FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY
SITE # 130191

WORK ASSIGNMENT NO. D004434-18

Prepared for:

New York State Department of Environmental Conservation
Albany, New York

Prepared by:

MACTEC Engineering and Consulting, P.C.
Portland, Maine

MACTEC: 3612082117

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TABLE OF CONTENTS

LIST OF FIGURES

Figure

LIST OF TABLES

Table

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
FAP	Field Activities Plan
GPS	Global Positioning System
HASP	Health and Safety Plan
IDW	investigation derived waste
MACTEC	MACTEC Engineering and Consulting, P.C.
ml	milliliters
NYSDEC	New York State Department of Environmental Conservation
P&S	Pine & Swallow Associates, Inc.
PID	photoionization detector
PPE	Personal Protective equipment
ROW	right of way
TCL	Target Compound List
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
WA	work assignment
WAWNC	Water Authority of Western Nassau County

1.0 INTRODUCTION

MACTEC Engineering and Consulting, P.C., (MACTEC), under contract to the New York State Department of Environmental Conservation (NYSDEC) has prepared this Field Activities Plan (FAP) for initial characterization activities at the Water Authority of Western Nassau County (WAWNC) Well 57 Site (Site No. 1-30-191) in New Hyde Park, Nassau County, New York. This letter work plan describes proposed field activities that will be performed for Task 3 of Work Assignment (WA) #D004434-18.

The objective of the WA is to investigate the source(s) of elevated chlorinate organic compounds impacting the WAWNC Station 57 well field. The sampling scope presented herein is based on information developed and presented in the Task 2 Records Search and Hydrogeologic Evaluation (MACTEC, 2009). That report developed information on the locations of dry cleaning businesses and other possible sites where chlorinated solvents may have been used, stored or disposed. Based on that information, the NYSDEC has directed MACTEC to collect environmental samples to characterize groundwater and soil vapor conditions near approximately thirteen properties.

The sampling program includes the following components:

- groundwater samples collected at sequential intervals from small-diameter borings that will be advanced using direct-push methods;
- groundwater samples collected from existing monitoring wells; and
- soil vapor samples collected from temporary vapor points that will be installed using direct-push drilling methods.

Sampling details are described in the following subsections. The overall sampling program is outlined in Table 1.1. Proposed sample identification and analytical requirements are listed in Table 1.2. Explorations and sampling locations are shown on Figures 1.1 through 1.6.

Figure 1.6 is an area plot that identifies the locations of the study area and Figures 1.1 through 1.5.

2.0 FIELD OPERATIONS

Companion documents to this FAP that will govern the execution of the field exploration activities include MACTEC's Program Quality Assurance Program Plan (MACTEC, 2007) and Health and Safety Plan (HASP) (MACTEC, 2005). In addition to these program documents, MACTEC will prepare a Site-specific HASP (Appendix A) that will document potential job hazards, provide contaminant action levels, and identify appropriate response actions, safety procedures, and project contacts.

Subcontractors chosen to support the field activities include:

- Chemtech Laboratory – NYSDEC Environmental Laboratory Approval Program (ELAP) certified laboratory for the analysis of groundwater samples and investigation derived waste (IDW) samples, if necessary;
- Con-Test Laboratory – NYSDEC ELAP certified laboratory for the analysis of soil vapor samples.
- Pine & Swallow Associates, Inc. (P&S) – specialty direct-push contractor for groundwater profiling and soil vapor grab sampling

MACTEC will locate sampling points and monitoring wells using Ground Positioning System (GPS) such as a Trimble XR or XT Sub-meter unit. Locations will be also documented in photographs and by taping and measuring from nearby features such as building corners, where appropriate.

The sampling activities proposed in this FAP will occur predominantly within road right of ways (ROW) and will require permission from the appropriate municipal authorities. MACTEC will work to obtain access. For any sampling locations that are on private property and outside road ROWs, MACTEC will identify the property owner and NYSDEC will be responsible for obtaining Site access.

3.0 FIELD SAMPLING SCOPE OF WORK

MACTEC will collect groundwater samples from borings that will be advanced using direct-push drilling methods and from existing monitoring wells. Soil vapor will be characterized by installing temporary vapor points, also using direct-push drilling technology.

3.1 DIRECT-PUSH GROUNDWATER SAMPLING

Groundwater profile sampling will be conducted by P&S by advancing up to eleven borings under MACTEC oversight. P&S will complete direct-push borings by advancing 1.32-inch outside diameter steel rods to the water table and then at successive 10-foot intervals to collect water samples as directed by MACTEC. The lead rod will include a 5-foot long MicroWell ™ screen. Upon reaching a desired depth, the drill rods will be purged and the MicroWell will be developed by removing water prior to sampling. Water will be purged and sampled using a foot valve connected to polyethylene tubing. A minimum of one volume of rod water will be purged from each interval prior to sampling. If during purging, the rods are purged dry, a sample will be collected if sufficient yield is present to provide a sufficient sample volume within 20 minutes of recharge. Because clay lenses and layers are typical in the Magothy Formation, some sampling intervals may correspond to clay layers that restrict groundwater flow.

Purge water will be containerized for testing and disposal, as necessary as discussed below. Borings will advanced to the depth objectives specified on Table 1.1 or until the rods cannot be advance further due to the formation conditions that are encountered or the limits of the drilling method and equipment. This drilling method has been used to sample successfully to depths of approximately 200 feet in Nassau County, however coarse glacial gravel or cobbles can limit the depths achieved, if present.

MACTEC will collect water samples directly into 40- milliliter (ml) glass vials for transport and analysis at the off-site laboratory. Samples will be submitted to Chemtech for analysis for Target

Compound List (TCL) volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B.

At the conclusion of drilling activities, P&S will abandon the rods in place by filling the interior annulus with bentonite and cutting off the top of the rods approximately two feet below the ground surface. A surface seal will be constructed of cold-patch asphalt or cement if the boring was completed through pavement. MACTEC will use GPS to survey the boring location and will also photo-document the location and surface condition at the time of completion.

The drilling method described minimizes equipment decontamination requirements since the only downhole equipment (i.e. steel rods), are abandoned in place. Used tubing and PPE such as gloves will be bagged and screened for the presence of VOCs. In the absence of visual contamination and positive VOCs readings, these will be disposed of as municipal trash. If contamination is observed, the materials will be rinsed and cleaned in the field prior to disposal. The resulting waste water will be containerized and disposed of appropriately.

3.2 MONITORING WELL SAMPLING

MACTEC will collect groundwater samples from up to 15 existing monitoring wells. Well information is provided on Table 1.2 and the locations of the wells are shown on Figures 1.1 through 1.6. The current condition of many of these wells has not yet been determined. MACTEC will attempt to locate each well and if found will assess its condition and suitability for sampling. The condition of the surface seal and cover will be documented and each well will be sounded to document well bottom depth and static water level. Groundwater samples will be collected using low-flow sampling procedures to achieve a turbidity of 50 nephelometric turbidity units or less during sampling. The pump or tubing intake will be located approximately 5 feet above the well bottom to position it within the presumed well screen. If a well exhibits continuing drawdown at pumping rates of less than 100 ml per minute it will be noted as a slow-recovering well and sampled. Samples will be submitted to Chemtech for analysis for TCL VOCs by USEPA Method 8260B. Downhole equipment such as pumps will be decontaminated between sample locations by washing with soap and water and rinsing with de-ionized water. Fluids will be examined for visual

contamination and screened with a PID. If no contamination is observed, the fluids will be allowed to infiltrate into the ground near the sample location. If no suitable location is present, the fluids will be containerized and characterized and disposed of as appropriate at the end of the field event.

3.3 SOIL VAPOR SAMPLING

Soil vapor samples will be collected at up to nine locations. The preferred method will be to use direct-push drilling methods will be used to advance 1.32-inch diameter borehole to a depth of 10 feet below ground surface. A 6-inch long soil vapor implant will be installed at the bottom of each borehole and glass beads will be used to create a sampling zone around the screen. A bentonite slurry seal will be constructed for a minimum of three feet above the beads and any additional remaining open borehole will be filled with bentonite or clean sand. Inert Teflon tubing will extend from the implant to the ground surface to permit sampling.

Before collecting samples, vapor will be purged from each constructed implant such that greater than three times the volume of the annular space of the screen pack plus the volume of the implant and sample tubing is removed. The volume calculation will be documented in the field notes and the purge rate will be at a rate of less than 0.2 liters per minute using a personal air monitoring pump. During the soil gas purge, vapors will be screened with a photoionization detector (PID). The soil gas samples will be collected with one-liter SUMMA®-type canisters with flow valves set to approximately 20 minutes per sample. Flow into the canisters will be less than 0.2 liters per minute, as requested by the New York State Department of Health. Samples will be analyzed by Con-Test for VOCs by USEPA Method TO-15 with minimum reporting limits of 1.0 microgram per cubic meter.

At the conclusion of sampling, the tubing will be pulled from the vapor boring and a surface seal will be completed using cold-patch asphalt or cement, as appropriate to the starting surface condition. Photographs will be taken to document the location and surface condition. The boring location will be documented using GPS.

An alternative method that may be employed if access is difficult due to underground utilities or traffic will consist of hand-driving steel pipe using an electric jackhammer. If this method is used, the pipe will be Schedule 40 steel 0.82 OD piping. Any drill rods or reusable equipment will be pressure washed with soap and water before reuse. Since these shallow soil gas borings are being completed in road right-of-ways and not at areas where a release of chlorinated solvents has been identified, the wash water will be allowed to infiltrate into the ground near the boring if possible as long as no visible contamination or positive PID readings are observed. If no suitable area for infiltration is present, the wash water will be containerized and disposed of a non-hazardous waste.

3.4 ANALYTICAL PROGRAM

Water samples will be analyzed by Chemtech of Mountainside, New Jersey, a NYSDEC-approved Standby laboratory for our contract with NYSDEC. Samples will be analyzed for VOCs by USEPA Method 8260B. Field duplicates will be submitted at a frequency of at least 5%. Matrix spike and matrix spike duplicates will be run by the laboratory at a frequency of 5%. Trip blanks will be supplied by the laboratory and will accompany each sample shipment for analysis of VOCs. One field blank will be collected by running de-ionized water through representative sample tubing and a geopump (or the equivalent pump used during well sampling).

Soil vapor samples will be analyzed by Con-Test of East Longmeadow, Massachusetts, a NYSDEC-approved standby subcontractor air analyses. Samples will be analyzed for VOCs by USEPA Method TO-15 with minimum reporting limits of 1.0 microgram per cubic meter.

4.0 INVESTIGATION-DERIVED WASTE

The method of disposing of IDWs generated during this remedial investigation will be based upon whether the wastes are considered hazardous or non-hazardous. The approach to field screening and handling of the IDW are described in the following paragraphs.

The groundwater profile borings are exploratory in nature and these and existing monitoring wells are not located in areas of known releases. Therefore, purge water will be released to the ground surface in the area of well as long as it does not exhibit visual or olfactory evidence of contamination, or PID readings above background. If the water exhibits evidence of potential contamination, it will be containerized in United States Department of Transportation (USDOT) approved 55-gallon containers for later disposal.

USDOT -approved 55-gallon containers filled during the field investigation will be staged in an area to be determined that will be designated by the NYSDEC. MACTEC will identify potential staging locations and communicate options to the NYSDEC. Transport and disposal of any waste containers will be arranged by MACTEC on behalf of NYSDEC. Containers will be labeled with the following information: drum contents; Site name and the NYSDEC Site Number; and date drum filling began and date drum was sealed.

The planned direct-push drilling method is not expected to generate drilling soil cuttings. If cuttings are produced, they will be screened for VOCs with a PID. Soils with visual evidence of contamination or with sustained PID readings greater than background will be containerized for off-Site disposal in 55-gallon drums. Soils with sustained PID readings of less than or equal to background will be considered non-contaminated and will be used as backfill for the borings from which they were extracted if possible. Since most borings are planned on municipal roadways, disposal may not be an option at a drilling location and excess soil may therefore need to be containerized for off-Site disposal.

5.0 DATA EVALUATION

MACTEC will review the laboratory data to determine that the data meets the project specific criteria for data quality and data use. Data Usability Summary Reports (DUSR) will be prepared for each media sampled. The DUSRs will be prepared in accordance with the "Guidance for the Development of Data Usability Reports" (NYSDEC, 2002).

MACTEC will produce a Site Characterization Report that documents the scope of work completed, provides the laboratory results in tabular format and provides field documentation such as field exploration records, sampling forms, photographs, etc. The report will include figures showing the locations of all explorations and sampled wells and select contaminant results (e.g. tri- and tetrachloroethene). The draft report will be submitted to the NYSDEC for comment and MACTEC will revise the report based on comments received. MACTEC will identify potential data gaps and discuss these and possible supplemental characterization tasks with the NYSDEC. Based on these discussions NYSDEC may authorize supplemental sampling to further characterize groundwater or other media that are contributing to observed impacts at the Station 57 well field. If additional sampling is authorized, MACTEC will prepare a supplemental FAP for NYSDEC approval. The results of any supplemental activities will be incorporated into the Final Site Characterization Repot. The Final Report will be submitted to the NYSDEC as both hardcopy and electronic deliverables.

6.0 SCHEDULE

Field work is planned for February, 2010. The estimated duration of the direct-push program is thirteen field days based on previous experience with the planned subcontractor in Nassau County. Prior to mobilization, MACTEC will conduct a site visit to mark locations, facilitate utility clearance, located monitoring wells, and arrange property access, as necessary. A two day trip is planned for this effort. Field start date is contingent upon access approval, work permits and final approval from NYSDEC of this Work Plan.

7.0 REFERENCES

MACTEC, 2009. Records Search and Hydrogeological Evaluation – FINAL. Letter to Mr. Brian Jankauskas, NYSDEC Division of Environmental Remediation Albany, NY from Sandin, Eric and John Peterson. September 8, 2009

MACTEC, 2007. Program Quality Assurance Program Plan. Prepared for the New York State Department of Environmental Conservation, Albany, NY, 2007.

MACTEC, 2009. Program Health and Safety Plan. Prepared for the New York State Department of Environmental Conservation, Albany, NY, 2005.

NYSDEC, 2002. Guidance for the Development of Data Usability Reports, Division of Environmental Remediation, 2002.

FIGURES

Legend

- Water Supply Well (not located precisely)
- Non-Production Well
- Planned GW Profile Location
- Planned Soil Vapor Location
- Dry Cleaner Location **
- Chemical Company or Supplier ***
- New York State DER Site
- RCRA Listing
- Toxic Release Inventory (USEPA)
- Nassau County Industrial Survey

** = Current and historical locations from regulatory databases and phonebook records

*** = Phonebook records

Nassau County color digital orthoimagery (2007) obtained from New York State GIS Clearinghouse at: http://www.nysgis.state.ny.us

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Checked/Date: ECS 01/27/10

FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY - SITE 1-30-191
NEW HYDE PARK, NEW YORK

MACTEC

AREA NEAR WELL 57
Project 3612-08-2117
Figure 1.1

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Legend

- Non-Production Well
- Planned GW Profile Location
- Planned Soil Vapor Location
- Dry Cleaner Location **
- Chemical Company or Supplier ***
- New York State DER Site
- RCRA Listing
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FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY - SITE 1-30-191
NEW HYDE PARK, NEW YORK

MACTEC

AREA NEAR 1010-1309 JERICHO
Project 3612082117
Figure 1.2

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FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY - SITE 1-30-191
NEW HYDE PARK, NEW YORK

MACTEC

AREA NEAR 1519 JERICHO
Project 3612082117
Figure 1.3

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Broadway
Leonard
Park
Nassau Terminal
Denton
Dennis
1st
Railroad
Main
Hoffman
Plaza
Washington
Tanners Pond
Somerset

N 7088
25
VP-15
N-4151
50 NASSAU TERMINAL R
N 6134
N 10333
N 10334
170 NASSAU TERMINAL RD
N 2227
VP-10
N-11171
N 11172

Legend

- Non-Production Well
- Prior Groundwater Profile Location
- Dry Cleaner Location **
- Chemical Company or Supplier ***
- New York State DER Site
- RCRA Listing
- Toxic Release Inventory (USEPA)
- Nassau County Industrial Survey

** = Current and historical locations from regulatory databases and phonebook records
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FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY - SITE 1-30-191
NEW HYDE PARK, NEW YORK

MACTEC

AREA NEAR 50-170 NASSAU TERMINAL
Project 3612082117
Figure 1.4

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Water
Maple
Eastern
Atlas
Pubins
N 8585
N 8584
N 10059
Baxter
N 10060
DENTON & HILLSIDE AVE
Corwin
Dallas
Evergreen
GW-11
N 17
1801 Falmouth Ave
GW-05
SV-05
Falmouth
GW-04
1840 FALMOUTH AVE
Denton
7th
Water
N 6865
GW-07
Gilford
SV-07
1836 GILFORD AVE
1807 GILFORD AVE
N 10332
GW-06
SV-06
1824 GILFORD AVE
6th
Falmouth
GW-09
SV-08
GW-08
Old Stewart
Highland
Gilford
Imperial
5th
Highland
94 Denton Avenue
4th
Jasmine
Lincoln
3rd
West End
GW-10
Gould
2nd
Belmont
Leonard
Broadway
1st

Legend

- Water Supply Well (not located precisely)
- Non-Production Well
- Planned GW Profile Location
- Planned Soil Vapor Location
- Dry Cleaner Location **
- Chemical Company or Supplier ***
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Checked/Date: ECS 12/14/09

FIELD ACTIVITIES PLAN
WAWNC WELL 57 STUDY - SITE 1-30-191
NEW HYDE PARK, NEW YORK

MACTEC

AREA NEAR GILFORD AVE
Project 3612-08-2117
Figure 1.5

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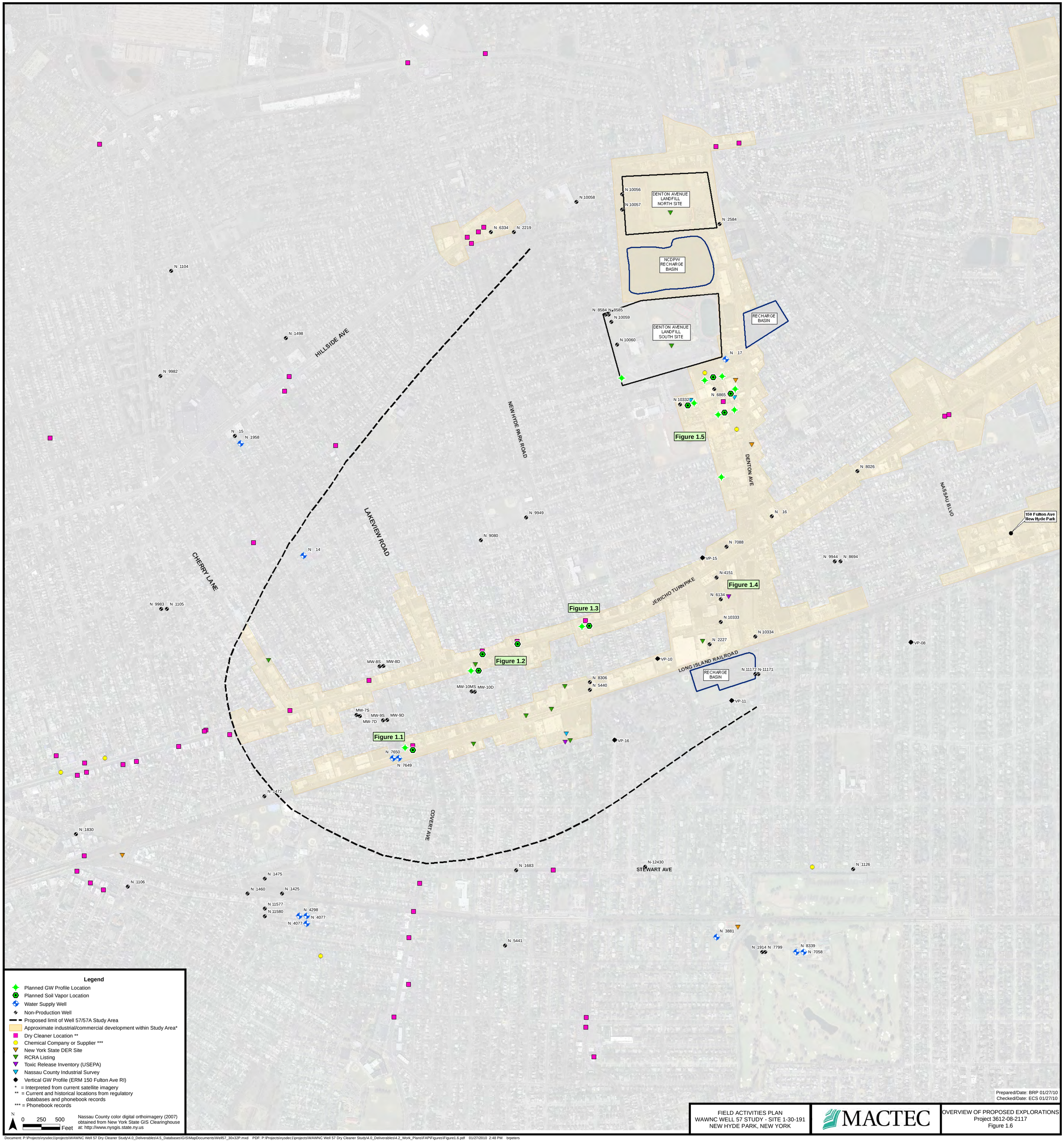

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TABLES

Table 1.1: Sampling Approach

Database Name	Street Address	Approach	Notes
Boulevard Cleaners	608 2nd Ave	One groundwater profile with samples at 10-ft intervals from water table to direct-push refusal. One soil vapor boring with temporary point and grab sample at 10-ft depth.	Locate on 2nd street near to curb and in front (S) of structure. Locate on S 6th Street between former dry cleaner and production wells
Clean Street USA	1824 Gilford Ave	One groundwater profile with samples at 10-ft intervals from water table to direct-push refusal. One soil vapor boring adjacent to GW profile - temporary point and grab sample at 10-ft depth.	Magothy Fm. clay may be present starting at 90 ft bgs based on N-17 drilling log and therefore some intervals may not yield. Locate GW profile to SW on Highland Ave ROW. Soil vapor to south of building as shown on figure.
Petrometer Corp	1807 Gilford	One groundwater profile boring along Gilford Ave in front of building. Sample at 10-ft intervals from water table to 110 ft bgs. One soil vapor sample at adjacent location with grab sample at 10-ft depth	1807 is not a current tax address in County database but Sanborn maps confirm building location. TCE-use documented at this address.
Techem DER Site	1840 Falmouth Avenue	One groundwater profile boring located to the south on Gilford. Sample at 10-ft intervals from water table to 110 ft bgs.	No apparent access adjacent to structure on south side. No soil gas proposed unless groundwater profile indicates shallow solvents.
Dakon Corp	1836 Gilford	One groundwater profile boring located to the south on Highland Ave. Sample at 10-ft intervals from water table to 110 ft bgs. One soil vapor sample adjacent to the structure's north side along Gilford Ave; grab sample at 10-ft depth.	No apparent access adjacent to structure on south side. TCE-use mentioned in historic reference. Preferred location would be on south or west side of structure but access does not look feasible.
Zoe Chemical Company	1801 Falmouth Ave	Two groundwater profile borings along north side of Falmouth Ave. Sample at 10-ft intervals from water table to 110 ft bgs. One soil vapor boring between GW profiles - temporary point and grab sample at 10-ft depth.	Locate one profile in front of tank cradles and one profile to west in front of building. 111-TCA use indicated in file record.
USEPA Denton Ave Landfill	Evergreen and Leonard Blvd	One groundwater profile boring to direct-push refusal. Sample at 10-foot intervals starting at water table. Sample existing wells N-8584, N-8585, N-10059, N-10060 (on west side of landfill); N-10332 and N-6865 on Gilford Street; N-9949 , N-9080 off New Hyde Park Road if wells are intact.	Locate near intersection of Evergreen Ave and Leonard Blvd near SW corner of landfill fence. Groundwater data from these wells and the profile (above) will provide additional spatial information to compare with the groundwater profile data from Falmouth, Gilford, and Denton Avenue properties.

Table 1.1: Sampling Approach

Database Name	Street Address	Approach	Notes
Nostro MFG Corp	50 Nassau Terminal Rd	Sample existing monitoring wells N-6134, N-10333, N-2227, and N-4151 if they exist and are intact.	No new explorations are planned at this time. Existing wells n-7088, n-8306 ANDN n-5440 will be evaluated and sampled to characterize conditions in this industrial area.
DeLux Cleaners	1113 Jericho Tpke	One soil vapor boring with temporary vapor point and grab sample from 10-ft bgs.	Located curbside in front of structure and on north side of Jericho Blvd.
Ampholith	1010 Jericho Tpke	One groundwater profile boring to be located to SW in parking area or as back-up on S 10th Street. Sample at 10-ft intervals from water table to 120 ft bgs. One soil vapor boring with temporary vapor point and grab sample from 10 ft bgs.	No access directly south of structure. Groundwater location is downgradient of both 1113 Jericho and 1010 Jericho properties. Adjacent to groundwater boring.
Jericho Hope Cleaners	1519 Jericho Tpke	One groundwater profile boring to be located curbside in front 1519 Jericho. Sample at 10-ft intervals from water table to 120 ft bgs. One soil vapor boring with temporary vapor point and grab soil vapor sample from 10 ft bgs.	
La Via Cleaners	253 Jericho Tpke	No Work Planned - Street address doesn't match current or historic building numbering	Suspect this was located in Floral Park and to the west of Well 57 study area and zone of influence.
Lily Cleaners	1003 Jericho Tpke	No Work Planned - Street address doesn't match current or historic building numbering	Suspect this is mis-identified in DER data base and is not actually in New Hyde Park.
Continental Cleaners	1309 Jericho Tpke	One soil vapor boring with temporary vapor point from 10-foot bgs. Also sample existing wells MW-10MS and MW-10D.	Soil vapor proposed to rule out shallow solvent source. Locate in Jericho Tpke ROW in front of structure. Existing well MW-10MS appears to be downgradient.
Star Carting DER Site	94 Denton Avenue	One groundwater profile boring to direct-push refusal. Sample at 10-foot intervals starting at water table.	Locate boring near intersection of Gould St and Lincoln to characterize groundwater both downgradient of 94 Denton and other nearby businesses.

Table 1.2: Proposed Sample Identification and Analyses

				Water		Soil Vapor	
Site Type	**Media**	**Site ID**	**Sample ID**	**8260B VOCs**	**QA/QC**	**VOC TO-15**	**Notes**
Groundwater Profile Sampling (Direct-Push Microwell Drilling Method)							**Profile Target Depth**
GW 01: South of 608 2nd Avenue							**Direct-Push refusal or 200 ft bgs**
Profile Boring	Groundwater	GW-01	130191GW01A	1			10-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01B	1	FD		20-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01C	1			30-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01D	1			40-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01E	1			50-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01F	1			60-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01G	1			70-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01H	1			80-ft below water table
Profile Boring	Groundwater	GW-01	130191GW01I	1			90-ft below water table
GW-02: southwest of 1113 Jericho and 1010 Jericho Turnpike							**120 ft bgs**
Profile Boring	Groundwater	GW-02	130191GW02A	1			10-ft below water table
Profile Boring	Groundwater	GW-02	130191GW02B	1			20-ft below water table
Profile Boring	Groundwater	GW-02	130191GW02C	1			30-ft below water table
Profile Boring	Groundwater	GW-02	130191GW02D	1			40-ft below water table
Profile Boring	Groundwater	GW-02	130191GW02E	1			50-ft below water table
GW-03: south of 1519 Jericho Turnpike							**120 ft bgs**
Profile Boring	Groundwater	GW-03	130191GW03A	1			10-ft below water table
Profile Boring	Groundwater	GW-03	130191GW03B	1			20-ft below water table
Profile Boring	Groundwater	GW-03	130191GW03C	1			30-ft below water table
Profile Boring	Groundwater	GW-03	130191GW03D	1			40-ft below water table
Profile Boring	Groundwater	GW-03	130191GW03E	1			50-ft below water table
GW-04: Falmouth Ave to south of 1801 structure							**110 ft bgs**
Profile Boring	Groundwater	GW-04	130191GW04A	1			10-ft below water table
Profile Boring	Groundwater	GW-04	130191GW04B	1			20-ft below water table
Profile Boring	Groundwater	GW-04	130191GW04C	1			30-ft below water table
Profile Boring	Groundwater	GW-04	130191GW04D	1			40-ft below water table
GW-05: Falmouth Ave to south of tank cradles							**110 ft bgs**
Profile Boring	Groundwater	GW-05	130191GW05A	1			10-ft below water table
Profile Boring	Groundwater	GW-05	130191GW05B	1			20-ft below water table
Profile Boring	Groundwater	GW-05	130191GW05C	1			30-ft below water table
Profile Boring	Groundwater	GW-05	130191GW05D	1			40-ft below water table
GW-06: Gilford Ave to south of 1807 structure							**110 ft bgs**
Profile Boring	Groundwater	GW-06	130191GW06A	1	FD		10-ft below water table
Profile Boring	Groundwater	GW-06	130191GW06B	1			20-ft below water table
Profile Boring	Groundwater	GW-06	130191GW06C	1			30-ft below water table
Profile Boring	Groundwater	GW-06	130191GW06D	1			40-ft below water table
GW-07: Gilford Ave near Denton Ave							**110 ft bgs**
Profile Boring	Groundwater	GW-07	130191GW07A	1			10-ft below water table
Profile Boring	Groundwater	GW-07	130191GW07B	1			20-ft below water table
Profile Boring	Groundwater	GW-07	130191GW07C	1			30-ft below water table
Profile Boring	Groundwater	GW-07	130191GW07D	1			40-ft below water table
GW-08: Highland Ave to southwest of 1824 Gilford Ave structure							**Direct-Push refusal or 200 ft bgs**
Profile Boring	Groundwater	GW-08	130191GW08A	1			10-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08B	1			20-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08C	1			30-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08D	1			40-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08E	1			50-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08F	1			60-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08G	1			70-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08H	1			80-ft below water table
Profile Boring	Groundwater	GW-09	130191GW08I	1			90-ft below water table
Profile Boring	Groundwater	GW-08	130191GW08D	1			40-ft below water table
GW-09: Highland Ave to southwest of 1836 Gilford Ave structure							**110 ft bgs**
Profile Boring	Groundwater	GW-09	130191GW09A	1			10-ft below water table
Profile Boring	Groundwater	GW-09	130191GW09B	1			20-ft below water table
Profile Boring	Groundwater	GW-09	130191GW09C	1			30-ft below water table
Profile Boring	Groundwater	GW-09	130191GW09D	1			40-ft below water table

Prepared By: ECS 12/07/09
Checked By: JWP 12/11/09

Table 1.2: Proposed Sample Identification and Analyses

				Water		Soil Vapor	
Site Type	**Media**	**Site ID**	**Sample ID**	**8260B VOCs**	**QA/QC**	**VOC TO-15**	**Notes**
GW-10: Gould Ave to south of Lincoln St intersection							**Direct-Push refusal or 200 ft bgs**
Profile Boring	Groundwater	GW-10	130191GW10A	1			10-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10B	1			20-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10C	1			30-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10D	1			40-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10E	1	FD		50-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10F	1			60-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10G	1			70-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10H	1			80-ft below water table
Profile Boring	Groundwater	GW-10	130191GW10I	1			90-ft below water table
GW-11: Leonard Boulevard near intersection with Evergreen Ave							**Direct-Push refusal or 200 ft bgs**
Profile Boring	Groundwater	GW-11	130191GW11A	1			10-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11B	1			20-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11C	1	FD		30-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11D	1			40-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11E	1			50-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11F	1			60-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11G	1			70-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11H	1			80-ft below water table
Profile Boring	Groundwater	GW-11	130191GW11I	1			90-ft below water table
Soil Vapor Borings							**See Figures for locations**
Soil Vapor	Soil Vapor	SV-01	130191SV01			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-02	130191SV02			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-03	130191SV03			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-04	130191SV04			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-05	130191SV05			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-06	130191SV06			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-07	130191SV07			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-08	130191SV08			1	10 ft bgs
Soil Vapor	Soil Vapor	SV-09	130191SV09			1	10 ft bgs
Monitoring Well Sampling							**Well Depth (ft bgs)**
Well	Groundwater	MW-10MS	MW10MS	1	FD		193
Well	Groundwater	MW-10D	MW10D	1			116
Well	Groundwater	N-9949	N9949	1			96
Well	Groundwater	N-4151	N4151	1			68
Well	Groundwater	N-6134	N6134	1			75
Well	Groundwater	N-10333	N10333	1			63
Well	Groundwater	N-2227	N2227	1			76
Well	Groundwater	N-10332	N10332	1			60
Well	Groundwater	N-10060	N10060	1			114
Well	Groundwater	N-10059	N10059	1			95
Well	Groundwater	N-8585	N8585	1			107
Well	Groundwater	N-8584	N8584	1			73
Well	Groundwater	N-8306	N8306	1			89
Well	Groundwater	N-5440	N5440	1			72
Well	Groundwater	N-7088	N7088	1			70
Well	Groundwater	N-6865	N-6865	1			301
TOTAL SAMPLES				84		9	

NOTES:

Sample ID: Successive 10-foot depth intervals from each Site ID will be labeled "A", "B", "C", etc.

8260B VOCs = Target Compound List Volatile Organic Compounds analyzed by USEPA SW-846 method 8260 for water.

FD (Field duplicates) will be collected at a 5% freqency for water samples. The laboratory will provide quality control data such as matrix spike/duplicate results as part of their internal QA/QC procedures.

Prepared By: ECS 12/07/09
Checked By: JWP 12/11/09

APPENDIX A

SITE-SPECIFIC HEALTH AND SAFETY PLAN

MACTEC, Inc.

MACTEC Short Form HASP

Site: WAWNC Well 57 Study Site #130191 Job Number: 3612082117
Street Address: Various locations in New Hyde Park, Long Island, New York
Proposed Date(s) of Investigation: February 1 – March 15 (TBD)
Prepared by: Kendra Bavor, CSP, LHSR Date: 1-21-2010
*Approved by: Cindy Sudano Date: 1-25-10
Site Description: Densely populated area, working along busy road ways and in right of ways.
(attach map)
Proposed Activity(s): Oversight supervision of Direct Push ground water sampling (0-200' bgs), Soil vapor sampling (0-10' bgs), Well Sampling existing wells (MACTEC)
*Approval also serves as certification of a Hazard Assessment as required by 29 CFR 1910.132

Dates of Required Training and Medical Surveillance:

		Names of Field Team			
		TBD			
	Req?	Dates	Dates	Dates	Dates
Medical Surveillance	X				
Site Specific Medical Testing:_____					
40-Hour Initial	X				
8-Hour Supervisor [1,3]					
8-Hour Refresher	X				
First Aid/CPR [1,2]					
Respirator Fit Test [1]					
Respirator Brand [1]					
Hazard Communication [1]	X				
Fall Protection [1]					
Confined Space Entry [1]					

[1] If Applicable
[2] At least one worker must be trained in First Aid/CPR and should received Bloodborne Pathogen Training
[3] Required for Field Lead and Site Health and Safety Officer

Known or Suspected Contaminants (include PELs/TLVs):

Contaminants of Concern	Historical Highest Sample Data	PEL/TLV	Fact Sheet Included
None Known – investigating for:			
Tetrachloroethylene (PCE)	NA	25 ppm, 100ppm STEL	X
Trichloroethylene (TCE)	NA	10 ppm; 100 ppm STEL; 300 ppm ceiling	X

JHAs: Check and attach all that apply (add applicable JHAs not already listed):

Activity Specific JHAs:

☒	Mobilization/Demobilization and Site Preparation
☒	Field Work - Oversight
☒	Decontamination
☒	Groundwater Sampling
☐	Soil Sampling
☐	Drilling Operation (MACTEC Driller)
☐	Geoprobe (MACTEC Geoprobe Operator)
☐	Excavations and Backfilling
☒	Soil Vapor Survey

Hazard Specific JHAs:

☐	Insect Stings and Bites
☐	Gasoline
☐	Working with Preservatives (Acids)
☐	
☐	
☐	
☐	
☐	
☐	

Chemicals Brought to the Site:
List all chemicals brought to the site (e.g., preservatives, decontamination solutions, gasoline, etc.). Attach MSDS

Chemicals	MSDS Attached?
NONE	☐
	☐
	☐
	☐

Chemicals will be kept in their original containers. If transferred to another container, aside from days use by one individual, the new container will be labeled with the name of the chemical and the hazard warnings.

HAZARD IDENTIFICATION SUMMARY

Complete the checklist for summarizing the hazards identified in the JHAs

Standard Hazards			
☐ Falling Objects	☒ Slips and trips	☒ Pinch points	☒ Rotating equipment
☐ Falls	☒ Power equipment/tools	☐ Elevated work surfaces	☐ _____
Eye Hazards			
☐ Particulates	☐ Liquid splashes	☐ Welding Arc	☐ _____
Hearing Hazards			
☐ None	☒ Impact noise	☐ High frequency noise	☒ High ambient noise

Respiratory Hazards						
☐ None	☐ Dust/aerosols/particulates	☒ Organic Vapors	☐ Acid Gases	☐ O_2 deficient	☐ Metals	☐ Asbestos

Chemical Hazards			
☐ None	☒ Organic solvents	☐ Reactive metals	☐ PCBs
☐ Acids / bases	☐ Oxidizers	☐ Volatiles/Semi-volatiles	☐ _____

Environmental Hazards			
☐ None	☒ Temperature extremes: ☒ Cold ☐ Heat	☐ Wet location	☐ Bio hazards (snakes, insects, spiders, poisonous plants, etc.)
☐ Explosive vapors	☐ Confined space	☐ Engulfment Hazard	☐ _____

Electrical Hazards				
☐ None	☐ Energized equipment or circuits	☒ Overhead utilities	☒ Underground utilities	☐ Wet location

Fire Hazards			
☒ None	☐ Cutting, welding, or grinding generated sparks or heat sources	☐ Flammable materials present	☐ Oxygen enriched location

Ergonomic Hazards					
☒ Lifting	☐ Bending	☐ Twisting	☐ Pulling/tugging	☐ Repetitive motion	☒ Carrying
Computer Use in the: ☐ Office ☐ Field				☐ _____	

Radiological Hazards						
☒ None	☐ Alpha	☐ Beta	☐ Gamma/X-rays	☐ Neutron	☐ Radon	☐ Non-Ionizing

Other Hazards
☒ Traffic

PPE and Monitoring Instruments

Initial Level of PPE *			
☐ Level D	☒ Modified Level D	☐ Level C	* Cannot use Short Form HASP for Level B or A work

Standard PPE					
☒ Hard Hat	☐ Safety boots	☒ Safety glasses	☐ Chem. Resistant Boots	☒ High visibility vest	☐ Other:_____

Eye and Face Protection			
☐ Face shield	☐ Vented goggles	☐ Unvented goggles	☐ Indirect vented goggles

Hearing Protection			
☒ Ear plugs	☐ Ear Muffs	☐ Ear plugs and muffs	☐ Other _____

Respiratory Protection					
☒ None	☐ Dust mask	☐ Full Face APR	☐ Half Face APR	Cartridge Type: _____	Change Cartridges: _____

Protective Clothing			
☒ Work uniform	☐ White uncoated Tyvek®	☐ Poly-coated Tyvek®	☐ Saranex®
☐ Boot covers	☐ Reflective vest	☐ Chaps or Snake Legs	☐ Other _____

Hand Protection					
☐ None	☐ Cotton gloves	☐ Leather gloves	☐ Glove liners	☒ Cut-resistant gloves (optional)	☐ Other _____
☐ Outer Gloves: List Type Nitrile			☐ Inner Gloves: List Type_____		

Monitoring Instruments Required*

Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling.)
- When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon.)

☐ LEL/O2 Meter	☒ PID: ☒ 10.0-10.6 eV Lamp ☐ 11.7 eV Lamp	☐ FID	☐ Hydrogen Sulfide/Carbon Monoxide
☐ Dräger Pump (or equivalent) List Tubes_____	☐ Dust Meter: ☐ Respirable dust ☐ Total dust		☐ Other _____

*Monitoring instruments will be calibrated daily in accordance with manufacturer's instructions.

Air Monitoring Action Levels:

PID/FID Reading [1]	Detector Tube [1]	Dust Meter [1]	LEL[2]/O_2 [1]	Action	Level of PPE
9 ppm				Stop work. Evacuate the area. Reevaluate. If action levels continue to be exceeded, contact HSO	D
			>10% LEL	Stop work. Evacuate area. If action levels continue to be exceeded, contact HSO, consider return with ventilation system and spark proof/intrinsically safe equipment.	
			<19.5% O_2	Stop work and evacuate area.	

[1] Sustained readings measured in the breathing zone
[2] Readings at measured at the source (borehole, well, etc.)

PPE Selection Guidelines

When selecting the appropriate PPE for the job, consider the following:

- **Safety glasses** – general eye protection – source of hazard, typically coming from straight on, required at most sites
- **Tinted Safety Glasses** – same as above, but when working in direct sunlight. May need two both tinted and untinted if working in both sunlight and shade/overcast skys.
- **Safety goggles** – needed for splash hazard, more severe eye exposures coming from all directions. Non-vented or indirect venting for chemical splash, non-vented for hazardous gases or very fine dust, vented for larger particulates coming from all directions.
- **Face shield** – needed to protect face from cuts, burns, chemicals (corrosives or chemicals with skin notation), etc.
- **Safety boots** – needed if danger of items being dropped on foot that could injure foot
- **Hard hat** – danger from items falling on head – any overhead work, tools, equipment, etc that is above the head and could fall on head of item fails, or falls off work platform. Typically required at most sites as a general PPE
- **Thin, chemical protective inner gloves** (e.g., thin Nitrile, PVC – do not use latex – many people are allergic to latex) –needed to protect hands from incidental contact with low risk contamination at very low concentrations (ppb or low ppm concentrations in groundwater or soil) or used in combination with outer gloves as a last defense against contamination. Need to specify type
- **Outer gloves** – thicker gloves (e.g., Nitrile, Butyl, Viton, etc.) – used when potential for high concentrations of contaminants (e.g., floating product, percent ranges of contaminant, opening drums, handling pure undiluted chemicals, etc.). Need to specify type.
- **Leather gloves, leather palm, cotton** – good in protecting hands against cuts – no protection from chemicals. May be used in combination with chemical protective gloves.
- **Boot Covers** – when there is contamination in surface soils or waking surface in general. When safety boots need protection from contact with contaminants.
- **White (uncoated) Tyveks** – protect clothing from getting dirty, good for protection against solid, non-volatile chemicals (e.g., asbestos, metals) – no chemical protection.
- **Polycoated Tyveks** – least protective of chemical protective clothing. Used when some risk of contamination getting on skin or clothing. Usually, lower ppm ranges of contaminants.
- **Saranex** – Greater protection against contamination than Polycoated Tyveks. Used to protect against PCBs or higher concentrations of contaminants in the soil or groundwater.
- **Other Chemical protective clothing** – if significant risk of dermal exposure, contact H&S to determine best kind.
- **Long sleeved shirts, long pants** – if working in areas with poison ivy/oak/sumac, poisonous insects, etc. and no chemicals exposure. May want to use uncoated Tyveks for work in areas where poisonous plants are know to be to protect clothing.
- **Cartridge Respirator (Level C PPE)** – Need to calculate change schedule (contact Division EH&S Manager for this) to determine length of use. To be able to use cartridge respirators, need to know contaminants, estimate levels to be encountered in the breathing zone, need to ensure that cartridge will be effective against COCs, and need to be able to monitor for COCs using PID, FID, Dräger tubes, etc.. If can't do any of these, then Level B PPE is probably going to be needed.
- **High Visibility Vest** – needed for any road work (with in 15 feet of a road) or when working on a site with vehicular traffic or working around heavy equipment. Needed if work tasks would take employee concentration away from movement of vehicles and workers would have to rely on the other driver's ability to see the employee in order not to hit them. This includes heavy equipment as well as cars and trucks, on public roads or the jobsite. Not needed if wearing Polycoated Tyveks – as they are already high visibility.
- **Reflective Vest** – see above, but for use at night.
- **Hearing Protection** – needed if working at noise levels above 85 dBA on a time weighted average. If noise measurements are not available, use around noisy equipment, or in general, if you have to raise your voice to be heard when talking to someone standing two feet away.
- **Protective Chaps** – required when using a machete or chain saw or any other cut hazard to legs.

Work Zones:
The work zones will be defined relative to the location of the work activity. The Exclusion Zone is considered the area within a 10-foot diameter of the sampling location. The Contamination Reduction Zone is considered to be the area with in a 20-foot diameter of the sampling location. The decontamination zone being located upwind of the work area. Work zones will be maintained through the use of:

- ☐ Warning Tape
- ☒ Visual Observations
- ☒ Barricades, signs and cones along roadway and right of ways

Decontamination Procedures and Equipment:
Note: See Decontamination JHA for further information

Level D Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Boots, and Gloves Wash and Rinse (if worn)	Scrub outer boots, and outer gloves decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal (if worn)	Remove outer boots and gloves. Deposit in plastic bag.
Station 4: Inner glove removal	Remove inner gloves and place in plastic bag.
Station 5: Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Modified Level D and Level C PPE Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4: Canister or Mask (Level C only) Change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and worker returns to duty.
Station 5: Boot, Gloves and Outer Garment Removal	Boots, chemical resistant splash suit, and inner gloves are removed and deposited in separate containers lined with plastic.
Station 6: Face Piece Removal (Level C only)	Facepiece is removed. Avoid touching face with fingers. Facepiece is deposited on plastic sheet.
Station 7: Field Wash	Hands and face are thoroughly washed. Shower as soon as

possible.

Site Communication:

- ☒ Verbal
- ☐ Two-way radio
- ☒ Cellular telephone
- ☒ Hand signals
  - Hand gripping throat ---------- Out of air, can't breathe
  - Grip partner's wrist or both hands around waist ---------- Leave area immediately
  - Hands on top of head ---------- Need assistance
  - Thumbs up ---------- OK, I am all right, I understand
  - Thumbs down ---------- No, negative
- ☐ Horn
- ☐ Siren
- ☐ Other:

EMERGENCY CONTACTS

NAME	TELEPHONE NUMBERS		DATE OF PRE-EMERGENCY NOTIFICATION (if applicable)
Fire Department:	911		
Hospital:	718-470-7000/ or 516-294-3535		
Police Department:	911		
Site Health And Safety Officer: TBD	Office:	Home:	
Client Contact: Brian Jankauskas	Office: 518-402-9620	Pager:	
Project Manager: Eric Sandin	Office:207-828-3556	Cell:207-807-1152	
Division EH&S Manager: Cindy Sundquist	Office: 207-828-3309 (w) 207-650-7593(c)	Home: 207-892-4402	
EPA/DEP (if applicable):			
OTHER: Ambulance	911		

Emergency Equipment:

The following emergency response equipment is required for this project and shall be readily available:

- ☒ Field First Aid Kit
- ☐ Fire Extinguisher (ABC type)
- ☐ Eyewash (Note: 15 minutes of free-flowing fresh water)
- ☐ Other: _____

EMERGENCY PROCEDURES

- The HSO (or alternate) should be immediately notified via the on-site communication system. The HSO assumes control of the emergency response.
- The HSO notifies the Project Manager and client contact of the emergency. The HSO shall then contact the Division ES&H Manager who will then contact the Corporate EH&S Manager.
- If applicable, the HSO shall notify off-site emergency responders (e.g. fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the HSO evacuates the site. Site workers should move to the predetermined evacuation point (See Site Map).
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs (if available), should be donned. If appropriate PPE is unavailable, site workers should evacuate and call in emergency personnel.
- For chemical spills, follow the job specific JHA for spill containment
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and wash affected area. Site worker should shower as soon as possible after incident.
- If a worker is injured, first aid shall be administered by certified first aid provider.
- If the emergency involves toxic gases, workers will back off and reassess. Prior to re-entering the work zone, the area must be determined to be safe. Entry will be using Level B PPE and utilize appropriate monitoring equipment to verify that the site is safe.
- An injured worker shall be decontaminated appropriately.
- After the response, the SHSO shall follow-up with the required company reporting procedures, including the completing the MACTEC Incident Analysis Report.

Site Specific Emergency Procedures are as follows: _____

_____

_____

Additional Health and Safety Procedures

Underground utility clearance will be provided by the subcontractor. Use caution when working in area of known utilities.

Establish a work zone and provide warning for the general public in high traffic areas. Consider using flashing lights.

FIELD TEAM REVIEW: I acknowledge that I understand the requirements of this HASP, and agree to abide by the procedures and limitations specified herein. I also acknowledge that I have been given an opportunity to have my questions regarding the HASP and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Routes to Emergency Medical Facilities

Confirm routes to hospital from specific sites prior to commencing field work.

PRIMARY HOSPITAL:

Facility Name: Long Island Jewish Medical Center

Address: 27005 76th Ave # C204, New Hyde Park, NY 11040

Telephone Number 718-470-7000

DIRECTIONS TO PRIMARY HOSPITAL (attach map):
3 miles From Nassau Terminal Road
Start North on Nassau Terminal Road Toward Jericho Turnpike (NY25)
Turn Right onto Jericho Tpk (NY25)
Trun Left onto Denton Ave
Trun Left onto Marcus Ave which become Union Turnpike.
Turn Right onto 270th ST
Rigth on 76th Ave

ALTERNATE HOSPITAL:

Facility Name: Nassau Immediate Medical Care

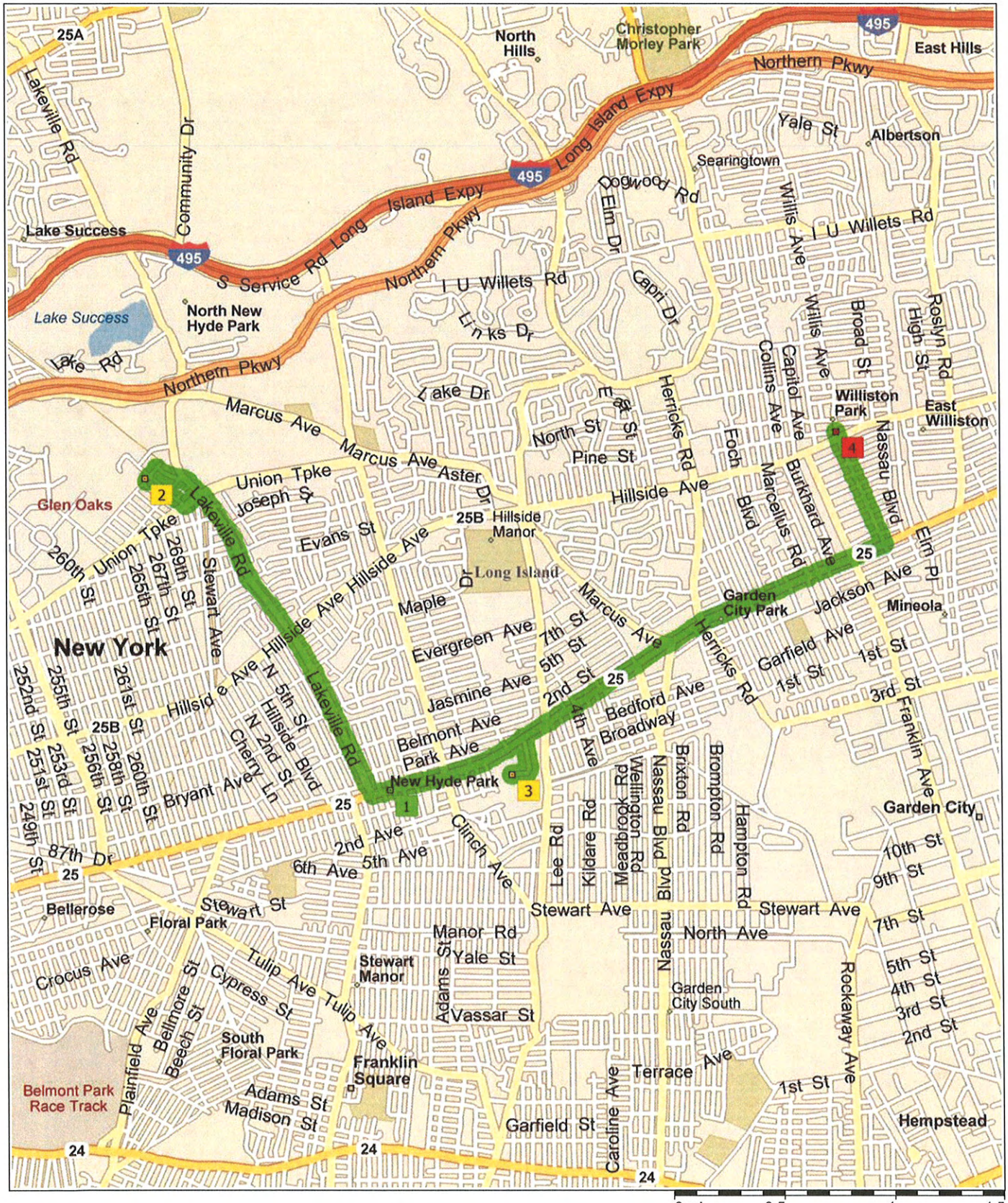
Address: 465 Willis Ave, Williston Park, NY 11596

Telephone Number 516-294-3535

DIRECTIONS TO ALTERNATE HOSPITAL (attach map):
3 miles From Jericho sites.
Start north east on Jericho Turnpike (NY25) toward N 12th St.
Turn Left onto Herrick Road.
Turn right onto Hillside Ave (NY 25B)
Turn left onto Willis Ave.
Location on Left.

Hospital locations

7.7 miles; 21 minutes



9:00 AM	0.0 mi	1 Depart 1010 Jericho Tpke, New Hyde Park, NY 11040 on SR-25 [Jericho Tpke] (West) for 153 yds
9:00 AM	0.1 mi	Turn RIGHT (North) onto Lakeville Rd for 1.6 mi
9:05 AM	1.7 mi	Turn LEFT (South-West) onto Union Tpke for 164 yds
9:05 AM	1.8 mi	Turn RIGHT (North-West) onto 271st St for 0.2 mi
9:06 AM	2.0 mi	Turn LEFT (South-West) onto 76th Ave for 43 yds
9:06 AM	2.0 mi	2 At Long Island Jewish Medical Center [76th Ave, Queens, NY 11040, (718) 470-7000], return North-East on 76th Ave for 131 yds
9:07 AM	2.1 mi	Turn RIGHT (South-East) onto Hewlett St for 0.2 mi
9:08 AM	2.3 mi	Bear RIGHT (South-East) onto Lakeville Rd for 1.7 mi
9:13 AM	4.0 mi	Turn LEFT (East) onto SR-25 [Jericho Tpke] for 0.8 mi
9:14 AM	4.7 mi	Turn RIGHT (South) onto Nassau Terminal Rd for 0.2 mi
9:15 AM	5.0 mi	3 At Nassau Terminal Rd, New Hyde Park, NY 11040, return East on Nassau Terminal Rd for 0.2 mi
9:16 AM	5.2 mi	Turn RIGHT (East) onto SR-25 [Jericho Tpke] for 1.9 mi
9:20 AM	7.1 mi	Turn LEFT (North) onto Willis Ave for 0.6 mi
9:21 AM	7.7 mi	4 Arrive 465 Willis Ave, Williston Park, NY 11596

Check one
Initial Report: ☐
Update: ☐
Final Report: ☐

Category C: ☐
Category B: ☐
Category A: ☐

ATTACHMENT 1
INCIDENT ANALYSIS REPORT
Attorney-Client Work Product Prepared in Anticipation of Litigation

(Review instructions on page 9 prior to completing this form)

Local Office ID Number: _____

To: Office of the General Counsel
This information has been prepared at your request and under your direction in anticipation of litigation so that you may prove appropriate legal advice to the undersigned and the management of the Company.

Section 1 – General Information

Report Date: _____ Incident Date: _____ Time of incident: _____

Employee Name: _____ Sex: ☐ M ☐ F

Job Title: _____ Hire Date: _____ Time employee began work: _____

Department: _____ Project Manager: _____ Client: _____

Office where employee works from: _____ Immediate Supervisor: _____ Hours employee worked during last 7 days: ____ hr

Location where incident occurred: _____ Is this a Company controlled work site: ☐ Yes ☐ No

Section 2 – Incident Type (mark all that apply)

A. Type of incident being reported:

☐ Near Miss ☐ First-aid Case ☐ Medical Treatment ☐ Hospitalization ☐ Day Away Case ☐ Restricted/Transfer Case
☐ Fatality ☐ Vehicle Incident ☐ Notice of Violation ☐ Regulatory Inspection ☐ Environmental Release
☐ Other (please describe): _____

B. If an **injury or illness** - describe the part of the body that was affected and how it was affected:

C. If an **environmental release** - describe the quantity and name and CAS# of material released into the environment:

D. If an **inspection by a regulatory agency** - what agency, who were the inspectors, and supply inspector contact information:

Section 3 – Incident Description (Attach and number additional pages, as needed, to ensure **all details related to the incident are captured.**)

A. List the names of all persons involved in the incident, and employer information:

B. List the names of any witnesses, their employer, and a local/company telephone number or address:

C. What was the employee(s) doing just prior to the incident?

D. Explain in **detail** what happened?

E. Explain in **detail** what object or substance directly harmed the employee?

F. List any damaged equipment or property (other than motor vehicles) model and serial number **and** estimated costs to repair/replace damaged equipment or property, if applicable:

Section 4 - Incident Analysis

A. Was a Job Hazard Analysis (JHA) completed for the work being performed? YES ☐ NO ☐ Who prepared the JHA?

B. When and who was the last safety officer (i.e. LHSR, supervisor, Division ES&H Manager, etc.) at your work site?

C. When and what safety training **directly related** to the incident has the person(s) involved had?

Section 5 - Incident Investigation Results

#	**Causal Factors** (Attach and number any additional pages as needed to completely address this section)
1	
2	
3	
4	
5	

Root Cause(s) Analysis (The below items represent major root cause categories which have been determined to be Less Than Adequate (LTA). A more detailed determination of the root cause will be facilitated, if needed, by your Division's ES&H Manager.)

1. Equipment Reliability Program Implementation
2. Administrative / Management Systems
3. Procedures
4. Human Factors Engineering
5. Training
6. Immediate Supervision
7. Communications
8. Personal Performance

Root Cause #	Corrective Actions to be taken (Attach additional pages as needed to completely address this section)	Responsible Person	Proposed Completion Date	Closed on Date	Verified by and Date Verified

Section 6 – Notifications, Certification & Approvals

Check the appropriate boxes indicating the applicable reports have been made to the following organizations:

Auto Lessor ☐ **Insurer** ☐ **Workers' Compensation Administrator** ☐

Post-incident Substance Abuse Testing Has Been Performed ☐

Incident investigated by (signatures):			
Employee(s):	**Date:**	Employee's Supervisor:	Date:
LHSR/Project/Office Manager:	Date:	Division ES&H Manager:	Date:

Check one
Initial Report: ☐
Update: ☐
Final Report: ☐

ATTACHMENT 2
VEHICLE INCIDENT REPORT
Attorney-Client Work Product Prepared in Anticipation of Litigation
(Review instructions on page 12 prior to completing this form)

Section 1 - General Information

Date of incident: _____

Time incident occurred: _____ ☐ AM ☐ PM Illumination: ☐ Dark ☐ Light Road Condition: ☐ Dry ☐ Wet ☐ Icy/snow

Were police summoned to scene? ☐ Yes ☐ No Police Department and Location: _____

Report #: _____ Officer's Name and Badge Number: _____

Section 2 - Company Driver and Vehicle

Driver's name: _____ D/L # _____ State: _____

Driver's home office address: _____ Driver's Phone # _____

Company Vehicle # _____ Year _____ Model _____ License # _____ State _____

Company car? ☐ Yes ☐ No Owned by employee? ☐ Yes ☐ No

Leased/rented from _____

Passenger/Witness Name(s) _____ Address: _____ Phone: _____

Passenger/Witness Name(s) _____ Address: _____ Phone: _____

Passenger/Witness Name(s) _____ Address: _____ Phone: _____

Damage to vehicle: _____

Injuries to employee(s): _____

Injuries to others: _____

Vehicle was being used for: Company business ☐ Yes ☐ No Personal business ☐ Yes ☐ No

Towed: ☐ Yes ☐ No By Whom: _____ To Where: _____

Section 3 - Other Driver and Vehicle Information

Driver's Name: _____ D/L # _____ State _____

Current Address _____ City _____ State _____

Telephone Home: _____ Work: _____ Cell: _____

Reg. Owner's Name: _____ Address: _____ City: _____ State: _____
(verify registration document)

The Other Vehicle: Make _____ Model _____ Year _____ License # _____ State _____

Insurance company name: _____ Address: _____ Phone # _____

Policy No. _____ Contact Person _____ Phone # _____

Passenger/Witness Name(s) _____ Address: _____ Phone: _____

Passenger/Witness Name(s) _____ Address: _____ Phone: _____

Damage: (*Make note of pre-existing damage and take pictures if possible.* ***Attach additional pages as needed)***

Injuries to other driver/passengers:

Section 4 – Approvals (signatures required)

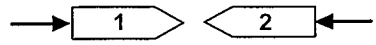
Form completed by: _____ Signature: _____ Date: _____

Things to Do First In The Event Of a Motor Vehicle Incident

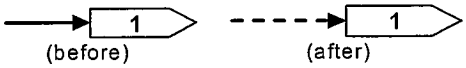
1. Most important: **STOP**.
2. **Call 911 if there are injuries.**
3. Call for an officer if the incident occurred on public property (streets, highways or roads). Disputes often arise between the parties involved as to who was at fault; therefore, a police report is important. If an officer is unable to attend the scene of the accident, a counter police report may be filed at most stations. Insurance companies rely on police reports to determine liability.
4. Complete the Incident Investigation Report and the Vehicle Incident Report forms. It is important that both these forms are completed in detail. Include a diagram of the incident on the back of the report. Incomplete information may lead to delays in processing associated claims and in helping to prevent this type of incident from occurring again.
5. Express no opinion as to who was at fault. This is for the insurance companies to determine.
6. Give only information that is required by the authorities or as directed by MACTEC contractual requirements.
7. Sign only those statements required by the authorities or as directed by MACTEC contractual requirements. Do not sign away your rights or the company's rights.
8. If you are injured or think you were injured, tell your supervisor and see a physician. Your supervisor will notify MACTEC's Worker's Compensation insurance carrier, your Division's ES&H Manager and the Corporate Director of ES&H by phone, email or fax. For additional instructions on what to do, go to MACTEC's ES&H website on the intranet at:

   http://intranet.mactec.com/EnvSafetyHealth/HealthSafety_Claims_Reporting.htm
9. Your supervisor will forward both completed incident reports immediately to your Division's ES&H Manager.

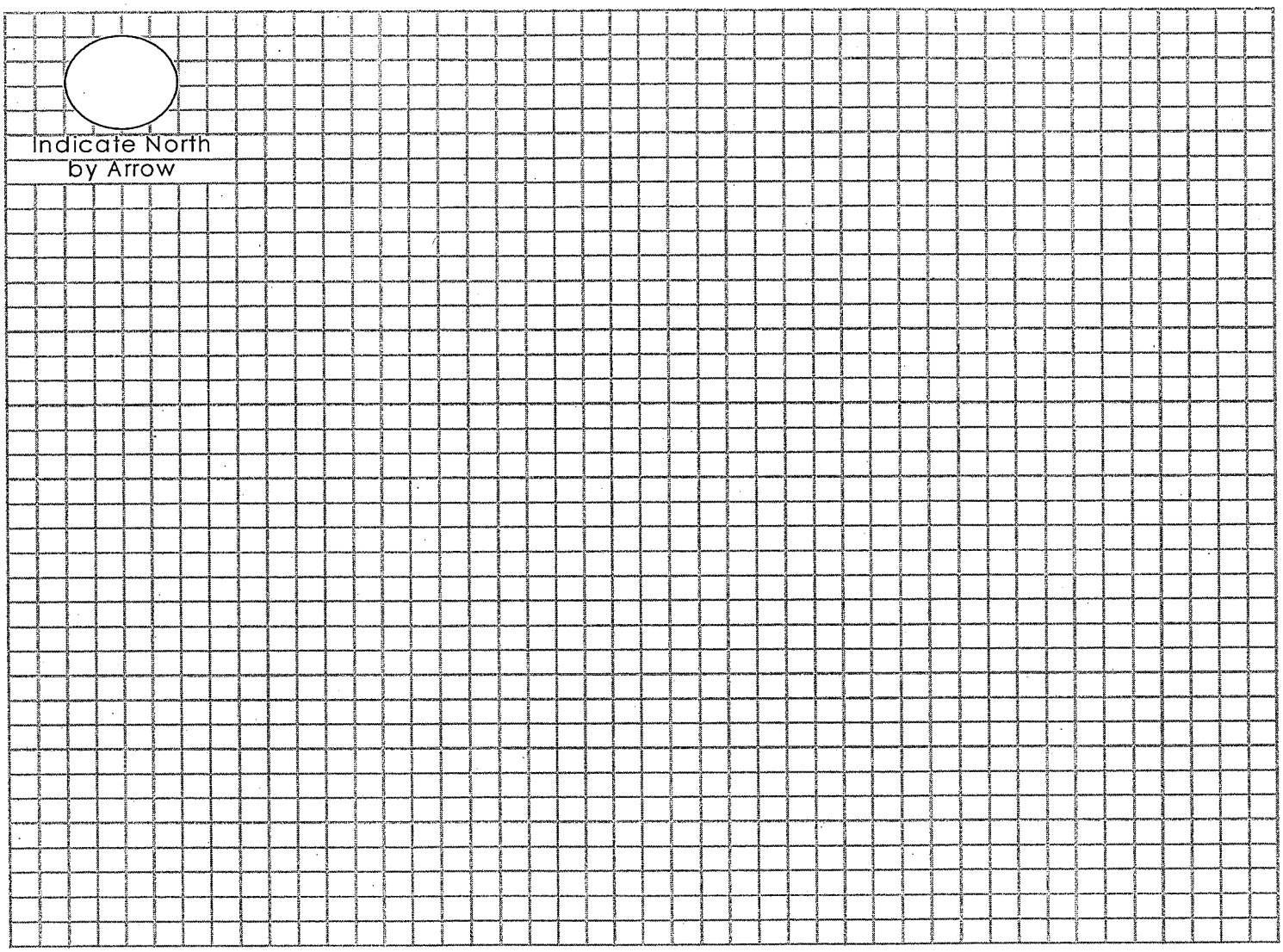
Instructions:

1. Number each vehicle and show directions 

2. Use a solid line to show path before incident and use a dotted line to show path after incient



3. Show pedestrian/non-motorist by: 
4. Show railroad by:
5. Indicate north by arrow as: 
6. Show street or highway names or numbers
7. Show signs, signals, warning and traffic controls.



Prepared by: _____ Date: _____

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name: Tetrachloroethene
CAS Number: 127-18-4
Synonyms: tetrachloroethylene; Perchloroethylene (Perc)

HEALTH HAZARD DATA

Color: colorless

Physical State: Solid ; Liquid X ; Gas

Odor: chloroform-like

Odor Threshold: 47 ppm

Vapor Density: 6.8 g/L

Ionization Potential (IP): 9.32 eV

IDLH: 150 ppm

Carcinogen: OSHA ; IARC ; NTP X ; ACGIH X ; NIOSH X

Skin absorbable: yes __ no X

Skin corrosive: yes __ no X

Signs/Symptoms of Acute Exposure:
Irritation of eyes, nose, and throat; nausea; flushing of the face and neck; vertigo; dizziness; incoherence; headache; sleepiness, and skin irritation

Source	TWA (units)	STEL (units)	C (units)
OSHA PEL	100 ppm		200 ppm
ACGIH TLVs	25 ppm	100 ppm	
NIOSH RELs	Lowest Feasible		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
PID	Microtip 10.6 eV	Isobutylene 100 ppm	1.04 ppm	26 ppm
PID	HNu 10.2 eV	Isobutylene 100 ppm	0.86	21.5 ppm
Detecor Tube	Drager 8101 501	2 - 40 ppm		25 ppm

Checked by: Emmet F. Curtis Date: 12/5/03

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Teflon, Viton, CPF3, Barricade, Responder, Trellchem, Tychem

Gloves: Viton, Teflon, and Polyvinyl Alcohol (do not use in (water)

Boots: Nitrile Rubber

Service Limit Concentration (ppm): 1000

MUC 1/2 Mask APR=TWA x 10= 125 ppm
MUC Full-Face APR=TWA x 10= 125 ppm

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA / NA

Fire Extinguishing Media:

Dry Chemical	X	Foam	X
Water Spray	X	CO_2	X

Incompatibilities:
Strong oxidizers, chemically-active metals, caustic soda, sodium hydroxide, and potash

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name: Trichloroethene

CAS Number: 79-01-6

Synonyms: Ethylene trichloride, TCE, Trichloroethylene, Trilene

HEALTH HAZARD DATA

Color: Colorless

Physical State: Solid ___ Liquid X Gas ___

Odor: Chloroform-like

Odor Threshold: 82 ppm

Vapor Density: 4.5 g/L

Ionization Potential (IP): 9.45 eV

IDLH: 1000 ppm

Carcinogen: OSHA ___ IARC ___ NTP ___ ACGIH ___ NIOSH X

Skin absorbable: yes ___ no X

Skin corrosive: yes ___ no X

Signs/Symptoms of Acute Exposure: Irritant to eyes and skin, headache nausea, vomiting, dermatitis, vertigo, visual disturbance, fatigue, giddiness, sleepiness

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	100 ppm		200 ppm
ACGIH TLVs	10 ppm	100 ppm	
NIOSH RELs	25 ppm		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
PID	Microtip 10.6eV	Isobutylene 100 ppm	0.92	23
PID	HNu 10.2eV	Isobutylene 100 ppm	0.90	22.5
Detector Tube	Drager 6828541	2 - 50 ppm		25

Checked by: Emmet F. Curtis Date: 12/5/03

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Viton, PE/EVAL, Tychem, Barricade, Trellchem, Teflon, Responder

Gloves: Viton, Teflon, Polyvinyl alcohol (do not use in water)

Boots: Teflon, Viton

Service Limit Concentration (ppm): 1000

MUC 1/2 Mask APR = TWA x 10 = 250 ppm

MUC Full-Face APR = TWA x 10 = 250 ppm

FIRE/REACTIVITY DATA

Flash Point: Unknown

LEL/UEL: 8% / 10.5%

Fire Extinguishing Media:

Dry Chemical	X	Alcohol resistant Foam	X
Water Spray	X	CO_2	X

Incompatibilities: Strong caustics and alkalis, chemically-active metals (such as barium, lithium, sodium, magnesium, titanium, and beryllium)

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminant exists. Professional judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

MACTEC

Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation **Date of Analysis:** 8/15/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for Site Visit	1A) N/A	1A) Prior to leaving for site ▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ If respiratory protection is required/potentially required, ensure that training and fit-testing has occurred within the past year. ▪ Familiarize yourself with route to the site
	1B) Vehicle defects	1B) Inspect company owned/leased vehicle for defects such as: ▪ Flat tires ▪ Windshield wipers worn or torn ▪ Oil puddles under vehicle ▪ Headlights, brake lights, turn signals not working
	1C) Insufficient emergency equipment, unsecured loads	1C) Insufficient emergency equipment, unsecured loads ▪ Ensure vehicle has first aid kit and that all medications are current (if first aid kits are not provided at the site) ▪ Ensure vehicle is equpped with warning flashers and/or flares and that the warning flashers work ▪ Cell phones are recommended to call for help in the event of an emergency ▪ Vehicles carrying tools must have a safety cage in place. All tools must be properly secured ▪ Vehicles must be equipped with chocks if the vehicle is to be left running, unattended. ▪ Ensure sufficient gasoline is in the tank
2. Operating vehicles – general	2A) Collisions, unsafe driving conditions	2A) Drive Defensively! ▪ Seat belts must be used at all times when operating any vehicle on company business. ▪ Drive at safe speed for road conditions ▪ Maintain adequate following distance ▪ Pull over and stop if you have to look at a map ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary
3. Driving to the jobsite	3A) Dusty, winding, narrow roads	3A) Dusty, winding, narrow roads ▪ Drive confidently and defensively at all times. ▪ Go slow around corners, occasionally clearing the windshield.
	3B) Rocky or one-lane roads	3B) Rocky or one-lane roads ▪ Stay clear of gullies and trenches, drive slowly over rocks. ▪ Yield right-of-way to oncoming vehicles---find a safe place to pull over.
	3C) Stormy weather, near confused tourists	3C) Stormy weather, near confused tourists ▪ Inquire about conditions before leaving the office. ▪ Be aware of oncoming storms. ▪ Drive to avoid accident situations created by the mistakes of others.

MACTEC

Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation **Date of Analysis:** 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3D) When angry or irritated	3D) When angry or irritated ▪ Attitude adjustment; change the subject or work out the problem before driving the vehicle. Let someone else drive.
	3E) Turning around on narrow roads	3E) Turning around on narrow roads ▪ Safely turn out with as much room as possible. ▪ Know what is ahead and behind the vehicle. ▪ Use a backer if available.
	3F) Sick or medicated	3F) Sick or medicated ▪ Let others on the crew know you do not feel well. ▪ Let someone else drive.
	3G) On wet or slimy roads	3G) On wet or slimy roads ▪ Drive slow and safe, wear seatbelts.
	3H) Animals on road	3H) Animals on road ▪ Drive slowly, watch for other animals nearby. ▪ Be alert for animals darting out of wooded areas
4. Gain permission to enter site	4A) Hostile landowner, livestock, pets	4A) Hostile landowner, livestock, pets ▪ Talk to land owner, be courteous and diplomatic ▪ Ensure all animals have been secured away from work area
5. Mobilization/ Demobilization of Equipment and Supplies	5A) Struck by Heavy Equipment/Vehicles	5A) Struck by heavy equipment ▪ Be aware of heavy equipment operations. ▪ Keep out of the swing radius of heavy equipment. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times ▪ Employees shall wear a high visibility vest or T-shirt (reflective vest required if working at night). ▪ Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation.
	5B) Struck by Equipment/Supplies	5B) Struck by Equipment/Supplies ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.
	5C) Overexertion Unloading/Loading Supplies	5C) Overexertion Unloading/Loading Supplies ▪ Train workers on proper body mechanics, do not bend or twist at the waist while exerting force or lifting. ▪ Tightly secure all loads to the truck bed to avoid load shifting while in transit.
	5D) Caught in/on/between	5D) Caught in/on/between ▪ Do not place yourself between two vehicles or between a vehicle and a fixed object.
	5E) Slip/Trip/Fall	5E) 1E). Slip/Trip/Fall ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas. ▪ Drivers will maintain 3 point contact when mounting/dismounting vehicles/equipment. ▪ Drivers will check surface before stepping, not jumping down.

MACTEC

Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation **Date of Analysis:** 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5F) Vehicle accident	5F) Vehicle accident ▪ Employees should follow MACTEC vehicle operation policy and be aware of all stationary and mobile vehicles.
6. Site Preparation	6A) Slip/Trip/Fall	6A) Slip/Trip/Fall ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas
7. Installation of soil erosion and sediment controls	7A) Overexertion	7A) Overexertion ▪ Workers will be trained in the proper method of placing erosion controls. ▪ Do not bend and twist at the waist while lifting or exerting force.
	7B) Struck by Equipment/Supplies	7C) Struck by Equipment/Supplies ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.
8. Driving back from the jobsite	8A) See hazards listed under item #3	8A) See safe work practices under item #3

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Minimum Recommended PPE*: Safety Shoes, Safety glasses with side shields, High visibility vest, ear plugs (Hearing protection), Nitrile gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for site visit	1A) N/A	▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Complete site specific/ client required training ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.
2. Traveling to the site by vehicle	2A) See JHA for Mobilization, Demobilization and Site Preparation	▪ See JHA for Mobilization, Demobilization and Site Preparation
3. Initial Arrival - Assess Site Conditions	3A) Communication with subcontractor and other site personnel	▪ Develop communication methods (agree on hand signals, warning alarms) ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone ▪ Hold and document Safety tailgate meetings ▪ Establish work zones, evacuation routes and rally locations.
	3B) Insect Bites and Stings	▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects. ▪ Inform crew members if allergic to insects and what to do if you need assistance. ▪ Avoid wearing heavy fragrances. ▪ Carry first-aid and sting relief kits. ▪ Carry identification of known allergies and necessary emergency medication. ▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails.

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3C) Poisonous plants	▪ Wear long sleeves, long pants and boots ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.
	3D) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Wear long sleeve shirt and full length pants ▪ Be aware of your surroundings. ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers.
	3E) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled
	3F) Overhead Power Lines	▪ Identify the location of all overhead power lines at the site. ▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Re-locate work so it is not close to power lines ▪ Avoid storing materials under overhead power lines
	3G) Underground Utilities	▪ All utilities will be marked prior to excavation activities ▪ For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet ▪ Use lineman's gloves when locating underground power lines ▪ Work at adequate offsets from utility locations ▪ Immediately cease work if unknown utility markings are discovered.

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3H) Cold Stress	▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration. ▪ Be aware of signs of hypothermia, its prevention, detection and treatment. ▪ Have extra protection available, in case of an emergency such as blankets and heating devices. ▪ Don't work under extremely adverse weather conditions ▪ Stay in tune to current weather and extended forecasts.
	3I) Heat Stress	▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.
	3J) Lightning and Thunder	▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thunder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds.
	3K) Severe Weather	▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc
	3L) Sun	▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3M) High Crime Areas	▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone ▪ Do not work after dark.
	3N) Operations conducted at an active facility	▪ Stay well clear of operations being conducted at the facility ▪ Keep alert for moving materials, equipment or vehicles ▪ Determine client specific PPE needs prior to arriving at the site ▪ Determine client specific emergency response procedures and follow as appropriate ▪ Participate in client required safety training ▪ Get copies of Clients MSDSs for any client chemicals that workers may be exposed to. ▪ Provide MSDSs to client for all chemicals brought to the site.
	3O) Remote Locations	▪ Carry a two-way radio and know how to use it. ▪ Work in teams. Account for all at the end of the work day. ▪ Make sure someone on crew is certified in first aid. ▪ Carry a first aid kit.
	3P) Set up Decon Station	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: o Gross boot wash and rinse and removal o Outer glove removal o Suit removal o Respirator removal (if worn). o Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.
4. Walk around the Site	4A) Poisonous plants	▪ See section 3C above
	4B) Vermin, leaches, animal borne disease	▪ See Section 3 D above ▪
	4C) Chemical Hazards	▪ See Section 3 E above

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Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4D) Slips/Trips/Falls	▪ Wear slip resistant footwear preferably laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Site SHSO will inspect the entire work area to identify and mark hazards. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.
5. Oversight during drilling, or construction operations	5A) Heavy Equipment/ Vehicles	▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. Ground personnel will stay clear of all suspended loads. ▪ Ground personnel will wear high visibility vests ▪ Eye contact with operators will be made before approaching equipment.
	5B) Eye Injury	▪ Wear appropriate safety glasses (tinted for sun). ▪ Watch where you walk, especially around trees and brush with protruding limbs.
	5C) Foot Injury	▪ Wear steel toed boots ▪ Wear insulated steel toed boots during winter ▪ Ensure shoes/boots have good traction ▪ Pay attention to where you place your feet, especially when walking on uneven terrain
	5D) Head Injury	▪ Wear hardhat ▪ Do not walk or work under scaffolding or other elevated work unless there are guardrails and toeboards in place ▪ Flag or mark protruding objects at head level
	5E) Chemical Hazards	▪ See Section 3E above ▪ Wash hands and face prior to consumption of food, beverage or tobacco.
	5F) Dust - particulates (respiratory)	▪ Use dust suppression methods ▪ Stand upwind of point of dust generation
	5G) Overhead Power Lines	▪ See Section 3F above.
	5H) Underground Utilities	▪ See Section 3G above

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Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5I) Standing/Static Posture	▪ Change posture on a frequent basis ▪ Stretch prior to any physical activity
	5J) Slips/`Trips/Falls	▪ See Section 4D above
6. Sampling Oversight	6A) Chemical Hazards	▪ See Section 3E above ▪ Wash hands and face prior to consumption of food, beverage or tobacco. ▪ Calibrate meters in a clean, well ventilated area ▪ Store calibration gases in well vented area. Ensure chemical labels and warnings are legible.
	6B) Personnel Decontamination	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: o Gross boot wash and rinse and removal o Outer glove removal o Suit removal o Respirator removal (if worn). o Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.
	6C) Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Mechanical devices (e.g., hand truck, cart, forklift, etc.) should be used to reduce manual handling of materials and drums. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs) ▪ Split heavy loads in to smaller loads ▪ Make sure that path is clear prior to lift. ▪ Redesign work area to avoid low lifts ▪ Stretch prior to lifting ▪ Maintain a healthy life style and level of physical fitness.

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Job Hazard Analysis - HASP Format

Job Title: Field Work - Oversight **Date of Analysis:** 7-14-2009

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6D) Hand Tools	▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or work surface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools. ▪ Daily inspections will be performed. ▪ Remove broken or damaged tools from service and tag out as defective ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ Do not use excessive force or impact ▪ Do not use tool improperly. Ensure all workers are trained
	6E) Slips/Trips/Falls	▪ See Section 4D above.
	6F) Struck by Vehicle	▪ Ground personnel in the vicinity of vehicles operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind vehicles when it is in operation ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads. ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary ▪ Place cones in the font and rear of the vehicle ▪ Prior to driving off, walk around vehicle to collect cones and identify any hazards - especially low level hazards that may be difficult to see when in the vehicle. ▪ Set up "Workers in the Road" or similar warning signs and cones to alert traffic. ▪ Use emergency flashers and roof top flashing light (recommended) to alert oncoming vehicular traffic. ▪ Remain alert at all times as to the traffic outside the vehicle. Step to the side of the road when distracted by by-standers. Keep unofficial personnel out of the work area. ▪ Exit vehicle with caution. ▪ Wear High Visibility Vest when outside the vehicle. ▪ Utilize vehicle as a shield from oncoming traffic, as practical
7. IDW pickup oversight	7A) Foot Injury	▪ See Section 5C above.
	7B) Chemical Hazards	▪ See Section 3E above.
	7C) Lifting	▪ See Section 6C above.
	7D) Slips/Trips/Falls	▪ See Section 4D above
8. Return to office/home	8A) See Mobilization/ Demobilization and Site Preparation JHA	▪ See Mobilization/ Demobilization and Site Preparation JHA

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Decontamination **Date of Analysis:** 5/30/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Establish Decontamination Station	1A) Materials Handling	1A) Materials Handling ▪ Use proper lifting techniques ▪ Use mechanical aids, if available, to move heavy items.
2. Decontamination / Steam cleaning.	2A) Struck by steam/hot water/pressure washing	2A) Struck by steam/hot water ▪ Workers not directly engaged in steam cleaning operations must stay clear. ▪ Workers using steam cleaning equipment must be trained on operation and safety devices/procedures using the owners/operators manual. ▪ Use face shield **and** safety glasses or goggles, if steam cleaning. ▪ Stay out of the splash/steam radius. ▪ Pressure washer must have dead man switch. ▪ Do not direct steam at anyone. ▪ Do not hold objects with your feet or hands. ▪ Ensure that direction of spray minimizes spread of contaminants of concern. ▪ Use shielding as necessary.
	2B) Exposure to contaminants	2B) Exposure to contaminants ▪ Conduct air monitoring (see HASP). ▪ Wear proper PPE (see HASP). ▪ See MSDSs for hazards associated with the decon solutions used (if other than water alone us used).
	2C) Slips/Trips/Falls	2C) Slips/Trips/Falls ▪ Be cautious as ground/plastic can become slippery ▪ Use boots or boot covers with good traction
3. Vehicle Decontamination	3A) Vehicle traffic in and out of the CRZ	3A) Large Vehicle Traffic ▪ Always wear a hard hat, steel toe boots, and a high visibility vest (unless Tyveks are used and are high visibility). ▪ Vehicle drivers are not to exit the vehicle in the CRZ. ▪ Identify an individual to communicate with vehicle drivers and maintain order ▪ Trucks will be lined with plastic and kept out of direct contact with any contaminated materials during loading. Wear PPE when removing plastic lining from truck beds. ▪ If not in the vehicle, obtain eye contact with the driver, so he is aware of your presence and location in the CRZ. ▪ If you are driving the vehicle, be aware of personnel in the CRZ and maintain communication with the identified personnel.
	3B) Exposure to contaminants	3B) Exposure to contaminants ▪ Use safety glasses or goggles, Polycoated Tyvek (if level of contamination poses dermal hazard or to keep work clothes dry), high visibility vest (if high visibility Tyveks are not used) hard hats, steel toe boots, and gloves while cleaning contaminated materials. ▪ Do not doff PPE until decontamination of the vehicle is complete and a decontamination certificate has been issued by the HSO. ▪ Conduct air monitoring (see HASP). ▪ See MSDSs for hazards associated with the decon solutions (if other than water alone is used).

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Decontamination **Date of Analysis:** 5/30/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3C) Slips/Trips/Falls	3C) Slips/Trips/Falls ▪ Be cautious as ground/plastic can become slippery ▪ Use boots or boot covers with good traction
4. Equipment and Sample Decontamination	4A) Chemical exposure when handling contaminated sample jars and equipment	4A) Chemical exposure ▪ Wear PPE as outlined in the HASP. ▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for contaminants ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.) if appropriate (see HASP)
	4B) Materials Handling related injuries	4B) Materials Handling related injuries ▪ Use proper lifting techniques when lifting heavy equipment ▪ Use two person lift for heavy coolers
5. Personal Decontamination	4C) Exposure to contaminants	4C) Exposure to contaminants ▪ Avoid bringing contaminated materials via shoes and clothing into the CRZ by examining such prior to exiting the EZ. ▪ Removal of PPE will be performed by the following tasks in the listed order: ▪ Gross boot wash and rinse and removal ▪ Outer glove removal ▪ Suit removal ▪ Respirator removal (if worn). ▪ Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Respirators will be removed and decontaminated at a specified location within the CRZ by a designated technician, then placed in storage bag. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ See MSDSs for hazards associated with the decontamination solutions used. ▪ Decon solutions will be disposed of according to the work plan.

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling **Date of Analysis:** 9/21/06

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization	3A) See JHA Mobilization/Demobilization/Site Preparation	1A) See JHA Mobilization/Demobilization/Site Preparation
2. General Site Hazards	2A) See JHA Field Work - General	2A) See JHA Field Work - General
	2B) Chemical exposure	2B) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
3. Calibrate monitoring equipment	4A) Exposure to calibration gases	4A) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well ventilated area
4. Opening the well cap, taking water level readings	5A) Contact with poisonous plants or the oil from poisonous plants	5A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with spray paint if working at a fixed location. ▪ Wear PPE as described in the HASP. ▪ Do not touch any part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.
	5B) Contact with biting insects (i.e., spiders, bees, etc.) which may have constructed a nest in the well cap/well.	5B) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.
	5C) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated groundwater/ soil); liquid splash; flammable atmospheres.	5C) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin ▪ Immediately monitor breathing zone after opening well to determine exposure and verify that level of PPE is adequate – see Action Levels in HASP ▪ Monitor headspace in well. After the initial headspace reading (if required by the Work Plan), allow the well to vent for several minutes before obtaining water level and before sampling. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.
	5D) Back strain due to lifting bailers or pumps and from moving equipment to well locations	5D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling **Date of Analysis:** 9/21/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Foot injuries from dropped equipment	5E) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear Steel toed boots
5. Collecting water samples	6A) Fire/Explosion/Contamination hazard from refueling generators	6A) Fire/Explosion/Contamination hazard from refueling generators ▪ Turn the generator off and let it cool down before refueling ▪ Segregate fuel and other hydrocarbons from samples to minimize contamination potential ▪ Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited ▪ See JHA for Gasoline use
	6B) Electrocution	6B) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water ▪ Do not stand in wet areas while operating power equipment ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	6C) Exposure to contaminants	6C) Exposure to Contaminants ▪ Stand up wind when sampling ▪ Monitor breathing zone with appropriate monitoring equipment (see HASP) ▪ Wear chemical resistant PPE as identified in HASP ▪ See section 4C) under Safe Practices above
	6D) Infectious water born diseases	6D) Infectious water born diseases ▪ Wear chemical resistant gloves and other PPE – as identified in HASP ▪ Prevent water from contacting skin ▪ Wash exposed skin with soap and water ASAP after sampling event ▪ Ensure that all equipment is adequately decontaminated using a 10% bleach solution
	6E) Exposure to water preservatives	6E) Exposure to water preservatives ▪ Work in a well ventilated area, upwind of samples ▪ Wear chemical resistant PPE as identified in HASP ▪ When preserving samples always add acid to water, avoid the opposite. ▪ See JHA Acids - Sampling
	6F) Slips/trips/falls	6F) Slips/trips/falls ▪ Ground can become wet/muddy, created by spilled water ▪ Place all purged water in drums for removal ▪ Wear good slip resistant footwear
	6G) Repetitive Motion and other Ergonomic Issues	6G) Ergonomic Issues ▪ Use mechanical means where possible to raise and lower equipment into well. ▪ Alternate raising and lowering equipment between field sampling team members, and alternate bailing the well. ▪ Use safe lifting techniques.

MACTEC

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling **Date of Analysis:** 9/21/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
6. Sample Processing	7A) Contaminated water	7A) Contaminated water ▪ Wear appropriate PPE as identified in HASP ▪ Decontaminate outside of bottles ▪ Prevent water from contacting skin ▪ Work in well ventilated area – upwind of samples ▪ Waste will be returned to the operation office for storage and disposal
7. Shipping Samples	8A) Freeze burns, back strain, hazardous chemical exposure, sample leakage	8A) Freeze burns, back strain, hazardous chemical exposure, sample leakage ▪ Wear appropriate chemical resistant gloves as identified in HASP. ▪ Wear leather or insulated gloves when handling dry ice. ▪ Follow safe lifting techniques – get help lifting heavy coolers. ▪ Samples that contain hazardous materials under the DOT definition, must be packaged, manifested and shipped by personnel that have the appropriate DOT HAZMAT training.

MACTEC

Job Hazard Analysis - Short Form HASP

Job Title: Soil Vapor Sampling **Date of Analysis:** 01/20/2010

Minimum Recommended PPE*:
steel-toed boots, safety glasses with side shields, chemical resistant gloves-nitrile, hearing protection, flashlight/work gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Begin Site Work	1A) SEE SITE-SPECIFIC HASP	1A) See Site-Specific HASP and don appropriate PPE.
2. Utility Clearance	2A) Underground utilities: electrical, flammable, and explosive hazards.	2A) Notify Dig Safe and Local Utility Companies to Identify and mark Utilities coming into the building from the outside (e.g., gas, water, sewer, refrigerant, and electrical lines). • Review facility drawings to determine and mark indoor locations of subsurface utility lines. • Mark and maintain utility markings for the duration of the site work.
3. General Site Hazards	3A) See JHA Field Work – General/ or Oversight	3A) See JHA Field Work – General./ or Oversight
	3B) Chemical exposure	3B) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
4. Calibrate monitoring equipment	4A) Exposure to calibration gases	4A) Exposure to calibration gases ▪ Review equipment manuals. ▪ Calibrate in a clean, well ventilated area.
5. Access location	5A) Slips, Trips, Falls	5A) Observe walking surfaces for potential tripping hazards, icy or wet surfaces. Avoid puddles. Salt or sand areas of ice.
	5B) Lifting Injuries	5B) See JHA Field Work – General/ or Oversight • Follow safe lifting techniques.
6. Drill Hole in surface (floor/ground/road way)	6A) Electrocution	6A) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water. ▪ Do not stand in wet areas while operating power equipment. ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	6B) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated Soil Vapor).	6B) Exposure to hazardous substances ▪ Wear PPE as identified in HASP (steel-toed boots, safety glasses, nitrile gloves and a flashlight or lamp). ▪ Review hazardous properties of site contaminants with workers before sampling operations begin. ▪ Immediately monitor breathing zone using a PID after drilling hole to determine exposure and verify that level of PPE is adequate – see Action Levels in HASP.

MACTEC

Job Hazard Analysis - Short Form HASP

Job Title: Soil Vapor Sampling **Date of Analysis:** 01/20/2010

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6C) Back strain due to lifting and from moving equipment	6C) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ DO NOT LIFT MORE THAN THE MACTEC LIMIT OF 50 POUNDS. ▪ Use proper lifting techniques.
	6D) Foot injuries from dropped equipment/drill bit	6D) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely. ▪ Watch feet when drilling and hold drill firmly. ▪ Wear Steel toed boots.
7. Installing Probes Using Rotary Hammer	7A) Electrocution	7A) Electrocution • See 6A above.
	7B) Lifting Injuries	7B) See JHA Field Work – General/ or Oversight • Follow safe lifting techniques.
	7C) Injuries from Impact/Vibration/Entanglement	7C) Impact Injuries • Loss of control of the hammer drill during operation can cause serious injury. • Read and follow the manufacturer's instructions for proper operation of the rotary hammer drill. • Always hold the body handle and side handle firmly during operation (use two hands) to prevent loosing control of the drill. • Ensure that the rotary hammer drill is in the OFF position before plugging it into power. • Ensure that the extension cord is sufficiently rated for the hammer drill. Check the manufacturer's instruction manual. • Make sure that long hair, loose clothing, etc., are tied back so that they cannot get caught in the drill bit. • Watch the placement of the extension cord to ensure that it will not become tangled in the drill bit. • Follow the manufacturer's instructions for operation of the rotary hammer drill. • Ensure that the soil vapor probe is seated properly and locked into the housing in the rotary hammer drill prior to turning on the drill. • Do not lean on the rotary hammer, this reduces the effectiveness of the rotary drill and cause the drill bit to get stuck. • Maintain proper balance when operating the hammer and always work on a level surface. • Stop drilling if the drill bit becomes bound in the subsurface. This can cause the hammer to buck/turn and can cause injury. • Always turn off the hammer drill before moving to a new location or changing probes.

MACTEC

Job Hazard Analysis - Short Form HASP

Job Title: Soil Vapor Sampling **Date of Analysis:** 01/20/2010

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	7D) Noise	7D) Noise • Wear hearing protection at all times when operating the hammer drill.
	7E) Burns	7E) Burns • Do not touch the drill bit during and immediately after use as it may be hot. Allow a few minutes for the bit to cool.
8. Installing Probes Using Slide Hammer	8A) Lifting Injuries	8A) See JHA Field Work – General/ or Oversight
	8B) Noise	8B) Noise • Wear hearing protection at all times when using the slide hammer.
	8C) Cuts from Burs on Slide Hammer	8C) Cuts from Burs on Slide Hammer • Inspect the slide hammer. • Wear sturdy work gloves when operating and handling the slide hammer.
	8C) Pinching Hazard	8C) Pinching Hazards • Wear sturdy work gloves. • Keep your hands on the handles at all times while operating the slide hammer.
	8D) Foot Injuries from Dropping Slide Hammer on Feet	8D) Foot Injuries from Dropping Slide Hammer on Feet • See #6D above.
9. Collecting Sub-Slab/ sub pavement sample	9A) Cutting Hazard	9A) Cutting Hazard • Use MACTEC approved Maxisafe knife to cut the tubing. • Always cut the tubing away from you. ▪ Keep hands and body parts away from the path of the knife.
	9B) Exposure to contaminants	9B) See #6B above.
	9C) Pinching Hazard	9C) Pinching Hazard from attaching regulators/tubing • Use appropriate size wrenches for the fittings. • Take care when using wrenches to attach regulator and or tubing to cans to not pinch fingers.
10. Mixing Mortar to Fill Drill Holes	10A) Inhalation of Dust	10A) Inhalation of Dust ▪ Empty the bag of mortar slowly into appropriately sized container. ▪ Have water available to immediately add to mortar to suppress the creation of airborne dust.

Prepared by: Kendra Bavor, CSP 1/20/2010

MACTEC, Inc.

Site Health and Safety Checklist

Site: _____

Project Number: _____ **Project Manager:** _____

Prepared by: _____

Names of MACTEC employees onsite: _____

_____

Y	N	N/A			Comments
☐	☐	☐	1.	Are emergency phone numbers posted?	
☐	☐	☐	2.	Are directions to the nearest emergency medical care posted?	
☐	☐	☐	3.	Is there a Site Health And Safety Officer (HSO) at the site?	
☐	☐	☐		a. Is it current?	
☐	☐	☐		b. Does it address know/suspected hazards?	
☐	☐	☐		c. Is it approved?	
☐	☐	☐	4.	Have applicable workers received 40-hour initial training? (24-hours training for contractors is acceptable)	
☐	☐	☐	5.	Do visitors sign the visitor's log acknowledging that they understand:	
☐	☐	☐		a. General site information?	
☐	☐	☐		b. Operations?	
☐	☐	☐		c. Specific hazards?	
☐	☐	☐		d. Required safety procedures and requirements?	
☐	☐	☐	6.	Are Tailgate Safety Meetings taking place?	
☐	☐	☐		a. Are names of attendees and subject matter documented?	
☐	☐	☐		b. Are they being held on a weekly basis? More often if needed?	
☐	☐	☐	7.	Is there a charged fire extinguisher on-site?	
☐	☐	☐	8.	Is there an eyewash on-site?	
☐	☐	☐	9.	Is there a first aid kit on-site?	
☐	☐	☐	10.	Are PPE identified in the HASP being worn by site workers?	
☐	☐	☐		a. Are hard hats worn?	
☐	☐	☐		b. Are steel toed boots/shoes being worn?	
☐	☐	☐	11.	Are safety goggles or safety glasses worn?	

Prepared by:_____
Checked by: _____

Y	N	N/A		Comments
☐	☐	☐	12. Are approved respirators worn when needed?	
☐	☐	☐	a. Are the cartridges appropriate for the hazards at the site?	
☐	☐	☐	b. Are cartridges changed daily, unless specified otherwise in the HSO?	
☐	☐	☐	13. Is there an assigned safety standby outside the exclusion zone for Level B and A work?	
☐	☐	☐	14. Are ear plugs/muffs worn when noise makes conversation difficult at a distance of 2 feet?	
☐	☐	☐	15. Are gloves and protective clothing worn when there is a danger of chemical exposure?	
☐	☐	☐	16. Are there confined spaces at the site?(if no go to 19.)	
☐	☐	☐	a. If yes, will Harding ESE employees be entering the space?	
☐	☐	☐	b. Is a permit being used?	
☐	☐	☐	c. Is the permit completely filled out and approved prior to entry?	
☐	☐	☐	d. Are confined spaces thoroughly emptied of the hazardous substances prior to entry?	
☐	☐	☐	e. Is ventilation provided prior to entry?	
☐	☐	☐	f. Is air within the confined space tested for oxygen deficiency, explosive concentrations, and toxic substances in that order?	
☐	☐	☐	g. Is the air in the space tested frequently?	
☐	☐	☐	h. Is approved respiratory equipment required in the confined space if the air cannot be made acceptable?	
☐	☐	☐	i. Is there an assigned safety standby outside the confined space?	
☐	☐	☐	j. Is the safety standby trained and equipped to handle emergencies?	
☐	☐	☐	17. Are the caps kept on the cylinder when not in use?	
☐	☐	☐	a. Is the entry being done in compliance with the MACTEC Permit Required Confined Space Program?	
☐	☐	☐	18. Is there at least one person on site current in their first aid/CPR training?	
☐	☐	☐	19. Are work areas properly illuminated?	
☐	☐	☐	20. Do employees who drive on company business have current operators licenses?	
☐	☐	☐	21. Do employees wear their seat belts?	

Y	N	N/A		Comments
☐	☐	☐	22. Are trucks and trailers secured from movement during loading and unloading operations?	
☐	☐	☐	23. Is the location of electrical power lines and other utilities determined before digging or drilling?	
☐	☐	☐	24. Are MACTEC vehicles parked in a safe manner?	
☐	☐	☐	25. Is the drill rig parked in a safe manner?	
☐	☐	☐	a. Is there a minimum of 10 feet between power lines and the mast?	
☐	☐	☐	26. Are traffic cones set up if needed?	
☐	☐	☐	27. Is there a wind indicator showing wind direction on-site?	
☐	☐	☐	28. Are exits in building/trailers kept free of obstruction?	
☐	☐	☐	29. Are appropriate air monitoring instruments being used?	
☐	☐	☐	a. Are air monitoring instruments properly calibrated?	
☐	☐	☐	30. Are tools and equipment used by employees in good condition?	
☐	☐	☐	31. Are ladders in good condition and secured when in use?	
☐	☐	☐	32. Are electrically operated tools grounded?	
☐	☐	☐	33. Are exposed wiring and cords not frayed or deteriorated?	
☐	☐	☐	34. Do extension cords have a grounding conductor?	
☐	☐	☐	35. Are compressed gas cylinders stored and transported in such a manner as to prevent it from being damaged?	
☐	☐	☐	a. Are the caps kept on the cylinder when not in use?	
☐	☐	☐	36. Is there a means to minimize heat or cold stress on-site?	
☐	☐	☐	37. Are breaks taken as required?	
☐	☐	☐	38. Are meals eaten only in areas free from toxic materials?	
☐	☐	☐	Other: Describe_____	
☐	☐	☐	_____	
☐	☐	☐	_____	

File: Project files folder 4.7
Rev. Date: 3-17-09

DAILY TAILGATE SAFETY MEETING CHECKLIST

Project: _____ Site: _____
Date: Location:

To be reviewed on the first day of site activities and when new workers arrive on site:

Alternate for Health & Safety:
Location of on-site HASP:
Site training requirements: See HASP
Specific medical surveillance requirements: See HASP

Agenda:
During the project, one or more of the agenda items could be selected for the required daily site training.

Check-off: Date

1.	Planned work for this day (discuss)	☐	☐	☐	☐	☐
2.	Physical hazards and controls (discuss/review)	☐	☐	☐	☐	☐
3.	Chemical hazards and controls (discuss/review)	☐	☐	☐	☐	☐
4.	Biological hazards and controls (discuss/review)	☐	☐	☐	☐	☐
5.	Personal protective equipment Modified D	☐	☐	☐	☐	☐
6.	Personal protective equipment required per the hazard assessment:	☐	☐	☐	☐	☐

SPECIFY TYPE	
Protective coveralls	
Safety glasses/goggles	ANSI approved
Hard hat	ANSI approved
Foot protection	Safety toe boots & overboots
Work gloves	
Chemical gloves	
Hearing protection	
Other	

7.	Review inspection, decontamination, and maintenance procedures and the limitations of the above stated PPE.	☐	☐	☐	☐	☐
8.	Decontamination procedure (discuss/review)	☐	☐	☐	☐	☐
9.	Exclusion zone maintained/ Identified	☐	☐	☐	☐	☐
10.	Site emergency response plan (discuss/review)	☐	☐	☐	☐	☐
11.	Signs and symptoms of overexposure to chemicals anticipated on site	☐	☐	☐	☐	☐
12.	General health and safety rules	☐	☐	☐	☐	☐
13.	Specific health and safety requirements relating to site activities including: (discuss/review)	☐	☐	☐	☐	☐
14.	Working in temperature extremes	☐	☐	☐	☐	☐
15.	Rain or other weather advisories	☐	☐	☐	☐	☐
16.	Drilling/boring	☐	☐	☐	☐	☐
17.	UST	☐	☐	☐	☐	☐
18.	Excavations	☐	☐	☐	☐	☐
19.	Heavy equipment	☐	☐	☐	☐	☐
20.	Drilling/ Boring	☐	☐	☐	☐	☐
21.	Lockout/tagout	☐	☐	☐	☐	☐

Prepared by:_____
Checked by: _____

I have participated in the daily safety meeting discussing the topics indicated on the reverse and fully understand my responsibility for complying with all health and safety requirements. I have had the opportunity to have my questions on site health and safety issues and procedures answered.

Employee Name	**Employee Signature**	**Date**

_____ _____

Name and Signature of person conducting training Date

Prepared by:_____
Checked by: _____

1.1 MEDICAL DATA SHEET

This Medical Data Sheet will be completed by all on-site personnel and kept in the Support Zone during site operations. It is not a substitute for the Medical Surveillance Program requirements consistent with the MACTEC E&C Corporate Health and Safety Program for Hazardous Waste Sites. This data sheet will accompany any personnel when medical assistance or transport to hospital facilities is required. If more space is required, use the back of this sheet.

Project: _____

Name: _____

Address: _____

Home Telephone: Area Code ( )

Age: _____ Height: _____ Weight: _____

In case of emergency, contact: _____

Address: _____

Telephone: Area Code ( )

Do you wear contact lenses? Yes ( ) No ( )

Allergies: _____

List medication(s) taken regularly: _____

Particular sensitivities: _____

Previous/current medical conditions or exposures to hazardous chemicals: _____

_____

Name of Personal Physician: _____

Telephone: Area Code ( )