeled, and storage areas should be posted with "No Smoking" signs. Fire extinguishers should be installed in all areas that contain flammable liquids.

2.2.5 Public Safety

Work areas will be regulated so that the public will be protected from injury or accident. Adequate danger signs, barriers, etc., will be placed to effectively warn the public of hazards as well as to restrict access to dangerous areas.

2.3 Off-Road Movement of Drill Rigs

The following rules apply to the off-road movement of drill rigs:

- Before moving a drill rig, an inspection should be made of the route of travel for depressions, slumps, gullies, ruts, and similar obstacles.
- The brakes of a drill rig carrier should always be checked before traveling, particularly on rough, uneven, or hilly ground.
- All passengers should be discharged before a drill rig is moved on rough or hilly terrain.
- The front axle of 4 x 4 or 6 x 6 vehicles or carriers should be engaged when traveling off-road on hilly terrain.
- Caution should be used when traveling on a hillside. The hillside capability of drill rigs should be evaluated conservatively, because the addition of drilling tools may raise the center of mass. When possible, travel should be made directly uphill or downhill.
- Obstacles such as small logs, small erosion channels, or ditches should be crossed squarely, not at an angle.

- When lateral or overhead clearance is close, someone on the ground should act as a guide.
- After the drill rig has been moved to a new drilling site, all brakes or locks should be set. Wheels should be blocked on steep grades.
- The mast (derrick) of the drill rig should not be in the raised or partially raised position during off-road travel.
- Loads on the drill rig and supporting trucks should be tied down during transport.

2.4 Drilling Equipment

2.4.1 Skid-Mounted Units

Labels clearly indicating the function and direction of control levers should be posted on the lower unit controls of all drills.

An emergency safety power shutoff device should be installed within reach of the operator on all units. The device should be clearly labeled or otherwise made readily identifiable and checked daily to ensure that it is operable. The power unit should be operated only by authorized and qualified personnel.

Equipment will be shut down during manual lubrication and while repairs or adjustments are being made. Equipment such as internal combustion engines will not be refueled while running. Where practical, the gasoline tank should be positioned or shielded to avoid accidental spillage of fuel on the engine or exhaust manifold during refueling operations. Hazardous gears and moving parts also should be shielded to prevent accidental contact.

A dry chemical or carbon dioxide fire extinguisher, rated 5 pounds or larger, should be carried on the unit and removed to a position within 25 feet of the work site during drilling operations. Extinguishers will be inspected and tagged at least once every 3 months.

Engine exhaust systems should be equipped with spark arresters when operated in areas where sparks constitute a fire hazard.

2.4.2 Overhead and Underground Utilities

Special precaution must be taken when using a drill rig on a site within the vicinity of electrical power lines and other utilities. Electricity can shock, burn, and cause death.

Overhead and underground utilities should be located, noted, and emphasized on all boring location plans and assignment sheets. When overhead electrical power lines exist at or near a drilling site, all wires should be considered dangerous.

A check should be made for sagging power lines before a site is entered. Power lines should not be lifted to gain entrance. The appropriate utility company should be contacted and a request should be made that it lift or raise and cut off power to the lines.

The area around the drill rig should be inspected before the drill rig mast (derrick) is raised at a site in the vicinity of power lines. The minimum distance from any point on the drill rig to the nearest power line should be determined when the mast is raised or is being raised. The mast should not be raised and the drill rig should not be operated if this distance is less than 20 feet, because hoist lines and overhead power lines can be moved toward each other by the wind.

The existence of underground utilities, such as electric power, gas, petroleum, telephone, sewer, and water lines, should always be suspected. These underground electric lines are as dangerous as overhead lines, so a utility locating service should always be contacted.

There are generally two types of utility locating services. One is a "free" service that is paid for by companies with underground pipes, lines, etc., to protect the public and to prevent costly repairs. However, these services have access only to drawings for primary pipes or lines, typically on public property or right-of-way easements, but not to drawings showing supply or feeder lines from a primary system to the interior of a property. Therefore, they are not required, and in fact hesitate, to locate interior lines. Sites can be cleared for drilling by such services, but without the drill operator's knowledge of the locations of underground feeder or supply lines.

A second type of locating service is provided by a paid subcontractor who physically sweeps or clears interior locations using locating equipment. Locating costs can be minimized by obtaining all available maps, drawings, and employee interview information before contracting with the locating company. This is especially important at large industrial plants or military bases, which can have an intricate network of underground utilities. It is important that every location be cleared, even those for hand-auger borings.

If a sign warning of underground utilities is located on a site boundary, it should not be assumed that underground utilities are located on or near the boundary or property line under the

sign; they may be a considerable distance from the sign. The utility company should be contacted to check it out.

The owners of utility lines or the nearest underground utility location service should always be contacted before drilling is started. However, remember that some services provide information on utilities going to, but not within, a site. Metal detectors or other locating equipment may be necessary to determine the presence of shallow (surface) utilities onsite. The utility personnel should mark or flag the location of the underground lines and determine what specific precautions must be taken to ensure safety.

2.4.3 Site Selection and Working Platforms

In preparing a work site located on adverse topography, precautions must be taken against cave-ins, slides, and loose boulders. The drill platform should be stabilized by outriggers or adequate timbering.

Prior to drilling, adequate site clearing and leveling should be performed to accommodate the drill rig and supplies and to provide a safe working area. Drilling should not commence when tree limbs, unstable ground, or site obstructions result in unsafe tool-handling conditions.

Suitable storage locations should be provided that allow for the convenient handling of tools, materials, and supplies without danger that they could fall and injure anyone. Storing or transporting tools, materials, or supplies within or on the drilling mast (derrick) should be avoided. Pipes, drill rods, bits, casings, augers, and similar drilling tools should be securely stacked in an orderly manner on racks or sills.

Penetration hammers or other types of driving hammers should be placed at a safe location on the ground or secured when unattended on a platform. Work areas, platforms, walkways, scaffolding, and other accessways should be kept free of obstructions and substances such as ice, grease, or oil that could create a hazardous surface. All controls, control linkages, and warning and operation lights and lenses also should be kept free of ice, grease, or oil.

In the vicinity of power transmission or distribution lines, drills should be adequately grounded and set with at least a 15-foot clearance between any part of the drill or mast and the power lines.

Toilet facilities will be convenient to drill crews, or transportation will be readily available to nearby toilet facilities. Toilets will be either the chemical type or constructed over ground pits, which will be backfilled when abandoned. They should be fly tight and maintained in a sanitary condition.

Mud pits and drainage excavations should be safely sloped and located to provide minimum interference with work. Where necessary, suitable barricades, catwalks, etc., should be provided to reduce the possibility of personal injury. Ladders will be positioned in pits or excavations that are 5 or more feet deep. Such excavations should be periodically inspected to ensure safe operation and adequate maintenance.

Truck-mounted drills will be equipped with a "safetyline" or with clearly marked and conspicuously located emergency switches. The safetyline emergency stop consists of a taut wire that runs around the back of the machine and connects to a special switch that turns off the power unit when the line is contacted. When emergency switches are used in lieu of a safetyline, there should be a minimum of two switches--one located within easy reach of the operator, and one located within easy reach of workers at ground level near the drill or auger head.

Trucks should not be moved backward unless the driver has personally inspected the area behind the truck. In restricted or congested areas, or areas where workmen are located, the assistance of a "spotter" is mandatory. Also, trucks will be equipped with serviceable automatic backup alarms.

Before the mast is raised, personnel will be cleared from the immediate area--with the exception of the operator and a helper, when necessary. A check should be made to ensure safe clearance from energized power lines or equipment. Unsecured equipment must be removed from the mast, and cables, mud lines, and catline ropes must be adequately secured to the mast before raising. After it is raised, the mast must be secured to the rig in an upright position with steel pins.

Drill equipment will not be moved until a thorough inspection has been made to ensure that the mast, drill rods, tools, and other equipment are secured. A check will also be made of the steering mechanism, brakes, lights, load limits, and proper flagging and lighting of load extensions. Applicable traffic laws will be observed when moving drill equipment over public roads.

2.5 Surface Drilling Operations

Before the mast of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be releveled if it settles after the initial setup. The mast should only be lowered when the leveling jacks are down, and the leveling jack pads should not be raised until the mast is completely lowered. Before drilling operations start, the mast should be secured or locked, if required by the drill's manufacturer.

Before the power unit is started, all gears should be disengaged, the cable drum brake should be set, and no rope should be in contact with the cathead.

Before the mast is raised, a check should be made for overhead obstructions. Everyone (with the exception of the operator) should be cleared from the areas immediately to the rear and sides of the mast and informed that the mast is being raised. The drill rig should not be driven from hole to hole with the mast in the raised position.

The drill rig should only be operated from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill. "Horsing around" in the vicinity of the drill rig and tool and supply storage areas is strictly prohibited, even when the drill rig is shut down. Caution should be taken when mounting/dismounting the platform.

Drill operations should be terminated during an electrical storm.

The consumption of alcoholic beverages, depressants, stimulants, or any other chemical substance while on the job is strictly prohibited. All unattended boreholes must be adequately covered or protected to prevent people or animals from stepping or falling into the hole. When the drilling project has been completed, all open boreholes should be adequately covered, protected, or backfilled, according to local or state regulations.

A safety chain and cable arrangement should be used to prevent water swivel and mud line whip. All water swivels and hoisting plugs should be checked for possible frozen bearings and should be properly lubricated before use. A frozen bearing could cause mud line whip, which could injure the operator.

Only drill operators should brake or set the chucks to prevent engagement of the transmission prior to removal of the chuck wrench. Also, the chuck jaws should be periodically checked and replaced as necessary.

A string of drill rods should not be braked by the chuck jaws during lowering into the hole. A catline or hoisting cable and plug should be used for braking prior to tightening of the chuck. Failure to follow this procedure could result in steel slivers on the rods, possible hand injuries, and loss of the rods into the hole. Following braking, drill rods should be allowed to drain completely before removal from the working area.

Drill rods will not be lowered into the hole with a pipe wrench. Serious back and hand injuries may result if the rods are lowered by this method.

When using drilling fluids, a rubber or other suitable wiper should be used to remove the material from the drill rods when removing them from the drill hole. When drilling with air, the exhaust and cuttings should be directed away from workers with devices such as diverter heads, the use of which should be stipulated on drilling agreements where appropriate.

Care must be exercised by the operator to avoid a sudden hoist release of the drill rod while the rod is being carried from the hole. The hoisting capacity and weight of the drill rod must be known to prevent collapse of the mast during drill string removal from the hole. The operating capacity of the mast and hoist also must be known and must not be exceeded.

When tool joints are broken on the ground or on a drilling platform, fingers should be positioned so they will not be caught between the wrench handle and the ground or the platform if the wrench slips or the joint suddenly lets go. Pipe wrench jaws should be checked periodically and replaced as they become worn.

2.6 Use of Augers

The use of mismatched auger sections should be avoided. Different brands and different weights should not be used in the same auger flight.

Because some pins lose their temper after very little use, causing the spring or clip section to fail, only tight-fitting pins designed for the auger should be used.

A daily inspection--to include a thorough check of the hydraulic hoses, connections, and valves--will be made before equipment is used. Deficiencies should be corrected or safe condition verified before the equipment is started.

A durable sign containing the following wording should be installed on all equipment in full view of the operator:

- All personnel must be clear before starting this machine
- Stop the auger to clean it
- Stop engine when repairing, lubricating, or refueling
- Do not wear loose-fitting clothing or gauntlet-type gloves.

The following general procedures should be used when advancing a boring with continuous flight or hollow-stem augers:

- An auger boring should be started with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low revolutions per minute (rpm).
- A system of responsibility should be established for the series of activities required for auger drilling, such as connecting or disconnecting auger sections and inserting or removing the auger fork. The operator must be sure that the tool handler is well away from the auger column and that the auger fork has been removed before rotation is started.
- Only the manufacturer's recommended method of securing the auger to the power coupling should be used. The coupling or the auger should not be touched with the hands, a wrench, or any other tool during rotation.
- Tool hoists should be used to handle auger sections whenever possible. Hands or fingers should never be placed under the bottom of an auger section when the auger is being hoisted over the top of the auger section in the ground or other hard surface, such as the drill rig platform. Feet should never be allowed to get under the auger section that is being hoisted.
- Workers should stay clear of the auger and other rotating components of the drill rig. Workers should never reach behind or around a rotating auger for any reason.
- Hands or feet should never be used to remove cuttings from the auger.
- Augers should be cleaned only when the drill rig is in neutral and the augers have stopped rotating. A special paddle should be designed for cleaning auger flights; if available, pressurized water is recommended for jet cleaning.

3.0 REMEDIATION SYSTEM EQUIPMENT

LBG operates remediation system equipment at various sites. Remediation equipment includes but is not limited to pump and treat, soil vapor extraction, two-phase vapor extraction, liquid and vapor phase granular activated carbon, thermal destruction and air stripping tower systems. This brief list of safety requirements cover hazards specific to this type of operation. The list assumes that safety requirements for standard operations inherent in SVE operations are already being followed, such as 29 CFR 1910.120 "Hazwoper" planning, training, and other requirements; or drilling, trenching, and shoring safety practices.

The components of a typical remediation system equipment can include an electric or gasoline powered motor, a carbo absorption bed, and various filters, piping, and controls.

3.1 Basic Requirements

3.1.1 General

Employees will not proceed with work on, or in the proximity of, the remediation equipment until they have been properly trained and have attended a safety briefing covering the hazards involved. This may in the form of a "tailgate" safety briefing or a more extensive session, depending upon the extent of the hazards, the employees' safety knowledge, and site-specific exposures.

The use of unsafe or defective equipment is not permitted. Equipment must be inspected regularly and, if found to be defective, immediately removed from use and repaired or replaced.

Employees should be familiar with the location of first-aid kits and fire extinguishers. Telephone numbers or radio frequencies for emergency assistance must also be prominently posted and kept current.

3.1.2 Housekeeping

Good housekeeping practices should be observed in and around the work area. Suitable storage should be provided for all materials and supplies.

Any work surfaces, platforms, stairways, walkways, scaffolding, or accessways should be kept free of obstructions. Any debris should be collected and stored in piles or containers for removal and proper disposal.

3.1.3 Flammable Liquids

All highly flammable liquids should be stored and handled only in approved containers. Portable containers must be of the approved, red safety container type, equipped with flame arresters and self-closing lids.

Approved hand pumps should be used to dispense gasoline from drums. Gasoline must not be used for degreasing or starting fires. Also, gasoline containers should be clearly labeled, and any storage areas should be posted with "No Smoking" signs. Fire extinguishers should be installed in all areas that contain flammable liquids.

3.1.4 Public Safety

Work areas should be regulated so that the public will be protected from injury or accident. Adequate danger signs, barriers, etc., should be placed to effectively warn the public of hazards as well as to restrict access to dangerous areas.

3.1.5 Drilling Safety

Construction of soil-vapor extraction systems requires installation of soil-vapor extraction wells and separate air inlet wells. Safety requirements for drilling operations should be followed.

3.2 Specific Requirements

3.2.1 Chemical Hazards

Some of the primary chemical hazards at remediation operations are site contaminants related to volatile organic compounds. Typically, contaminants are drawn from extraction wells and treated with carbon absorption units and/or are incinerated. Additional chemical hazards associated with these treatment technologies include fuel for the incinerator and activated carbon saturated with site contaminants. Manufacturers' Material Safety Data Sheets should be available on site for all neat chemical compounds used.

Personnel can be exposed to site contaminants during sampling and equipment maintenance. Because soil-vapor extraction systems are typically closed systems terminating in contaminant oxidization or absorption apparatus, chances of exposure incidents during normal operations are minimal. If chemical exposure occurs, however, it is most likely during sampling

or equipment maintenance. Sampling typically includes sampling of site soils or ground water to measure the long-term effectiveness of remediation activities, or sampling process water or vapors to determine the efficiency of treatment technologies in capturing or destroying the contaminants.

A potential for exposure exists during maintenance procedures because of cleaning sediment from knockout pots and from general piping system repairs.

In order to minimize the potential hazards associated with chemical exposure, all site workers should have a knowledge of particular site hazards and contaminants. Based upon site conditions, proper personal protective equipment should be worn such as hard hats, chemical protective clothing, and safety shoes.

3.2.2 Physical Hazards

Physical hazards can be managed by general housekeeping in work areas and routine equipment maintenance. Scaffolding may be erected around water stripping towers and incinerators and should be inspected periodically, as part of a routine maintenance procedure.

3.2.3 Pressure

Remediation systems typically recover soil vapors or ground water from beneath the ground surface. Remedial equipment should be shut off when maintenance activities or repairs occur.

3.2.4 Electric Hazards

Because several types of equipment in remediation systems are commonly powered by electricity, electrical hazards exist at these remedial sites. Liquid ring vacuum pumps, knockout pumps, air stripper holding tanks and pumps, and other elements of the treatment units are frequently powered by electricity. General housekeeping and equipment maintenance are necessary to prevent electrical safety hazards. Worn switches and wiring should be quickly repaired, use of water should be controlled, and unnecessary spills prevented. Ground fault interrupters (GFI) should be used on all circuits carrying power from a nearby indoor source to outdoor equipment or from an outdoor portable generator to equipment. Equipment should also

be properly grounded as a protection against shocks, static electricity, and lightning if an electrical storm occurs.

3.2.5 Lighting

In addition to providing required or recommended illumination intensities of at least 5 foot-candles for nighttime operation, consideration should be given to the selection and placement of lighting equipment. Proper lighting should provide minimum glare, eliminate harsh shadows, and provide adequate illumination to perform work efficiently and safely. Light bulbs should be of the heavy duty, outdoor, nonshattering type.

All lighting circuits, including extension cords, should be grounded and have GFI protection. Circuits and extension cords should be inspected periodically.

3.2.6 Incinerator/Treatment System

Thermal hazards exist with incinerators, and boundaries should be set up to prevent contact with headed surfaces. Additionally, proper thermal protection should be available for personnel working at the incinerator. Vapor extractor pumps should be set to shut off automatically if the incinerator shuts off, to prevent accumulation of high concentrations of volatile compounds that could result in an explosion hazard.

3.2.7 Carbon Bed Temperature

A hazard related to carbon absorption units is the heat of reaction, which is high for some materials, such as ketones, treated in high concentrations. SVE equipment should be designed to take this into account when carbon absorption is employed and the bed temperature must be monitored.

Typically, but not limited to, two carbon units will be piped in series to treat the recovered vapors. Carbon units will be changed out according to the air permit guidelines.

When carbon units are changed out, the primary unit will be taken off line, the secondary unit will become the primary unit, and a fresh carbon vessel will become the secondary unit.

All field activities will be initiated in Level D. If the action levels specified in Table 5-1 are reached, an upgrade will be made to Level C.

3.2.8 Vapor Emission Response Plan

If the air concentration of (chlorinated) organic vapors exceeds 5 ppm above background in the exhaust of the treatment system, the system exhaust will be continuously monitored and necessary actions will be taken to reduce system emissions to 5 ppm--for example, by bleeding air into the system, changing carbon canisters, etc. If the organic vapor levels measured in the treatment system exhaust are between 5 ppm and 50 ppm above background, continue site activities and perform continuous monitoring. If the organic vapor level exceeds 50 ppm above background in the treatment system exhaust, shut down work activities until the system is repaired.

Prior to beginning construction activities, notify fire departments and police as well as the local emergency facility of planned site activities. These organizations should be briefed on the nature of planned site work and given a schedule of the proposed tasks. Changes or modifications to the planned work or schedule which could affect the need for emergency services shall be communicated to these organizations. LBG shall communicate to the local hospital and fire department what types of materials may be encountered at the site.

Should the level of total (chlorinated) hydrocarbons exceed 100 ppm for any single reading, or should the explosimeter indicate in excess of 10 percent of the lower explosive limit on any single reading, work in that area will be shut down and personnel will be evacuated upwind. Work will not resume there until authorized by the Site Safety Officer.

3.2.9 System Start-Up and Initial Operating Period

The VE system is designed to operate unattended 24 hours per day, 7 days per week. Once the electrical connections are complete, LBG will begin system start-up.

LBG will monitor the system on a weekly basis during the month of operation. LBG field personnel will use a photoionization detector (PID) to monitor the VE system emissions before GAC treatment. LBG will monitor between GAC units and at the point of vapor emissions to determine GAC breakthrough and compare those concentrations to air emissions standards. These measurements will be used to estimate the amount of VOCs removed from the soil and the rate at which the GAC is being used to treat vapor phase emissions. As part of the daily monitoring, LBG will follow the Vapor Emission Response Plan.

3.2.10 Continued Operations and Maintenance

After the first month of operation, LBG will monitor the system biweekly for the second and third month. From the beginning of the fourth month to the remainder of the treatment period, LBG will monitor the system once a month. The following data will be recorded on each visit:

- Operating time
- Applied vacuum at blower inlet
- Induced vacuum at air inlet wells
- Vapor temperature at blower inlet
- Vapor temperature at blower outlet
- Pressure at blower outlet
- Concentrations of VOCs at blower outlet
- Concentrations of VOCs in treated emissions.

LBG field personnel will analyze and record the vapor-phase VOC concentrations before and after GAC treatment.

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APPENDIX D

DECONTAMINATION PROCEDURES

Procedure for Level C Decontamination

Level C decontamination, if required, will take place on plastic sheeting so all contaminated material can be contained for proper disposal.

Station 1: Segregated Equipment Drop

Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination.

Equipment: various size containers
plastic liners
plastic drop cloths

Station 2: Suit/Safety Boot Wash

Thoroughly wash splash suit and safety boots. Scrub with long-handle, soft-bristle scrub brush and copious amounts of decon solution or detergent/water. Repeat as many times as necessary.

Equipment: container (30-50 gallons)
decon solution
or
detergent/water
2-3 long-handle, soft-bristle scrub brushes

Station 3: Suit/Safety Boot Rinse

Rinse off decon solution or detergent/water using copious amounts of water. Repeat as many times as necessary.

Equipment: container (30-50 gallons)

or

high-pressure spray unit

water

2-3 long-handle, soft-bristle scrub brushes

Station 4: Canister or Mask Change

If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canisters will be exchanged, depositing the old canisters in containers with plastic liners. The worker will enter the work area and return to duty.

Equipment: canister (or mask)

boot covers

gloves

Station 5:

Step 1 - Tape, Safety Boot and Outer Glove Removal

Remove safety boots and gloves and deposit in container with plastic liner.

Equipment: container (30-50 gallons)

plastic liners

bench or stool

boot jack

Step 2 - Splash Suit Removal

With assistance of helper, remove splash suit. Deposit in container with plastic liner.

Equipment: container (30-50 gallons)

bench or stool

liner

Step 3 - Facepiece Removal

Remove facepiece. Avoid touching face with gloves. Deposit facepiece in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners

Masks will be collected at a central location. Decontamination will be performed as follows:

- remove all cartridges, canisters and filters, plus gaskets or seals not affixed to their seats;
- remove elastic headbands;
- remove exhalation cover;
- remove speaking diaphragm or speaking diaphragm-exhalation valve assembly;
- remove inhalation valves;
- wash facepiece and breathing tube in cleaner mixed with warm water, preferably at 120°F to 140°F; wash components separately from the face mask; remove heavy soil from surfaces with a hand brush;
- remove all parts from the wash water and rinse twice in clean warm water;
- air dry parts in a designated clean area; and,
- wipe facepiece, valves and seats with a damp lint-free cloth to remove any remaining soap or other foreign materials.

Station 6: Inner Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Equipment: container (20-30 gallons)
plastic liners

Station 7: Inner Clothing Removal (optional)

Remove clothing soaked with perspiration. Place in container with plastic liner. Do not wear inner clothing offsite if there is a possibility small amounts of contaminants might have been transferred in removing splash suit.

Equipment: container (30-50 gallons)
plastic liners

Station 8: Field Wash (optional)

Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.

Equipment: water
soap
tables
wash basins/buckets
field showers

Station 9: Redress

Put on clean clothes. A dressing trailer is needed in inclement weather.

Procedure for Level B Decontamination

Level B decontamination, if required, will take place on plastic sheeting so all contaminated material can be contained for proper disposal.

Station 1: Segregated Equipment Drop

Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Equipment: various size containers
plastic liners
plastic drop cloths

Station 2: Suit/Safety Boot Wash

Thoroughly wash chemical-resistant splash suit, SCBA, gloves, and safety boots. Scrub with long-handle, soft-bristle scrub brush and copious amounts of decon solution or detergent/water. Wrap SCBA regulator (if belt-mounted type) with plastic to keep out water. Wash backpack assembly with sponges or cloths.

Equipment: container (30-50 gallons)
decon solution
or
detergent/water
2-3 long-handle, soft-bristle scrub brushes
sponges or cloths

Station 3: Suit/SCBA/Boot/Glove Rinse

Rinse off decon solution or detergent/water using copious amounts of water. Repeat as many times as necessary.

Equipment: container (30-50 gallons)
or
high-pressure spray unit
water
small buckets
2-3 long-handle, soft-bristle scrub brushes
sponges or cloths

Station 4: Tank Change

If worker leaves Exclusion zone to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged and worker returns to duty.

Equipment: air tanks
tape
boot covers
gloves

Station 5: Tape, Safety Boot and Outer Glove Removal

Remove safety boots and gloves and deposit in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners
bench or stool
boot jack

Station 6: SCBA Backpack Removal

While still wearing facepiece, remove backpack and place on table. Disconnect hose from regulator valve and proceed to next station.

Equipment: table

Station 7: Splash Suit Removal

With assistance of helper, remove splash suit. Deposit in container with plastic liner.

Equipment: container (30-to gallons)
plastic liners
bench or stool

Station 8: Facepiece Removal

Remove facepiece. Avoid touching face with gloves. Deposit in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners

Masks will be collected at a central location. Decontamination will be performed as follows:

- remove all cartridges, canisters and filters, plus gaskets or seals not affixed to their seats;
- remove elastic headbands;
- remove exhalation cover;
- remove speaking diaphragm or speaking diaphragm-exhalation valve assembly;
- remove inhalation valves;
- wash facepiece and breathing tube in cleaner mixed with warm water, preferably 120°F to 140°F; wash components separately from the face mask; remove heavy soil from surfaces with a hand brush;
- remove all parts from the wash water and rinse twice in clean warm water;
- air dry parts in a designated clean area; and,
- wipe facepiece, valves and seats with a damp lint-free cloth to remove any remaining soap or other foreign materials.

Station 9: Inner Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Equipment: container (20-30 gallons)
plastic liners

Station 10: Inner Clothing Removal (optional)

Remove clothing soaked with perspiration. Place in container with plastic liner. Do not wear inner clothing offsite since there is a possibility small amounts of contaminants might have been transferred in removing fully encapsulating suit.

Equipment: container (30-50 gallons)
plastic liners

Station 11: Field Wash (optional)

Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.

Equipment: water
soap
small tables
basins or buckets
field showers

Station 12: Redress

Put on clean clothes. A dressing trailer is needed in inclement weather.

Equipment: tables
chairs
lockers
clothes

Procedures for Level A Decontamination

(to be formulated on a case-by-case basis)

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APPENDIX II

COMMUNITY AIR MONITORING PLAN

Introduction

This Community Air Monitoring Plan addresses community concerns of possible offsite airborne migration of suspected contaminants that may be generated during the performance of onsite field activities. The scope of work for the Community Air Monitoring Plan is based on guidelines contained in the New York State Department of Environmental Conservation (NYSDEC) Region 2 document titled "Community Air Monitoring Plan". Actions to be taken addressing suspected chemical hazards to onsite workers performing the above field activities have been established in the Onsite Health and Safety Plan.

Site Description

The subject Site is located in a commercial and industrial area in Brooklyn, New York. The Site consists of a two-story building with a partial basement. The building is approximately 55,000 square feet in area. The property is approximately 55,000 square feet in area. Prevailing winds are from the west.

Suspected Onsite Contaminants

Previous investigations have revealed concentrations of volatile organic compounds (VOCs) in the soil and ground water.

Scope of Work

The Scope of Work of the approved Work Plan consists of intrusive and non-intrusive activities in excavating and removing some impacted soil from trenches and other areas.

Non-Intrusive Activities

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area will be accomplished as follows.

- VOCs will be monitored at the downwind perimeter of the work area daily at 2 hour intervals. If total organic vapor levels exceed 5 ppm (parts per million)

above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings will be recorded and available for State (DEC and DOH) personnel to review.

- Particulates will be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, then dust suppression techniques will be employed. All readings will be recorded and available for State (DEC and DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.
- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts relating to the above are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect if organic vapor levels have approached 5 ppm above background. However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

A. All emergency Response Contacts as listed in the Health and Safety Plan will be notified.

B. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

C. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

Ground Intrusive Activities

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area will be accomplished as follows:

- VOCs must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings will be recorded and available for State (DEC and DOH) personnel to review.
- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind

particulate level is 150 ug/m^3 greater than the upwind particulate level, then dust suppression techniques will be employed. All readings will be recorded and available for State (DEC and DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts related to a major vapor emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor emission Response Plan shall automatically be placed into effect if organic vapor levels are approached

5 ppm above background. However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

A. All emergency Response Contacts as listed in the Health and Safety Plan will be notified.

B. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

C. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

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APPENDIX III

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II

GROUND WATER SAMPLING PROCEDURE
LOW STRESS (Low Flow) PURGING AND SAMPLING

I. SCOPE & APPLICATION

This Low Stress (or Low-Flow) Purging and Sampling Procedure is the EPA Region II standard method for collecting low stress (low flow) ground water samples from monitoring wells. Low stress Purging and Sampling results in collection of ground water samples from monitoring wells that are representative of ground water conditions in the geological formation. This is accomplished by minimizing stress on the geological formation and minimizing disturbance of sediment that has collected in the well. The procedure applies to monitoring wells that have an inner casing with a diameter of 2.0 inches or greater, and maximum screened intervals of ten feet unless multiple intervals are sampled. The procedure is appropriate for collection of ground water samples that will be analyzed for volatile and semi-volatile organic compounds (VOCs and SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, and microbiological and other contaminants in association with all EPA programs.

This procedure does not address the collection of light or dense non-aqueous phase liquids (LNAPL or DNAPL) samples, and should be used for aqueous samples only. For sampling NAPLs, the reader is referred to the following EPA publications: DNAPL Site Evaluation (Cohen & Mercer, 1993) and the RCRA Ground-Water Monitoring: Draft Technical Guidance (EPA/530-R-93-001), and references therein.

II. METHOD SUMMARY

The purpose of the low stress purging and sampling procedure is to collect ground water samples from monitoring wells that are representative of ground water conditions in the geological formation. This is accomplished by setting the intake velocity of the sampling pump to a flow rate that limits drawdown inside the well casing.

Sampling at the prescribed (low) flow rate has three primary benefits. First, it minimizes disturbance of sediment in the bottom of the well, thereby producing a sample with low turbidity (i.e., low concentration of suspended particles). Typically, this saves time and analytical costs by eliminating the need for collecting and analyzing an additional filtered sample from the same well. Second, this procedure minimizes aeration of the ground water during sample collection, which improves the sample quality for VOC analysis. Third, in most cases the procedure significantly reduces the volume of ground water purged from a well and the costs associated with its proper treatment and disposal.

III. ADDRESSING POTENTIAL PROBLEMS

Problems that may be encountered using this technique include a) difficulty in sampling wells with insufficient yield; b) failure of one or more key indicator parameters to stabilize; c) cascading of water and/or formation of air bubbles in the tubing; and d) cross-contamination between wells.

Insufficient Yield

Wells with insufficient yield (i.e., low recharge rate of the well)

may dewater during purging. Care should be taken to avoid loss of pressure in the tubing line due to dewatering of the well below the level of the pump's intake. Purging should be interrupted before the water level in the well drops below the top of the pump, as this may induce cascading of the sand pack. Pumping the well dry should therefore be avoided to the extent possible in all cases. Sampling should commence as soon as the volume in the well has recovered sufficiently to allow collection of samples. Alternatively, ground water samples may be obtained with techniques designed for the unsaturated zone, such as lysimeters.

Failure to Stabilize Key Indicator Parameters

If one or more key indicator parameters fails to stabilize after 4 hours, one of four options should be considered: a) continue purging in an attempt to achieve stabilization; b) discontinue purging, do not collect samples, and document attempts to reach stabilization in the log book; c) discontinue purging, collect samples, and document attempts to reach stabilization in the log book; or d) Secure the well, purge and collect samples the next day (preferred). The key indicator parameter for samples to be analyzed for VOCs is dissolved oxygen. The key indicator parameter for all other samples is turbidity.

Cascading

To prevent cascading and/or air bubble formation in the tubing, care should be taken to ensure that the flow rate is sufficient to maintain pump suction. Minimize the length and diameter of tubing (i.e., 1/4 or 3/8 inch ID) to ensure that the tubing remains filled with ground water during sampling.

Cross-Contamination

To prevent cross-contamination between wells, it is strongly recommended that dedicated, in-place pumps be used. As an alternative, the potential for cross-contamination can be reduced by performing the more thorough "daily" decontamination procedures between sampling of each well in addition to the start of each sampling day (see Section VII, below).

Equipment Failure

Adequate equipment should be on-hand so that equipment failures do not adversely impact sampling activities.

IV. PLANNING DOCUMENTATION AND EQUIPMENT

- Approved site-specific Field Sampling Plan/Quality Assurance Project Plan (QAPP). This plan must specify the type of pump and other equipment to be used. The QAPP must also specify the depth to which the pump intake should be lowered in each well. Generally, the target depth will correspond to the mid-point of the most permeable zone in the screened interval. Borehole geologic and geophysical logs can be used to help select the most permeable zone. However, in some cases, other criteria may be used to select the target depth for the pump intake. In all cases, the target depth must be approved by the EPA hydrogeologist or EPA project scientist.

- Well construction data, location map, field data from last sampling event.

- Polyethylene sheeting.

- Flame Ionization Detector (FID) and Photo Ionization Detector (PID).

- Adjustable rate, positive displacement ground water sampling pump (e.g., centrifugal or bladder pumps constructed of stainless steel or Teflon). A peristaltic pump may only be used for inorganic sample collection.

- Interface probe or equivalent device for determining the presence or absence of NAPL.

- Teflon or Teflon-lined polyethylene tubing to collect samples for organic analysis. Teflon or Teflon-lined polyethylene, PVC, Tygon or polyethylene tubing to collect samples for inorganic analysis. Sufficient tubing of the appropriate material must be available so that each well has dedicated tubing.

- Water level measuring device, minimum 0.01 foot accuracy, (electronic preferred for tracking water level drawdown during all pumping operations).

- Flow measurement supplies (e.g., graduated cylinder and stop watch or in-line flow meter).

- Power source (generator, nitrogen tank, etc.).
- Monitoring instruments for indicator parameters. Eh and dissolved oxygen must be monitored in-line using an instrument with a continuous readout display. Specific conductance, pH, and temperature may be monitored either in-line or using separate probes. A nephalometer is used to measure turbidity.

- Decontamination supplies (see Section VII, below).

- Logbook (see Section VIII, below).

- Sample bottles.

- Sample preservation supplies (as required by the analytical methods).

- Sample tags or labels, chain of custody.

V. SAMPLING PROCEDURES

Pre-Sampling Activities

1. Start at the well known or believed to have the least contaminated ground water and proceed systematically to the well with the most contaminated ground water. Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations.

2. Lay out sheet of polyethylene for placement of monitoring and sampling equipment.

3. Measure VOCs at the rim of the unopened well with a PID and FID instrument and record the reading in the field log book.

4. Remove well cap.

5. Measure VOCs at the rim of the opened well with a PID and an FID instrument and record the reading in the field log book.

6. If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Note that the reference point should be surveyed for correction of ground water elevations to the mean geodesic datum (MSL).

7. Measure and record the depth to water (to 0.01 ft) in all wells to be sampled prior to purging. Care should be taken to minimize disturbance in the water column and dislodging of any particulate matter attached to the sides or settled at the bottom of the well.

8. If desired, measure and record the depth of any NAPLs using an interface probe. Care should be taken to minimize disturbance of any sediment that has accumulated at the bottom of the well. Record the observations in the log book. If LNAPLs and/or DNAPLs are detected, install the pump at this time, as described in step 9, below. Allow the well to sit for several days between the measurement or sampling of any DNAPLs and the low-stress purging and sampling of the ground water.

Sampling Procedures

9. Install Pump: Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well in the EPA-approved QAPP or a depth otherwise approved by the EPA hydrogeologist or EPA project scientist. The pump intake must be kept at least two (2) feet above the bottom of the well to prevent disturbance and resuspension of any sediment or NAPL present in the bottom of the well. Record the depth to which the pump is lowered.

10. Measure Water Level: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.

11. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

12. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and DO) approximately every five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):

+0.1 for pH
+3% for specific conductance (conductivity)
+10 mv for redox potential
+10% for DO and turbidity

Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.

13. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. VOC samples must be collected first and directly into sample containers. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container.

Ground water samples to be analyzed for volatile organic compounds (VOCs) require pH adjustment. The appropriate EPA Program Guidance should be consulted to determine whether pH adjustment is necessary. If pH adjustment is necessary for VOC sample preservation, the amount of acid to be added to each sample vial prior to sampling should be determined, drop by drop, on a separate and equal volume of water (e.g., 40 ml). Ground water purged from the well prior to sampling can be used for this purpose.

14. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.

15. Measure and record well depth.

16. Close and lock the well.

VI. FIELD QUALITY CONTROL SAMPLES

Quality control samples must be collected to determine if sample collection and handling procedures have adversely affected the quality of the ground water samples. The appropriate EPA Program Guidance should be consulted in preparing the field QC sample requirements of the site-specific QAPP.

All field quality control samples must be prepared exactly as regular investigation samples with regard to sample volume, containers, and preservation. The following quality control samples should be collected during the sampling event:

- Field duplicates
- Trip blanks for VOCs only
- Equipment blank (not necessary if equipment is dedicated to the well)

As noted above, ground water samples should be collected systematically from wells with the lowest level of contamination through to wells with highest level of contamination. The equipment blank should be collected after sampling from the most contaminated well.

VII. DECONTAMINATION

Non-disposable sampling equipment, including the pump and support cable and electrical wires which contact the sample, must be decontaminated thoroughly each day before use ("daily decon") and after each well is sampled ("between-well decon"). Dedicated, in-place pumps and tubing must be thoroughly decontaminated using "daily decon" procedures (see #17, below) prior to their initial use. For centrifugal pumps, it is strongly recommended that non-disposable sampling equipment, including the pump and support cable and electrical wires in contact with the sample, be decontaminated thoroughly each day before use ("daily decon").

EPA's field experience indicates that the life of centrifugal pumps may be extended by removing entrained grit. This also permits inspection and replacement of the cooling water in centrifugal pumps. All non-dedicated sampling equipment (pumps, tubing, etc.) must be decontaminated after each well is sampled ("between-well decon," see #18 below).

17. Daily Decon

A) Pre-rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

B) Wash: Operate pump in a deep basin containing 8 to 10 gallons of a non-phosphate detergent solution, such as Alconox, for 5 minutes and flush other equipment with fresh detergent solution for 5 minutes. Use the detergent sparingly.

C) Rinse: Operate pump in a deep basin of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

D) Disassemble pump.

E) Wash pump parts: Place the disassembled parts of the pump intc a deep basin containing 8 to 10 gallons of non-phosphate detergent solution. Scrub all pump parts with a test tube brush.

F) Rinse pump parts with potable water.

G) Rinse the following pump parts with distilled/ deionized water: inlet screen, the shaft, the suction interconnector, the motor lead assembly, and the stator housing.

H) Place impeller assembly in a large glass beaker and rinse with 1% nitric acid (HNO_3).

I) Rinse impeller assembly with potable water.

J) Place impeller assembly in a large glass bleaker and rinse with isopropanol.

K) Rinse impeller assembly with distilled/deionized water.

18. Between-Well Decon

A) Pre-rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

B) Wash: Operate pump in a deep basin containing 8 to 10 gallons of a non-phosphate detergent solution, such as Alconox, for 5 minutes and flush other equipment with fresh detergent solution for 5 minutes. Use the detergent sparingly.

C) Rinse: Operate pump in a deep basin of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

D) Final Rinse: Operate pump in a deep basin of distilled/deionized water to pump out 1 to 2 gallons of this final rinse water.

VIII. FIELD LOG BOOK

A field log book must be kept each time ground water monitoring activities are conducted in the field. The field log book should document the following:

- Well identification number and physical condition.
- Well depth, and measurement technique.
- Static water level depth, date, time, and measurement technique.
- Presence and thickness of immiscible liquid layers and detection method.
- Collection method for immiscible liquid layers.
- Pumping rate, drawdown, indicator parameters values, and clock time, at three to five minute intervals; calculate or measure total volume pumped.
- Well sampling sequence and time of sample collection.
- Types of sample bottles used and sample identification numbers.
- Preservatives used.
- Parameters requested for analysis.
- Field observations of sampling event.
- Name of sample collector(s).
- Weather conditions.
- QA/QC data for field instruments.

IX. REFERENCES

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