FINAL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN
FORMER SPEEDY'S CLEANERS
SITE # 8-28-128

WORK ASSIGNMENT NO. D004434-3

Prepared for:

New York State Department of Environmental Conservation
Albany, New York

Prepared by:

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

MACTEC: 3612082109

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ASP	Analytical Services Protocols
bgs	below ground surface
CSM	conceptual site model
EEO	Equal Employment Opportunity
°F	degrees Fahrenheit
FS	Feasibility Study
ft/day	feet per day
HASP	Health and Safety Plan
ID	inside diameter
IDW	investigation-derived wastes
IRM	Interim Remedial Measure
K	hydraulic conductivity
Labella	Labella Associates, P.C.
MACTEC	MACTEC Engineering and Consulting, P.C.
MBE	minority business enterprise
MCDOH	Monroe County Department of Health
MNA	monitoring natural attenuation
msl	mean sea level
NELAP	National Environmental Laboratory Accreditation Program
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation

NYSDOH	New York State Department of Health

GLOSSARY OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

OBG	O'Brien and Gere Engineers, Inc.
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PVC	Polyvinyl Chloride
QAPjP	Quality Assurance Project Plan
QAPP	Quality Assurance Program Plan
RI	Remedial Investigation
SCGs	standards, criteria and guidance values
Site	Former Speedy's Cleaners site
SVOC	semivolatile organic compound
TAL	Target Analyte List
TEAM	TEAM Environmental Consultants, Inc.
µg/Kg	microgram per kilogram
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WA	Work Assignment
WP	Remedial Investigation/Feasibility Study Work Plan

1.0 INTRODUCTION

This Remedial Investigation/Feasibility Study (RI/FS) Work Plan (WP) has been prepared by MACTEC Engineering and Consulting, P.C. (MACTEC) in response to Work Assignment (WA) No. D004434-3 from the New York State Department of Environmental Conservation (NYSDEC) for the Former Speedy's Cleaners site (Site) in the Town of Brighton, Monroe County, New York (Figure 1.1). The Site is listed as a Class 2 Inactive hazardous waste disposal site (Site No. 8-28-128) in the Registry of Inactive Hazardous Waste Disposal Sites in New York State (NYS). This WP has been prepared in accordance with the NYSDEC requirements in WA No. D004434-3 dated July 15, 2008, and with the July 2005 Remedial Investigation/Remedial Design Superfund Standby Contract between MACTEC and the NYSDEC.

The RI for the Site is being conducted in accordance with the WA, as well as with the United States Environmental Protection Agency (USEPA) RI/FS guidance (USEPA, 1988); NYSDEC Technical and Administrative Guidance Memorandum #4025 entitled "Guidelines for Remedial Investigations/Feasibility Studies" (NYSDEC, 1989); and the NYSDEC Draft DER-10 "Technical Guidance for Site Investigation and Remediation" (NYSDEC, 2002). This WP presents a technical scope of work for completing the RI/FS activities and preparing the RI and FS reports.

The objectives of the RI are to identify a source area, if possible, and determine the nature and distribution of contamination associated with the Site, as well as to determine if contaminants detected in site media originated from the Site, or are associated with the release of tetrachloroethene (PCE) at the nearby Carriage Cleaners property. The investigation will assess the potential for threat to human health and the environment from the Site by delineating the extent of potential groundwater and soil contamination. The FS will develop remedial objectives and evaluate potential remedial alternatives from an engineering, environmental, public health, and economic perspective, and develop a preferred alternative.

This WP is organized into six sections as follows:

- *Section 1.0* – Introduction.
- *Section 2.0* – Site Background and Physical Setting: Consists of a review of existing site information and presents the current conceptual site model (CSM).

- *Section 3.0* – Scope of Work: Presents details of the work to be performed to complete the WA, including: WP and Budget Preparation; RI activities and reporting; the various human and ecological Risk Assessment tasks; and the FS.
- *Section 4.0* – Project Organization.
- *Section 5.0* – Project Budget, Schedule, and Assumptions.
- *Section 6.0* – Workplan References.

The WP is supplemented by the following attached documents:

- *Appendix A* -Carriage Cleaners RI Figures
- *Appendix B* - Site Specific Quality Assurance Project Plan (QAPjP)
- *Appendix C* - Site Specific Health and Safety Plan (HASP)
- *Appendix D* - Project Schedule
- *Appendix E* - Cost Tables (under separate cover)
- *Appendix F* - M/WBE and Equal Employment Opportunity (EEO) Utilization Plan

2.0 SITE BACKGROUND AND PHYSICAL SETTING

On August 13, 2008, MACTEC personnel visited the Site and adjacent areas south of the Site with representatives of the NYSDEC, New York State Department of Health (NYSDOH), Monroe County Department of Health (MCDOH), and the site owner. Information pertaining to the history of site operations and past releases of contamination were reviewed to help prepare the WP for the RI field investigation. The observations of the Site reconnaissance, the information collected, and other information provided in the WA are summarized below.

2.1 SITE LOCATION AND DESCRIPTION

The Site is located at 2150 Monroe Avenue in a mixed residential/commercial area in the Town of Brighton, Monroe County (Figure 1.1). It is identified on the Town of Brighton tax map as Map 137.14, Block 2, Lot 9. The site property is 0.15 acres and consists of an approximately 3,000 square foot, two story brick and block construction building with a partial basement and a paved parking lot.

The site building currently houses the "Made U Look Salon" on the first floor and the "Alwyn Photography Studios" on the second floor. The property is bordered immediately to the northwest by a multitenant residential building; to the northeast by a parking lot and residential community; to the southeast by Hampshire Drive; and to the southwest by Monroe Avenue. Multi-unit and single residences are also located west across Monroe Avenue. The Site and surrounding community is serviced by public drinking water.

The Site was reportedly first developed in the 1940's (Labella Associates, P.C. [Labella], 1999). The R.L. Polk & Co. Rochester Suburban City Directories reviewed indicated that the Site was used as: George and Bill's Super Grocery from 1950 to 1952 (City Directories prior to 1950 were not reviewed); Speedy's Cleaners from 1953 to 1981; and Lasser's Home Products Starting in 1982. An inspection of the former Speedy's Cleaners completed on June 29, 1977 by the Monroe County Health Department documented the use of approximately 550 gallons of PCE per year (NYSDEC, 2008). A Phase I Investigation conducted in 1999 for the Site by Labella indicated that the first floor of the site building was still being used as Lasser's Home Products, and that the second floor was used as a photography studio and office (Labella, 1999). According to Monroe County property deeds, the current owner purchased the property in 1999.

2.2 PREVIOUS FIELD INVESTIGATIONS

As provided in the NYSDEC Work Authorization letter to MACTEC (NYSDEC, 2008) and other input from the NYSDEC, several investigative activities have been conducted at and in the vicinity of the Site. The former Speedy's Cleaners was identified during RI activities at the nearby Newcomb Oil/Former CITGO Gasoline Station site (Spill # 0306131) and the Carriage Cleaners site (Site # 828120), located approximately 450 feet and 350 feet west-northwest of the Site, respectively (Figure 2.1). The investigation at the Former CITGO Gasoline Station was completed because of petroleum contamination in groundwater, and the investigation at the Carriage Cleaners site was completed because of PCE contamination.

According to documentation in the O'Brien and Gere Engineers, Inc. (OBG) Carriage Cleaners RI Report (OBG, 2007), three investigations have been conducted to date in the vicinity of the Site, including:

1. Haley and Aldrich investigation of the Former CITGO station – Haley and Aldrich was contracted by Newcomb Oil to investigate and address potential impacted environmental media associated with the Newcomb Oil/Former CITGO Station located at 2087 Monroe Avenue. The OBG RI report indicates that Haley and Aldrich installed at least 21 wells (OBG RI Report figures identify wells HA-101 to HA-123, with HA-103 and HA-107 not shown) and completed 17 soil borings.
2. Labella – Labella completed a Phase II Environmental Site Assessment of the Carriage Cleaners site in 2004; including the completion of 27 Geoprobe soil borings and the installation of five direct push monitoring wells (MW-1 to MW-5).
3. OBG – OBG completed RI and FS activities at the Carriage Cleaners Site in 2007. Investigations included the installation of 10 monitoring wells; MW-203S to MW-209S screened at the first encountered water, and MW-104I, MW-111I, and MW-202I, screened in intermediate bedrock. A total of 29 monitoring wells were sampled, and hydraulic conductivity (K) testing was conducted at 19 wells. In addition, thirty direct push soil borings were completed, fifteen of which were located on the Speedy's Cleaners property. Soil vapor and indoor air/sub-slab vapor sampling were also conducted.

In addition, Empire Geo-Services, under contract with the NYSDEC, installed groundwater monitoring wells MW-201 and MW-202 on the Former Speedy's Cleaners site, and collected groundwater samples from these wells in July 2002 (Empire Geo-Services, 2004).

During these investigations, PCE was detected in soil vapor, ground water, and soil samples collected directly adjacent to the former Speedy's Cleaners property. Groundwater flow beneath the Site is

reportedly to the north/northeast. The Site is reportedly located down- and cross-gradient to the Carriage Cleaners site (OBG, 2007). Although the former Speedy's Cleaners site is near the Carriage Cleaners site, the groundwater flow direction and the presence and distribution of PCE suggests that the former Speedy's Cleaners site is a separate source for PCE contamination and is contributing to off-site groundwater and soil vapor contamination (OBG, 2007).

RI activities completed during the Carriage Cleaners RI on the actual Former Speedy's Cleaners property included the advancement of 15 shallow soil borings, collection of vapor intrusion samples, and installation of one (1) groundwater monitoring well. Additionally, monitoring wells were installed downgradient of the Former Speedy's Cleaners site. Twelve (12) soil samples were collected from the vadose zone at the Site during the shallow soil boring program. PCE was detected in each of the soil samples at concentrations ranging from a lab estimate of 0.64 micrograms per kilogram (µg/Kg) along the front (west) of the property to 4,800 µg/Kg near the back (east) of the property. In addition, the NYSDOH recommended that a sub-slab depressurization system be installed based on PCE concentrations detected in the sub-slab samples and indoor air samples collected at the Site. The groundwater quality data along with the groundwater flow data suggest that a source for PCE exists at the Former Speedy's Cleaners Site (OBG, 2007). Locations of the shallow soil borings are included on Figure 2.2 and locations of the monitoring wells are included on Figure 2.3. In addition, Figures from the OBG Carriage Cleaners RI Report showing: 1) Site soil sampling locations and PCE concentrations, 2) well locations and PCE and its breakdown product concentrations in groundwater samples, and 3) groundwater contours are include in Appendix A.

Based on the results of groundwater and indoor air monitoring, the Former Speedy's Cleaners site was listed as a Class 2 site in the NYS Registry for Inactive hazardous Waste Disposal Sites in February 2007.

2.3 PHYSICAL SETTING

The sections below describe site topography, climate, surface water and groundwater hydrology, and geology.

2.3.1 Topography

The Site is located approximately 485 feet above mean sea level (msl). Topography at the Site is fairly level. The land surface slopes slightly downward to the east for approximately one mile, before dropping steeply downward toward Allen Creek, which flows northeast towards the Irondequoit Creek (elevation of approximately 250 feet above msl three miles northeast of the Site. A small line of southwest-northeast trending hills with an elevation of approximately 650-700 feet above msl are located approximately 1.1 miles northwest of the Site. Irondequoit bay is located approximately four miles from the Site and Lake Ontario is approximately 8 miles north of the Site. Figure 1.1 shows the general topography of the surrounding area.

2.3.2 Climate

The climate of the area is characterized by moderately warm summers and cold winters. Mean monthly temperatures range from 24 degrees Fahrenheit (°F) in January to 70°F in July. Average annual precipitation is 32 inches. Average annual snowfall is 90 inches per year (National Climatic Data Center, 1999).

2.3.3 Surface Water Hydrology

The Site consists primarily of impermeable surfaces (asphalt pavement or building), and surface water at the site is expected to flow to local storm sewers. Water that does not flow into the sewers may infiltrate into unpaved areas in the vicinity of the site, or it may flow toward Allen Creek, located approximately 800 feet north/northeast of the Site. Allen Creek eventually flows into Irondequoit Bay and then Lake Ontario.

2.3.4 Groundwater Hydrology

Groundwater at the Site is reportedly approximately seven to ten feet below ground surface (bgs), based on previous investigation results (OBG, 2007). The groundwater table at the Site is present in either overburden or weathered/fractured bedrock, depending on the bedrock elevation. Shallow groundwater flow is anticipated to flow east-northeast towards the Irondequoit Creek drainage basin. Deeper groundwater flow may follow other local or regional flow patterns.

The majority of the existing groundwater monitoring wells at and in the vicinity of the Site are constructed with screens straddling the overburden (till), and upper shallow (highly fractured) bedrock. Hydraulic conductivity testing of this zone yielded K values ranging from 2 feet per day (ft/day) to 230 ft/day, with a geometric mean of approximately 8.86 ft/day (OBG, 2007). Two wells, referred to as intermediate wells by OBG, are also constructed within the more competent deeper bedrock (a third deeper bedrock well appears to be hydraulically connected to the shallow fractured bedrock zone and exhibits similar K values to the this shallow zone). Hydraulic conductivity estimates in the two intermediate wells were 28.3 ft/day and 12.8 ft/day.

2.3.5 Geology

Overburden in the vicinity of the Site consists of brown, loose, silt and fine sand overlying glacial till, which consists of loose to dense, fine and medium sand with some silt and gravel (OBG, 2007). Based on OBG boring logs, depth to rock at the Site varies from nine to 15 feet bgs. Bedrock encountered by OBG consists of a medium dark gray dolomite of the Lockport Dolomite group. OBG indicated that the shale present in the rock cores may indicate that the bedrock below the site is the transition zone between the Lockport Dolomite and underlying Rochester Shale. The OBG RI report also indicated that there was an apparent five foot deep trough in the bedrock surface below the eastern portion of the Site based on well drilling logs. A review of the refusal depth noted on the OBG Geoprobe boring logs from the Site did not confirm the presence of this through, although bedrock chips were not noted in the logs. Additional bedrock depth information would be needed to confirm the existence of this trough.

2.4 SITE WALKOVER

On August 13, 2008, representatives from MACTEC, the NYSDEC, the NYSDOH, and the MCDOH, as well as the Site owner, conducted a site visit. The Site walkover consisted of viewing the Site to assess possible contamination sources, exploration locations, and logistics for the field program (i.e., existing well locations, drilling and sampling locations and access feasibility). MACTEC also provided photo documentation of the Site (site photos will be included in the RI Report).

2.5 CONCEPTUAL SITE MODEL

Based on the review of the historical data, a CSM was developed. The conceptual model presents a description of the media affected, the source of impact, types of contamination, contaminants of potential concern, primary or secondary release mechanisms, migration pathways, and potential receptors. The conceptual model for the Site is presented in Table 2.1. The CSM will be modified and updated as needed based on data to be collected at the Site during the RI.

Review of historic data indicates that chlorinated solvents have migrated into soil, groundwater, and possibly bedrock as a result of previous activities at and upgradient from, the Site. Groundwater is present at approximately seven to ten feet bgs. Groundwater reportedly flows to the east-northeast in overburden and shallow bedrock. Groundwater flow in deeper/more competent rock has not been determined.

Existing data indicate that groundwater and soil in the vicinity of the Site contains concentrations of chlorinated solvents above applicable standards, criteria and guidance values (SCGs). Previous investigations did not identify a specific source/PCE disposal area, but the data suggests that the Site is contributing to the presence of PCE and PCE breakdown products in on-site and off-site groundwater and soil vapor.

2.6 TECHNICAL OBJECTIVES

Based on existing data, chlorinated solvents are present in groundwater at and in the vicinity of the Site at concentrations above the Class GA groundwater standards as defined in 6 of New York Codes, Rules, and Regulations (NYCRR) Part 700-705 (NYS, 1999b). In addition, soil samples collected from the Site indicated the presence of chlorinated solvents above 6 NYCRR Part 375 Soil Cleanup Objectives for unrestricted use (NYS, 2006). Contaminants detected are listed hazardous wastes under Title 6 of NYCRR Part 371 (NYS, 1999a). Based on this groundwater and soil contamination, the Site may pose a potential significant threat to public health and the environment as defined in 6 NYCRR 375 (NYS, 2006). Existing data reviewed was not sufficient to determine a specific PCE source/disposal area, the full nature and extent of on-site contamination, and the relationship between the former Speedy's Cleaners Site and the Carriage Cleaners Site. As such, the RI will be performed at the former Speedy's Cleaners Site with the following technical objectives:

- evaluate source area soil (if encountered) to determine if residual contamination exists on the Site
- evaluate if potential contamination at the site is contributing to the groundwater contamination plume identified from the Carriage Cleaners Site
- define the areal and vertical extent of contaminants in area groundwater and soil, as well as evaluate groundwater flow direction
- evaluate present and future human health exposure pathways, such as through exposure to site source materials, groundwater, and/or vapor migration to indoor air
- determine the relationship between the former Speedy's Cleaners Site and the Carriage Cleaners Site and possible responsibility for the off-site portions of the PCE groundwater plume

The RI field program described in Section 3 is planned to further characterize the Site based on the technical objectives listed above. This information will be used to evaluate the need for further action, including potential additional investigations and remedial evaluations.

3.0 SCOPE OF WORK

To evaluate the potential threat to human health and the environment, and to collect data for future evaluation of remedial alternatives for the Site, field investigations are planned. These activities will support the evaluation of soil and groundwater conditions at and in the vicinity of the Site. Specifically, data collection is necessary to complete the following:

- characterize the extent of potential soil contamination present at the Site;
- characterize the vertical and areal distribution of groundwater contamination;
- evaluate whether potential contamination present at the Site is contributing to the known off-site PCE groundwater plume;
- evaluate migration pathways, and actual or potential receptors;
- collect data for the future evaluation of potential remedial alternatives for the Site.

3.1 WORK PLAN AND BUDGET PREPARATION (TASK 1)

A task of the WA is the preparation of this WP and includes review of existing Site data, a historical review, a Site visit, and a scoping session with the NYSDEC. A preliminary historical records review was conducted during the preparation of this WP. A Site reconnaissance and scoping session was conducted on August 13, 2008 with the NYSDEC. To the extent practical, MACTEC will collect additional information, as needed, to augment the existing data. Additional information may include additional aerial photographs, historic investigation reports, and other historical data.

3.2 REMEDIAL INVESTIGATION (TASK 2)

The RI fieldwork is anticipated to be conducted as described in the following subsections. The RI fieldwork will be conducted in accordance with the specifications presented in the Quality Assurance Program Plan (QAPP) (MACTEC, 2007), a stand-alone document, and the Site-specific QAPjP, included as Appendix B to this WP. Quality Control and Quality Assurance procedures for sample handling and sample shipment are presented in Section 5.0 of the QAPP. Health and Safety procedures for on-Site activities are presented in the Program HASP (MACTEC, 2005) and the Site-specific HASP, included as Appendix C to this Site WP.

Off-Site laboratory water and soil analyses will be performed by Columbia Analytical Services, a NYSDOH National Environmental Laboratory Accreditation Program (NELAP) approved laboratory. Off-Site laboratory analysis will comply with the NYSDEC Analytical Services Protocols (ASP) (NYSDEC, 2005).

Proposed sampling techniques and rational are provided in Table 3.1, and sample identification and analyses is presented in Table 3.2.

Data reviewed from the previous investigations will be used to refine the data collection needs described in this WP. General field activities, including mobilization, health and safety, and decontamination, are described in the following subsections. Upon approval of the WP, MACTEC will begin procurement of subcontractors.

3.2.1 General Field Activities

The general field activities to be completed, including mobilization, health and safety, and decontamination are described in the following subsections. Upon approval of the WP, MACTEC will complete procurement of subcontractors and begin mobilization. MACTEC and its subcontractors will mobilize to the Site and begin the RI fieldwork in accordance with the project schedule. Mobilization will include obtaining utility clearances and acquisition of the following:

- transportation to and from the Site
- drilling equipment and field supplies
- health and safety equipment
- decontamination supplies and equipment
- sampling equipment.

Initially a field team orientation meeting will be held on-site prior to work start-up with MACTEC and subcontractor personnel to familiarize field workers with Site history, health and safety requirements, equipment calibration procedures, and all other investigation methods and procedures. The NYSDEC will be responsible for obtaining Site access prior to initiation of work activities.

3.2.1.1 Health and Safety

MACTEC anticipates that the RI fieldwork will be conducted at Level D personal protection. Specific investigation activities and required level of personal protection are set forth in the Site-specific HASP (Appendix C). Criteria for upgrading or downgrading the specified level of protection are also provided in the Site-specific HASP. Additional health and safety requirements are set forth in the Program HASP (MACTEC, 2005). Should site conditions pose a threat to those present on-site, and/or should site conditions warrant an upgrade from Level D, as defined by the HASP, work will stop and the situation will be re-evaluated by the NYSDEC and MACTEC. In addition, the NYSDEC Community Air Monitoring Plan (CAMP) will be followed for intrusive investigations. A copy of the CAMP is included in Appendix B with the Health and Safety Plan.

3.2.1.2 Investigation Derived Wastes

The method of disposing investigation-derived wastes (IDW) generated during this RI will be based upon whether the wastes are considered hazardous or non-hazardous. If no visual (e.g. sheen) or olfactory indication of contamination is noted, purged groundwater will be allowed to infiltrate into the ground surface in the vicinity of the purged well. United States Department of Transportation approved 55-gallon containers filled during the field investigation will be staged on-Site in an area designated by the NYSDEC, and approved by the Site owner. Transport and disposal of these containers will be arranged by MACTEC on behalf of NYSDEC. Containers will be labeled as described in the Site-specific QAPjP.

3.2.1.3 Field Program Sampling Activities

Figure 3.1 is an aerial photograph of the Site area and proposed sampling locations. Table 3.1 provides the proposed field tasks; Table 3.2 presents sample parameters, and specific analyses. Currently, the field program is anticipated to include the following (see Table 3.1 for sampling rationale):

- Complete up to four borings through the basement floor and collect soil samples from below the basement concrete slab for volatile organic compound (VOC) analysis.
- Complete up to 15 Geoprobe borings and collect at least one soil sample from each boring for VOC analysis and up to three water samples for VOC analysis, if possible.

- Collect a soil sample from two to three of the Geoprobe borings for semivolatile organic compound (SVOC), Target Analyte List (TAL) metals (plus cyanide), pesticides, and polychlorinated biphenyls (PCB) analyses.
- Based on analytical results from the Geoprobe sampling, install up to four overburden/bedrock interface wells, one of which will be paired with existing overburden well MW-206S.
- Collect groundwater samples from the two to three of the new wells for VOC, SVOC, TAL metal, pesticide and PCB analyses.
- Collect groundwater samples from up to 21 existing wells for VOC analyses.
- Collect groundwater samples from up to 10 new and existing wells for monitoring natural attenuation (MNA) parameters.
- Collect three background soil samples for TAL metals analysis.

3.2.2 Geoprobe Soil and Groundwater Samping

Soil borings. To better characterize site soils, nineteen soil borings will be installed to the top of the bedrock at select locations. Fifteen soil borings will be located outside of the Former Speedy's Cleaners building (see Figure 3.1), and four soil borings will be advanced beneath the buildings basement slab. The soil boring installations will be completed using direct push technology. Exterior borings will be completed using a sub-contracted direct push drill rig (e.g. Geoprobe). Interior samples will be completed by coring a three-inch diameter hole through the buildings concrete slab and then using a core sampling slide hammer to collect soil samples down to the water table (estimated at approximately nine feet bgs). Continuous sampling of each boring shall be done to identify the geology of the subsurface as described in Section 4.5.1 of the QAPP (MACTEC, 2007). Photoionization detector headspace readings will be used to screen soil samples for the presence of VOCs as each soil sample is removed from the split-spoon. Samples will be described using the Unified Soil Classification System. The sample description and classification, VOC headspace reading, and boring observations will be recorded on the Data Record as discussed in Subsection 4.5.2.2 of the QAPP.

At a minimum, one sample will be collected from each soil boring for analysis by an Environmental Laboratory Accreditation Program certified laboratory. The sample location (i.e. depth) will be based on field screening data. The soil samples shall be analyzed for VOCs via USEPA Method 8260. In addition, two to three samples will be collected from the same interval as the VOC sample (based on field observations) and analyzed for metals via USEPA method 6010B, SVOC via USEPA method 8270, pesticides via USEPA method 8081 and PCB via USEPA 8082.

Groundwater. If groundwater is encountered in the direct push borings in the vicinity of the Site building, and the borings are not located near any existing monitoring wells, up to four groundwater samples will be collected for analysis of VOCs via USEPA Method 8260. Samples will be collected using a check valve or Geopump from inside a slotted stainless steel rod that is driven into the water table as described in Section 4.5.1 of the QAPP (MACTEC, 2007).

3.2.3 Groundwater Monitoring Well Installation

To determine groundwater flow characteristics and quality upgradient, at, and downgradient of the Site and better define the groundwater plume, four overburden/bedrock groundwater monitoring wells. MW-206, MW-210, MW-211, and MW-212, will be installed. Groundwater analytical data and permanent data monitoring points will assist in determining the extent of potential chlorinated solvent contamination in the vicinity of the Site, and to allow monitoring of that contamination. Hydraulic testing of the wells will be conducted to calculate groundwater K values for the overburden/shallow bedrock.

The groundwater monitoring wells will be installed approximately 10-feet into bedrock, with two of the wells installed using tri-cone drilling techniques and two of the wells installed in the vicinity of the Site building using HQ coring techniques as described in Section 4.4.3 of the QAPP (MACTEC, 2007). Figure 3.1 shows the approximate proposed locations of the monitoring wells. The exact locations of the wells may vary based on utility locations and findings of the direct push investigation. The wells will consist of two-inch inside diameter (ID) Schedule 40 Polyvinyl Chloride (PVC) casing and a ten foot long two-inch ID PVC well screen, with the screen extending across the overburden/bedrock interface. Well screens will have 0.010-inch wide machine slots (unless geologic conditions dictate otherwise) with # 0 sand pack to 2 feet above the screen, a two foot bentonite seal above the sand pack and a bentonite grout backfill to the ground surface. The wells will be completed with a locking cap and a six-inch flush mount cover with a two foot concrete apron.

3.2.4 Monitoring Well Development

Upon completion of monitoring well installations, the newly installed monitoring wells will be developed (no sooner than 24 hours after installation for wells installed with top of screens below the

water table) using pump and surge techniques as described in the Section 4.4.4 of the QAPP (MACTEC, 2007).

3.2.5 Groundwater Sampling and Conductivity Testing

One round of groundwater samples will be collected from up to 25 new and existing monitoring wells. After the new monitoring wells have been installed and developed, groundwater samples will be collected from the four new monitoring wells and from 21 of the existing area monitoring wells. Groundwater analytical data will be used to assess the distribution of potential contamination in the vicinity of the Site, and to allow monitoring of that contamination, if present. See Figure 3.1 and Table 3.1, respectively, for proposed locations and sample collection and analysis rationale. The first round of groundwater samples will be collected no sooner than two weeks following the development of the monitoring wells. Prior to well sampling, a round of water levels will be collected. Monitoring wells will be sampled using low-flow sampling procedures as described in the Section 4.5.4.3.2 of the QAPP (MACTEC, 2007). Samples will be collected from the least contaminated to the most contaminated locations as determined from the assumed groundwater flow direction and historic analytical data. Field measurements for pH, temperature, specific conductivity, oxidation reduction potential, dissolved oxygen, and turbidity will be collected through a flow through cell (with the exception of turbidity) from each well during pre-sample purging.

Groundwater samples from all wells will be analyzed for VOCs by USEPA Method 8260. Samples collected from two to three of the new monitoring wells will be analyzed for dissolved TAL metals by USEPA Methods 6010B/7470, SVOCs by USEPA Method 8270, and pesticides and PCBs by USEPA Methods 8081/8082 (see Table 3.2) as described in the NYSDEC ASP of June 2005 (NYSDEC, 2005). Groundwater for metals analyses will be field filtered using dedicated 0.5 micron filters. The laboratory will provide NYSDEC Category B deliverables. In addition, up to 10 wells will be sampled for MNA parameters, including, total organic carbon by USEPA Method 415.1, nitrate by NYSDEC ASP Method 352.1, nitrite by NYSDEC ASP Method 354.1, sulfate by NYSDEC ASP Method 375.4, sulfide by NYSDEC ASP Method 376.2, methane/ethane/ethene by American Society for Testing and Materials Method D-1945, carbon dioxide by Hach Method, alkalinity by USEPA Method 310.1, chloride by USEPA Method 325.3, and iron and manganese will be analyzed by USEPA Method 6010B.

Upon completion of the groundwater sampling event, hydraulic conductivity tests will be performed on the four new monitoring wells to characterize shallow overburden and bedrock characteristics. The procedures for conducting the hydraulic conductivity tests are presented in Subsection 4.7.2 of the QAPP (MACTEC, 2007). The hydraulic conductivity tests will consist of slug tests, using a solid mass of PVC (the slug) and a data logger. For wells with screens installed across the water table, two rising head tests will be conducted at each well. For wells with screens installed below the water table, one rising and one falling head test will be conducted at each well. Hydraulic conductivity test data will be analyzed by the methods of Hvorslev (1951) and Bouwer and Rice (1976).

3.2.6 Site Survey

MACTEC's survey subcontractor will complete a survey of the newly installed wells. Horizontal and vertical locations will be presented to MACTEC in a database to be used with geographic information system software and no formal survey of the Site and surrounding area with a CAD drawing is anticipated. Locations of other sampling locations, such as Geoprobe soil samples will be surveyed using a Trimble Global Positioning System. Sample locations will be presented on an aerial photograph of the Site and surrounding area. Horizontal locations will be tied to the NYS Plane Coordinate System using North American Datum of 1983.

Vertical elevations of groundwater monitoring wells will be tied to msl, using North American Vertical Datum of 1988, and measured to an accuracy of 0.01 foot. Horizontal well measurements will be to an accuracy of 0.1 foot.

3.2.7 Remedial Investigation Report

Upon completion of the field investigations and receipt of analytical data, MACTEC will prepare an RI Report. The RI Report will include a summary of the Site background and history including results of investigations conducted prior to the RI. Additional background information reviewed during subsequent tasks will be included. The RI Report will summarize results of the field investigations and laboratory analytical activities performed during the field work. Boring logs and environmental sampling data will be included as appendices to the RI Report. The information provided in the RI Report will be used to prepare a FS to evaluate remedial alternatives for the Site.

One hard copy of the Draft and one hard copy of the Final RI Report will be sent to the NYSDEC, NYSDOH, and MCDOH Project Managers. In addition, one copy of each report will be submitted in electronic format. Laboratory and location information will also be submitted in the NYSDEC database format. The Draft report will be submitted for review and comment by the NYSDEC. The Final report will incorporate the NYSDEC review comments. The NYSDEC will be responsible for forwarding copies of the report to state and county agencies other than those listed above.

3.3 FEASIBILITY STUDY (TASK 3)

A FS will be completed to evaluate the most applicable remedial alternatives. Prior to proposing a remedy for the Site, Remedial Action Objectives will be developed. The proposed remedy for the Site will be aimed at restoring the Site to pre-release conditions, or, at a minimum, eliminating or mitigating all significant threats to public health and the environment posed by the contaminants. Scientific and engineering principles will be applied to determine the most appropriate remedy for the Site, with the goal of protecting public health and the environment and complying with the state SCGs. The proposed remedial action will be based on the criteria outlined in 6 NYCRR 375.

3.4 SUPPORT ACTIVITIES

Based on the location of the field activities being in a residential community, it is likely that public meetings may be necessary. MACTEC will assist the NYSDEC, as needed, in preparation and review of any documents/presentations for technical accuracy, as well as preparing specialized figures or diagrams for insertion. MACTEC is anticipated to attend the public meetings and provide figures and drawings placed on poster board for the NYSDEC use.

4.0 PROJECT ORGANIZATION

Project organization, including principal functions and responsibilities, are described below.

Program Manager – William Weber, P.E. Mr. Weber has overall responsibility for organizing and setting program operating procedures with the NYSDEC, and confirming that WAs are implemented in accordance with contract requirements.

Project Manager – Mark Stelmack, P.E. Mr. Stelmack will be the primary contact with Mr. Jason Pelton, the NYSDEC Project Manager. He will be responsible for establishing protocols to be used on the WA and confirming implementation, for maintaining quality and consistency within the RI reports, and for monitoring the overall WA schedule and budget.

Site Manager/RI Lead – Chuck Staples. Mr. Staples is responsible for managing execution of the Site scope of work and for task-specific budgeting and scheduling issues. During field activities, Mr. Staples will be the liaison among field staff, subcontractors, and representatives from the NYSDEC, and county or municipal agencies.

FS and Interim Remedial Measure (IRM) Lead – Ryan Belcher, P.E. Mr. Belcher is responsible for managing the FS and potential IRM (if required). He will provide the potential remedial alternatives, recommend those alternatives that will receive a detailed evaluation, provide a detailed analysis, and recommend a preferred alternative. Mr. Belcher will also oversee implementation of IRMs if required.

Human Health Exposure Assessment - Jay Peters. Mr. Peters will be responsible for the qualitative exposure assessment and characterization of the exposure setting.

Analytical Laboratory – Columbia Analytical Services is a NYSDOH NELAP approved laboratory. They will provide analytical services for water and soil sample analyses.

Data Validation – Environmental Data Validators, Inc. (minority business enterprise [MBE]) will provide data validation services for the project.

Drilling Subcontractor – Geologic NY is a NYS certified driller on MACTEC's NYSDEC standby drilling and direct push contract list. They were selected based on cost effectiveness.

Direct Push Subcontractor – Nothnagle Drilling is a NYS certified driller on MACTEC's NYSDEC standby drilling and direct push contract list. They were selected based on cost effectiveness.

IDW Disposal Subcontractor – Upon determination of IDW quantities, a subcontractor will be competitively procured.

Survey Subcontractor – Om Popli Surveyors (MBE) will provide surveying services for the Site.

Data Manager – Brad Schoonard. Mr. Schoonard will participate in data management and report production.

Project Assistant – Bryanna Stiles. Ms. Stiles will also assist with the management of files, data, and report production.

Health and Safety – Cynthia Sundquist, CIH. The Health and Safety Supervisor, is responsible for review and approval of the Site-specific HASP, and, throughout the duration of field activities, has authority to stop work should unacceptable health and safety risks occur. The on-Site Health and Safety Officer will be appointed when the field investigation schedule is finalized.

5.0 PROJECT BUDGET, SCHEDULE AND ASSUMPTIONS

The proposed project schedule for the RI/FS is provided and shown in Appendix D.

The proposed schedule for execution of this project depends upon scheduled NYSDEC review and comment on deliverables, and the NYSDEC confirmation of Site access approval. Cost tables are provided in Appendix E (which is provided under separate cover). The minority and woman owned business enterprise (M/WBE) and EEO utilization plan is included in Appendix F.

The project schedule and costs are dependent on the following assumptions:

- No laboratory data validation, other than the NYSDEC Data Usability Summary Report will be required for the project.
- The NYSDEC will acquire permission from property owners to gain access for the subsurface investigations.

6.0 REFERENCES

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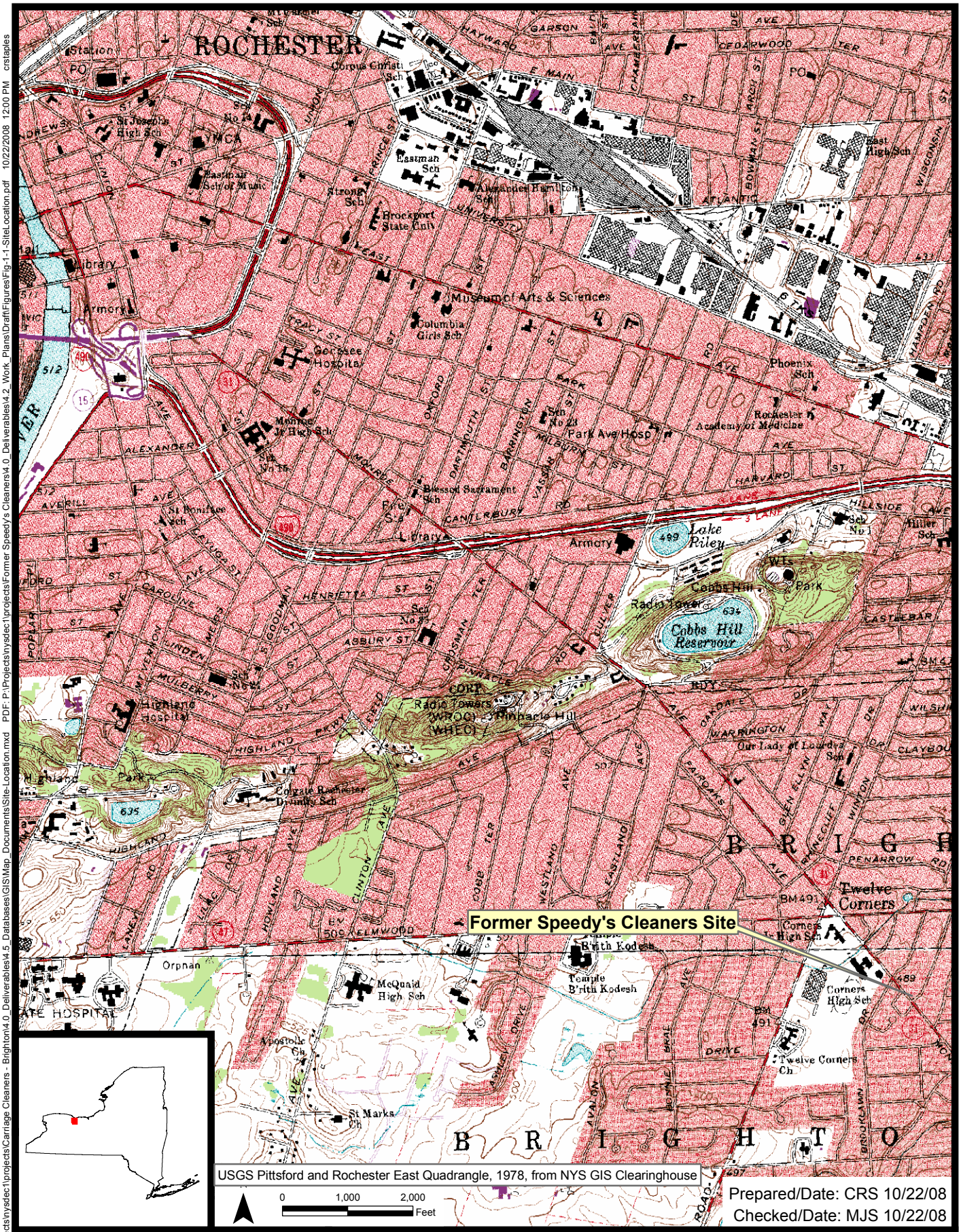
FIGURES



Prepared/Date: CRS 10/22/08
Checked/Date: MJS 10/22/08

NYSDEC
Former Speedy's Cleaners Site
Brighton, NY

MACTEC

Site Location
Project 3612-08-2109
Figure 1.1

Document: P:\Projects\nysdec1\projects\Carriage Cleaners - Brighton\4.0_Deliverables\4.5_Databases\GIS\Map_Documents\Site-Location.mxd PDF: P:\Projects\nysdec1\projects\Former Speedy's Cleaners\4.0_Deliverables\4.2_Work_Plans\Draft\Figures\Fig-1.1-SiteLocation.pdf 10/22/2008 12:00 PM crstaples

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NYSDEC
Former Speedy's Cleaners Site
Brighton, NY

MACTEC

Site Features

Project 3612-08-2109 Figure 2.1

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NYSDEC
Former Speedy's Cleaners Site
Brighton, NY

MACTEC

RI Soil Investigation Locations

Project 3612-08-2109 Figure 2.2

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NYSDEC
Former Speedy's Cleaners Site
Brighton, NY

MACTEC

Existing Monitoring Well Locations

Project 3612-08-2109 Figure 2.3

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NYSDEC
Former Speedy's Cleaners Site
Brighton, NY

MACTEC

Proposed Explorations

Project 3612-08-2109 Figure 3.1

TABLES

Table 2.1: Conceptual Site Model

Media	Known or Suspected Source of Contamination	Type of Contamination (General)	COPCs (Specific)	Primary or Secondary Source Release mechanism	Migration Pathways	Potential Receptors
Soil	Former dry cleaning operations. Spills or disposal of solvents which may be under a newer portion of the Site building	Solvents	PCE; TCE; 1,2 DCE; vinyl choride	Leaks and or Spills	Infiltration / percolation	Human: direct contact if excavation occurs in contaminated area (s)
Groundwater	Contaminated Soil and bedrock (Secondary Source)	Solvent	PCE; TCE; 1,2 DCE; vinyl choride	Infiltration / percolation from contaminated soil and bedrock	Groundwater flow	The community surrounding the Site is serviced by public water. Human or ecological receptors are not expected to be exposed, although it is possible that construction workers could come in contact with groundwater in deep excavations.
Air /Soil Vapor	Contaminated soil and bedrock at the Site and contaminated groundwater downgradient from the Site.	Solvents	PCE; TCE; 1,2 DCE; vinyl choride	Volatilization of contaminants from soil, bedrock, and groundwater	Soil Vapor Intrusion	Human: sub-slab depressurization systems have been installed at potential receptor residences.

Notes:
COPCs = contaminants of potential concern
PCE = Tetrachloroethene
TCE = Trichloroethene
DCE = Dichloroethene

Prepared by: CRS 10/1/08
Checked by: MJS 10/15/08

TABLE 3.1: PROPOSED FIELD TASKS AND METHODOLOGY

LOCATION ID	DESCRIPTION AND METHODOLOGY	RATIONALE	ANALYTICAL
BKSS-1 to BKSS-3	Collect three background soil samples.	Evaluate metal concentrations in background soils.	Samples for metals analysis at each location.
DP-1 to DP-4	Complete up to four direct push borings below the Former Speedy's building basement slab with a slide hammer.	Evaluate extent of soil contamination to be remediated either by excavation or soil vapor extraction.	Soil samples for VOC analysis.
DP-5 to DP-19	Complete up to 15 direct push borings around the Former Speedy's Cleaners building.	Evaluate potential source areas below the building in the vicinity of where dry cleaning machines and floor drain/storage areas may have been located.	Sample soil for TCL VOCs at all locations. Two to three soil samples will be analyzed for SVOC, pesticides/PCB, and metals analysis. In addition, up to three groundwater samples will be analyzed for VOCs if groundwater is encountered in areas away from existing wells.
MW-206, MW-210, MW-211, MW-212	Install up to four monitoring wells using HSA techniques to bedrock, and then HQ coring to approximately 20 feet bgs. Well screens will be installed across the overburden bedrock intrerface.	Installation of monitoring wells to evaluate shallow overburden/bedrock groundwater upgradient and downgradient of Former Speedy's Cleaners.	No samples during well installation.
HA-105, HA-106, HA-111, HA-112, HA-114, HA-115, HA-117 to HA-119, HA-122, HA-123, DEC-Well, MW-201, MW-202, MW-202I, MW-203S to MW-209S, MW-206 and MW-210 to MW-212.	Collect one round of groundwater samples at each location using low flow techniques .	Evaluate current groundwater concentrations at the site and hydraulic characteristics. Evaluate natural attenuation conditions at previously sampled wells and baseline conditions at the new wells.	Groundwater samples will be collected for VOC analysis. In addition, two to three of the new wells will be sampled for SVOC, Pesticides/PCBs, and metals analyses to better characterize the Site. Samples will also be collected from up to ten wells for monitoring natural attenuation parameters.

Notes:
VOCs = Target Compond List Volatile Organic Compounds analyzed by EPA Method 8260.
SVOCs = Semi-Volatile Organic Compounds analyzed by EPA Method 8270.
Pesticides/PCBs = Pesticides and polychlorinated bi-phenols analyzed by EPA Methods 8081 and 8082.
TAL metals = Dissolved Target Analyte List metals analyzed by Method 6010B, 7470A, and 7471A.
MNA Parameters = Monitoring Natural Attenuation Parameters = TOC by USEPA Method 415.1, Nitrate by NYSDEC ASP Method 352.1, Nitrite by NYSDEC ASP Method 354.1, Sulfate by NYSDEC ASP Method 375.4, Sulfide by NYSDEC ASP Method 376.2, Methane/Ethane/Ethene by ASTM Method D-1945, carbon dioxide by Hach Method, Alkalinity by USEPA Method 310.1, chloride by USEPA Method 325.3, and iron and manganese will be analyzed by USEPA Method 6010B. In addition, oxyen and reduction/oxydation potential will be measured during well stabilization.
See Table 3.2 for location ID's.

TABLE 3.2: PROPOSED SAMPLE IDENTIFICATION AND ANALYSES

							Soil Samples				Water Samples				
Site Type	**Media**	**Site ID**	**Sample ID**	**MS/MSD**	**DUP**	**RINS**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**MNA parameters**
Background Soil Samples															
Soil Boring	Soil	BKSS-001	828128-BKSS001__							1					
Soil Boring	Soil	BKSS-001	828128-BKSS001__							1					
Soil Boring	Soil	BKSS-002	828128-BKSS002__							1					
Direct Push Sampling															
Soil Boring	Soil	DP-001	828128-DP001__				1								
Soil Boring	Soil	DP-001	828128-DP001__				1								
Soil Boring	Soil	DP-002	828128-DP002__				1								
Soil Boring	Soil	DP-003	828128-DP003__				1								
Soil Boring	Soil	DP-004	828128-DP004__	1	1	1	1	1	1	1					
Soil Boring	Soil	DP-005	828128-DP005__				1								
Soil Boring	Soil	DP-005	828128-DP005__				1	1	1	1					
Soil Boring	Soil	DP-006	828128-DP006__				1								
Soil Boring	Soil	DP-007	828128-DP007__				1	1	1	1					
Soil Boring	Soil	DP-007	828128-DP007__				1								
Soil Boring	Soil	DP-008	828128-DP008__				1								
Soil Boring	Soil	DP-009	828128-DP009__				1								
Soil Boring	Soil	DP-010	828128-DP010__				1								
Soil Boring	Soil	DP-011	828128-DP011__	1	1	1	1								
Soil Boring	Soil	DP-012	828128-DP012__				1								
Soil Boring	Soil	DP-012	828128-DP012__				1								
Soil Boring	Soil	DP-013	828128-DP013__				1								
Soil Boring	Soil	DP-014	828128-DP014__				1								
Soil Boring	Soil	DP-015	828128-DP015__				1								
Soil Boring	Soil	DP-016	828128-DP016__				1								
Soil Boring	Soil	DP-016	828128-DP016__				1								
Soil Boring	Soil	DP-017	828128-DP017__				1								
Soil Boring	Soil	DP-018	828128-DP018__				1								
Soil Boring	Soil	DP-019	828128-DP019__				1								
Well Sampling															
WELL - Overburden	Groundwater	MW-1	828128-MW-1___R1												
WELL - Overburden	Groundwater	MW-2	828128-MW-2___R1												
WELL - Overburden	Groundwater	MW-3	828128-MW-3___R1												
WELL - Overburden	Groundwater	MW-4	828128-MW-4___R1												
WELL - Overburden	Groundwater	MW-5	828128-MW-5___R1												
WELL -Over/Bed	Groundwater	HA-101	828128-HA-101___R1												
WELL -Over/Bed	Groundwater	HA-102	828128-HA-102___R1												
WELL -Over/Bed	Groundwater	HA-104	828128-HA-104___R1												
WELL-Bedrock	Groundwater	MW-104I	828128-MW-104I___R1												

TABLE 3.2: PROPOSED SAMPLE IDENTIFICATION AND ANALYSES

							Soil Samples				Water Samples				
Site Type	**Media**	**Site ID**	**Sample ID**	**MS/MSD**	**DUP**	**RINS**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**MNA parameters**
WELL -Over/Bed	Groundwater	HA-105	828128-HA-105___R1								1				
WELL -Over/Bed	Groundwater	HA-106	828128-HA-106___R1								1				
WELL -Over/Bed	Groundwater	HA-107	828128-HA-107___R1												
WELL -Over/Bed	Groundwater	HA-108	828128-HA-108___R1												
WELL -Over/Bed	Groundwater	HA-109	828128-HA-109___R1												
WELL -Over/Bed	Groundwater	HA-110	828128-HA-110___R1												
WELL -Over/Bed	Groundwater	HA-111	828128-HA-111___R1								1				
WELL-Bedrock	Groundwater	MW-111I	828128-MW-111I___R1												
WELL -Over/Bed	Groundwater	HA-112	828128-HA-112___R1								1				
WELL -Over/Bed	Groundwater	HA-113	828128-HA-113___R1												
WELL -Over/Bed	Groundwater	HA-114	828128-HA-114___R1								1				1
WELL -Over/Bed	Groundwater	HA-115	828128-HA-115___R1								1				
WELL -Over/Bed	Groundwater	HA-116	828128-HA-116___R1												
WELL -Over/Bed	Groundwater	HA-117	828128-HA-117___R1								1				
WELL -Over/Bed	Groundwater	HA-118	828128-HA-118___R1								1				
WELL -Over/Bed	Groundwater	HA-119	828128-HA-119___R1		1	1					1				1
WELL -Over/Bed	Groundwater	HA-120	828128-HA-120___R1												
WELL -Over/Bed	Groundwater	HA-121	828128-HA-121___R1												
WELL -Over/Bed	Groundwater	HA-122	828128-HA-122___R1								1				
WELL -Over/Bed	Groundwater	HA-123	828128-HA-123___R1								1				
WELL -Over/Bed	Groundwater	DEC-Well	828128-DEC-Well___R1								1				
WELL -Over/Bed	Groundwater	MW-201	828128-MW-201___R1								1				1
WELL -Over/Bed	Groundwater	MW-202	828128-MW-202___R1		1	1					1	1	1	1	
WELL-Bedrock	Groundwater	MW-202I	828128-MW-202I___R1								1				1
WELL -Over/Bed	Groundwater	MW-203S	828128-MW-203S___R1								1				1
WELL -Over/Bed	Groundwater	MW-204S	828128-MW-204S___R1	1							1				
WELL -Over/Bed	Groundwater	MW-205S	828128-MW-205S___R1								1				1
WELL -Over/Bed	Groundwater	MW-206	828128-MW-206___R1	1							1	1	1	1	1
WELL - Overburden	Groundwater	MW-206S	828128-MW-206S___R1								1				
WELL -Over/Bed	Groundwater	MW-207S	828128-MW-207S___R1								1				
WELL -Over/Bed	Groundwater	MW-208S	828128-MW-208S___R1												
WELL -Over/Bed	Groundwater	MW-209S	828128-MW-209S___R1								1				
WELL -Over/Bed	Groundwater	MW-210	828128-MW-210___R1								1				
WELL -Over/Bed	Groundwater	MW-211	828128-MW-211___R1								1				1
WELL -Over/Bed	Groundwater	MW-212	828128-MW-212___R1								1	1	1	1	1
TOTAL SAMPLES				4	4	4	24	3	3	3	25	3	3	3	9

Notes:

TABLE 3.2: PROPOSED SAMPLE IDENTIFICATION AND ANALYSES

							Soil Samples				Water Samples				
Site Type	**Media**	**Site ID**	**Sample ID**	**MS/MSD**	**DUP**	**RINS**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**VOCs**	**SVOCS**	**Pesticides/PCB**	**TAL Metals**	**MNA parameters**

Sample ID = Site IDs begin with the NYSDEC Site # 8-28-128. Groundwaterand soil samples have "___" for three digit sample intake depth in feet below ground surface (to be determined in field).
MS/MSD = matrix spike and matrix spike duplicate sample collected
DUP = Duplicate sample collected
RINS = Rinseate sample collected
VOCs = Target Compond List Volatile Organic Compounds analyzed by EPA Method 8260.
SVOCs = Semi-Volatile Organic Compounds analyzed by EPA Method 8270.
Pesticides/PCBs = Pesticides and polychlorinated bi-phenols analyzed by EPA Methods 8081 and 8082.
TAL metals = Dissolved Target Analyte List metals analyzed by Method 6010B, 7470A, and 7471A.
MNA Parameters = Monitoring Natural Attenuation Parameters = TOC by USEPA Method 415.1, Nitrate by NYSDEC ASP Method 352.1, Nitrite by NYSDEC ASP Method 354.1, Sulfate by NYSDEC ASP Method 375.4, Sulfide by NYSDEC ASP Method 376.2, Methane/Ethane/Ethene by ASTM Method D-1945, Carbon Dioxide by Hach Method, Alkalinity by USEPA Method 310.1, chloride by USEPA Method 325.3, and iron and manganese will be analyzed by USEPA Method 6010B. In addition, oxygen and reduction/oxydation potential will be measured during well stabilization.
Sample totals do not include QA/QC samples.

APPENDIX A

CARRIAGE CLEANERS RI FIGURES

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FIGURE 4

LEGEND

MONITORING WELL

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

WELL LOCATIONS

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 1/30/07

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T:\10653_NYSDEC\CarriageCleaners\mxd\RI_REPORT\GWE_JULY2005.mxd

FIGURE 8

This document was developed in color. Reproduction in B/W may not represent the data as intended.

LEGEND

- MONITORING WELL
- GROUND WATER ELEVATION CONTOUR
- HYDRAULIC FLOW POTENTIAL
- 476.71 GROUND WATER ELEVATION

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

GROUND WATER ELEVATIONS JULY 2005

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 1/30/07

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FIGURE 14

This document was developed in color. Reproduction in B/W may not represent the data as intended.

LEGEND

▲ SOIL BORING

CARRIAGE CLEANERS
NYSDEC

SOIL DATA - PCE

FORMER SPEEDY'S CLEANERS
2150 MONROE AVENUE

0 15 30 60
Feet

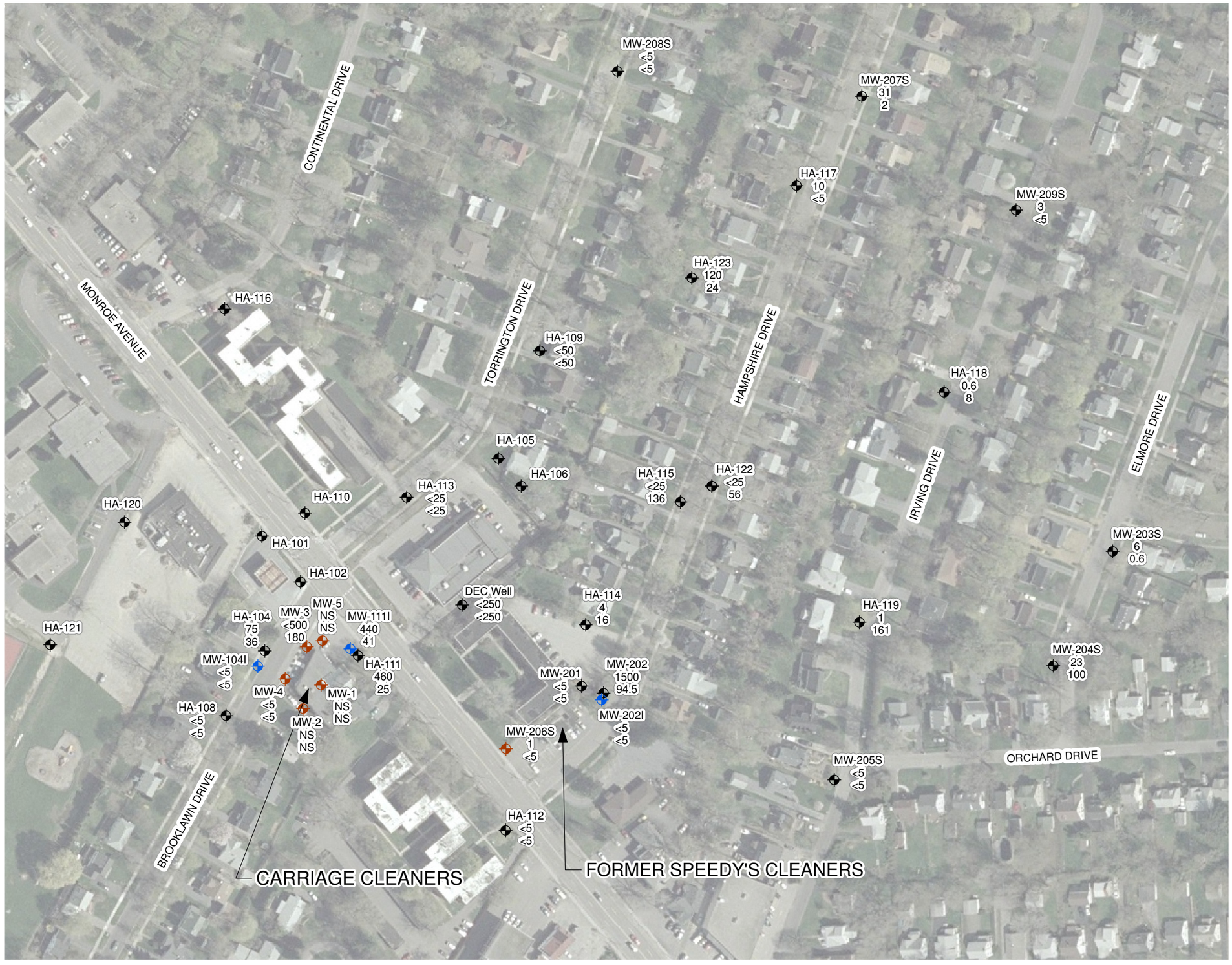
FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 1/30/07

T:\10653_NYSDEC\CarriageCleaners\mxd\RI_REPORT\NEW_FIGS\PCE_CONC_RND1.mxd

FIGURE 15



LEGEND

- <all other values>
- OVERBURDEN
- SHALLOW BEDROCK INTERFACE
- INTERMEDIATE BEDROCK

HA-123 WELL ID
120 PCE CONCENTRATION (UG/L)
24 TOTAL TCE, CIS-1,2-DCE, TRANS-1,2-DCE, AND VINYL CHLORIDE CONCENTRATIONS (UG/L)
NS NOT SAMPLED

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

COC CONCENTRATIONS IN GROUND WATER JULY 2005

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 1/30/07

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PLOT DATE: 1/30/07

FIGURE 16

LEGEND

- OVERBURDEN
- SHALLOW BEDROCK INTERFACE
- INTERMEDIATE BEDROCK

HA-123 WELL ID
72 PCE CONCENTRATION (UG/L)
11.2 TOTAL TCE, CIS-1,2-DCE, TRANS-1,2-DCE, AND VINYL CHLORIDE CONCENTRATIONS (UG/L)

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

COC CONCENTRATIONS IN GROUND WATER DECEMBER 2005

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

APPENDIX B

SITE SPECIFIC QUALITY ASSURANCE PROJECT PLAN (QAPJP)

QUALITY ASSURANCE PROJECT PLAN
FORMER SPEEDY'S CLEANERS SITE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

This Quality Assurance Project Plan (QAPjP) identifies sections of the QAPP (MACTEC, 2007) that apply to the activities described in the site Work Plan, describes variances to those procedures, and specifies the analytical methods used for laboratory analysis of environmental samples.

1.0 GENERAL PROCEDURES AND PRACTICES

The general procedures used to conduct the Remedial Investigation/Feasibility Study at the Former Speedy's Cleaners site will be taken from the following sections of the QAPP:

Section 2.0	Program Organization and Responsibilities
Section 9.0	Internal Quality Control
Section 11.0	Preventive Maintenance
Section 12.0	Data Assessment
Section 13.0	Corrective Action
Section 14.0	Reports to Management

2.0 FIELD PROCEDURES AND SAMPLING

The following field investigation techniques and procedures set forth in the QAPP will be used at the site:

QA/QC Procedures	Section 3.0
Decontamination	Subsection 4.3
Sample Handling	Subsections 4.5 and 5.0
Exploratory Drilling	Subsection 4.4.3
Monitoring Well Installation	Subsection 4.4.3
Geoprobe Sampling Methodology	Subsection 4.5.1
General Soil Sampling Methodology	Subsection 4.5.2
General Water Sampling Methodology	Subsection 4.5.4
Low Flow Groundwater Sampling	Subsection 4.5.4.3
Aquifer Characterization	Subsection 4.7
Global Positioning Surveys	Subsection 4.8.2
Field Instrument Calibration	Section 6.0

The following variances to the above procedures are described in subsections 2.1 to 2.4.

2.1 INVESTIGATION DERIVED WASTE

Decontamination of equipment will follow procedures described in the QAPP except for disposal of purge water. Well water purged during well development will be placed in USDOT-approved 55-gallon containers for off-site disposal. If well water purged prior to groundwater sampling exhibit visual and olfactory signs of contamination, the water will be considered contaminated and placed in USDOT-approved 55-gallon containers. If no visual and olfactory signs of contamination are noted, pre-sampling purge water will be considered non-hazardous and will be allowed to infiltrate into the ground surface at the sampling location.

Drill soil cuttings will be screened for VOCs with a PID. Soils with visual evidence of contamination or with PID readings greater than 5 ppm will be containerized in USDOT approved

55-gallon containers for off-site disposal. Soils with sustained PID readings of less than or equal to 5 ppm will be considered non-contaminated and will be used as backfill for the borings at the approximate interval from which they were extracted. Remaining uncontaminated soils will be spread evenly on the ground surface in unpaved areas, as agreed upon with the property owner and the NYSDEC. If space does not allow for the disposal of non-contaminated drill cuttings, cuttings will be placed in 55-gallon containers for off-site disposal.

Off-site transport and disposal of RI-generated wastes (hazardous and non-hazardous) will be the responsibility of MACTEC, signing on behalf of the NYSDEC.

2.2 SAMPLING AND ANALYSIS PROGRAM

Data Quality Objectives (DQOs) for Former Speedy's Cleaners site sampling activities are summarized in Table A-1. DQOs are described in accordance with USEPA guidelines (USEPA, 1987) and the NYSDEC Analytical Services Protocols (ASP) (NYSDEC, 2005).

Analytical data requirements were established using the methods described in the ASP. Analytical methods to be used for laboratory analysis are presented in Table A-2. Analytical Level B deliverables as described in the ASP will be provided by the laboratory. Data Usability Summary Report (DUSR) will be issued based on DEC guidelines (NYSDEC, 2002).

2.3 SAMPLING IDENTIFICATION

Sample identification is outlined in the Work Plan Table 3.2 and varies from Subsection 4.1 of the QAPP. The Sample ID starts with the Site ID 828128. After the site ID, the next digits represent the sample type, as outlined below:

Sample Type will include the following identifications:

DP – Direct Push Soil Sample

MW, HA – Groundwater Well Sample (i.e. monitoring well and Haley and Aldrich well)

2.4 DRUM LABELING

Drums 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.

Upon completion of the project, the NYSDEC Project Manager will be notified in writing about the location, number, and any relevant information regarding drums staged on the site. Drums are to be stored on wooden pallets. Drums shall be staged as directed by the NYSDEC. Final off-site transport and disposal of RI-generated wastes will be the responsibility of MACTEC.

REFERENCE

MACTEC Engineering and Consulting, Inc., 2007. Program Quality Assurance Program Plan. Prepared for the New York State Department of Environmental Conservation, Albany, New York. October 2007.

New York State Department of Environmental Conservation (NYSDEC), 2005. "*Analytical Services Protocols"*; 6/05 Edition; June 2005.

New York State Department of Environmental Conservation (NYSDEC), 2002. Draft DER-10, Technical Guidance for Site Investigation and Remediation. December 2002.

U.S. Environmental Protection Agency (USEPA), 1987. "Data Quality Objectives for Remedial Response Activities"; Office of Emergency and Remedial Response and Office of Waste Programs Enforcement; Washington DC; EPA/540/G-87/003; March 1987.

Table B.1:

Analytical DQO Levels

Parameter	Use	Data Quality Level
PH Temperature Specific Conductance Turbidity	Provides physical and chemical data on groundwater samples for use during sampling collection.	Level I
PID screening	Provides qualitative real-time information on air quality in the breathing zone for health and safety decisions, and to identify potentially contaminated groundwater and soil,.	Level I
TCL VOCs, SVOCs, Inorganics, pesticides/PCBs and MNA parameters	Provides analytical information to compare to standards and guidance values.	Level III

Notes:

TCL = target compound list

VOCs = volatile organic compounds

SVOCs = semi-volatile organic compounds

PCB = polychlorinated biphenyl's

MNA = monitoring natural attenuation. Parameters include TOC, nitrate, nitrite, sulfate, sulfide, methane/ethane/ethane, carbon dioxide, alkalinity, chloride, iron, and manganese.

Table B.2:

Summary of Analytical Methods

Media	Parameter	Method
Groundwater from monitoring wells and borings	TCL VOCS, SVOCS, Metals, Pesticides/PCBs, and MNA methods	8260B, 8270C, 6010B/7470A/7471A, 8081/8082 using NYSDEC ASP 2005 and MNA methods.
Soil from borings	TCL VOCS, SVOCS, Metals, Pesticides/PCBs	8260B, 8270C, 6010B/7470A/7471A, 8081/8082 using NYSDEC ASP 2005

Notes:

TCL = target compound list

VOCs = volatile organic compounds

SVOCs = semi volatile organic compounds

PCB = polychlorinated biphenyl's

MNA = monitoring natural attenuation

MNA methods = TOC by USEPA Method 415.1, Nitrate by NYSDEC ASP Method 352.1, Nitrite by NYSDEC ASP Method 354.1, Sulfate by NYSDEC ASP Method 375.4, Sulfite by NYSDEC ASP Method 376.2, Methane/Ethane/Ethene by RSK 175, carbon dioxide by HACH Method, Alkalinity by USEPA Method 310.1, chloride by USEPA Method 325.3, and iron and manganese by USEPA Method 8260B.

APPENDIX C

SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)

MACTEC, Inc.

MACTEC Short Form HASP

Site: Former Speedy's Cleaners Job Number: 36120821109
Street Address: 2150 Monroe Avenue, Brighton, NY
Proposed Date(s) of Investigation: 1 Nov 2008 – 7 Nov 2008
Prepared by: Michael Washburn Date: 9/10/2008
*Approved by: Kendra Bavor Date: 10/7/2008
Site Description: A hazardous waste site with contaminates of concern consisting of chlorinated solvents
(attach map)
Proposed Activity(s): Direct-push boring with groundwater and soil samples. Drilling and well installation.
*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			
	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]					
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
Field personnel will be identified and current in required training and surveillance as noted in this table prior to site work.

Known or Suspected Contaminants (include PELs/TLVs):

Contaminants of Concern	Historic data	PEL/TLV
Groundwater/soil: PCE	4800 ug/L	25 ppm
TCE	25 ug/L	10 ppm
1, 2 DCE	69 ug/L	200 ppm
Tolune	4 ug/L	20 ppm
Xylene	13 ug/L	200 ppm

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

Activity Specific JHAs:

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

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?
HCL	☒
METHANOL	☒
	☐
	☐

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						
☐						

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	☐ Other _____
☒ Outer Gloves: List Type vinyl or 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 Vinyl Chloride	☐ Dust Meter: ☐ Respirable dust ☐ Total dust		☐ Other _____

*Monitoring instruments will be calibrated daily in accordance with manufacturer's instructions. Results will be recorded in the field logbook.

Air Monitoring Action Levels:

PID/FID Reading [1]	Detector Tube [1]	Dust Meter [1]	LEL[2]/O_2 [1]	Action	Level of PPE
Anything above background	<0.5 ppm			Continue to monitor with PID	Modified D
41 ppm	<0.5 ppm			Continue to monitor with PID/DT	Level C
Anything above background	>0.5 ppm			Stop work. Move up wind. Re-evaluate	Stop work
Above 92 ppm	>0.5 ppm			Upgrade to Level B PPE	Level B

[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

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:	585-275-2121		
Police Department:	911		
Site Health And Safety Officer:	Office:	Home:	
Client Contact: **Jason Pelton**	Office: 518-402-9818	Pager:	
Project Manager: **Mark Stelmack**	Office: 207-828-3592	Home:	
Division EH&S Manager: Cindy Sundquist	Office: 207-828-3309 (w) 207-650-7593(c)	Home: 207-892-4402	
EPA/DEP (if applicable):	NA	NA	
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: Use engineering controls to control visual dust present during boring (i.e. wet surface to control dust).
Drilling contractor required to clear for underground/ aboveground utilities.

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

PRIMARY HOSPITAL:

Facility Name: Strong Memorial Hospital

Address: 575 Elmwood Avenue, Rochester, NY

Telephone Number (585) 275-2121

DIRECTIONS TO PRIMARY HOSPITAL (attach map):

Driving directions to Strong Memorial Hospital: General Information

3.4 mi – about **9 mins**

1. Head **northwest** on **Monroe Ave/RT-31** toward **Brooklawn Dr**		0.3 mi
2. Turn **left** at **Elmwood Ave**		3.0 mi
3. Make a **U-turn** Destination will be on the right		299 ft

ALTERNATE HOSPITAL:

Facility Name: Highland Hospital of Rochester

Address: 1000 South Ave, Rochester, NY

Telephone Number (585) 473-2200

DIRECTIONS TO ALTERNATE HOSPITAL (attach map):

Driving directions to Highland Hospital of Rochester

3.4 mi – about **9 mins**

1. Head **northwest** on **Monroe Ave/RT-31** toward **Brooklawn Dr**		0.3 mi
2. Turn **left** at **Elmwood Ave**		2.2 mi
3. Turn **right** at **Meadowbrook Rd**		0.3 mi
4. Turn **left** at **Highland Ave**		0.3 mi
5. Turn **right** at **South Ave** Destination will be on the right		

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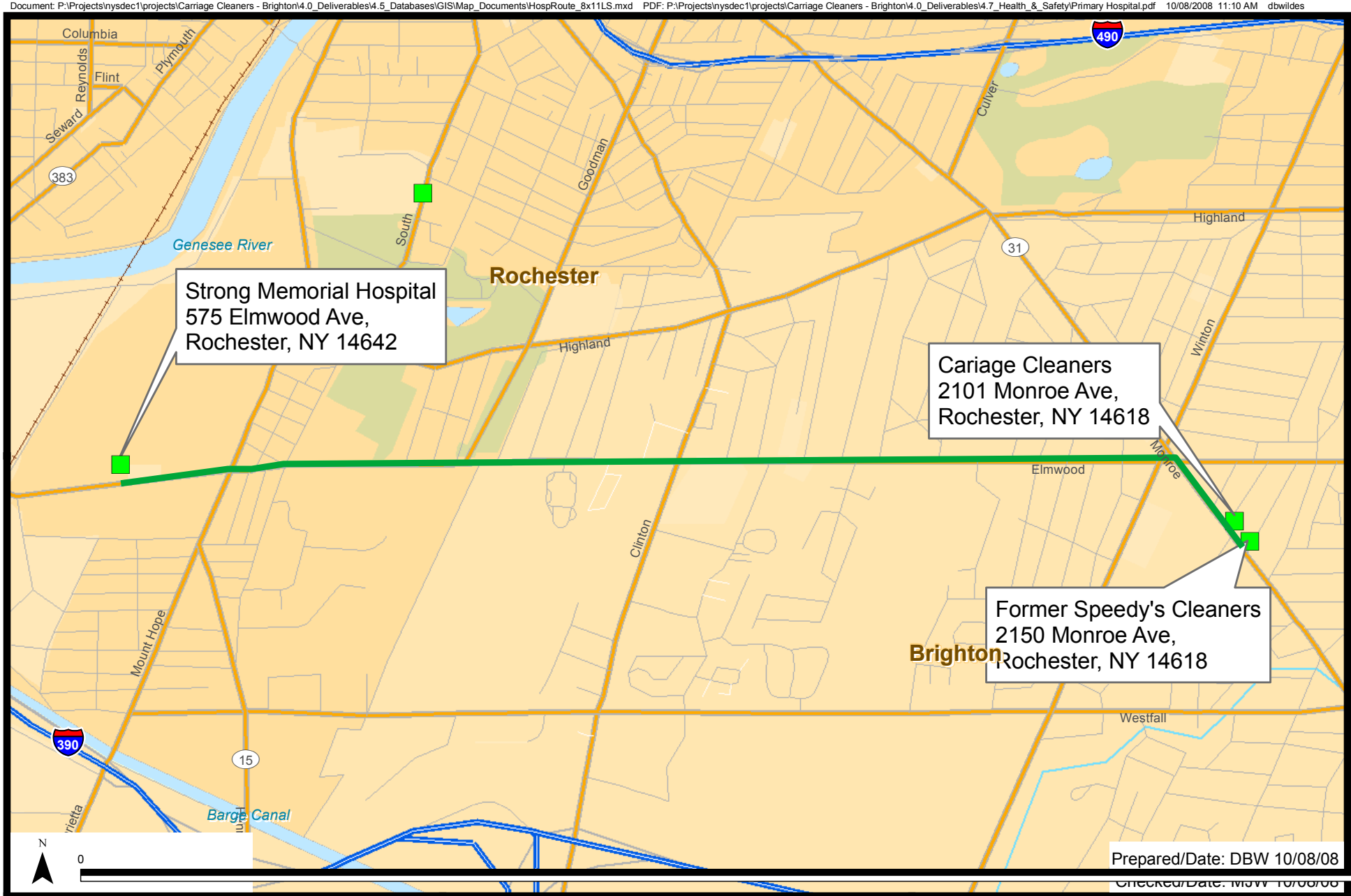

Prepared/Date: DBW 10/08/08

Checked/Date: MJW 10/08/08

PRIMARY HOSPITAL ROUTE
CARRAGE & SPEEDY'S CLEANERS
ROCHESTER, NEW YORK

MACTEC

PRIMARY HOSPITAL ROUTE

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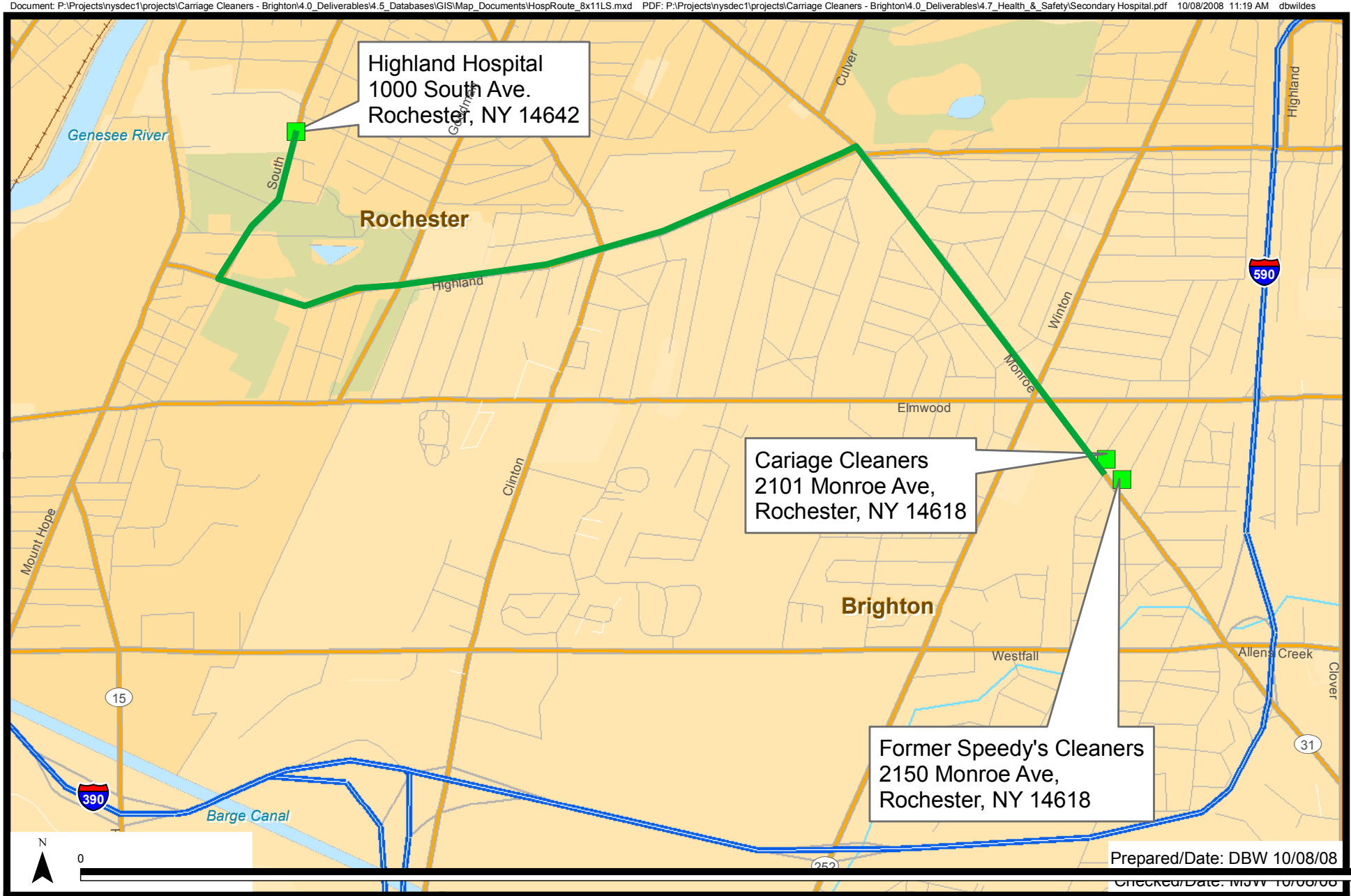

SECONDARY HOSPITAL ROUTE
CARRAGE & SPEEDY'S CLEANERS
ROCHESTER, NEW YORK

MACTEC

SECONDARY HOSPITAL ROUTE

Job Hazard Analysis Form

JHA No.: JHA -_____-____-___-___

Job Title: Mobilization/Demobilization, Site Preparation **Date of Analysis:** 5/1/07

Job Location: New Rochelle, New York **Team Leader:** John Peterson

Applicable ES&H Procedures:
- 2.9.A - Hazardous Waste Operations and Emergency Response Program
- 2.9.B - Hearing Conservation Program
- 2.9.C - Respiratory Protection Program
- 2.9.D - Personal Protective Equipment Program
- 2.9.E - Hazard Communication Program
- 2.5.1 - Operation of Company Vehicles and Use of Personal Vehicles on Company Business
- 2.5.1 - Heavy Equipment
- 2.13.1 - Medical Surveillance

Other Referenced JHAs:

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

Key Work Steps	Hazards/Potential Hazards	Safe Practices
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.
	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.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	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.
	5F) Vehicle Incident	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
	6B) Overexertion	6B) Overexertion ▪ Workers will be trained in the proper method of lifting items. ▪ Do not bend and twist at the waist while lifting or exerting force.
	6C) Struck by Equipment/Supplies	6C) 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.
7. Driving back from the jobsite	8A) See hazards listed under item #3	8A) See safe work practices under item #3

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Job Hazard Analysis – HASP Format

Job Title: Field Work - General **Date of Analysis:** 8/15/06

Minimum Recommended PPE*: hard hat, steel-toed boots, safety glasses
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization/ Demobilization and Site Preparation	1A) See Mobilization/Demobilization and Site Preparation JHA	1A) See Mobilization/Demobilization and Site Preparation JHA
2. Communication	2A) Safety, crew unity	2A) Talk to each other. ▪ 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 wherabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone ▪ Review Emergency Evacuation Procedures (see below).
3. Walking and working in the field	3A) Falling down, twisted ankles and knees, poor footing	3A) Always watch your footing. ▪ Horseplay is strictly prohibited ▪ 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. ▪ Wear laced boots with a minimum 8" high upper and non-skid Vibram-type soles for ankle support and traction.
	3B) Falling objects	3B) Protect head agains falling objects. ▪ Wear your hardhat for protection from falling limbs and pinecones, and from tools and equipment carried by other crewmembers. ▪ Stay out of the woods during extremely high winds.
	3C) Chemical/Toxicological Hazards	3C) Chemical/Toxicological Hazards ▪ See HASP for appropriate level of PPE ▪ 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 labelled ▪ Decon thoroughly prior to consumption of food, beverage or tobacco.
	3D) Damage to eyes	3D) Protect eyes: ▪ Watch where you walk, ecpecially around trees and brush with limbs sticking out. ▪ Exercise caution when clearing limbs from tree trunks. Advise wearing eye protection. ▪ Ultraviolet light from the sun can be damaging to the eyes; look for sunglasses that specify significant protection from UV-A and UV-B radiation. If safety glasses require, use one's with tinted lenses
	3E) Bee and wasp stings	3E) See JHA for Insect Stings and Bites
	3F) Ticks and infected mosquitos	3F) See JHA for Insect Stings and Bites
	3G) Wild Animals	3G) Wild Animals ▪ Avoid phyisical contact with wild animals ▪ Do not threaten and/or conrner animals ▪ Make noise to get the animal to retreat. ▪ Stay in or return to vehicle/equipment if in danger

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Job Hazard Analysis – HASP Format

Job Title: Field Work - General **Date of Analysis:** 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3H) Contact with poisonous plants or the oil from those plants:	3H) 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. ▪ Do not allow plant to touch any part of your body/clothing. ▪ Wear PPE as described in the HASP and wear Tyveks, gloves and boot covers if contact with plant is likely ▪ 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.
		 POISON IVY (Rhus toxicondendron L.) POISON OAK (Rhus diversiloba) POISON SUMAC (Rhus toxicondendron vernix)
	3I) Back Injuries	3I) Back Injuries ▪ Site personnel will be instructed on proper lifting techniques. ▪ Mechanical devices should be used to reduce manual handling of materials. ▪ Split heavy loads in to smaller loads ▪ Team lifting should be utilized if mechanical devices are not available. ▪ Make sure that path is clear prior to lift.
	3J) Shoveling	3J) Shoveling ▪ Select the proper shovel for the task. A long handled, flat bladed shovel is recommend for loose material ▪ Inspect the handle for splinters and/or cracks ▪ Ensure that the blade is securely attached to the handle ▪ Never be more than 15 inches from the material you are shoveling ▪ Stand with your feet about hip width for balance and keep the shovel close to your body. ▪ Bend from the knees (not the back) and tighten your stomach muscles as you lift. ▪ Avoid twisting movements. If you need to move the snow to one side reposition your feet to face the direction the snow will be going. ▪ Avoid lifting large shoveling too much at once. When lifting heavy material, pick up less to reduce the weight lifted. ▪ Pace yourself to avoid getting out of breath and becoming fatigued too soon. ▪ Be alert for signs of stress such as pain, numbness, burning and tingling. Stop immediately if you feel any of these symptoms.
	3K) Slips/Trips/Falls	3K) Slips/Trips/Falls ▪ Maintain work areas safe and orderly; unloading areas should be on even terrain; mark or repair possible tripping hazards. ▪ Site SHSO inspect the entire work area to identify and mark hazards. ▪ Maintain three points of contact when climbing ladders or onto/off of equipment

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Job Hazard Analysis – HASP Format

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Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3L) Overhead Hazards	3L) Overhead Hazards ▪ Personnel will be required to wear hard hats that meet ANSI Standard Z89.1. ▪ All ground personnel will stay clear of suspended loads. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. ▪ All overhead hazards will be identified prior to commencing work operations.
	3M) Dropped Objects	3M) Dropped Objects ▪ Steel toe boots meeting ANSI Standard Z41 will be worn.
	3N) Noise	3N) Noise ▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs); all equipment will be equipped with manufacturer's required mufflers. Hearing protection shall be worn by all personnel working in or near heavy equipment.
	3O) Eye Injuries	3O) Eye Injuries ▪ Safety glasses meeting ANSI Standard Z87 will be worn.
	3P) Heavy Equipment (overhead hazards, spills, struck by or against)	3P) Heavy Equipment ▪ All operators will be trained and qualified to operate equipment ▪ Equipment will have seat belts. ▪ Operators will wear seat belts when operating equipment. ▪ Do not operate equipment on grades that exceed manufacturer's recommendations. ▪ Equipment will have guards, canopies or grills to protect from flying objects. ▪ Ground personnel will stay clear of all suspended loads. ▪ Personel 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 wear high visibility vests ▪ Spill and absorbent materials will be readily available. ▪ Drip pans, polyethylene sheeting or other means will be used for secondary containment. ▪ Ground personnel will stay out of the swing radius of excavators. ▪ Eye contact with operators will be made before approaching equipment. ▪ Operator will acknowledge eye contact by removing his hands from the controls. ▪ Equipment will not be approached on blind sides. ▪ All equipment will be equipped with backup alarms and use spotters when significant physical movement of equipment occurs on-site, (i.e., other than in place excavation or truck loading). ▪ Inspect rigging prior to each use.

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Job Hazard Analysis – HASP Format

Job Title: Field Work - General **Date of Analysis:** 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3Q) Struck by vehicle/equipment	3Q) Struck by vehicle/equipment ▪ Be aware of heavy equipment operations. ▪ Keep out of the swing radius of heavy 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 counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads.
	3R) Struck/cut by tools	3R) Struck/cut by 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 worksurface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools.
	3S) Caught in/on/between	3S) Caught in/on/between ▪ Workers will not position themselves between equipment and a stationary object. ▪ Workers will not wear long hair down (place in pony-tail and tuck into shirt) or jewelry if working with tools/machinery.
	3T) Contact with Electricity/Lightning	3T) Contact with Electricity/Lighting ▪ All electrical tools and equipment will be equipped with GFCI. ▪ Electrical extension cords will be of the “Hard” or “Extra Hard” service type. ▪ All extension cords shall have a three-blade grounding plug. ▪ Personnel shall not use extension cords with damaged outer covers, exposed inner wires, or splices. ▪ Electrical cords shall not be laid across roads where vehicular traffic may damage the cord without appropriate guarding. ▪ All electrical work will be conducted by a licensed electrician. ▪ All equipment will be locked out and tagged out and rendered in a zero energy state prior to commencing any operation that may exposed workers to electrical, mechanical, hydraulic, etc. hazards. ▪ All utilities will be marked prior to excavation activities. ▪ All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead powerlines known to be 50 kV or less and 35 feet from all others.) ▪ The SHSO shall halt outdoor site operations whenever lightning is visible, outdoor work will not resume until 30 minutes after the last sighting of lightning.
	3U) Equipment failure	3U) Equipment failure ▪ All equipment will be inspected before use. If any safety problems are noted, the equipment should be tagged and removed from service until repaired or replaced.

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Job Hazard Analysis – HASP Format

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Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3V) Hand & power tool usage.	3V) Hand & power tool usage ▪ Daily inspections will be performed. ▪ Ensure guards are in place and are in good condition. ▪ Remove broken or damaged tools from service. ▪ Use the tool for its intended purpose. ▪ Use in accordance with manufacturers instructions. ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ See JHA for Power Tool Use - Electrical and Power Tool Use - Gasoline
	3W) Fire Protection	3W) Fire Protection ▪ Ensure that adequate number and type of fire extinguishers are present at the site ▪ Inspect fire extinguishers on a monthly basis – document ▪ All employees who are expected to use fire exinguishers will have received training on an annual basis. ▪ Obey no-smoking policy ▪ Open fires are prohibited ▪ Maintain good housekeeping. Keep rubbish and combustibles to a minimum. ▪ Keep flammable liquids in small containers with lids closed or a safety can. ▪ When dispensing flammable liquids, do in well vented area and bond and ground containers.
	3X) Confined Space Entry	3X) Confined Space Entry ▪ See JHA for Confined Space Entry
4. Environmental health considerations	4A) Heat Stress	4A) Take precautions to prevent 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. NOTE: The severity of the effects of a given environmental heat stress is decreased by reducing the work load, increasing the frequency and/or duration of rest periods, and by introducing measures which will protect employees from hot environments. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Allow approximately 2 weeks with progressive degrees of heat exposure and physical exertion for substantial acclimatization. ▪ Acclimatization is necessary regardless of an employee's physical condition (the better one's physical condition, the quicker the acclimatization). Tailor the work schedule to fit the climate, the physical condition of employees, and mission requirements. ▪ A reduction of work load markedly decreases total heat stress. ▪ 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.

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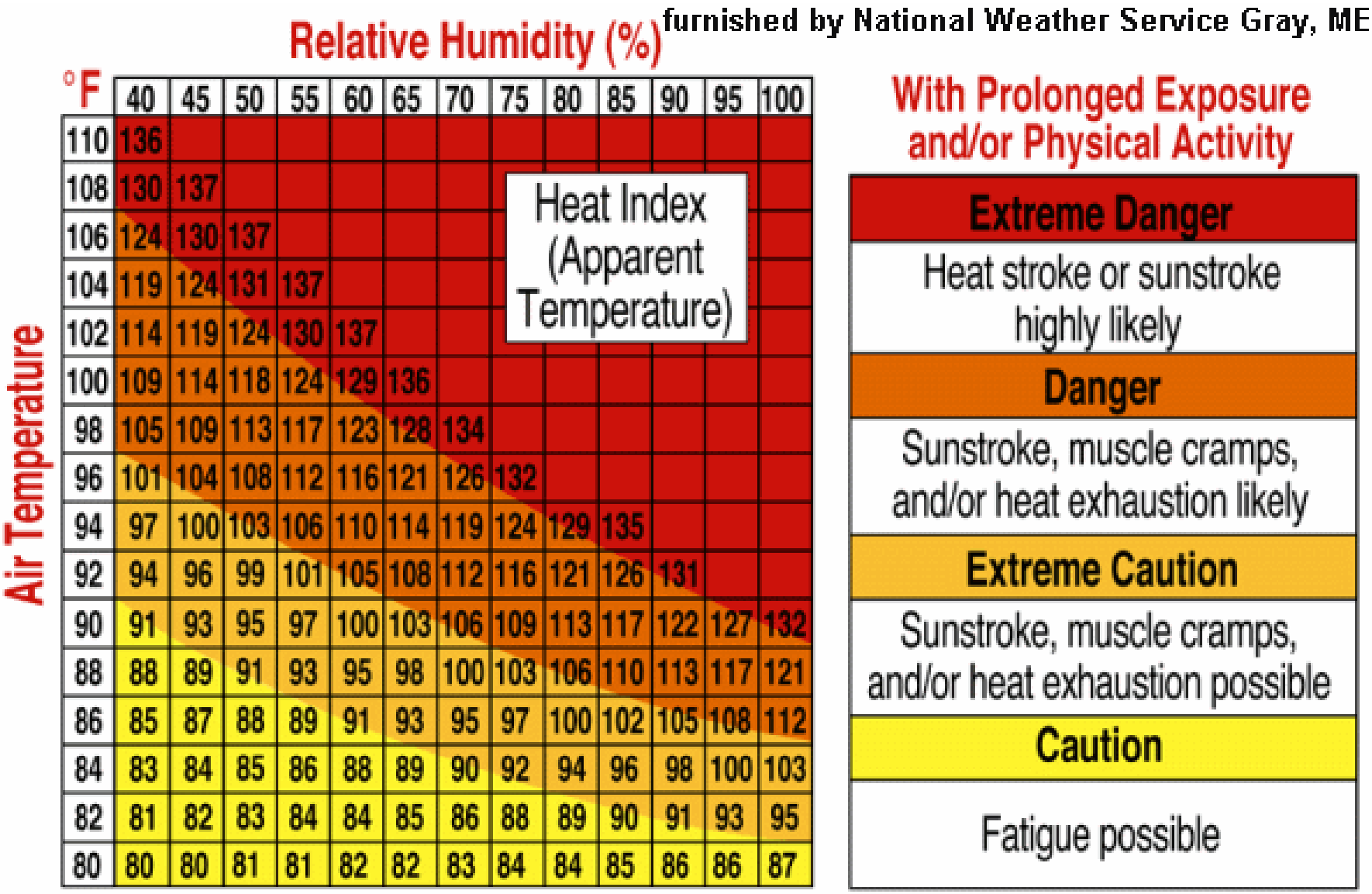
Job Hazard Analysis – HASP Format

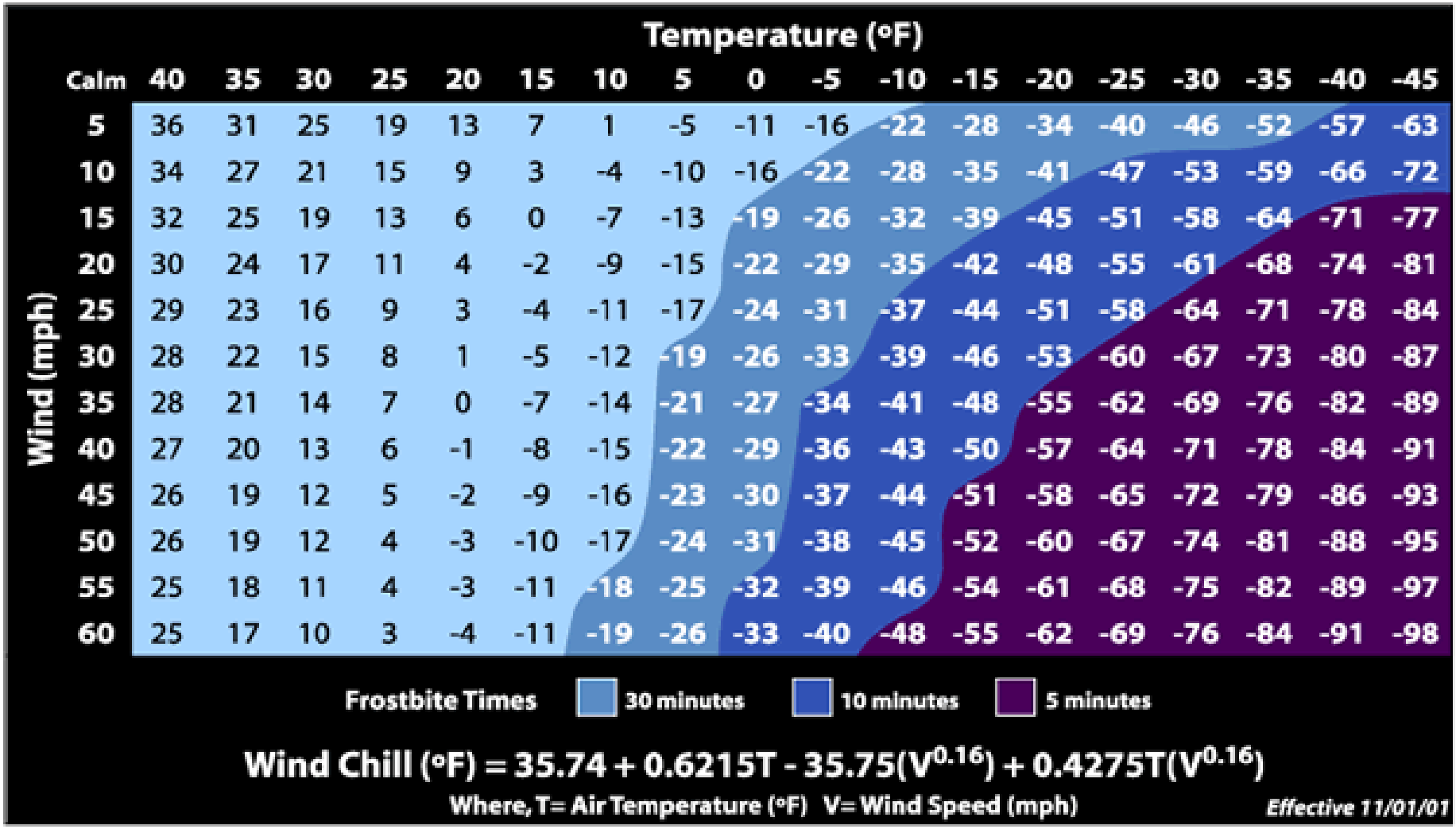
Job Title: Field Work - General **Date of Analysis:** 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4B) Wet Bulb Globe Temperature (WBGT) Index	4B) WBGT ▪ Curtail or suspend physical work when conditions are extremely severe (see attached Heat Stress Index). ▪ Compute a Wet Bulb Globe Temperature Index to determine the level of physical activity (take WBGT index measurements in a location that is similar or closely approximates the environment to which employees will be exposed). WBGT THRESHOLD VALUES FOR INSTITUTING PREVENTIVE MEASURES 80-90 degrees F — Fatigue possible with prolonged exposure and physical activity. 90-105 degrees F — Heat exhaustion and heat stroke possible with prolonged exposure and physical activity. 105-130 degrees F — Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.
	4C) Cold Extremes	4C) Take precautions to prevent cold stress injuries ▪ Cover all exposed skin and be aware of frostbite. While cold air will not freeze the tissues of the lungs, slow down and use a mask or scarf to minimize the effect of cold air on air passages. ▪ 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.
	4D) Wind	4D) Effects of the wind ▪ Wind chill greatly affects heat loss (see attached Wind Chill Index). ▪ Avoid marking in old, defective timber, especially hardwoods, during periods of high winds due to snag hazards.
	4E) Thunderstorms	4E) Thunderstorms ▪ Monitor weather channels to determine if electrical storms are forcased. ▪ 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 thurnder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds. ▪ Only return to work 30 minutes after the after the last strike or sound of thunder

furnished by National Weather Service Gray, ME



Wind Chill Chart



Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times — 30 minutes — 10 minutes — 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

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.

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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.

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Job Hazard Analysis - HASP Format

Job Title: Soil Sampling **Date of Analysis:** 4/25/06

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 sampling event	1A) Chemical exposure	1A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
2. Carrying equipment to site location	2A) Back or muscle strain	2A) Back or muscle strain ▪ Use proper lifting techniques when lifting pumps or generators ▪ Use mechanical aids if available ▪ Use 2 person lift for heavy items
3. Calibrate monitoring equipment	1A) Exposure to calibration gases	3A) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well ventilated area
4. Preparing sampling location	4A) Contact with poisonous plants or the oil from poisonous plants	4A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.
	4B) Contact with biting insects (i.e., spiders, bees, etc.)	4B) 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.
	4C) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated soil); flammable atmospheres.	4C) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin ▪ Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.
	4D) Back strain due to lifting or moving equipment to sampling locations	4D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques
	4E) Foot injuries from dropped equipment	4E) 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

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Job Hazard Analysis - HASP Format

Job Title: Soil Sampling **Date of Analysis:** 4/25/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
5. Collecting soil samples	5A) Working around drill rigs	5A) See JHA - Drilling
	5B) Encountering underground or overhead utilities	5B) Have all utilities located.
	5C) Fire/Explosion/Contamination hazard from refueling generators	5C) 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
	5D) Electrocution	5D) 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.
	5E) Exposure to contaminants	5E) 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
	5F) Exposure to preservatives	5F) Exposure to preservatives ▪ Work in a well ventilated area, upwind of samples ▪ Wear chemical resistant PPE as identified in HASP ▪ Review MSDSs
	5G) Slips/trips/falls	5G) Slips/trips/falls ▪ Ground can become wet/muddy ▪ Wear good slip resistant footwear
	5H) Lifting Injury	5H) Lifting injury ▪ Use proper lifting techniques when carrying quantities of samples ▪ Use proper ergonomics when hand digging for samples
	5I) Eye injury	5I) Eye Injury ▪ Wear eye protection when using picks or similar devices to loosen soil

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Job Hazard Analysis - HASP Format

Job Title: Soil Sampling **Date of Analysis:** 4/25/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5J) Fire	5J) Fire ▪ When using gas powered auger, maintain fire watch whenever fueling or otherwise handling gasoline ▪ See JHA - Gasoline
6. Soil sampling using floor corer	6A) Back injury	6A) Back Injury ▪ Use proper lifting techniques when moving floor corer and generator ▪ Use mechanincal aids if available ▪ Use two person lift for heavy items.
	6B) Electric Shock	6B) Electric Shock ▪ Use electric cords free from defects ▪ Keep cords out of water ▪ Ensure all electrical equipment is properly grounded ▪ Use GFCI
	6C) Hearing	6C) Hearing ▪ Wear hearing protection
	6D) Fire	6D) Fire ▪ When using generator, maintain fire watch whenever refueling or otherwise handling gasoline ▪ See JHA - Gasoline
	6E) Contamination	6E) Contamination ▪ Use appropriate PPE for the contaminants of concern (see HASP). ▪ Minimize sample contact ▪ Label sample in accordance with procedures ▪ Monitor breathing zone levels.

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Job Hazard Analysis - HASP Format

Job Title: Insect Stings and Bites **Date of Analysis:** 4/20/06

Minimum Recommended PPE*: Long sleeved shirt and pants, light colored clothing
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Traveling/working in areas with potential Tick Bites –Example outdoor wooded areas or fields.	1. Lyme Disease, Rocky Mountain Spotted Fever, etc.	▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Each outer garment should overlap the one above it. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails. ▪ Search the body on a regular basis, especially hair and clothing; ticks generally do not attach for the first couple of hours. ▪ If a tick becomes attached, pull it by grasping it as close as possible to the point of attachment and pull straight out with gentle pressure. Wash skin with soap and water then cleanse with rubbing alcohol. Place the tick in an empty container for later identification, if the victim should have a reaction. Record dates of exposure and removal. ▪ Do not try to remove the tick by burning with a match or covering it with chemical agents. ▪ If you can not remove the tick, or the head detaches, seek propmt medical help. ▪ Watch for warning signs of illness: a large red spot on the bite area; fever, chills, headache, joint and muscle ache, significant fatigue, and facial paralysis are reactions that may appear within two weeks of the attack. Symptoms specific to Lyme disease include: confusion, short-term memory loss, and disorientation.
2. Working/traveling in areas with potential bee and wasp stings-Example wooded areas and fields	2. Allergic reactions, painful stings	▪ Be alert to hives in brush or in hollow logs. Watch for insects travelling in and out of one location. ▪ If you or anyone you are working with is known to have allergic reactions to bee stings, tell the rest of the crew and your supervisor. Make sure you carry emergency medication with you at all times. ▪ Wear long sleeve shirts and trousers; tuck in shirt.. Bright colors and metal objects may attract bees. ▪ If you are stung, cold compresses may bring relief. ▪ If a stinger is left behind, scrape it off the skin. Do not use a tweezers as this squeezes the venom sack, worsening the injury. ▪ If the victim develops hives, asthmatic breathing, tissue swelling, or a drop in blood pressure, seek medical help immediately. Give victim antihistime, (Benadryl, chlo-amine tabs).
3. Traveling/working in areas of potential Mosquito Bites-Example- Woods, fields, near bodies of water and etc.	3. Skin irritation, encephalitis	▪ Wear long sleeves and trousers. ▪ Avoid heavy scents. ▪ Use insect repellants. If using DEET, do not apply directly to skin, apply to clothing only. ▪ Carry after-bite medication to reduce skin irritation.

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Job Hazard Analysis - HASP Format

Job Title: Working with Preservatives (Acids) **Date of Analysis:** 5/30/06

Minimum Recommended PPE*: Safety glasses/goggles, nitrile gloves,
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Opening the box of ampoules	1A) Cuts or punctures with a knife	1A) Cuts or punctures with a knife ▪ Use appropriate techniques when handling a knife. Always cut away from you.
	1B) Broken ampoules in the box. Cuts from the broken glass.	1B) Broken ampoules in the box. Cuts from the broken glass. ▪ Wear safety goggles and protective gloves. ▪ Dispose of the preservative and broken glass by approved methods.
	1C) Broken ampoules in the box. Breathing fumes.	1C) Broken ampoules in the box. Breathing fumes. ▪ Wear safety goggles and protective gloves. ▪ Always work in a well-ventilated area.
2. Breaking top of glass ampoule	2A) Cuts from the broken glass.	2A) Cuts from the broken glass ▪ Wear safety goggles and protective gloves. ▪ Use a paper towel to wrap ampoule in to snap the top or use an ampoule breaker. ▪ Always point the ampoule away from you when you snap off the top.
	2B) Skin contact chemical burns.	2B) Skin contact chemical burns. ▪ Wear safety goggles and protective gloves. ▪ Fumes may come into contact with the perspiration on your skin and rehydrate to form an acid. ▪ If your skin itches, flush affected area for 15 minutes with water.
	2C) Eye contact	2C) Eye contact ▪ Wear safety goggles. ▪ If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.
	2D) Breathing fumes	2D) Breathing fumes ▪ HNO_3 and HCL have high vapor pressure. Always work in a well-ventilated area.
3. Adding acid to sample	3A) Chemical reaction	3A) Chemical reaction ▪ Wear safety goggles and protective gloves. Acid may react with high alkaline sample and fizz (releases CO_2).
	3B) Eye contact	3B) Eye contact ▪ Wear safety goggles. ▪ If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.
	3C) Skin contact chemical burns.	3C) Skin contact chemical burns. ▪ Wear safety goggles and protective gloves.
4. Ampoule disposal	4A) Cuts from the broken glass.	4A) Cuts from the broken glass. ▪ Wear safety goggles and protective gloves. ▪ Place used ampoules in an empty, non-reactive container in the field and bring it back to the office. Dispose of the preservative and broken glass by approved methods.

Material Safety Data Sheet
Hydrochloric Acid, Reagent ACS

ACC# 95547

Section 1 - Chemical Product and Company Identification

MSDS Name: Hydrochloric Acid, Reagent ACS
Catalog Numbers: AC423790025, AC423790250, AC423795000, NC9619320
Synonyms: Muriatic acid; Chlorohydric acid; Hydrogen chloride; Spirits of salt
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7647-01-0	Hydrochloric acid	36.5	231-595-7
7732-18-5	Water	Balance	231-791-2

Hazard Symbols: C
Risk Phrases: 34 37

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless to slight yellow clear liquid. **Danger!** Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May be harmful if swallowed.
Target Organs: Respiratory system, teeth, eyes, skin, circulatory system.

Potential Health Effects

Eye: May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitization to light.
Skin: May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Contact with liquid is corrosive and causes severe burns and ulceration.
Ingestion: May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May be harmful if swallowed.
Inhalation: May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. Exposure to the mist and vapor may erode exposed teeth. Causes corrosive action on the mucous membranes.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause fetal effects. Laboratory experiments have resulted in mutagenic effects. Prolonged exposure may cause conjunctivitis, photosensitization, and possible blindness.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes). SPEEDY ACTION IS CRITICAL!
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Give milk of magnesia.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Do NOT use sodium bicarbonate in an attempt to neutralize the acid.
Antidote: Do NOT use oils or ointments in eye.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Reaction with water may generate much heat which will increase the concentration of fumes in the air. Containers may explode when heated.
Extinguishing Media: For large fires, use water spray, fog, or alcohol-resistant foam. Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Do NOT get water inside containers. Do NOT use straight streams of water. Most foams will react with the material and release corrosive/toxic gases. Cool containers with flooding quantities of water until well after fire is out. For small fires, use carbon dioxide (except for cyanides), dry chemical, dry sand, and alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Large spills may be neutralized with dilute alkaline solutions of soda ash (sodium carbonate, Na2CO3), or lime (calcium oxide, CaO). Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Contents may develop pressure upon prolonged storage. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes. Use caution when opening. Keep from contact with moist air and steam.

Storage: Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers. Store protected from moisture. Do not store near flammable or oxidizing substances (especially nitric acid or chlorates).

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hydrochloric acid	2 ppm Ceiling	50 ppm IDLH	5 ppm Ceiling; 7 mg/m3 Ceiling
Water	none listed	none listed	none listed

OSHA Vacated PELs: Hydrochloric acid: No OSHA Vacated PELs are listed for this chemical. Water: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear neoprene or polyvinyl chloride gloves to prevent exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Appearance: colorless to slight yellow
Odor: strong, pungent
pH: 0.01
Vapor Pressure: 5.7 mm Hg @ 0 deg C
Vapor Density: 1.26
Evaporation Rate:> 1.00 (N-butyl acetate)
Viscosity: Not available.
Boiling Point: 81.5-110 deg C @ 760 mmHg
Freezing/Melting Point:-74 deg C
Decomposition Temperature: Not available.
Solubility: Miscible.
Specific Gravity/Density:1.0-1.2
Molecular Formula:HCl.H2O
Molecular Weight:36.46

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Mechanical shock, incompatible materials, metals, excess heat, exposure to moist air or water, bases.
Incompatibilities with Other Materials: Acetates, acetic anhydride, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, calcium phosphide, cesium acetylene carbide, cesium

carbide, chlorosulfonic acid, 1,1-difluoroethylene, ethylene diamine, ethyleneimine, fluorine, lithium silicides, magnesium boride, mercuric sulfate, oleum, perchloric acid, potassium permanganate, beta-propiolactone, propylene oxide, rubidium acetylene carbide, rubidium carbide, silver perchlorate + carbon tetrachloride, sodium, sodium hydroxide, sulfuric acid, uranium phosphide, vinyl acetate, zinc, metal oxides, aluminum, amines, carbonates, iron, steel, copper alloys, copper, alkali metals, bases, moisture.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, carbon monoxide, carbon dioxide, hydrogen gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7647-01-0: MW4025000; MW4031000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 7647-01-0:
Inhalation, mouse: LC50 = 1108 ppm/1H;
Inhalation, mouse: LC50 = 8300 mg/m3/30M;
Inhalation, rat: LC50 = 3124 ppm/1H;
Inhalation, rat: LC50 = 45000 mg/m3/5M;
Inhalation, rat: LC50 = 8300 mg/m3/30M;
Oral, rabbit: LD50 = 900 mg/kg;
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
Carcinogenicity:
CAS# 7647-01-0:
ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: IARC Group 3 - not classifiable CAS# 7732-18-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Experimental reproductive effects have been reported.
Teratogenicity: Embryo or Fetus: Stunted fetus, Inhalation, rat TCL0=450 mg/m3/1H Specific Developmental Abnormalities: homeostatis, Inhalation, rat TCL0=450 mg/m3/1H (female 1 days pre-mating).

Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: Cytogenetic analysis: Hamster, lung = 30 mmol/L.; Cytogenetic analysis: Hamster, ovary = 8 mmol/L.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 3.6 mg/L; 48Hr; Lethal (unspecified) Bluegill/Sunfish: LC50; 96 Hr; pH 3.0-3.5 No data available.
Environmental: Rapidly hydrolyzes when exposed to water. Will exhibit extensive evaporation from soil surfaces. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	HYDROCHLORIC ACID				No information available.
Hazard Class:	8				
UN Number:	UN1789				
Packing Group:	II				

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7647-01-0 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 7647-01-0: 5000 lb final RQ; 2270 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 7647-01-0: 500 lb TPQ
SARA Codes
CAS # 7647-01-0: acute.
Section 313
This material contains Hydrochloric acid (CAS# 7647-01-0, 36 5%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7647-01-0 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7647-01-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
California No Significant Risk Level: None of the chemicals in this product are listed.

European / International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
C
Risk Phrases:
R 34 Causes burns.
R 37 Irritating to respiratory system.

Safety Phrases:
S 1/2 Keep locked up and out of reach of children.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 9 Keep container in a well-ventilated place.

WGK (Water Danger/Protection)
CAS# 7647-01-0: 1
CAS# 7732-18-5: No information available.
Canada - DSL/NDSL
CAS# 7647-01-0 is listed on Canada's DSL List.
CAS# 7732-18-5 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D1A, E.
Canadian Ingredient Disclosure List
CAS# 7647-01-0 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 7647-01-0: OEL-AUSTRALIA:TWA 5 ppm (7 mg/m3) OEL-AUSTRIA:TWA 5 ppm (7 mg/m3) OEL-BELGIUM:STEL 5 ppm (7.7 mg/m3) OEL-DENMARK:STEL 5 ppm (7 mg/m3) OEL-FINLAND:STEL 5 ppm (7 mg/m3);Skin OEL-FRANCE:STEL 5 ppm (7.5 mg/m3) OEL-GERMANY:TWA 5 ppm (7 mg/m3) OEL-HUNGARY:STEL 5 mg/m3 OEL-JAPAN:STEL 5 ppm (7.5 mg/m3) OEL-THE NETHERLANDS:TWA 5 p pm (7 mg/m3) OEL-THE PHILIPPINES:TWA 5 ppm (7 mg/m3) OEL-POLAND:TWA 5 mg/m3 OEL-RUSSIA:STEL 5 ppm (5 mg/m3) OEL-SWEDEN:STEL 5 ppm (8 mg/ m3) OEL-SWITZERLAND:TWA 5 ppm (7.5 mg/m3);STEL 10 ppm (15 mg/m3) OEL -THAILAND:TWA 5 ppm (7 mg/m3) OEL-TURKEY:TWA 5 ppm (7 mg/m3) OEL-UNI TED KINGDOM:TWA 5 ppm (7 mg/m3);STEL 5 ppm (7 mg/m3) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPOR E, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 7/06/1999
Revision #4 Date: 8/14/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet
Methanol

ACC# 14280

Section 1 - Chemical Product and Company Identification

MSDS Name: Methanol
Catalog Numbers: AC167830000, AC167830025, AC167835000, AC176840000, AC176840010, AC176840025, AC176840250, AC176845000, AC177150000, AC177150010, AC177150025, AC177150050, AC177150051, AC177150250, AC177150251, AC268280000, AC268280010, AC268280025, AC325740000, AC325740010, AC325740025, AC326630000, AC326630010, AC326630025, AC326950000, AC326950010, AC326951000, AC326952500, AC327900000, AC327900010, AC364390000, AC364390010, AC364391000, AC413770000, AC413770040, AC413775000, AC423950000, AC423950010, AC423950040, AC423950200, AC423955000, AC610090040, AC610200040, AC610400010, AC61040019, AC61040019, AC61040050, AC61040050, AC610401000, AC61040115, AC61040115, AC61040200, AC610981000, AC611070040, AC615130025, S75162, S75163, S75959, S75965, S75965A, S75965HPLC, S93301, S93301A, S93302, S93302A, 19123467, A408-1, A408-4, A408-4LC, A408SK-4, A411-20, A411-4, A412-1, A412-20, A412-200, A412-200LC, A412-4, A412-4LC, A412-500, A412200001, A412CU-1300, A412FB-200, A412FB115, A412FB19, A412FB50, A412J500, A412P-4, A412P-4LC, A412POP19, A412POPB-200, A412RB-200, A412RB-50, A412RB115, A412RS-200, A412RS115, A412RS19, A412RS28, A412RS50, A412SK-4, A412SS-115, A412SS-200, A412SS-50, A413-20, A413-200, A413-4, A413-500, A433F-1GAL, A433P-1GAL, A433P-4, A433P1GAL, A433S-20, A433S-200, A433S-4, A434-20, A450-4, A452-1, A452-212, A452-4, A452-4LC, A452J1, A452N1-19, A452N2-19, A452POP-200, A452POP50, A452RS-115, A452RS-19, A452RS-200, A452RS-28, A452RS-50, A452SK-1, A452SK-4, A452SS-115, A452SS-19, A452SS-200, A452SS-28, A452SS-50, A453-1, A453-1LC, A453-4, A453-500, A453J1, A454-1, A454-4, A454-4LC, A454J1, A454RS-115, A454RS-200, A454RS-28, A454SS-19, A454SS-200, A454SS-28, A454SS-50, A455-1, A455RS19, A456-1, A456-4, A457-4, A4574LC, A935-4, A935RB-200, A935RB200, A947-4, A947-4LC, A947POP-200, A947POP200, A947RS-115, A947RS-200, A947RS-28, A947SS-115, A947SS-200, A947SS-28, A947SS-50, BP1105-1, BP1105-4, BP1105SS19, BP1105SS28, BP2618100, HC400 1GAL, NC9105104, NC9134255, NC9173853, NC9283877, NC9360649, NC9386568, NC9419923, NC9433033, NC9433739, NC9541632, NC9942270, NC9964975, SC95-1, SW2-1, TIA947-4, TIA947P-200, TIA947P-200L
Synonyms: Carbinol; Methyl alcohol; Methyl hydroxide; Monohydroxymethane; Wood alcohol; Wood naptha; Wood spirits; Columbian spirits; Methanol.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-56-1	Methanol	> 99	200-659-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: APHA: 10 max clear liquid. Flash Point: 12 deg C.
Danger! Poison! May be fatal or cause blindness if swallowed. Vapor harmful. **Flammable liquid and vapor.** Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. May cause central nervous system depression. Cannot be made non-poisonous.
Target Organs: Eyes, nervous system, optic nerve.

Potential Health Effects

Eye: May cause painful sensitization to light. Methanol is a mild to moderate eye irritant. Inhalation, ingestion or skin absorption of methanol can cause significant disturbances in vision, including blindness.
Skin: Causes moderate skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. Methanol can be absorbed through the skin, producing systemic effects that include visual disturbances.
Ingestion: May be fatal or cause blindness if swallowed. Aspiration hazard. Cannot be made non-poisonous. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause cardiopulmonary system effects.
Inhalation: Methanol is toxic and can very readily form extremely high vapor concentrations at room temperature. Inhalation is the most common route of occupational exposure. At first, methanol causes CNS depression with nausea, headache, vomiting, dizziness and incoordination. A time period with no obvious symptoms follows (typically 8-24 hrs). This latent period is followed by metabolic acidosis and severe visual effects which may include reduced reactivity and/or increased sensitivity to light, blurred, doubl and/or snowy vision, and blindness. Depending on the severity of exposure and the promptness of treatment, survivors may recover completely or may have permanent blindness, vision disturbances and/or nervous system effects.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may cause effects similar to those of acute exposure. Methanol is only very slowly eliminated from the body. Because of this slow elimination, methanol should be regarded as a cumulative poison. Though a single exposure may cause no effect, daily exposures may result in the accumulation of a harmful amount. Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did not produce significant maternal toxicity.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Effects may be delayed.
Antidote: Ethanol may inhibit methanol metabolism.

Section 5 - Fire Fighting Measures

General Information: Ethanol may inhibit methanol metabolism. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than

water and a fire may be spread by the use of water. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water.
Flash Point: 12 deg C (53.60 deg F)
Autoignition Temperature: 455 deg C (851.00 deg F)
Explosion Limits, Lower:6.0 vol %
Upper: 31.00 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid use in confined spaces.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methanol	200 ppm TWA; 250 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	200 ppm TWA; 260 mg/m3 TWA 6000 ppm IDLH	200 ppm TWA; 260 mg/m3 TWA

OSHA Vacated PELs: Methanol: 200 ppm TWA; 260 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Appearance: clear, colorless - APHA: 10 max
Odor: alcohol-like - weak odor
pH: Not available.
Vapor Pressure: 128 mm Hg @ 20 deg C
Vapor Density: 1.11 (Air=1)
Evaporation Rate:5.2 (Ether=1)
Viscosity: 0.55 cP 20 deg C
Boiling Point: 64.7 deg C @ 760 mmHg
Freezing/Melting Point:-98 deg C
Decomposition Temperature: Not available.
Solubility: miscible
Specific Gravity/Density:.7910 g/cm3 @ 20°C
Molecular Formula:CH4O
Molecular Weight:32.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, ignition sources, confined spaces.
Incompatibilities with Other Materials: Oxidizing agents, reducing agents, acids, alkali metals, potassium, sodium, metals as powders (e.g. hafnium, raney nickel), acid anhydrides, acid chlorides, powdered aluminum, powdered magnesium.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, formaldehyde.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 67-56-1: PC1400000
LD50/LC50:
CAS# 67-56-1:
Draize test, rabbit, eye: 40 mg Moderate;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, rabbit: LC50 = 81000 mg/m3/14H;
Inhalation, rat: LC50 = 64000 ppm/4H;
Oral, mouse: LD50 = 7300 mg/kg;
Oral, rabbit: LD50 = 14200 mg/kg;
Oral, rat: LD50 = 5600 mg/kg;
Skin, rabbit: LD50 = 15800 mg/kg;
.
Human LDLo Oral: 143 mg/kg; Human LDLo Oral: 428 mg/kg; Human TCLo Inhalation; 300 ppm caused visual field changes & headache; Monkey LDLo Skin: 393 mg/kg. Methanol is significantly less toxic to

most experimental animals than humans, because most animal species metabolize methanol differently. Non-primate species do not ordinarily show symptoms of metabolic acidosis or the visual effects which have been observed in primates and humans.
Carcinogenicity:
CAS# 67-56-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: There is no human information available. Methanol is considered to be a potential developmental hazard based on animal data. In animal experiments, methanol has caused fetotoxic or teratogenic effects without maternal toxicity.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: ACGIH cites neuropathy, vision and CNS under TLV basis.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: 29.4 g/L; 96 Hr; LC50 (unspecified)Fish: Goldfish: 250 ppm; 11 Hr; resulted in deathFish: Rainbow trout: 8000 mg/L; 48 Hr; LC50 (unspecified)Fish: Rainbow trout: LC50 = 13-68 mg/L; 96 Hr.; 12 degrees CFish: Fathead Minnow: LC50 = 29400 mg/L; 96 Hr.; 25 degrees C, pH 7.63Fish: Rainbow trout: LC50 = 8000 mg/L; 48 Hr.; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 51,000-320,000 mg/L; 30 minutes; Microtox test No data available.
Environmental: Dangerous to aquatic life in high concentrations. Aquatic toxicity rating: TLm 96>1000 ppm. May be dangerous if it enters water intakes. Methyl alcohol is expected to biodegrade in soil and water very rapidly. This product will show high soil mobility and will be degraded from the ambient atmosphere by the reaction with photochemically produced hyroxyl radicals with an estimated half-life of 17.8 days. Bioconcentration factor for fish (golden ide) < 10. Based on a log Kow of -0.77, the BCF value for methanol can be estimated to be 0.2.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 67-56-1: waste number U154 (Ignitable waste).

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	METHANOL	METHANOL
Hazard Class:	3	3
UN Number:	UN1230	UN1230
Packing Group:	II	II
Additional Info:		FLASHPOINT 11 C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 67-56-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 67-56-1: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 67-56-1: immediate, fire.

Section 313

This material contains Methanol (CAS# 67-56-1, > 99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 67-56-1 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 67-56-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T F

Risk Phrases:

R 11 Highly flammable.
R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
R 39/23/24/25 Toxic : danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 36/37 Wear suitable protective clothing and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

WGK (Water Danger/Protection)

CAS# 67-56-1: 1

Canada - DSL/NDSL

CAS# 67-56-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 67-56-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/21/1999
Revision #14 Date: 9/05/2006

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

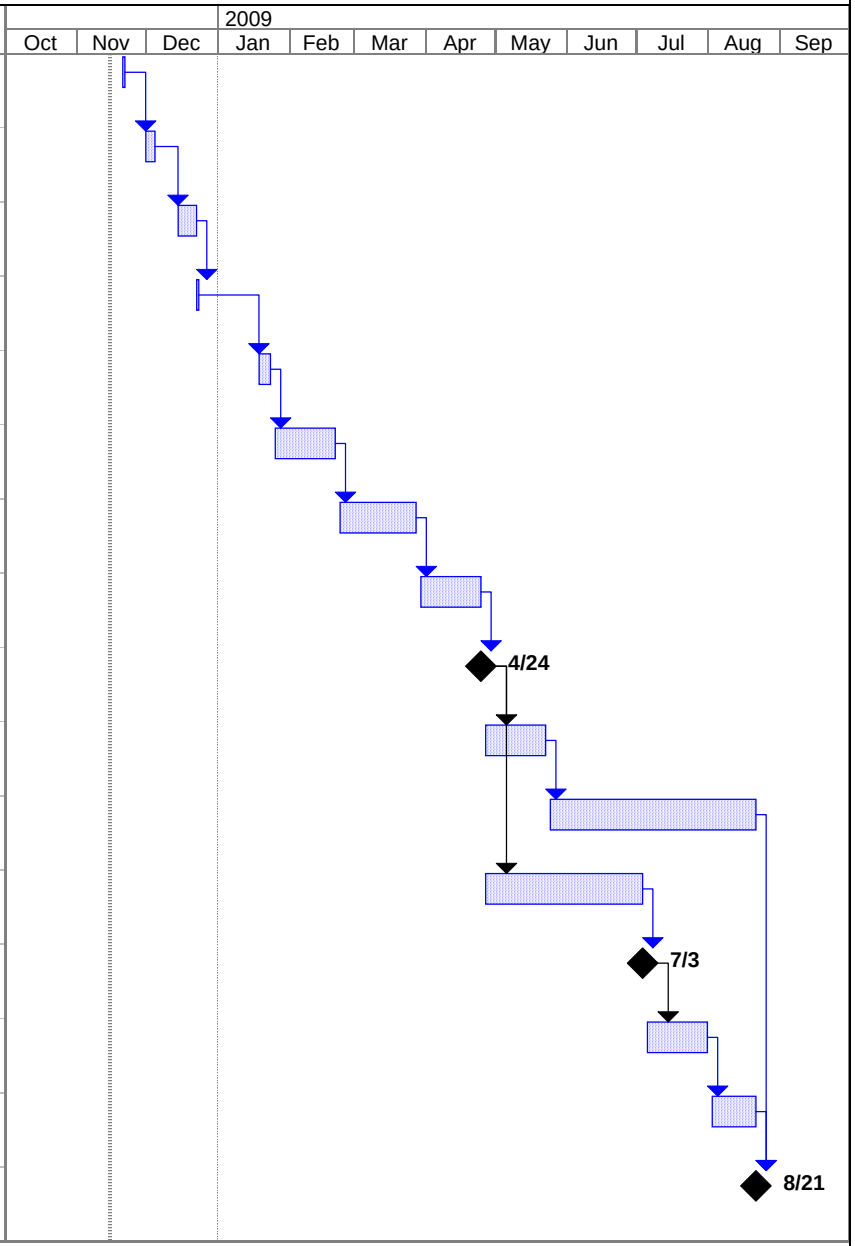
P:\Bureau\Common\CommunityAirMonitoringPlan (CAMP)\GCAMPR1.DOC

APPENDIX D

PROJECT SCHEDULE

Former Speedy's Cleaners
Project Schedule

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	1 day	Fri 11/21/08	Fri 11/21/08
2	Geoprobe Investigation	4 days	Mon 12/1/08	Thu 12/4/08
3	Well Installation	6 days	Mon 12/15/08	Mon 12/22/08
4	Site Survey	1 day	Tue 12/23/08	Tue 12/23/08
5	GW Sampling	5 days	Mon 1/19/09	Fri 1/23/09
6	GW Analytical	20 days	Mon 1/26/09	Fri 2/20/09
7	Data Validation	25 days	Mon 2/23/09	Fri 3/27/09
8	Prepare Draft RI Report	20 days	Mon 3/30/09	Fri 4/24/09
9	Submit Draft RI Report	0 days	Fri 4/24/09	Fri 4/24/09
10	NYSDEC Review Draft RI Report	20 days	Mon 4/27/09	Fri 5/22/09
11	Prepare RI Report	65 days	Mon 5/25/09	Fri 8/21/09
12	Prepare Draft FS	50 days	Mon 4/27/09	Fri 7/3/09
13	Submit Draft FS	0 days	Fri 7/3/09	Fri 7/3/09
14	NYSDEC Review Draft FS	20 days	Mon 7/6/09	Fri 7/31/09
15	Finalize FS	15 days	Mon 8/3/09	Fri 8/21/09
16	Submit Final RI/FS	0 days	Fri 8/21/09	Fri 8/21/09



Project: Former Speedys Schedule
Date: Sat 11/15/08

Task Milestone Summary

APPENDIX E

COST TABLES (UNDER SEPARATE COVER)

APPENDIX F

M/WBE AND EEO UTILIZATION PLAN (UNDER SEPARATE COVER)