Corrective Action Plan

Former Brainerd Manufacturing Facility

NYSDEC Site #V00519-8
East Rochester, New York

January 2017
Revised April 2017

0040-002-400

Prepared For:

DESPATCH INDUSTRIES, INC.
East Rochester, New York

Prepared By:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
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CORRECTIVE ACTION PLAN

FORMER BRAINERD MANUFACTURING FACILITY
NYSDEC SITE #V00519-8

EAST ROCHESTER, NY

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CERTIFICATION:

License No.: 070950-1 **Date:** 4-26-17

Registration State: New York **SEAL:**

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1.0 INTRODUCTION

Benchmark Environmental Engineering and Science, PLLC (Benchmark) has prepared this Corrective Action Plan, on behalf of Despatch Industries, Inc. (Despatch), to present a corrective action plan to the New York State Department of Environmental Conservation (NYSDEC) for Voluntary Cleanup Program (VCP) Site No. V00519-8, commonly referred to as the Former Brainerd Manufacturing Facility site ("Site"). The former Brainerd Manufacturing Facility is situated at the intersection of North Washington and Monroe Streets in the City of East Rochester, Monroe County, New York (see Figure 1).

1.1 Site Background

Despatch Industries, Inc. entered into Voluntary Cleanup Agreement (VCA) Site #V00519-8 with the New York State Department of Environmental Conservation (NYSDEC) in February 2002, to investigate and remediate a 3.3-acre property consisting of two parcels located in East Rochester, Monroe County, New York. The property was remediated to restricted commercial use and is presently used by DeskSet Ltd., an office furniture reconditioning sales company.

The Site is located in the County of Monroe, New York and is comprised of two parcels: an approximate 3.0-acre parcel identified as 115 North Washington Street on the East Rochester Tax Map #139.69-1-17 improved with a 73,400 square foot industrial/ manufacturing building and offices; and an approximately 0.3-acre parcel, comprised of an asphalt parking lot (Tax Map#139.69-1-19). The Site is bounded by residential properties, a Rochester Gas and Electric (RG&E) substation and a pre-cast concrete product manufacturing building owned by E.J. Delmonte to the north, Monroe Street, Rochester Lumber Company and A.J. Interiors to the south, North Washington Street to the east, and light industrial properties, railway and green space to the west (see Figure 2).

The Site was operated as an industrial facility for nearly 100 years prior to relocation of Brainerd's operations in 1998. Historic uses of the Site included the manufacture of hardware and decorative metal products using various metal finishing processes. The property has been operated under lease since January 2004 by an office furniture reconditioning and sales company.

In May 2002, Despatch Industries, Inc. signed a voluntary agreement with the NYSDEC to investigate and cleanup the Site. Environmental site investigations conducted by Benchmark (Ref. 1) identified the following:

- The uppermost-water bearing zone consists of a poorly graded sand, and is contaminated with chlorinated volatile organic compounds (cVOCs) suspected to originate from former plating operations and released via a sump interior to the Site building (the sump has been sealed). The primary cVOCs are perchloroethylene (PCE), trichloroethene (TCE), and to a lesser degree 1,1,1-trichloroethane. A narrow groundwater plume developed from the area of the source and traveled to the northwest.
- A localized area (approximately 20 feet by 25 feet) of the surficial soils along the western portion of the Site were contaminated with metals (i.e., lead, barium).

1.2 Remedial History

After acceptance into the VCP in May 2002, there were two interim remedial measures (IRMs) undertaken for this project: 1) groundwater pumping, pretreatment, and conveyance to the Monroe County Sewer System; and 2) installation of an on-site subslab depressurization system. A more detailed discussion of these IRMs is provided below.

1.2.1 Groundwater Pumping and Pretreatment

Site investigation data supported the need for an IRM to address groundwater impacts at the Site and to cut-off contaminated groundwater from further impacts off-site. The IRM was constructed during the period of June through August 2004 (Ref. 2). The IRM groundwater collection and pretreatment system involves recovery of contaminated groundwater from a pumping well with concurrent on-site batch treatment of the recovered groundwater via a low-profile air stripper with discharge of the pretreated water to the Monroe County Department of Environmental Services. Since August 2004, cVOC-impacted groundwater has been collected by pumping well PW-1 (PW-1R replaced PW-1 in this capacity in November 2011[1]) on a nearly continuous basis except for maintenance shutdowns and the issue with the pumping well PW-1. Since pumping began in August 2004, approximately 24,786,865 gallons of groundwater have been collected, pre-treated, and discharged to the Monroe County Sewer System under Sewer Use Permit 883 through July 25, 2016. Treated groundwater (effluent) from the air stripper has been tested monthly for PCE, toluene, and TCE and compared to the permitted discharge limit (PDL) of <2.13 mg/L. All effluent samples have been below the PDL. A comparison of influent to effluent concentrations

[1] The PW-1 pump became lodged in the well during routine pump maintenance. Several attempts were made to recover the pump and repair the well. However, it became apparent that sand had intruded the well likely through the well screen suggesting that the well could not be repaired effectively.

indicates 90 to greater than 99% removal of VOCs. Monroe County routinely collects a split sample for verification of permit compliance. The data indicate that the capture zone of the pump-and-treat system is effectively drawing groundwater into the system. Figure 3 is the groundwater isopotential map for the water level measurements from June 2016.

1.2.2 Sub-Slab Depressurization

The second IRM involved installation of a sub-slab depressurization (SSD) system on a design-build basis with post-installation performance testing to confirm adequate system performance (Ref. 3). Initial communication testing of the sub-slab was performed by Benchmark personnel to evaluate the number of extraction points and type of exhaust fans required to optimize the systems performance under the specific Site conditions. The SSD system was installed by Mitigation Tech, a Rochester, New York based vapor control (and radon) experienced contractor. The system consists of 28 extraction points (EP-1 through EP-28) and six RadonAway GP Series 501 fans distributed strategically throughout the building under the agreed design criteria established with the NYSDEC and NYSDOH. Six interior fans outfitted with manometers are visually inspected on a monthly basis. The system began operation in November 2010 and has operated continuously since that time.

1.2.3 Final Remedial Measure

The Site was remediated in accordance with the preferred remedy and as approved by the NYSDEC in the December 2011 RAWP (Ref. 4). The following are the components of the selected remedy:

1. Construction and maintenance of a soil cover system consisting of a demarcation layer followed by a minimum of 12 inches of NYSDOT-approved type 2 backfill material to prevent human exposure to contaminated soil/fill remaining at the site;
2. Continued operation of a previously constructed IRM groundwater pump and treat system in which groundwater is transferred from a pumping well (PW-1R) to an influent storage tank. The untreated groundwater is then pumped into a low profile air stripper for treatment and subsequent discharge to the sanitary sewer.
3. Continued operation of a previously constructed IRM sub-slab depressurization system comprised of a series of fans mounted to sub-slab piping to prevent migration of VOC-impacted vapors into the building.
4. Enhancement of the IRM groundwater pump and treat system with a second pumping well (PW-2) and subsequent addition of sodium bisulfite (SBS) after air stripping to reduce the dissolved oxygen concentration. [Note: SBS addition is only required for the water to be recharged to the groundwater in order to promote the

anaerobic degradation of the chlorinated VOCs.] Pretreated groundwater is then either discharged to the Monroe County sewer system or further treated by the addition of hydrogen gas via the groundwater Pressurized Remediation Optimizer Low Pressure system (gPRO® LP system) for reinjection upgradient of the source area. The system is operated on a continuous basis and delivers a pre-set flow rate of hydrogen gas. The hydrogenated water flows under gravity to the three upgradient reinjection wells (RW-1, RW-2, and RW-3) located along Monroe Street (see Figure 3).

5. Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the site.
6. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) institutional and engineering controls, (2) monitoring, (3) operation and maintenance and (4) reporting.
7. Periodic certification of the institutional and engineering controls listed above.

The September 2016 Periodic Review Report (PRR) (Ref. 5) indicated that, at the time of the Site inspection in August 2016, the Site was compliant with the NYSDEC-approved SMP; however, the gPRO® system requires continual maintenance to relieve clogging of injection wells and alternative in-situ measures are required to promote continued source area remediation.

1.3 Purpose and Scope

As outlined in the December 2013 Site Management Plan (SMP) (Ref. 6), if any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Plan will be submitted to the NYSDEC for approval. The Corrective Measures Plan is to explain the failure and provide details and a schedule for performing work necessary to correct the failure.

This Corrective Action Plan identifies the scope of planned corrective action and the method and means by which it will be completed. As required by the SMP, no work will be performed pursuant to this Corrective Action Plan until it is approved by the NYSDEC.

1.4 Project Organization and Responsibilities

The remedial activities will be completed by Benchmark under a design-build agreement with Despatch Industries, Inc. The NYSDEC Division of Environmental Remediation will monitor the remedial activities to verify that the work is performed in

accordance with the approved Corrective Action Plan and NYSDEC DER-10 guidance (Ref. 7).

Benchmark is a licensed professional engineering firm with extensive experience in design, construction, and operation of remedial measures at solid and hazardous waste facilities.

The designated Project Manager for the Site is Thomas H. Forbes, P.E. Mr. Forbes has over 28 years of experience in the design, implementation, maintenance and monitoring of remedial measures, and has served as Project Manager for the Site since 2002. Mr. Forbes will be the primary contact for NYSDEC on all matters relating to the Site, and will be available for contact during all working days.

2.0 DESCRIPTION OF PLANNED CORRECTIVE ACTION

A detailed description of the planned corrective action for the Site is presented in this section.

2.1 Pre-Mobilization Tasks

2.1.1 Underground Utilities Location

Prior to initiating subsurface work (i.e., advancing injection points within the building), the remediation contractor will locate, with the assistance of the building owner, any active subgrade utility lines within the work area. Underground lines will be staked and marked with fluorescent paint.

2.1.2 UIC Permit Approval

An Underground Injection Control (UIC) Permit request will be submitted to the United States Environmental Protection Agency (USEPA) for injection of groundwater amendment into the subsurface. Benchmark is simultaneously submitting this Corrective Action Plan and the Inventory of Injection Wells form to the USEPA for review and approval. Prior to issuance of a UIC Permit, the USEPA requires a letter from NYSDEC indicating its approval of the injection program.

2.1.3 Health and Safety Plan Development

A site-specific Health and Safety Plan (HASP) will be prepared and implemented by the remediation subcontractor in accordance with the requirements of 29 CFR 1910.120. The HASP will cover all on-site remediation activities. Benchmark will be responsible for Site control and for the health and safety of its authorized Site workers. Benchmark's HASP is provided for informational purposes in Appendix A.

2.2 Mobilization

Field operations will commence with the drilling subcontractor (to be determined) and injection subcontractor (Regenesis Remediation Services) mobilizing equipment and materials to the Site.

2.3 Source Area Groundwater Treatment

Remediation of the chlorinated VOCs in groundwater in the vicinity of monitoring wells MW-6 and MW-5, and pumping well PW-1R will be accomplished by creating a continuous *in situ* passive barrier system with Regenesis' PlumeStop® liquid activated carbon. Groundwater will be able to flow through this barrier system while at the same time the barrier will extract and destroy contaminants from groundwater. Such treatment will prevent off-site migration of the contaminant plume while also reducing long-term vapor risk to off-site properties.

The low viscosity of the PlumeStop allows for relatively simple installation and control of its placement in the aquifer. Once injected, the PlumeStop coats aquifer soil particles with a very thin layer of carbon. The PlumeStop begins working immediately by allowing sorption of contaminants from the dissolved phase to the thin layer of carbon resulting in rapid reductions of contaminant concentrations from groundwater (i.e., the extraction phase). The barrier is maintained in the long-term (years to decades) by destroying sorbed contaminants from the PlumeStop carbon through the use of enhanced *in situ* anaerobic bioremediation, which frees up new carbon sites for continued contaminant sorption (i.e., the PlumeStop regeneration phase).

2.3.1 Design Verification

As part of the proposed remedial design, Regenesis requires a design verification step be implemented to confirm the assumptions made based on Site characterization data. The goals of this verification are to:

- Confirm the Site's target application interval and relative contaminant impacts to soil.
- Confirm the contaminant concentrations and biogeochemical conditions in groundwater prior to PlumeStop application.

Better resolution on these two items significantly increases the success rate of the proposed strategy while avoiding potential project budget increases.

The design verification step would involve continuous core sampling within the targeted treatment area, and would include collection of 1-2 soil cores to estimate the fluid acceptance capacity of the formation, evaluate likely distribution patterns of PlumeStop during injection, and verify the vertical distribution of contaminants in the target treatment zone. Figure 4 shows the approximate locations for the soil cores. Changes in stratigraphy,

discoloration, and moisture content will be evaluated in context with the proposed remedial design. Soil samples may be field screened or submitted for laboratory analysis as needed to evaluate vertical distribution of COCs and confirm contaminant mass estimates and/or quantity of PlumeStop, HRC, and BDI required.

2.3.2 Proposed Remedial Design

As shown on Figure 4, PlumeStop would be injected within three zones using low pressure and high volume without the need or uncontrollability of *in situ* fracturing common to other carbon-based injectants. PlumeStop injects with the same ease as injecting water. By flooding the subsurface using simpler injection and pumping techniques we can fully coat the entire treatment pore space of an aquifer for a more complete barrier system.

The injection zones in the vicinity of wells MW-5 and MW-6 would have a treatment interval of 25 to 35 feet below ground surface (fbgs). PlumeStop would also be applied into pumping well PW-1R. Using available data, Regenesis prepared a design for the implementation of the Plume Stop barrier. The proposed plan includes the injection of PlumeStop liquid activated carbon, Hydrogen Release Compound (HRC®), and Bio-Dechlor Inoculum® (BDI). HRC is a controlled-release lactic acid to promote reducing conditions, optimize the anaerobic enhance reductive dechlorination process, and provide a long-term source of staged-release hydrogen. BDI Plus is an enriched microbial consortium containing species of *Dehalococcoides sp.* (DHC) to aid in rapid and effective treatment of undesirable anaerobic dechlorination intermediates such as dichloroethene and vinyl chloride.

Based on an estimated contaminant mass and stoichiometric hydrogen demand, a total of 6,800 lb of PlumeStop, 800 lb of HRC, and 18 liters of BDI would be applied to the MW-5 and MW-6 zones; nine injection points at each location. Pumping well PW-1R would receive 1,600 lb of PlumeStop, 150 lb of HRC, and 4 liters of BDI. Regenesis Remediation Services (RRS) provides an injection trailer equipped with pumps; mixing tank; delivery manifold injection heads with flow and pressure gauges; safety bypass valves; and a first aid station. RRS would work with Benchmark to perform the product application through direct push technology injection points. Appendix B includes information on the proposed Regenesis products and design.

2.4 Groundwater and Performance Monitoring

A groundwater sampling program will be implemented to evaluate the effectiveness of the in-situ groundwater treatment program. A baseline round of groundwater samples will be

collected from representative monitoring wells along the plume axis (i.e., MW-6, PW-1R, and MW-5) and analyzed for cVOCs via USEPA Method 8260B and biogeochemical parameters (e.g., nitrate, sulfate, iron) that may be necessary to fill any data gaps prior to reagent application. The samples will be collected via low-flow sampling procedures per Benchmark's previously approved Field Operating Procedure (FOP). Performance monitoring will be performed one month following the PlumeStop injection and quarterly thereafter for two events, at which point the data will be evaluated and a plan for further sampling or discontinuation of monitoring will be provided to the NYSDEC for approval.

2.5 Treatment System Decommissioning

Upon approval by NYSDEC that the gPRO® groundwater treatment system is no longer required, Despatch will decommission the system. Final treatment data and documentation of decommissioning will be included in the revised Final Engineering Report (FER) described in Section 4.0.

2.5.1 Equipment Decommissioning

The main components of the gPRO® groundwater treatment system are as follows:

- Centrifugal pump (American Stainless Model C143255ET1) with a 1.5 HP, 230 VAC single phase TEFC motor to transfer groundwater from the air stripper sump to the gPRO® system upon demand (this pump also serves to transfer treated effluent from the air stripper to the sanitary sewer, and will therefore remain in place and in use until it is determined that the pump and treat remedial system can be decommissioned).
- Chemical metering pump (LMI Model A15) rated at 0.16 gallons per hour to inject sodium bisulfite into the air stripper sump discharge line
- 2-inch Schedule 80 PVC piping from the air stripper effluent to the infusion tank
- 750-gallon flat bottom, closed-top, high density polyethylene gas infusion tank (72-inch diameter, 50-inch high) with a high-level float switch. The tank size was selected to allow the gPRO® module to remain submerged at the bottom of the tank at all times
- Three gPRO® LP 100 units
- One two-stage low-flow hydrogen regulator (gauge reading 0-100 PSI) and multi-cylinder simplex manifold
- Three hydrogen flow controllers set for a total gas flow of 1 liter per minute (L/min)

- Eight industrial grade hydrogen supply cylinders secured within a metal cylinder cage with appropriate placarding
- Flexible Parflex hose for hydrogen gas transfer
- NEMA electrical control panel
- Shed for the gas infusion tank

All equipment that has been in contact with treated groundwater originating from the air stripper will be double rinsed with potable water followed by air drying. Rinsate will be discharged to the pretreatment system day tank and re-processed through the air stripper. Following cleaning, the equipment will be handled in the following manner:

- Hydrogen infusion equipment that is currently rented from inVentures Technologies Inc. will be returned. Similarly, hydrogen cylinders will be returned to the supplier.
- The tank, metering pump, hydrogen cylinder storage cage, and storage shed will be kept by Despatch for another industrial use or sold.
- PVC piping will be drained and left in-place.
- Electrical equipment will be de-energized and locked out.

2.5.2 Re-Injection Well Decommissioning

The 4-inch diameter re-injection wells RW-1 through RW-3, which are installed to approximately 60 fbgs, will be grouted in-place in accordance with Section 2.1 of *NYSDEC Policy CP-43: Groundwater Monitoring Well Decommissioning Policy* dated November 3, 2009. The well casing will be filled with a standard grout mix (i.e., Portland cement and bentonite) using a tremie to within 5 feet of ground surface. The upper 5 feet of the casing and well materials will be removed and disposed as solid waste. The upper 5 feet of the borehole will be filled to ground surface with clean soil or stone and the asphalt will be patched.

3.0 SUPPORT DOCUMENTS DURING REMEDIAL ACTIVITIES

3.1 Health and Safety Requirements

Benchmark has prepared a Site-Specific Health and Safety Plan (HASP) for use by its employees in accordance with 29 CFR 1910.120. The HASP will cover all on-site remediation activities. Benchmark's HASP is provided for informational purposes in Appendix A. The remediation subcontractor will be required to develop and enforce a HASP as or more stringent than Benchmark's. The HASP includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.

Health and safety activities will be monitored throughout the field activities. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field activities.

3.2 Corrective Action Reporting

Benchmark will be on-site full-time to monitor and document corrective activities. Such monitoring and documentation will include: construction stake-out, surveying, record drawings; daily reports of activities; community air monitoring results; groundwater sampling and analysis; indoor air sampling; and progress photographs and sketches.

Standard reporting procedures will include preparation of a daily report and, when appropriate, problem identification and corrective measures reports. Appendix C contains sample project documentation forms. Information that may be included on the daily report form includes processes and locations of construction under way, and equipment and personnel working in the area, including subcontractors. The completed reports will be available on-site and submitted to the NYSDEC as part of the Final Engineering Report. The

NYSDEC will be promptly notified of problems requiring modifications to this Work Plan prior to proceeding or completing the construction item.

Photo documentation of the remedial activities will be prepared by a field representative throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or special circumstances arise.

4.0 POST-REMEDIAL REQUIREMENTS

4.1 Final Engineering Report

Upon completion of the injection work, the Final Engineering Report (FER) submitted to NYSDEC in December 2013 (Ref. 8) will be modified to include the completed corrective action. The FER will be revised to include the following information and documentation specific to the corrective action:

- Summary of the Site remedy that satisfied the remedial action objectives for the Site.
- Site map showing the areas.
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports.
- Photo documentation of remedial activities.
- Text describing the remedial activities performed; a description of any deviations from the Work Plan and associated corrective measures taken; and other pertinent information necessary to document that the site activities were carried out in accordance with this Work Plan.
- Analytical data packages and data usability summary reports (DUSRs).

4.2 Site Management Plan

The Site Management Plan (SMP) submitted to NYSDEC in December 2013 (Ref. 6) will be modified concurrent with the FER to describe the completed corrective action and present a revised Site Monitoring Plan.

5.0 PROJECT SCHEDULE

Figure 5 presents an overall project schedule for the performance of corrective action activities. Despatch intends to submit the revised FER and SMP and complete NYSDEC review and revisions by the end of December 2017. Despatch understands that once the corrective actions (including approval of the post-remedial requirements) have been completed, the NYSDEC will issue a letter declaring that the NYSDEC agrees that Despatch (as Volunteer) has met their obligations and that, barring an event triggering a reopener, the NYSDEC does not contemplate further action will need to be taken at the Site.

6.0 REFERENCES

1. Benchmark Environmental Engineering and Science, PLLC. *Voluntary Cleanup IRM Investigation Report, Former Brainerd Manufacturing Facility*. March 2003.

2. Benchmark Environmental Engineering and Science, PLLC. *Design Report for IRM Groundwater Collection and Pretreatment System, Former Brainerd Manufacturing Facility*. April 2004.

3. Benchmark Environmental Engineering and Science, PLLC. *Summary of Approach for Sub-Slab Depressurization*. September 28, 2010 letter to NYSDEC.

4. Benchmark Environmental Engineering and Science, PLLC. *Remedial Action Work Plan, Former Brainerd Manufacturing Facility, East Rochester, New York, NYSDEC Site No. V00519-8*. December 2011.

5. Benchmark Environmental Engineering and Science, PLLC. *Periodic Review Report, Former Brainerd Manufacturing Facility, East Rochester, New York, NYSDEC Site No. V00519-8*. September 2016.

6. Benchmark Environmental Engineering and Science, PLLC. *Site Management Plan, Former Brainerd Manufacturing Facility, East Rochester, New York, NYSDEC Site No. V00519-8*. December 2013.

7. New York State Department of Environmental Conservation. *DER-10; Technical Guidance for Site Investigation and Remediation*. May 3, 2010.

8. Benchmark Environmental Engineering and Science, PLLC. *Final Engineering Report, Former Brainerd Manufacturing Facility, East Rochester, New York, NYSDEC Site No. V00519-8*. December 2013.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

CORRECTIVE ACTION PLAN
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter[1]	GWQS/GV[3]	Monitoring Well Location																		
		MW-1							MW-2	MW-3				MW-4						
		8-18-06	1-31-12	9-25-13	12-4-13	6-4-14	6-4-15	6-28-16	8-18-06	8-21-06	6-4-14	6-4-15	6-28-16	8-22-06	1-30-12	9-25-13	12-4-13	6-4-14	6-4-15	6-28-16
TCL Volatile Organic Compounds (ug/L)																				
Acetone	**50**	ND	ND	ND	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.2	4.5 J
Bromodichloromethane	**5**	ND	ND	ND	ND	0.75	11	ND	ND	ND	1.4	1.4	1.2	ND	2.8	2.3	1.3	1.1	ND	ND
Bromoform	**50**	ND	ND	ND	ND	ND	0.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	**60**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	**5**	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert-butyl ether	**10**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	**NR**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	ND	ND
Toluene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.56 J	ND	ND	ND
Chloroform	**7**	ND	ND	ND	ND	ND	23	ND	0.91 J	ND	7	6.3	4.7	0.86 J	**11**	**15**	**12**	6.5	1.2	1.3
Tetrachloroethene	**5**	3.1 J	**53**	**83**	**150**	**70**	**65**	ND	**8.2**	ND	2	3.5	2.6	**87**	**11**	**28**	**13**	**22**	**16**	**17**
Trichloroethene	**5**	0.78 J	**19**	**15**	**65**	**17**	**30**	0.91 J	**6.3**	**11**	2.5	3.2	3.1	**240**	**90**	**46**	**33**	**37**	**16**	**16**
Trichlorofluoromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichlorethene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	0.74 J	ND	ND	ND	2.6 J	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	**1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	**5**	--	ND	ND	ND	--	--	--	--	--	--	--	--	--	ND	ND	ND	--	--	--
Total Chlorinated VOCs[4]	**NA**	4	72	98	215	87	95	0.91	15	11	5	7	6	327	101	74	46	59	32	33

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. MS/MSD collected at PW-1.
3. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV), 6 NYCRR Part 703.
4. Sum of chlorinated VOCs means adding the concentrations of tetrachloroethene, trichloroethene, cis & trans-1,2-dichlorethene, and 1,1-dichloroethene.
5. The enhanced hydrogen injection began operation in July 2012.

Definitions:

J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
NR = parameter not regulated by 6NYCRR TOGS 1.1.1 Part 703
N* = Indicates the spike or duplicate analysis is not within the quality control limits
"--" = Not analyzed
" ** " = Field threshold value; when exceeded, field filtered metals sample is collected (i.e., dissolved metals).

BOLD = Analytical result exceeds individual GWQS/GV.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

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Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter[1]	GWQS/GV[3]	Monitoring Well Location																	
		MW-5									MW-6								
		8-22-06	1-30-12	3-5-13	6-26-13	9-25-13	12/04/13	6-4-14	6-4-15	6-28-16	8-22-06	1-30-12	3-5-13	6-26-13	9-25-13	12-4-13	6-4-14	6-4-15	6-28-16
TCL Volatile Organic Compounds (ug/L)																			
Acetone	**50**	ND	ND	ND	ND	ND	3.4 J	3.3 J	ND	ND	ND	ND	ND	ND	ND	5.0 J	ND	ND	ND
Bromodichloromethane	**5**	ND	ND	0.51 J	ND	ND	ND	ND	ND	0.54 J	ND	4.4	0.47 J	ND	ND	ND	ND	ND	ND
Bromoform	**50**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	**60**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**87**	ND	ND
Methyl tert-butyl ether	**10**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	**NR**	ND	ND	ND	ND	ND	ND	4.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**5**	ND	ND	ND	ND	ND	0.51 J	0.71 J	ND	ND	3.2 J	0.95 J	ND	ND	ND	1.6	ND	ND	ND
Chloroform	**7**	1.4 J	1.3	**18**	ND	ND	ND	ND	ND	0.98 J	ND	**14**	2	ND	ND	0.51 J	ND	ND	ND
Tetrachloroethene	**5**	**1600**	**2800**	**590**	**400**	**150**	**110**	**50**	**40**	**530 D**	**3100**	**1700**	**410**	**1600**	**1300**	**1600**	**1500**	**570**	**1200**
Trichloroethene	**5**	**1400**	**1500**	**260**	**240**	**59**	**52**	**23**	**20**	**330 D**	**1500**	**660**	**95**	**520**	**450**	**570**	**560**	**130**	**340**
Trichlorofluoromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethene	**5**	0.56 J	0.67 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichlorethene	**5**	0.80 J	0.95 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**5**	**11**	**6.3 J**	1.3	ND	ND	ND	ND	ND	1.5	**16 J**	4	ND	ND	ND	3.8	ND	ND	ND
1,1,2-Trichloroethane	**1**	**1.5 J**	ND	ND	ND	ND	ND	ND	ND	0.57 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	**5**	--	ND	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	ND	ND	ND	--	--
Total Chlorinated VOCs[4]	**NA**	3,000	4,302	850	640	209	162	73	60	860	4,600	2,360	505	2,120	1,750	2,170	2,060	700	1,540

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. MS/MSD collected at PW-1.
3. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV), 6 NYCRR Part 703.
4. Sum of chlorinated VOCs means adding the concentrations of tetrachloroethene, trichloroethene, cis & trans-1,2-dichlorethene, and 1,1-dichloroethene.
5. The enhanced hydrogen injection began operation in July 2012.

Definitions:

J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.
NR = parameter not regulated by 6NYCRR TOGS 1.1.1 Part 703
N* = Indicates the spike or duplicate analysis is not within the quality control limits
"--" = Not analyzed
" ** " = Field threshold value; when exceeded, field filtered metals sample is collected (i.e., dissolved metals).

BOLD = Analytical result exceeds individual GWQS/GV.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

CORRECTIVE ACTION PLAN
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter[1]	GWQS/GV[3]	Monitoring Well Location																			
		MW-7	MW-8	MW-9									MW-10	PW-1[2]	PW-1R				PW-2			
		8-21-06	8-21-06	8-21-06	9-12-07	1-31-12	6-26-13	9-25-13	12-4-13	6-4-14	6/4/15	6-28-16	8-21-06	8-22-06	1-30-12	6-4-14	6-4-15	6-28-16	1-30-12	6-4-14	6-4-15	6-28-16
TCL Volatile Organic Compounds (ug/L)																						
Acetone	**50**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	6.9 J	8.1 J	0.46 J	12 J	8.7 J
Bromodichloromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	ND	ND	0.47	ND
Bromoform	**50**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	**60**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	**5**	ND	ND	ND	ND	ND	ND	ND	ND	**90**	ND	ND	ND	ND	ND	**12**	ND	ND	0.56 J	ND	ND	ND
Methyl tert-butyl ether	**10**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.7 J	0.43 J	0.23 J
Methyl Acetate	**NR**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5 J	2 J	ND	ND	ND	1.7	ND
Toluene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	ND	ND	3	ND	0.52	0.55 J
Chloroform	**7**	ND	ND	2 J	0.9 J	ND	ND	ND	0.82 J	ND	ND	ND	ND	0.55 J	1.1	1.3 J	0.72 J	ND	2.3	2.2	1.3	0.96 J
Tetrachloroethene	**5**	ND	**13**	**3100**	**2600**	**390**	**870**	**900**	**1000**	**1300**	**920**	**300**	**17**	**780**	**360**	**92**	**160**	**120**	1.3	**20**	**18**	**11**
Trichloroethene	**5**	**6.0**	**20**	**2700**	**1900**	**230**	**400**	**590**	**780**	**810**	**570**	**100**	**15**	**540**	**220**	**75**	**94**	**71**	3.3	**25**	**16**	**12**
Trichlorofluoromethane	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethene	**5**	ND	ND	3.5 J	1.3	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	**5**	ND	ND	3.2 J	1.3	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND	ND	ND	ND	ND	0.86 J	ND	ND
trans-1,2-Dichloroethene	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**5**	ND	ND	**34**	**12**	1.6	ND	ND	4.6	ND	ND	ND	0.60 J	3.6 J	0.96 J	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	**1**	ND	ND	**3.8 J**	**1.9**	0.5 J	ND	ND	0.74 J	ND	ND	ND	ND	0.51 J	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	**5**	ND	ND	0.62 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	**5**	--	--	--	--	ND	ND	ND	ND	--	ND	ND	--	--	ND	--	--	--	4.4	--	--	--
Total Chlorinated VOCs[4]	**NA**	6	33	5,800	4,503	620	1,270	1,490	1,780	2,110	1,490	400	32	1,320	580	167	254	191	5	46	34	23

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. MS/MSD collected at PW-1.
3. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV), 6 NYCRR Part 703.
4. Sum of chlorinated VOCs means adding the concentrations of tetrachloroethene, trichloroethene, cis & trans-1,2-dichlorethene, and 1,1-dichloroethene.
5. The enhanced hydrogen injection began operation in July 2012.

Definitions:

J = Estimated value; result is less than the sample quantitation limit but greater than zero.
ND = parameter not detected above laboratory detection limit.

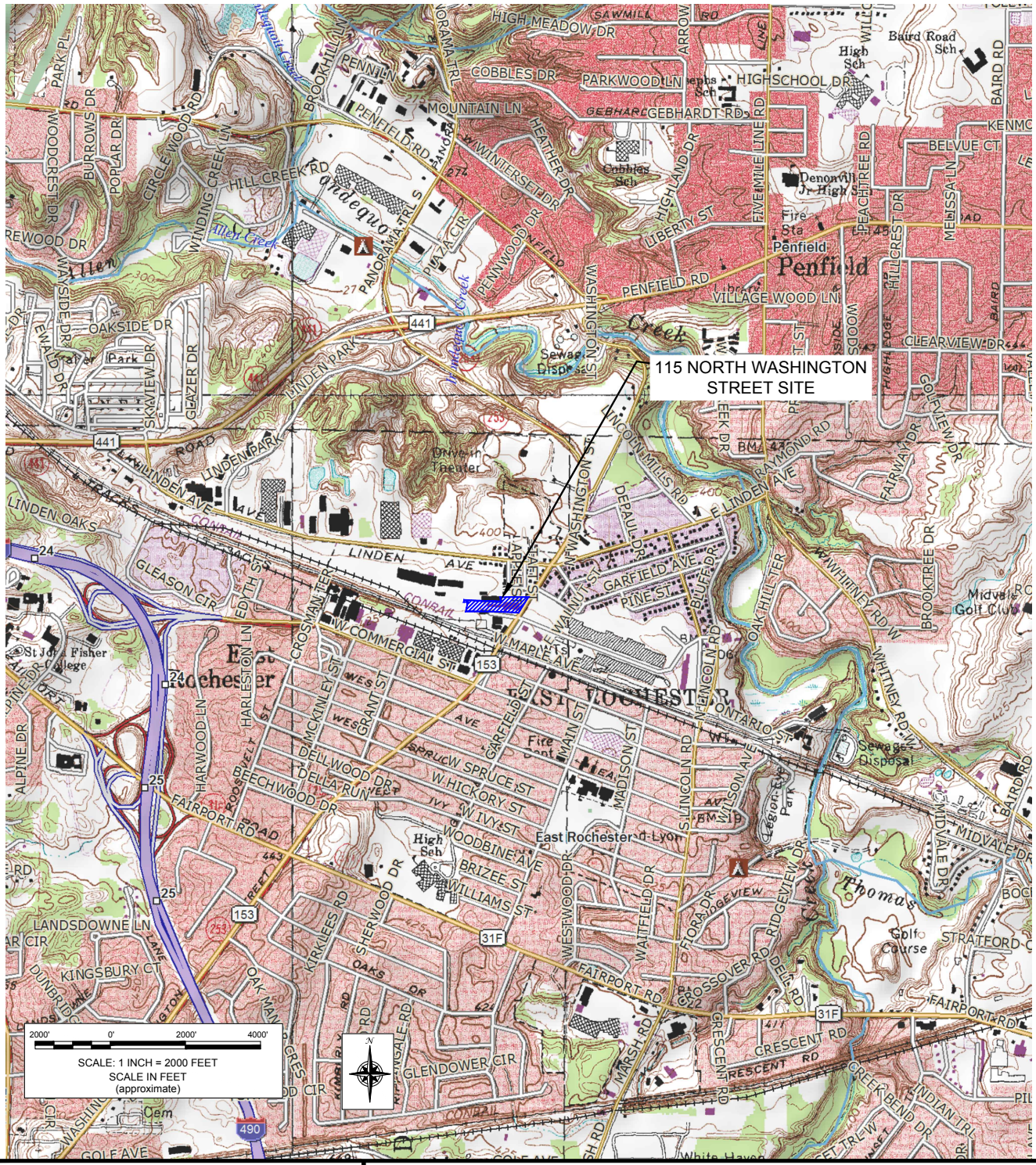
N* = Indicates the spike or duplicate analysis is not within the quality control limits
"--" = Not analyzed
" ** " = Field threshold value; when exceeded, field filtered metals sample is collected (i.e., dissolved metals).

BOLD = Analytical result exceeds individual GWQS/GV.

FIGURES

F:\CAD\Benchmark\Despatch\2-Corrective Action Plan (2017)\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

SITE LOCATION AND VICINITY MAP

CORRECTIVE ACTION PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK
NYSDEC SITE NO. V00519-8

PREPARED FOR

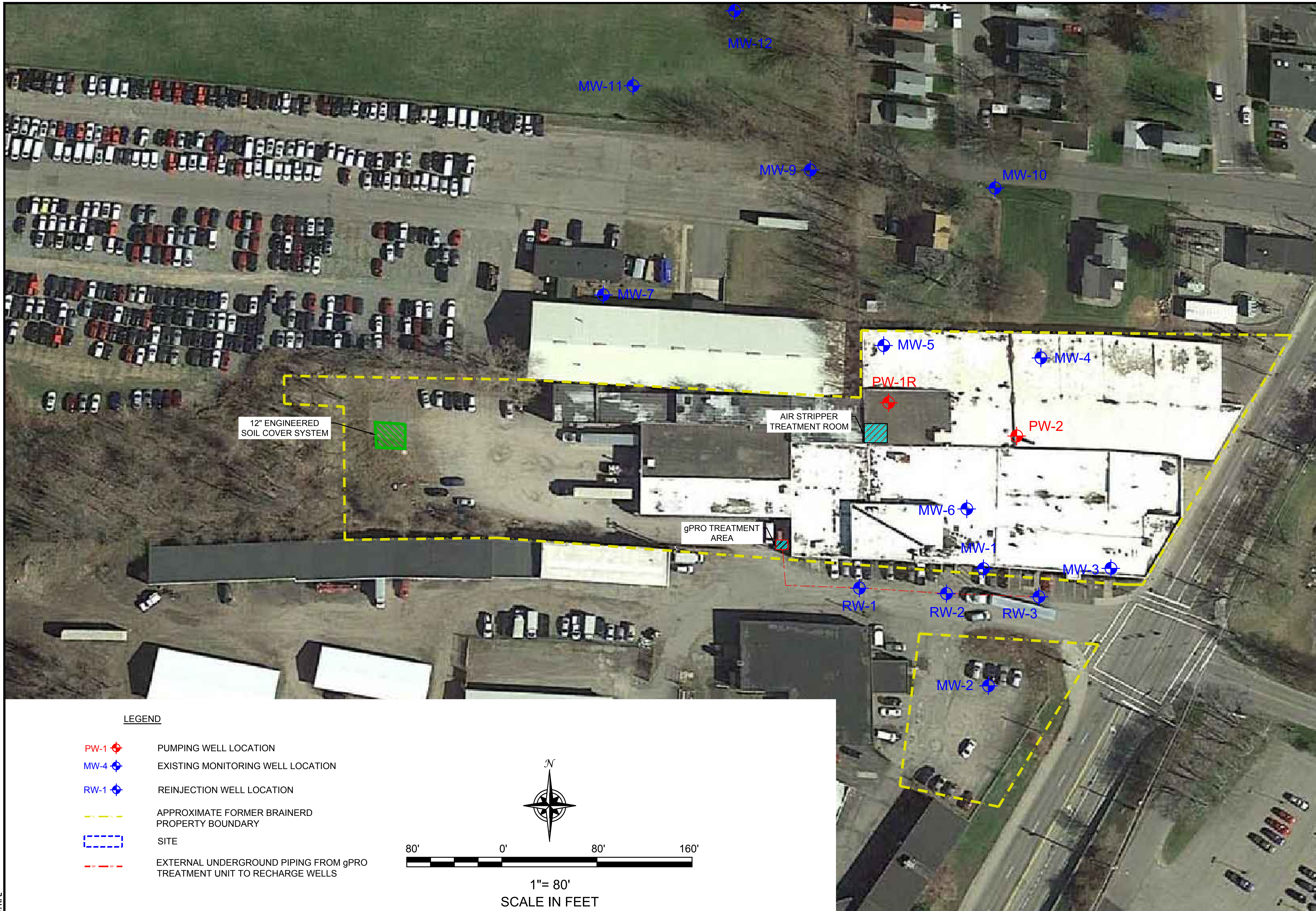
DESPATCH INDUSTRIES, INC.

PROJECT NO.: 0040-002-400

DATE: JANUARY 2017

DRAFTED BY: RFL

F:\CAD\Benchmark\Despatch\2-Corrective Action Plan (2017)\Figure 2: Site Plan.dwg



NOTES:
1. DATE OF AERIAL PHOTOGRAPHY APRIL 2016; SOURCE GOOGLE EARTH.

DATE: JANUARY 2017
DRAFTED BY: RFL

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0040-002-400

SITE PLAN

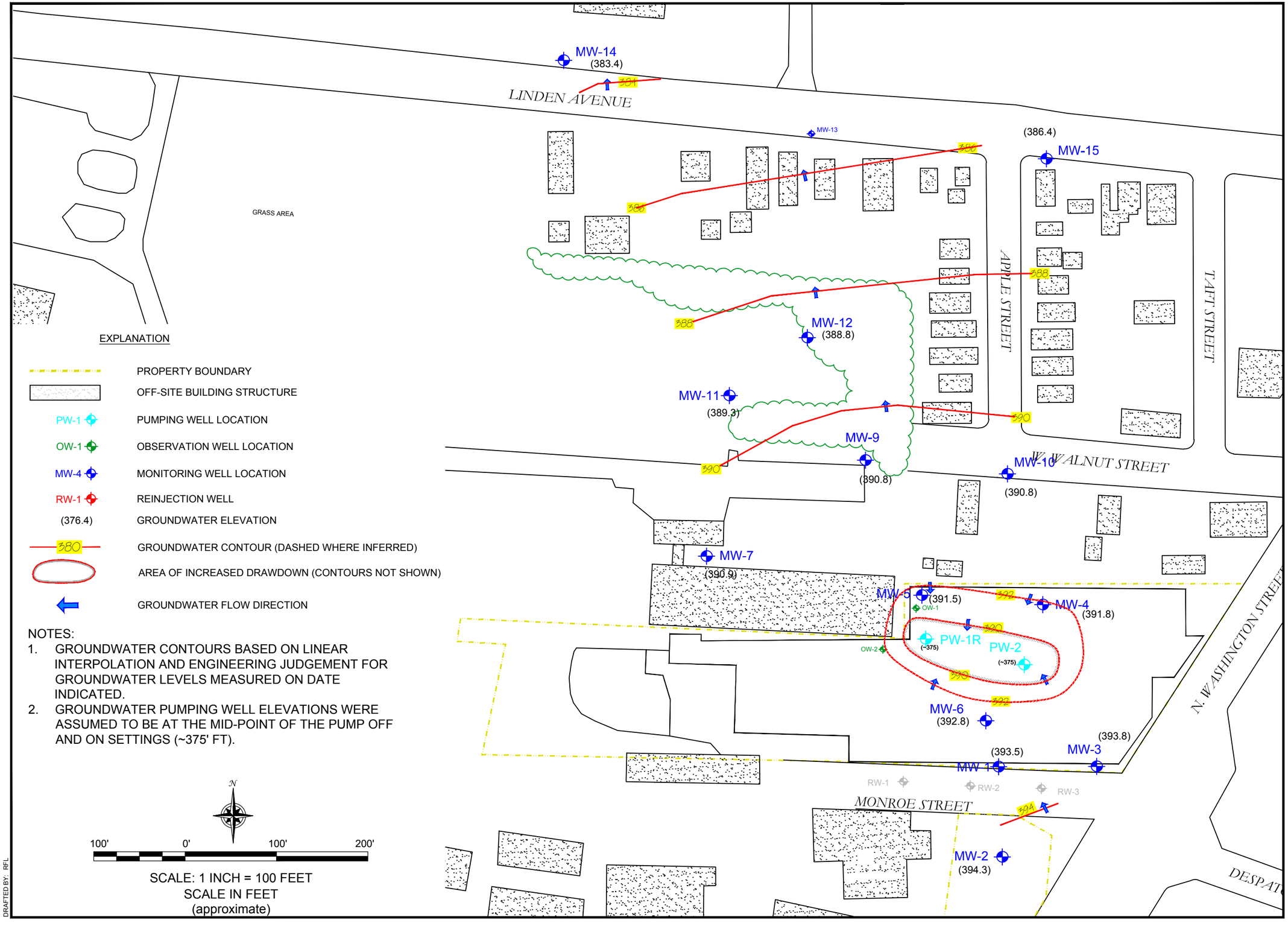
CORRECTIVE ACTION PLAN

FORMER BRAINERD MANUFACURING FACILITY
EAST ROCHESTER, NEW YORK
NYSDEC SITE NO. V00519-8

PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 2

F:\CAD\Benchmark\Despatch\2-Corrective Action Plan (2017)\Figure 3; GW ISO MAP.dwg



EXPLANATION

- PROPERTY BOUNDARY
- OFF-SITE BUILDING STRUCTURE
- PW-1 — PUMPING WELL LOCATION
- OW-1 — OBSERVATION WELL LOCATION
- MW-4 — MONITORING WELL LOCATION
- RW-1 — REINJECTION WELL
- (376.4) — GROUNDWATER ELEVATION
- 380 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- AREA OF INCREASED DRAWDOWN (CONTOURS NOT SHOWN)
- GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION AND ENGINEERING JUDGEMENT FOR GROUNDWATER LEVELS MEASURED ON DATE INDICATED.
2. GROUNDWATER PUMPING WELL ELEVATIONS WERE ASSUMED TO BE AT THE MID-POINT OF THE PUMP OFF AND ON SETTINGS (~375' FT).

N

100' 0' 100' 200'

SCALE: 1 INCH = 100 FEET
SCALE IN FEET
(approximate)

DATE: JANUARY 2017
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0040-002-400

GROUNDWATER ISOPOTENTIAL MAP JUNE 2016

CORRECTIVE ACTION PLAN
FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK
NYSDEC SITE NO. V00519-8
PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 3

F:\CAD\Benchmark\Despatch\2-Corrective Action Plan (2017)\Figure 4; Planned Plume Stop Inj Rev.dwg

EXPLANATION

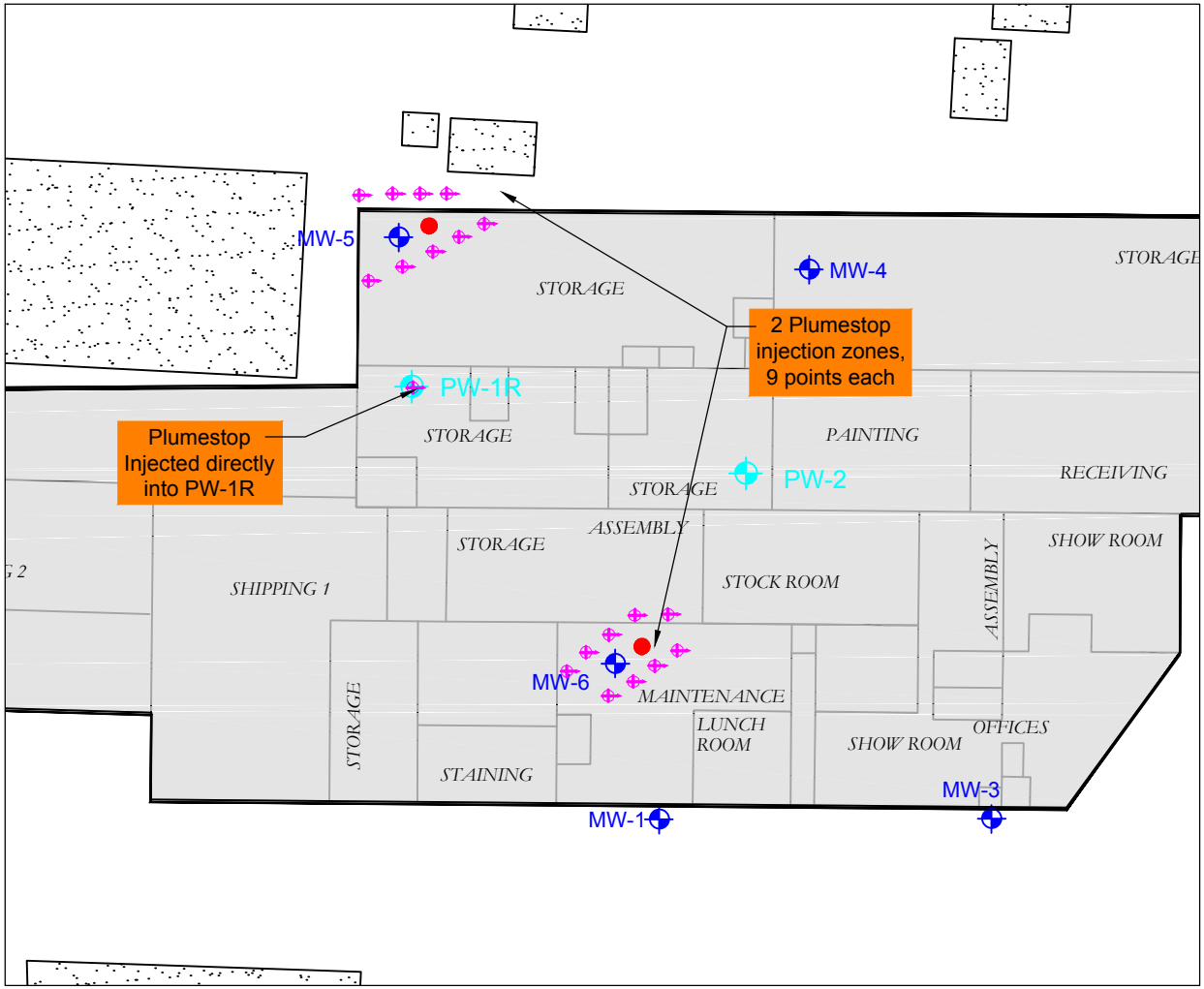
- FORMER BRAINERD PLANT
- OFFSITE BUILDING
- PW-1R — PUMPING WELL LOCATION
- MW-4 — MONITORING WELL LOCATION
- PLANNED PLUMESTOP INJECTION POINT (19)
- APPROXIMATE LOCATION OF SOIL CORE

NOTES:
1. PLUMESTOP INJECTION LOCATIONS MAY BE ADJUSTED DUE TO SITE ACCESS CONDITIONS (E.G., LOCATION OF WALLS, UTILITIES, ETC).

N

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0040-002-400

DATE: APRIL 2017

DRAFTED BY: RFL

PLUMESTOP INJECTION PLAN

CORRECTIVE ACTION PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK
NYSDEC SITE NO. VOO519-8

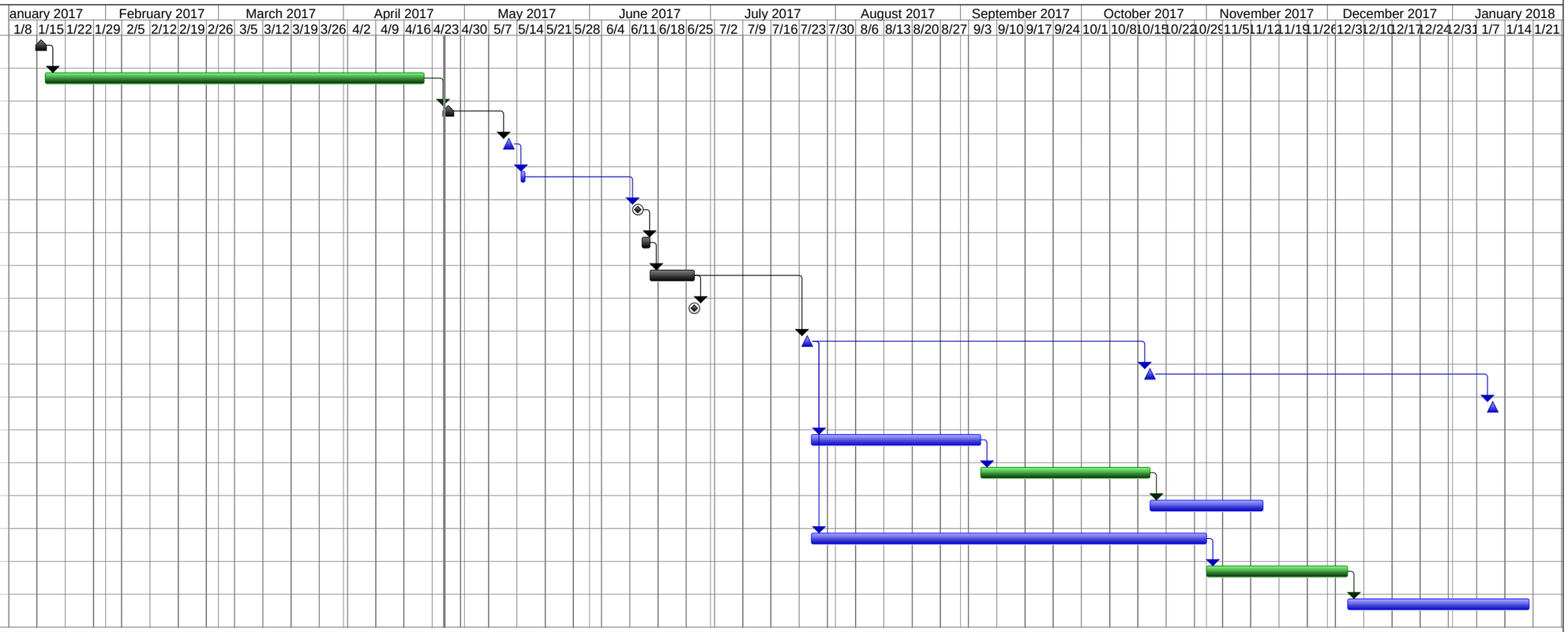
PREPARED FOR

DESPATCH INDUSTRIES, INC.

FIGURE 4

FIGURE 5
PROJECT SCHEDULE
CORRECTIVE ACTION PLAN
FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

ID	Task Name
1	Submit Corrective Action Plan to NYSDEC
2	NYSDEC Review Period
3	Submit Final Corrective Action Plan
4	Groundwater Baseline Monitoring
5	Design Verification (soil coring)
6	Mobilization
7	Design Verification
8	PlumeStop Injection
9	Contractor Demobilization
10	Groundwater Performance Monitoring (Event #1)
11	Groundwater Performance Monitoring (Event #2)
12	Groundwater Performance Monitoring (Event #3)
13	Revise Site Management Plan (SMP)
14	NYSDEC Review Period
15	Finalize SMP
16	Revise Final Engineering Report (FER)
17	NYSDEC Review Period
18	Finalize FER



APPENDIX A

HEALTH AND SAFETY PLAN

REMEDIAL ACTION WORK PLAN
APPENDIX A

HEALTH AND SAFETY PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

April 2011 0040-002-400
Revised December 2011

Former Brainerd Manufacturing Facility:

Health and Safety Plan for RA Activities

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes

Project Manager: Thomas H. Forbes

Designated Site Safety and Health Officer: Bryan C. Hann

Acknowledgement:

I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

FORMER BRAINERD MANUFACTURING FACILITY
HEALTH AND SAFETY PLAN FOR RA ACTIVITIES

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1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120 and USEPA Standard Operating Safety Guidelines, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC employees (referred to jointly hereafter as Benchmark-TurnKey) during Remedial Action (RA) activities at the Former Brainerd Manufacturing Facility located in East Rochester, Monroe County, New York. This HASP presents information and procedures for Benchmark-TurnKey employees who will be involved with field activities, including the assignment of responsibilities, personnel protection requirements, work practices and emergency response procedures. It is not intended to cover the activities of other contractors or subcontractors on the Site; these firms will be required to develop and enforce their own HASPs as discussed below. In order to ensure that proper coordination on such key issues as emergency notification and decontamination exists between Benchmark-TurnKey and other contractors or subcontractors, Benchmark-TurnKey will review all HASPs and coordinate procedures where appropriate.

This HASP presents information on known Site health and safety hazards using available historical information for previously investigated areas of the Site, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards. This HASP will be updated if new investigation data becomes available.

All Benchmark-TurnKey personnel involved with the field activities associated with the remedial actions will be required to comply with this HASP and any field modifications as directed by the Site Safety and Health Officer (SSHO).

1.2 Site Location and Description

The former Brainerd Manufacturing Facility is situated at the intersection of North Washington and Monroe Streets in the City of East Rochester, New York (Figure 1). The property is comprised of two parcels: an approximately 3.0 acre parcel located at 115 North

Washington Street (Tax Map 139.69-1-17) improved with a 73,400 square foot industrial/ manufacturing building and offices; and an approximately 0.3 acre parcel (Tax Map 139.69-1-19) comprised of an asphalt parking area. An open gravel lot comprises the western side of the larger parcel, with the former manufacturing building situated on the eastern side of the parcel adjacent to North Washington Street. A Rochester Gas and Electric (RG&E) substation and a pre-cast concrete product manufacturing building owned by E.J. Delmonte border the property to the north. Monroe Street, Rochester Lumber Company and A.J. Interiors are located south of the property, adjacent to the asphalt parking lot.

1.3 Site History

The property was operated as an industrial facility for nearly 100 years prior to relocation of Brainerd's operations in 1998. Historic operations conducted at the facility included the manufacture of hardware and decorative metal products. Production of these products involved stamping, cutting, drilling, burnishing, deburring, degreasing, lacquering and electroplating. The majority of the equipment formerly used in the production process has been removed from the premises.

1.4 Remedial Action Activities

Benchmark-TurnKey personnel will be on-site for Remedial Action activities including the following:

- Installation of a gPRO® LP System for direct delivery of dissolved hydrogen into the groundwater. This will involve installation of one groundwater extraction well northeast of pumping well PW-1 and three reinjection wells upgradient of the building. An aboveground storage area shed will hold the infusion tank and a gas cylinder security cage for gas regulators and manifolds, flow controllers, and cylinders.
- Groundwater monitoring to evaluate the effectiveness of the in-situ treatment.
- Monitoring of ASD System performance.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who will impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establishes the lines of communication among them for heath and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

All Benchmark-TurnKey personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The Benchmark-TurnKey Corporate Health and Safety Director is **Mr. Thomas H. Forbes**. The Corporate Health and Safety Director is responsible for developing and implementing the Health and Safety program and policies for Benchmark-TurnKey and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates Benchmark-TurnKey's Health and Safety training and medical monitoring programs, and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is **Mr. Thomas H. Forbes**. The Project Manager has the responsibility and authority to direct all Benchmark-TurnKey work operations at the Site. The Project Manager coordinates safety and health functions with the SSHO, and

bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site Work Plan.
- Providing Benchmark-TurnKey workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the SSHO.
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this Site is **Mr. Bryan H. Hann**. The qualified alternate SSHO is **Mr. Richard L. Dubisz**. The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during all work operations and has the authority to halt work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for Benchmark-TurnKey personnel on-site.
- Serving as the point of contact for safety and health matters.
- Ensuring that Benchmark-TurnKey field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing Site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP.
- Maintaining site-specific safety and health records as described in this HASP.
- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel who will have health and safety responsibilities in the work zone will include subcontractors and governmental agencies performing Site inspection work (i.e., NYDEC and/or its designated oversight contractor) who will be responsible for developing, implementing and enforcing a HASP equally stringent or more stringent than Benchmark-TurnKey's HASP. Benchmark-TurnKey assumes no responsibility for the health and safety of anyone outside its direct employ. During activities involving subcontractors, the subcontractor's HASP shall cover all non-Benchmark-TurnKey Site personnel. The subcontractor(s) shall assign a SSHO who will coordinate with Benchmark-TurnKey's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

3.0 HAZARD EVALUATION

The possibility exists that workers will be exposed to hazardous substances during well installation, development, and monitoring. The principal points of exposure would be through direct contact with impacted media or vapors during sample collection and handling activities. In addition, the use of large equipment will also present conditions for potential physical injury to workers. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

Manufacturing processes known to have previously taken place at the former Brainerd Manufacturing Facility give an indication as to the types of hazardous substances that may be encountered during RA activities. Table 1 identifies known constituents of potential concern (COPCs) and the maximum groundwater concentration observed during previous investigations. Based on this work, the COPCs include specific chlorinated organics, primarily tetrachloroethene (PCE), trichloroethene (TCE), and to a lesser extent 1,1,1-trichloroethane (1,1,1-TCA). Table 2 lists toxicity and exposure data for these COPCs. Brief descriptions of the toxicology of these materials and related health and safety guidance and criteria are provided below.

- **Tetrachloroethene (PCE)** is used a solvent for greases, waxes and rubbers. It is harmful by ingestion inhalation and skin absorption. Exposure can cause dermatitis, dizziness, nausea, liver and kidney damage. This compound is a suspected carcinogen.
- **Trichloroethene** (**TCE)** This compound was formally used in dry cleaning operations and metal degreasing. It is toxic by inhalation and skin absorption. It is an irritant to the skin, eyes and mucous membranes. Symptoms of exposure may include headache, dizziness and nausea. Exposure may cause liver and kidney damage. TCE is a suspected human carcinogen.
- **1, 1, 1-Trichloroethane (1,1,1-TCA)** This compound is used as a metal and plastic cleaning solvent. It is harmful by inhalation, ingestion and skin absorption. Exposure can cause headache and drowsiness. Repeated skin contact may result

in dry scaly and fissured dermatitis. Chronic exposure may result in liver and kidney damage.

With respect to the anticipated activities defined in Section 1.4, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0, will minimize the potential for exposure to airborne contamination. Further, exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

Attachment 4 includes a summary of the safety considerations that must be given when using hydrogen gas as well as the material safety data sheet for hydrogen gas.

3.2 Physical Hazards

Remedial Action activities at the Site may present the following physical hazards:

- The potential for physical injury during heavy equipment use, such as backhoes, excavators, and drill rigs.
- The potential for slip and fall injuries due to rough or uneven terrain, and/or open excavations.
- The potential for heat/cold stress to employees during the summer/winter months.

These hazards represent only some of the possible means of injury that may be present during RA activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing RA activities (such as, but not limited to, equipment operators and general laborers) who may be exposed to hazardous substances, health hazards, or safety hazards, and their supervisors/managers responsible for the Site, shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and Site control.
- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.

- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at Benchmark-TurnKey's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for Site safety and health.
- Safety, health and other hazards present on the Site.
- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the Site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure (see Section 5).
- Decontamination procedures (see Section 12).

- The Emergency Response Plan (see Attachment 1).
- Confined space entry procedures, if required (see Section 13).
- The spill containment program (see Section 9).
- Site control (see Section 11).

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during on-going Site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (i.e., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Attachment 1 of this HASP, Emergency Response Plan.

4.4 Site Visitors

Benchmark-TurnKey's SSHO will provide a site-specific briefing to all Site visitors and other non-Benchmark-TurnKey personnel who enter the Site beyond the Site entry point. The site-specific briefing will provide information about Site hazards, the Site lay-out including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for Site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to Benchmark-TurnKey employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment and termination physicals for all Benchmark-TurnKey employees involved in hazardous waste Site field operations. Annual exams are provided for those employees who are engaged in hazardous waste site field operations for more than 30 days per year, or who meet other specific criteria listed in 29 CFR 1910.120(f). Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by ADP Screening & Selection Services, an occupational health care provider under contract with Benchmark-TurnKey. ADP's local facility is Health Works WNY, Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 712-0670 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the Benchmark-TurnKey Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (i.e., sight, musculoskeletal,

cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites and to establish baseline medical data.

In conformance with OSHA regulations, Benchmark-TurnKey will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All Benchmark-TurnKey employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the Site as required by the HASP or as modified by the SSHO. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Due to possible contraindications, use of prescribed drugs should be reviewed with the Benchmark-TurnKey occupational physician.
- Alcoholic beverage and illegal drug intake are strictly forbidden during the work day.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this HASP.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for Benchmark-TurnKey employees, as requested and required.

The recommended specific safety practices for working around the subcontractor's equipment (e.g., drill rig, site truck.) are as follows:

- Although the subcontractors are responsible for their equipment and safe

operation of the Site, Benchmark-TurnKey personnel are also responsible for their own safety.

- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy equipment from location to location.
- Hard hats, safety boots, and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.
- Proper lighting must be provided when working at night.
- Investigation activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any investigation activity when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories, consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.
- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.
- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.
- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply, when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing. The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA)
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one- or two-piece chemical splash suit
- Inner and outer chemical resistant gloves
- Chemical-resistant safety boots/shoes
- Hardhat

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances

encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded. Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit)
- Inner and outer chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Hardhat

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen. Recommended PPE for Level D includes:

- Coveralls
- Safety boots/shoes
- Safety glasses or chemical splash goggles
- Hardhat
- Optional gloves; escape mask; face shield

7.2.4 Recommended Level of Protection for Site Tasks

Based on current information regarding the contaminants suspected to be present at the Site and the various tasks that are included in the investigation, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that particulates may be released to the air during intrusive activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PEL) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 Work Area Monitoring On-Site

Routine, real-time monitoring of the atmosphere within the work area will be conducted by Benchmark-TurnKey during all intrusive phases such as well installation and development, etc. Intrusive activities will be conducted in a manner to mitigate exposure to building occupants and minimize disruption of work activities, including working during off hours and the use of temporary engineering controls (e.g., fans, dust barriers) to control vapors and dust. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by Benchmark-TurnKey personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change.

8.1.2 Off-Site Community Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted when any intrusive activities are performed outdoors of the facility. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH's Generic Community Air Monitoring Plan (see Attachment 2) and include soil/waste excavation and handling; test pitting or trenching; and the installation of soil borings and monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities.

The monitoring will be performed at the downwind perimeter location at regular intervals and at a minimum of once per half hour during times when organic vapors, explosive gases or particulates exceed established limits for 5 minutes or longer until such time as work zone concentrations decrease to below the perimeter monitoring action levels. If sustained concentrations of organic vapors, explosive gas, or particulates are detected in excess of the threshold values identified in Section 8.2.2 at the downwind perimeter location for a period of 5 minutes or longer, the actions identified in Section 8.2.2 shall be taken.

8.2 Monitoring Action Levels

8.2.1 On-Site Levels

The PID or other appropriate instrument(s) will be used as specified in this Health and Safety Plan. Methane gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s) in accordance with this plan. In addition, fugitive dust/particulate concentrations will be monitored using a real-time particulate monitor as specified in this plan. Readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for on-site Benchmark-TurnKey personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to background on the PID) - Continue operations under Level D.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings above background to 5 ppm on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of 5 to 50 ppm above background on the PID - Continue operations under Level B, re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during construction activities. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5% - 21% oxygen - Proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - Leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities. Action levels based on the instrument readings shall be as follows:

- Less than 50 µg/m3 - Continue field operations.
- 50-150 µg/m3 - Don dust/particulate mask or equivalent
- Greater than 150 µg/m3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (i.e., wetting of excavated soils or tools at discretion of SSHO).

Readings with the combustible gas meter, particulate monitor and organic vapor analyzers will be recorded and documented in the Health and Safety Logbook. All instruments will be calibrated before use and the procedure will be documented in the Health and Safety Logbook.

8.2.2 Community Air Monitoring

In addition to the action levels prescribed in Section 8.2.1 for Benchmark-TurnKey personnel on-site, the following criteria shall also be adhered to for the protection of the downwind community consistent with NYSDOH requirements (see Attachment 2):

Organic Vapor Community Air Monitoring:

Community air monitoring will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A PID or other equipment will be suitable to the types of contaminants known or suspected to be present will be used, and will be capable of measuring and integrating over a 15-minute running average period. All air monitoring equipment will be calibrated daily. The 15-minute average concentrations will be compared to the levels specified below.

- If the 15-minute ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 1 ppm above background, work activities will be halted and monitoring continued. If the organic vapor decreases (per instantaneous readings) below 1 ppm over background, work activities can resume with continued monitoring.
- If the ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone persists at levels above 1 ppm over background but less than 25 ppm, activities must be halted, the source of vapors identified, corrective actions to abate the emissions taken, and monitoring continued. After these steps, work activities can resume provided that: the organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest off-site potential receptor or residential or commercial structure, whichever is less - but in no case less than 20 feet - is below 1 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the exclusion zone, work activities must be shut down and the following activities will be performed:
  - All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Attachment 1) will be advised.

- The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.
- Air monitoring will be continued at 1/2 the distance from the exclusion zone to the nearest receptor. All readings will be recorded and will be available for New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) personnel to review.

Explosive Vapor Community Air Monitoring

Explosive vapor community air monitoring will be performed at the downwind perimeter of the site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind site perimeter, the local Fire Department will be contacted (see Attachment 1 for phone number).

Airborne Particulate Community Air Monitoring

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading 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 provided that the downwind PM-10 particulate levels do not exceed 100 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.
- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 100 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful

in reducing the downwind PM-10 particulate concentration to within 100 ug/m^3 of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number and address of the Fire Department are included in Attachment 1 - Emergency Response Plan.

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-

petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes of 1,000 gallons or more, or lesser quantities that either form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.
- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a Site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on Site history and the scope of work, a hazardous material spill is not likely to occur during investigation efforts. However, the procedures identified below will be followed in the event of an unanticipated release.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented in Attachment 1 of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner who will in turn notify NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Benchmark-TurnKey will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails, and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal. If soil is impacted, it will be hand-excavated to the point that no visible signs of contamination remain and drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the Site. The response contractor may use heavy equipment (i.e., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/ cleanup contractors in the Western New York area that may be contacted for assistance (in order of preference) include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- Environmental Products and Services of Vermont, Inc.: (716) 597-0001

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released,

date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Although some of the RA activities will occur in a climate-controlled environment, measures will be taken to minimize heat/cold stress to Benchmark-TurnKey employees working outdoors. The SSHO and/or alternate SSHO will be responsible for monitoring Benchmark-TurnKey field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illness often encountered at construction, landfill, waste disposal, industrial, or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.
- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same. If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.
- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No Benchmark-TurnKey employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frostnip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue which will be firm to the touch but will yield little pain. The treatment is identical for Frostnip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frostnip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering
  2) Apathy (i.e., a change to an indifferent or uncaring mood)
  3) Unconsciousness
  4) Bodily freezing

  Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

  1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

  2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
  - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
  - At a workers request.
  - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).
  - As a screening measure whenever anyone worker on Site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for RA activities will be established by Benchmark-TurnKey on a daily basis and communicated to all employees and other Site users by the SSHO. It shall be the SSHO's responsibility to ensure that all Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.
- Contaminant Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contaminant Reduction Zone until decontaminated.
- Support Zone - The part of the Site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation activities involving disruption or handling of Site soils, sediment or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling activity.
- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling activity.
- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contaminant Reduction Zones will be strictly controlled by Benchmark-TurnKey. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO. The Contractor will maintain a Health and Safety Logbook containing the names of workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for Benchmark-TurnKey Employees

The degree of decontamination required is a function of a particular task and the environment in which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions which may arise at the Site. All Benchmark-TurnKey personnel on-site shall follow the procedure below.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive 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 cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for six consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke),

immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a Site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

Decontamination of heavy equipment will be conducted by the subcontractor in accordance with this approved HASP in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil clods, followed by high pressure water and detergent or steam cleaning.

Decontamination of all tools used for sample collection purposes will be conducted by Benchmark-TurnKey personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal) that will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by Benchmark-TurnKey employees is not anticipated to be necessary to complete the RA activities identified in Section 1.4. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by Benchmark-TurnKey employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through Benchmark-TurnKey's corporate Health and Safety Director. Benchmark-TurnKey employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper Site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by Benchmark-TurnKey and are required to be provided by the subcontractor on all heavy equipment brought on-site. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, which are used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blow torch operation, the hot work

permit presented in Attachment 3 will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Attachment 1.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Health and Safety Plan for RA Activities
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter	Maximum Groundwater Concentration (mg/L)
Tetrachloroethene	3.1
Trichloroethene	2.7
1,1,1 Trichloroethane	0.036

Notes:
1. Concentrations observed during July 2006 Site Investigation.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Health & Safety Plan for RA Activities
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (ppm):						
Tetrachloroethene	Perchloroethene, PCE	127-18-4	Ca	100	50	150
Trichloroethene	Ethylene trichloride, TCE	79-01-6	Ca	100	50	1000
1,1,1-Trichloroethane	1,1,1-TCA, Methyl chloroform	71-55-6	C	350	350	700

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:

Ca = NIOSH considers constituent to be a potential occupational carcinogen.

C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.

IDLH = Immediately Dangerous to Life or Health.

ND indicates that an IDLH has not as yet been determined.

TLV = Threshold Limit Value, est. by American Conference of Industrial Hygienists (ACGIH), equals the max. exposure conc. allowable for 8 hrs/day @ 40 hrs/week.

TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.

TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)

TLV-STEL or Short Term Exposure Limits are 15 min.exposures that should not be exceeded for even an instant. Not a stand alone value but is accompanied by the TLV-TWA.

It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceeded.

TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.

Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.

PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO CONSTITUENTS OF POTENTIAL CONCERN

Health and Safety Plan for RA Activities
Former Brainerd Manufacturing Facility
East Rochester, New York

Activity	Direct Contact with Surface and Subsurface Soils	Direct Contact with Groundwater	Inhalation of Vapors or Dust
Installation and Development of Extraction and Re-Injection Wells	X	X	X
gPRO System Installation	X	X	X
Groundwater Monitoring		X	X
ASD System Performance Monitoring			X

Notes:

1. Activity as described in Section 1.5 of the Health and Safety Plan.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 4

REQUIRED LEVELS OF PROTECTION

Health and Safety Plan for RA Activities
Former Brainerd Manufacturing Facility
East Rochester, New York

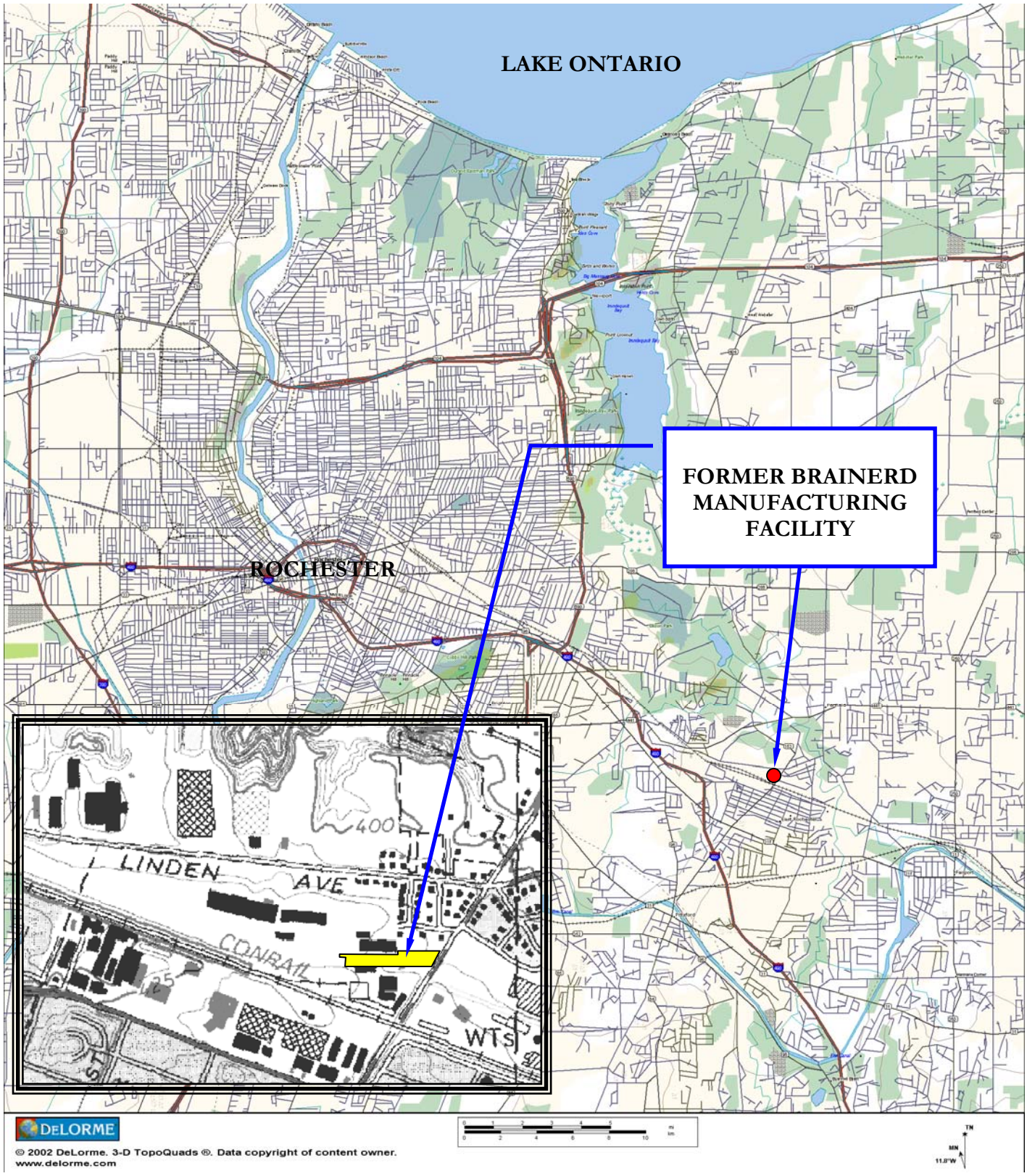
Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
Interim Remedial Measures Tasks					
Installation and Development of Extraction and Re-Injection Wells	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
gPRO System Installation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
Groundwater Monitoring	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
ASD System Performance Monitoring	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety s
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur.
   SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

FIGURE 1



BENCHMARK Environmental Engineering & Science, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

PROJECT NO.: 0040-002-400

DATE: JANUARY 2011

DRAFTED BY: BCH

FILEPATH:

SITE LOCATION AND VICINITY MAP

HASP FOR RA ACTIVITIES

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR
DESPATCH INDUSTRIES, INC.

ATTACHMENT 1

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
REMEDIAL ACTION ACTIVITIES

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

April 2011 0040-002-400

FORMER BRAINERD MANUFACTURING FACILITY
HEALTH AND SAFETY PLAN FOR RA ACTIVITIES
ATTACHMENT 1: EMERGENCY RESPONSE PLAN

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LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Remedial Action (RA) activities at the Former Brainerd Manufacturing Facility, 115 N Washington St., East Rochester, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on Site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire, due to use of gasoline on-site by vehicles

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features, however the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the Benchmark personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: *Thomas H. Forbes*
Work: (716) 856-0599
Mobile: (716) 864-1730

Corporate Health and Safety Director: *Thomas H. Forbes*
Work: (716) 856-0599
Mobile: (716) 864-1730

Site Safety and Health Officer (SSHO): *Bryan C. Hann*
Work: (716) 856-0635
Mobile: (716) 870-1165

Alternate SSHO: *Richard L. Dubisz*
Work: (716) 856-0635
Mobile: (716) 998-4334

ROCHESTER GENERAL HOSPITAL:	(585) 922-4000
FIRE:	911
AMBULANCE:	911
CITY OF ROCHESTER POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:

Former Brainerd Manufacturing Facility
115 N Washington St., East Rochester, NY 14445
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's SSHO to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction SSHO Officer to review evacuation routes and procedures as necessary and to inform all Benchmark-TurnKey workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (***Bryan Hann*** or ***Richard Dubisz***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that

these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying on them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (e.g., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on-site. If necessary, transport to medical center.
- Inhalation: Move to fresh air and, if necessary, transport to medical center.
- Ingestion: Decontaminate and transport to medical center.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to the Rochester General Hospital via ambulance. The SSHO will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Rochester General Hospital (see Figure A-1):

- Start out going southwest on N Washington St./NY-153 toward Monroe St.
- Turn right onto W Commercial St.
- Merge onto I-490 W toward Rochester.
- Merge onto NY-590 N via Exit 21.
- Merge onto NY-104 W via Exit 10A.
- Take the exit towards Goodman St./Portland Ave.
- Stay straight to go onto RT-104.
- Turn left onto Portland Ave./CR-114

The Rochester General Hospital is located at 1425 Portland Ave, Rochester, NY 14621, and is approximately 10 miles northwest of the Site.

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

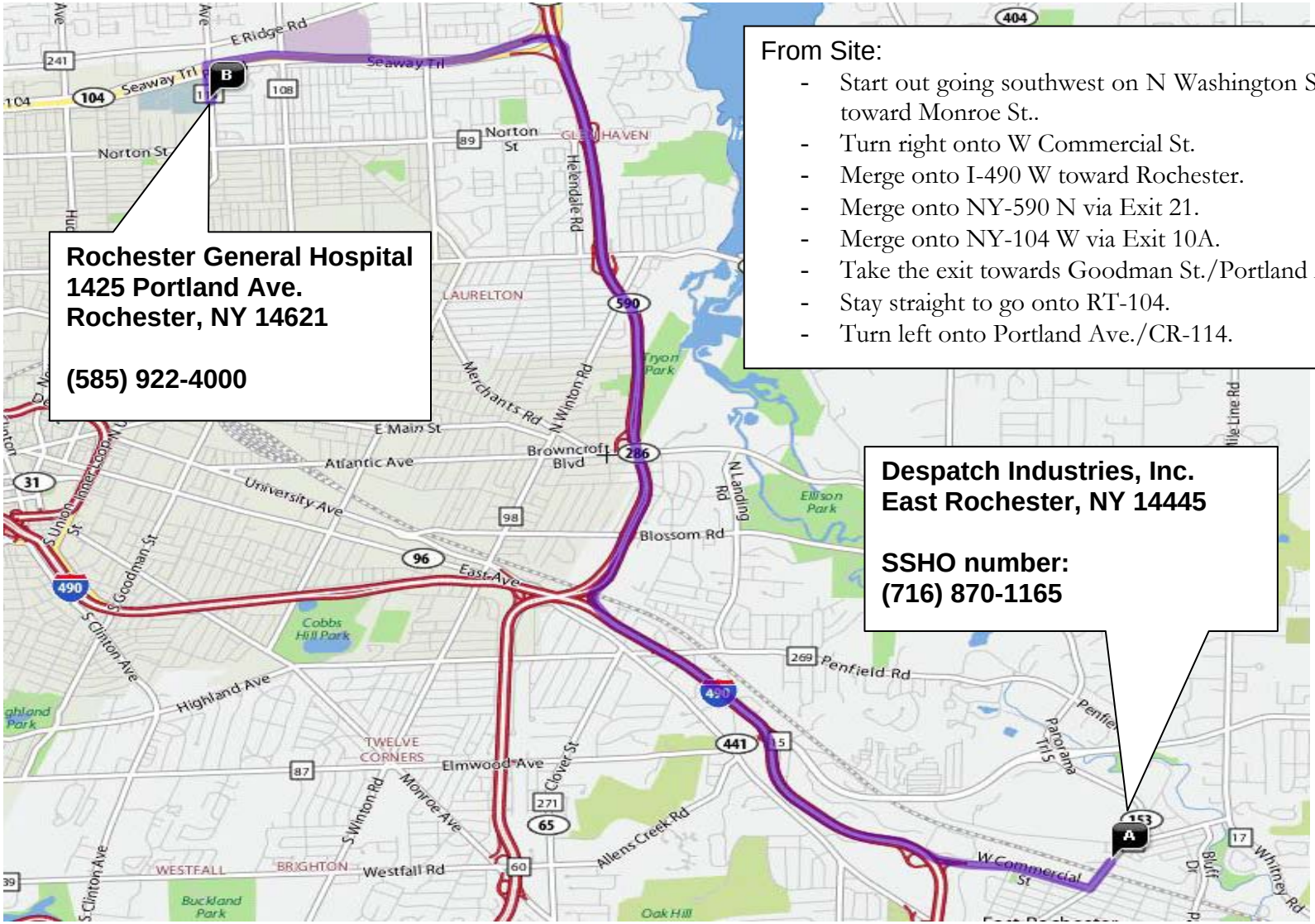
Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this Site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this Site.

FIGURES



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0040-002-400

DATE: DECEMBER 2009

DRAFTED BY: AJZ

HOSPITAL ROUTE MAP

EMERGENCY RESPONSE PLAN

115 N WASHINGTON STREET
EAST ROCHESTER, NEW YORK

PREPARED FOR
DEPATCH INDUSTRIES, INC.

FIGURE A-1

ATTACHMENT 2

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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 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 DEC/NYSDOH staff.

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. 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.

1. 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.

2. 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.

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

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) 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.

1. 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.

2. 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.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

ATTACHMENT 3

HOT WORK PERMIT FORM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

ATTACHMENT 4

HYDROGEN GAS – SAFETY CONSIDERATIONS AND MSDS

Product Name: Hydrogen	**CAS:** 1333-74-0
Hydrogen, Compressed (D.O.T); Water Gas	**DOT I.D No.:** UN 1049
Chemical Name and Synonyms: Hydrogen, Normal Hydrogen	**DOT Hazard Class:** Division 2.1
Formula: H_2	**Chemical Family:** Inorganic Flammable Gas

HEALTH HAZARD DATA

Time Weighted Average Exposure Limit:
Hydrogen is defined as a simple asphyxiant (ACGIH 1994-1995); OSHA 1993 PEL (8 Hr. TWA) = No Listing

Symptoms of Exposure:
Inhalation: High concentrations of hydrogen so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible nausea and eventual unconsciousness.

Toxicological Properties:

- Hydrogen is inactive biologically and essentially nontoxic; therefore, the major property is the exclusion of an adequate supply of oxygen to the lungs.
- Hydrogen is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.
- Persons in ill health where such illness would be aggravated by exposure to hydrogen should not be allowed to work with or handle this product.

Hazardous Mixtures of other Liquids, Solids or Gases: Hydrogen is flammable over a very wide range in air.	
PHYSICAL DATA	
Boiling Point: -423°F (-252.8°C)	**Liquid Density at Boiling Point:** 4.43 lb/ft3 (70.96 kg/m3)
Vapor Pressure @ 70°F (21.1°C) = Above the critical temperature of 399.8°F (-239.9°C)	**Gas Density at 70°F, 1 atm** .0052
Solubility in Water: Very slightly	**Freezing Point:** -434.6°F (-259.2°C)
Evaporation Rate: N/A (Gas)	**Specific Gravity (AIR=1)** @ 70°F (21.1°C) = .069
Appearance and Odor: Colorless, odorless gas	

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method used): N/A Gas	**Auto Ignition Temperature:** 1058°F (570°C)	**Flammable Limits % by Volume:** LEL 4 UEL 74.5
Extinguishing Media: Water, carbon dioxide, dry chemical		**Electrical Classification:** Class 1, Group B
Special Fire fighting Procedures: If possible, stop the flow of hydrogen. Cool surrounding containers with water spray. Hydrogen burns with an almost invisible flame of relatively low thermal radiation.		
Unusual Fire and Explosion Hazards: Hydrogen is very light and rises very rapidly in air. Should a hydrogen fire be extinguished and the flow of gas continue, increase ventilation to prevent an explosion hazard, particularly in the upper portions.		

REACTIVITY DATA

Stability: Stable
Incompatibility (Materials to Avoid): Oxidizers
Hazardous Decomposition Products: None
Hazardous Polymerization: Will not occur
Conditions to Avoid: None

SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:
Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

Waste disposal methods:
Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify type): Positive pressure air line with mask or selfcontained breathing apparatus should be available for emergency use.
Ventilation: Hood with forced ventilation
Local Exhaust: To prevent accumulation above the LEL
Mechanical (Gen.): In accordance with electrical codes
Protective Gloves: Plastic or rubber

SPECIAL PROTECTION INFORMATION—Cont

Eye Protection: Safety goggles or glasses
Other Protective Equipment: Safety shoes, safety shower

SPECIAL PRECAUTIONS

Special Labeling Information:
DOT Shipping Name: Hydrogen, Compressed
DOT Hazard Class: Division 2.1
DOT Shipping Label: Flammable Gas
I.D. No.: UN 1049

Special Handling Recommendation:
Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. For additional handling recommendations, consult Compressed Gas Association's Pamphlets G-5, P-1, P-14, and Safety Bulletin SB-2.

Special Storage Recommendations:
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of I noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in -first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area. For additional storage recommendations, consult Compressed Gas Association's Pamphlets G-5, P-1, P-14, and Safety Bulletin SB-2.

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

Special Packaging Recommendations:
Hydrogen is non-corrosive and may be used with any common structural material.

Introduction:

This document is a summary of the safety considerations that must be given when using iSOC® to infuse H_2 into groundwater. inVentures Technologies inc. does not accept responsibility for any damages arising from the use of hydrogen or any other compressed gases with the iSOC®. Remediation system using the iSOC® must be designed and approved by a qualified professional engineer considering all necessary and appropriate safety considerations and engineering specifications.

Safety Considerations:

Hydrogen is flammable and displaces oxygen, resulting in hazards of explosions, fires and anoxia. Hydrogen has specific properties that must be taken into considerations. It leaks easily due to the small size of its molecules; it is easily ignited, even by small static discharges; its flame is colourless; it burns rapidly and emits little heat (10% of the heat from hydrocarbons per comparable unit of energy); it forms flammable mixtures with air in a wide range of concentration (mixtures between 4% and 75% are flammable). Any cylinder containing a gas mixture greater than 2% Hydrogen is considered flammable. Since 2% H_2 is not likely to be enough partial pressure for bioremediation, an iSOC® system that uses hydrogen shall be designed to address issues of:

1. Leak prevention and detection

- Upon commissioning and maintenance, the system should be tested for leaks at all joints using appropriate gas detection methods, such as using the soapy solution to test fitting connections and using a lower explosion limit (LEL) detector to measure combustible gas content in the air.

2. Storage and ventilation of enclosed shelters and rooms

- Ideally, cylinders, gas lines and treatment wells shall be installed outdoors, protected from tampering, damage, corrosion, and if possible, severe weather (freezing rain, heavy snowfalls). An example for cylinder storage may be a chain-linked fence structure with a roof.
- If the cylinder is stored in a room or if piping/tubing containing flammable hydrogen runs through a room, the room is considered a classified area. Any electrical devices in this room mush comply with Electrical Codes (CSA C22.1 Canadian Electrical Code and NFPA 70 National Electrical Code) for Class 1, Zone1 and Group 2C. The top portion of the classified area is to be well ventilated.
- In the case of iSOC® installations where no electrical components are necessary for operation of the iSOC®, it is recommended that no electrical components be installed in the storage sheds, ground vaults or cabinets, which are considered enclosed areas. Enclosed areas shall be ventilated by openings located at a low point and at the highest point. A minimum of 10 volume exchanges of air per hour is recommended.
- For enclosed areas, an explosimeter or LEL detector shall be installed with a visible or audible alarm outside the area. This will warn the operator of a potential explosion prior to entering the area. Handheld or wall mounted hydrogen detectors can be found at http://www.h2scan.com/products.html.
- All cylinders are to be securely attached to a fixed structure.
- Do not store H_2 cylinders in the same room with oxygen cylinders. Ensure the pressure regulator is rated to the proper temperature range if the storage area is susceptible to freezing.

3. Tubing and Fittings

- Stainless steel tubing with compression fittings is to be used from the regulator to the wellhead. Paraflex CNG tubing with compression fittings can then be used for connections inside the well.

4. Well head space

- There is possibility of a rich Hydrogen environment in the head space of the well. Ventilation of the head space should be considered. As a minimum, the highest point of the well head should be open to atmosphere and warning labels to prohibit ignition sources within 20 ft (6 m) of the wells should be posted.

5. Warning Labels

- Placards in the official national language(s) should be posted at the entrance to any classified area or gas storage location to identify the presence of compressed gas, potential oxygen deficient atmosphere, presence of flammable gas products, and the need to ventilate the room adequately before entering due to risk of explosion.
- Warnings should also be posted to prohibit fire, ignitions sources and smoking near treatment wells.

APPENDIX B

REGENESIS PRODUCT INFORMATION AND PROPOSED DESIGN

PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation at an accelerated rate.

Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling
Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PlumeStop SDS.

REGENESIS

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

HRC® Technical Description

HRC® is an engineered, hydrogen release compound designed specifically for enhanced, *in situ* anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils. Upon contact with groundwater, this viscous, polylactate ester material becomes hydrated and subject to microbial breakdown producing a controlled-release of hydrogen for periods of up to 18-24 months on a single application.

Example of HRC

HRC enables enhanced anaerobic biodegradation by adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination. During this process, certain naturally occurring microorganisms replace chlorine atoms on chlorinated contaminants with the newly available hydrogen effectively reducing the contaminant to a less harmful substance with the preferred and innocuous endpoints of ethene or ethane.

For a list of treatable contaminants with the use of HRC, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Glycerol Tripolylactate- CAS #201167-72-8
- Glycerin- CAS #56-81-5
- Lactic acid- CAS #50-21-5

Properties

- pH - 3 (10% solution/water)
- Appearance – Viscous gel/liquid. Amber color
- Odor – Odorless

Storage and Handling Guidelines

Storage
Store away from incompatible materials
Store in original tightly closed container
Store in a cool, dry, well-ventilated place

Handling
Wash thoroughly after handling
Wear appropriate personal protective equipment
Wear eye/face protection
Provide adequate ventilation
Observe good industrial hygiene practices

HYDROGEN RELEASE COMPOUND

HRC® Technical Description

Applications

- Permanent injection wells
- Direct-push injection (barriers and grids)
- Recirculating wells
- Soil borings
- Excavation applications into soil or on top of bedrock
- Gravity feed into bedrock wells

Application instructions for this product are contained in the HRC Application Instructions.

Health and Safety

Avoid contact with eyes, skin, and clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Please review the HRC Safety Data Sheet for additional storage, usage, and handling requirements.

REGENESIS®

Corporate Headquarters
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

European Headquarters
The Tramshed, Beehive Yard
Walcot St, Bath BA1 5BB, United Kingdom

BDI PLUS® Technical Description

Bio-Dechlor INOCULUM Plus (BDI PLUS®) is an enriched natural consortium containing species of Dehalococcoides sp. (DHC). BDI PLUS has been shown to simulate the rapid and complete dechlorination of chlorinated solvents such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) to non-toxic end products, ethene, carbon dioxide and water.

The culture also contains microbes capable of dehalogenating halomethanes (e.g., carbon tetrachloride and chloroform) and haloethanes (e.g., 1,1,1-TCA and 1,1-DCA) as well as mixtures of these contaminants.

Species of Dehalococcoides sp. (DHC)

For a list of treatable contaminants with the use of BDI PLUS, view the Range of Treatable Contaminants Guide

Chemical Composition

- Non-hazardous, naturally-occurring, non-altered anaerobic microbes and enzymes in a water-based medium.

Properties

- Appearance – Murky, yellow to grey water
- Odor – Musty
- pH 6.0 to 8.0
- Density – Approximately 1.0 grams per cubic centimeter (0.9 to 1.1 g/cc)
- Solubility – Soluble in Water
- Vapor Pressure – None
- Non-hazardous

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Recommended storage containers: plastic lined steel, plastic, glass, aluminum, stainless steel, or reinforced fiberglass
Store in a cool, dry area at 4-5°C (39 - 41°F)
Material may be stored for up to 3 weeks at 2-4°C without aeration

Handling
Avoid prolonged exposure
Observe good industrial hygiene practices
Wear appropriate personal protective equipment

BDI PLUS® Technical Description

Applications

- BDI PLUS is delivered to the site in liquid form and is designed to be injected directly into the saturated zone requiring treatment.
- Most often diluted with de-oxygenated water prior to injection into either hydraulic push injection points or properly constructed injection wells.
- The typical dilution rate of the injected culture is 10 gallons of deoxygenated water to 1 liter of standard BDI PLUS culture.

Application instructions for this product are contained here BDI PLUS Application Instructions.

Health and Safety

Material is non-hazardous and relatively safe to handle; however avoid contact with eyes and prolonged contact with skin. OSHA Level D personal protection equipment including: vinyl or rubber gloves and safety goggles or a splash shield are recommended when handling this product. An eyewash station is recommended. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: BDI PLUS SDS.

REGENESIS

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

REGENESIS

Project Info

0.0

Rochester NY

PW 1R

Prepared For:

Tom Forbes. Benchmark

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	400
Top Treat Depth	ft	25.0
Bot Treat Depth	ft	35.0
Vertical Treatment Interval	ft	10.0
Treatment Zone Volume	ft^3	4,000
Treatment Zone Volume	cy	148
Soil Type	---	silty sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	9,874
Treatment Zone Effective Pore Volume	gals	5,984
Fraction Organic Carbon (foc)	g/g	0.003
Soil Density	g/cm^3	1.6
Soil Density	lb/ft^3	100
Soil Weight	lbs	4.0E+05
Hydraulic Conductivity	ft/day	5.0
Hydraulic Conductivity	cm/sec	1.76E-03
Hydraulic Gradient	ft/ft	0.007
GW Velocity	ft/day	0.18
GW Velocity	ft/yr	64

Sources of Hydrogen Demand	Unit	Value
Dissolved Phase Contaminant Mass	lbs	0
Sorbed Phase Contaminant Mass	lbs	1
Competing Electron Acceptor Mass	lbs	7
Total Mass Contributing to H_2 Demand	**lbs**	**8**

Stoichiometric Demand	Unit	Value
Stoichiometric H_2 Demand	lbs	1
Stoichiometric HRC Demand	**lbs**	**23**
Engineering/Safety Factor	**--**	**2**

Application Dosing	Unit	Value
Plume Stop to be Applied	**lbs**	**1,600**
HRC Primer to be Applied	**lbs**	**150**
BDI Plus to be Applied	**Liters**	**4**

PlumeStop® Application Design Summary

PW 1R	
Application Method	**Direct Push**
Spacing Within Rows (ft)	20
Spacing Between Rows (ft)	20
Application Points	**1**
Areal Extent (square ft)	400
Top Application Depth (ft bgs)	25
Bottom Application Depth (ft bgs)	35
PlumeStop to be Applied (lbs)	**1,600**
PlumeStop per point (lbs)	1600
PlumeStop per point (gals)	192
Mixing Water (gal)	**831**
Mixing Water (per pt)	831
Total Application Volume (gals)	**1,023**
Injection Volume per Point (gals)	1023
Anaerobic Bioremediation - HRC	
HRC Application Points	**1**
HRC to be Applied (lbs)	**150**
HRC per point (lbs)	150
Total Application Volume (gals)	**14**
Injection Volume per Point (gals)	13.8
Bioagumentation - BDI Plus	
BDI Plus Application Points	**1**
BDI Plus to be Applied (Liters)	**4**
BDI Plus per point (Liters)	4.0

Field App Instructions

Technical Notes/Discussion

Prepared By: Name

Date: 1/13/2017

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS

Project Info

0.0

Rochester NY

MW5&MW6 area total

Prepared For:

Tom Forbes. Benchmark

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	2,000
Top Treat Depth	ft	25.0
Bot Treat Depth	ft	35.0
Vertical Treatment Interval	ft	10.0
Treatment Zone Volume	ft^3	20,000
Treatment Zone Volume	cy	741
Soil Type	---	silty sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	49,371
Treatment Zone Effective Pore Volume	gals	29,922
Fraction Organic Carbon (foc)	g/g	0.003
Soil Density	g/cm^3	1.6
Soil Density	lb/ft^3	100
Soil Weight	lbs	2.0E+06
Hydraulic Conductivity	ft/day	5.0
Hydraulic Conductivity	cm/sec	1.76E-03
Hydraulic Gradient	ft/ft	0.007
GW Velocity	ft/day	0.18
GW Velocity	ft/yr	64

Sources of Hydrogen Demand	Unit	Value
Dissolved Phase Contaminant Mass	lbs	1
Sorbed Phase Contaminant Mass	lbs	3
Competing Electron Acceptor Mass	lbs	37
Total Mass Contributing to H_2 Demand	**lbs**	**41**

Stoichiometric Demand	Unit	Value
Stoichiometric H_2 Demand	lbs	3
Stoichiometric HRC Demand	**lbs**	**116**
Engineering/Safety Factor	**--**	**2**

Application Dosing	Unit	Value
Plume Stop to be Applied	**lbs**	**6,800**
HRC to be Applied	**lbs**	**800**
BDI Plus to be Applied	**Liters**	**18**

PlumeStop® Application Design Summary

MW5&MW6 area total	
Application Method	**Direct Push**
Spacing Within Rows (ft)	8
Spacing Between Rows (ft)	14
Application Points	**18**
Areal Extent (square ft)	2,000
Top Application Depth (ft bgs)	25
Bottom Application Depth (ft bgs)	35
PlumeStop to be Applied (lbs)	**6,800**
PlumeStop per point (lbs)	378
PlumeStop per point (gals)	45
Mixing Water (gal)	**5,113**
Mixing Water (per pt)	284
Total Application Volume (gals)	**5,928**
Injection Volume per Point (gals)	329
Anaerobic Bioremediation - HRC	
HRC Application Points	**18**
HRC to be Applied (lbs)	**800**
HRC per point (lbs)	44
Total Application Volume (gals)	**74**
Injection Volume per Point (gals)	4.1
Bioagumentation - BDI Plus	
BDI Plus Application Points	**18**
BDI Plus to be Applied (Liters)	**9**
BDI Plus per point (Liters)	0.5

Field App Instructions

Technical Notes/Discussion

Prepared By: ***Name***

Date: ***1/13/2017***

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

APPENDIX C

PROJECT DOCUMENTATION FORMS

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

DAILY LOG				
	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	PROJECT NO.
PROJECT LOCATION:	CLIENT:
FIELD ACTIVITY:	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS: A.M.:	IMPORTANT TELEPHONE CALLS:
P.M.:	
PERSONNEL ON SITE:	
SIGNATURE	DATE:

(CONTINUED)

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

DAILY LOG	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	PROJECT NO.

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

SIGNATURE	DATE:

(CONTINUED)

PROJECT NAME:	PROJECT NO.

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

DAILY LOG				
	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

REFERENCED PROJECT FIELD FORMS:

☐ Aquifer Test Data Sheet	☐ Impacted Soil Excavation Log	☐ Soil Gas Survey Log
☐ Chain-of-Custody Form	☐ Impacted Soil Transportation Log	☐ Step-Drawdown Test Data Sheet
☐ Construction Sample Summary Log	☐ Monitoring Well Inspection Form	☐ Survey Elevation Log
☐ Corrective Measures Report	☐ Nuclear Densitometer Field Log	☐ Tailgate Safety Meeting Form
☐ Daily Drilling Report	☐ Photographic Log	☐ Test Pit Excavation Log
☐ Drilling Safety Checklist	☐ Pipe Leakage Testing Log	☐ Underground/Overhead Utility Checklist
☐ Equipment Calibration Log	☐ Post-Closure Field Inspection Report	☐ Variance Log
☐ Field Borehole Log	☐ Pressure Packer Testing Log	☐ Water Level Monitoring Record
☐ Field Borehole/Monitoring Well Installation Log	☐ Problem Identification Report	☐ Water Quality Field Collection Log
☐ Field Investigation Report	☐ Real-Time Air Monitoring Log	☐ Water Sample Collection Log
☐ Field Slug Test Log	☐ Record of Telecom Meeting	☐ Well Abandonment/Decomm. Log
☐ Groundwater Elevation Log	☐ Sample Summary Collection Log	☐ Well Completion Detail
☐ GW Well Development and Purge Log	☐ Sediment Sample Collection Log	☐
☐ Hot Work Permit	☐ Seep Sample Collection Log	☐
☐ IDW Container Log	☐ Seepage Meter Sample Collection Log	☐

SIGNATURE DATE:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

DAILY LOG	DATE			
	REPORT NO.			
	PAGE	OF		

PROBLEM IDENTIFICATION REPORT

Date:
Project:
Job No:
Location:
CQA Monitor(s):
Client:
Contractor:
Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:
Ambient Air Temp. - P.M.:
Wind Direction:
Wind Speed:
Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
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DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:
Project:
Job No:
Location:
CQA Monitor(s):
Client:
Contractor:
Contractor's Supervisor:

WEATHER CONDITIONS:
Ambient Air Temp. - A.M.:
Ambient Air Temp. - P.M.:
Wind Direction:
Wind Speed:
Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative