ARAMARK Uniform Services (Syracuse) LLC
Former Christopher Service Company Site
3009 and 3117 Milton Avenue
Village of Solvay, New York

Voluntary Cleanup Project
VCP Site #V00665-7

Pre-Design
In-Situ Chemical Oxidation Pilot Test
& Remedial Action Work Plan

September 2007
Revision 1 – June 2008

Barton & Loguidice, P.C.
Engineers • Environmental Scientists • Planners • Landscape Architects

290 Elwood Davis Road
Box 3107
Syracuse, New York 13220

recycled paper

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Pre-Design In-Situ Chemical Oxidation Pilot Test & Remedial Action Work Plan

September 2007
Revision 1 – June 2008

Prepared for:

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1.0 Introduction and Purpose

ARAMARK Uniform Services (Syracuse) LLC ("ARAMARK") conducted an investigation of subsurface contamination in accordance with the New York State Department of Environmental Conservation's (NYSDEC) Voluntary Cleanup Program (VCP) at its 3009 and 3117 Milton Avenue facility located in the Village of Solvay, Onondaga County, New York (see Figure 1). The investigation and related activities were conducted under the oversight of The Wetlands Company, Barton & Loguidice, P.C. (B&L) and the New York State Department of Environmental Conservation (NYSDEC). The site is identified in the VCP registry as VCP #V00665-7.

The results of a sub-slab vapor survey have indicated the presence of chlorinated solvents, trichloroethene (TCE) and tetrachloroethene (PCE), above concentrations identified in the NYSDEC/NYSDOH Soil Vapor / Indoor Air Decision Matrices that warrant mitigation efforts. The elevated chlorinated solvent concentrations were limited to the western portion of the building near the former dry cleaning area (see Figure 2). The Voluntary Cleanup Site Investigation Report (Rev. No. 1 Submission, February 2007) envisioned implementation of a vapor mitigation system as an interim remedial measure prior to evaluation of the need for active source area remediation. Based upon further evaluation and comments from the Department, it appears chemical oxidation may be an effective way to both reduce contaminant mass at the site, and to bring contaminant levels below the NYSDEC/NYSDOH mitigation thresholds that would trigger the need for a vapor mitigation system. The current plan involves a phased approach: First, a pre-design in-situ chemical oxidation (ISCO) pilot test will be conducted to determine the feasibility of this remedial alternative. The pilot test will also be utilized to obtain pre-design data for the sub-slab ventilation system. If the pilot test is successful in eliminating, or decreasing the contaminant load to concentrations below the NYSDOH mitigation trigger values, sub-slab ventilation will not be implemented.

This Plan identifies the necessary tasks to complete the chemical oxidation assessment and sub-slab ventilation system design (if required). The Pre-Design ISCO Pilot Test Plan has been developed in accordance with the NYSDEC's May 2002 Voluntary Cleanup Guide and 6 NYCRR Part 375.

1.1 Site Description

The Site is approximately 0.75-acres and is situated at the southeast corner of the intersection of Milton Avenue and Bailey Street. The current primary site use is for an industrial laundry facility (3117 Milton Avenue), without dry cleaning operations. There is also a residential property (3009 Milton Avenue) located on the east side of the site which is currently vacant.

The majority of the Site consists of a two-story block building. There is a small parking area between the north side of the building and Milton Avenue. Beyond the rear of the building (south side) is a vacant area that historically abutted the backyards of two residential properties that were located on Third Street. The two properties on Third Street were purchased by ARAMARK and the houses have been demolished.

1.2 Site History

The main use of the western portion of the Site has been for industrial laundry services (with the eastern portion of the Site being occupied by a residential property). Historically, water washing and dry cleaning operations were conducted at the Site. From 1946 to 1953 the Site was operated as a storage and auto repair facility. Prior to use as an auto repair facility in 1946, the Site was utilized for residential housing. More detailed information regarding the Site History is available in the May 2006 Voluntary Cleanup Site Investigation Report (VCSIR).

1.3 Previous Investigations

Previous investigations conducted at the site include a 1999 Phase I Environmental Site Assessment (Phase I ESA) completed by LCS, a 2003 Limited Environmental Site Assessment Report and Supplement to the Site Investigation Report conducted by Ransom Environmental, and the most recently conducted Voluntary Cleanup Project Site Investigation by the Wetlands Company and B&L.

The first investigation conducted at the site was a Phase I ESA by LCS, Inc. in 1999. The Phase I ESA included a records review and non-intrusive site reconnaissance. No samples were collected as part of the Phase I ESA. LCS concluded that there was no historical evidence supporting the presence of a release of hazardous, toxic, or other contaminants of concern.

Ransom Environmental conducted a Limited Environmental Site Assessment in 2003. The Ransom investigation focused on two areas of concern at the laundry facility Site. The areas of concern included the former location of the 12,000-gallon fuel oil UST (located below the existing 10,000-gallon carbon dioxide AST) and the former dry cleaning area located in the interior of the western portion of the building.

The 2003 Ransom investigation included the installation of soil/groundwater borings by direct push methods. Soil and groundwater samples were collected. The investigation identified the presence of VOCs (including petroleum hydrocarbons and chlorinated solvents) and SVOCs (polynuclear aromatic hydrocarbons) at concentrations that exceeded NYSDEC TAGM 4046 recommended soil cleanup objectives and NYSDEC Groundwater Quality Standards. The source and extent of the contamination was not fully defined.

The most significant of the impacts were observed under the former dry cleaning area. Lower contaminant concentrations were observed adjacent to the former 12,000-gallon UST, and no impacts were observed adjacent to the residential property (3009 Milton Avenue).

A Supplement to the Limited Environmental Site Assessment and Site Investigation Report was prepared in November 2003 by Ransom Environmental, based on the collection of off-site groundwater samples. Although off-site impacts appeared minimal, VOCs (including petroleum hydrocarbons and chlorinated solvents) and SVOCs (polynuclear aromatic hydrocarbons) were identified at concentrations that exceeded NYSDEC Groundwater Quality Standards.

The Wetlands Company and B&L conducted a Voluntary Cleanup Site Investigation (VCP Site #V00665-7) for ARAMARK in accordance with the NYSDEC's May 2002 Draft Voluntary Cleanup Program Guide (see May 2006 VCSIR for complete investigation results). The field investigation activities included installation of subsurface soil borings and groundwater monitoring wells, installation of sub-slab and soil vapor survey points, and a residential private well survey. Several samples were collected as part of the investigation, including subsurface soil samples from the monitoring well borings, four rounds of groundwater samples from the permanent monitoring wells, and soil vapor samples from the sub-slab and soil gas survey points.

The results of these activities indicated the presence of residual petroleum-based contaminants (SVOCs) in subsurface soils, some of which exceeded their respective NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives. Subsurface soil exceedences were limited to SVOCs in proximity to MW-2 (located under the building near the former dry cleaning area) and MW-5 (western-most well on the north side of Milton Avenue – see Figure 2). Due to their isolated nature, relatively low-level exceedences, and lack of VOCs; subsurface soil impacts could potentially be managed through vapor mitigation without the need for active source remediation. However, there may be a benefit in implementing source control measures.

Residual petroleum-based and chlorinated solvent contaminants were also detected above NYSDEC Part 703 Groundwater Standards. It appears that there are two distinct groundwater plumes emanating from the site. Former monitoring well MW-6 delineates the western (downgradient) extent of the chlorinated solvent plume (see Figure 2). A petroleum-based plume (primarily indicated by elevated SVOCs) is present closer to Milton Avenue, but also encompasses a limited area below the building. The plume is delineated by historic GW locations with its terminus likely extending slightly beyond the MW-5.

The depth to groundwater is approximately 5 to 6 feet below grade, with the exception of shallower depths adjacent to Milton Avenue (i.e., MW-5 and MW-6). Groundwater flows from southeast to northwest. Transport of contaminants via groundwater has been limited due to a small horizontal groundwater gradient (<0.05%). The low-level groundwater exceedences combined with a lack of downgradient receptors (as confirmed by a residential well survey) justified pursuit of a vapor mitigation approach in lieu of active groundwater remediation at the site. NYSDEC granted abandonment of the monitoring well network. However, as discussed, implementation of chemical oxidation could either eliminate the need for a sub-slab ventilation system or reduce the period of time over which it would operate.

The results of the sub-slab vapor survey indicated the presence of chlorinated solvents, TCE and PCE, above concentrations identified in the NYSDEC/NYSDOH Soil/Vapor Indoor Air Decision Matrices that warrant mitigation efforts. The elevated chlorinated solvent concentrations were limited to the former dry cleaning area. Based upon these results, a phased approach for addressing the chlorinated solvents has been developed. First, a chemical oxidation pilot test will be conducted to determine the feasibility of this remedial alternative. The pilot test will also be utilized to obtain pre-design data for the design of a sub-slab ventilation system (if required). The necessity for the sub-slab ventilation system will be evaluated based upon the results of the ISCO pilot test. If ISCO is successful in eliminating, or decreasing the contaminant load to concentrations below NYSDOH mitigation trigger values, sub slab ventilation will not be implemented.

1.4 Summary of Environmental Conditions

Based upon observed site conditions, historical investigations and existing exposure scenarios, the following are potential contaminant migration pathways:

- Volatilization of organic constituents from subsurface soils and groundwater (vapor intrusion) under the western portion of the main building (3117 Milton Avenue).

- During potential future subsurface construction activities, one or more potential exposure pathways associated with residual subsurface soil, groundwater, and soil vapors could exist for potential construction site workers or wildlife.

The potential contaminant pathway for the volatilization of organic and chlorinated solvent vapors was verified by the results of the sub-slab and soil vapor survey. The results of the soil vapor monitoring, along with the Final NYSDEC/NYSDOH Soil Vapor/Indoor Air Decision Matrices that are the impetus for the remedial action are summarized in the following table (see Figure 2 for sample locations.

Parameter	Sub-slab Samples	
	VP-3	VP-4
TCE	**6,800**	**3,000**
PCE	**51,000**	**6,700**

*Sub-slab PCE concentrations >1,000 ug/m^3 require mitigation per Final NYS DEC/DOH matrices (October 2006). Sub-slab TCE concentrations >250 ug/m^3 require mitigation. TCE/PCE concentrations in **Bold** exceed NYS DEC/DOH concentrations that require mitigation. TCE/PCE concentrations in the unlisted historical vapor points were below thresholds requiring mitigation.*

1.5 Summary of Remedy

A mass reduction remedial practice will be evaluated. A pilot test will be conducted to determine the effectiveness of in-situ chemical oxidation (ISCO). ISCO involves injecting oxidants directly into contaminated soil and groundwater in order to destroy the contaminants in place. The oxidants react with the contaminants, ultimately producing innocuous substances such as carbon dioxide and water.

Depending upon the effectiveness of chemical oxidation, soil depressurization (sub-slab ventilation system) may also be utilized to prevent sub-slab vapors from entering the building. If necessary, suction fan(s) would be utilized to produce a low-pressure field under the slab, which will cause air to flow from the building into the soil to prevent mobilization of vapors into the building. The ventilation system would be augmented by sealing potential vapor routes in the existing slab over the area of impact.

1.6 Contemplated Use

Current site operations (commercial laundry without dry cleaning operations) are anticipated to be the future use of the Site.

2.0 Engineering Evaluation of the Remedy

The evaluation of the selected remedy was based on 6 NYCRR Part 375-1.8(f) including:

- Overall protectiveness of the public health and environment;
- Standards, criteria and guidance;
- Long term effectiveness and permanence;
- Reduction in toxicity, mobility or volume of contamination;
- Short term impacts and effectiveness;
- Implementability;
- Cost effectiveness; and
- Community acceptance.

2.1 Overall Protectiveness of Public Health and the Environment

Chemical oxidation could potentially reduce the overall contaminant mass such that the 1,000 ug/m^3 sub-slab vapor concentration can be met. If needed, the sub-slab ventilation system alternative would further reduce exposure risk.

2.2 Standards, Criteria, and Guidance (SCG)

The State of New York does not have any standards, criteria, or guidance values for concentrations of volatile chemicals in subsurface vapors (either soil vapor or sub-slab vapor). The use of chemical oxidation could directly reduce contaminant loadings at the Site. The utilization of sub-slab ventilation would minimize potential mobilization of contaminants through the existing slab. The results of the ISCO Pilot Test will be evaluated as outlined in Section 3.2.3.

2.3 Short-Term Effectiveness

Chemical oxidation would involve injections with a direct push drill unit above the areas of concern. Again, short-term construction impacts would be encountered. Subsurface contaminant destruction and degradation would be expedited with chemical oxidation. The destruction of the contaminant mass would likely make the 1,000 ug/m^3 sub-slab vapor concentration guidance value obtainable during the short term.

Sub-slab ventilation is a long-term mitigation practice utilized when there is no immediate threat to human health and the environment. The mitigation benefits are immediate. The installation of the ventilation system utilizes standard construction techniques and would result in short-term impacts to the Site. These impacts could be minimized by constructing the system during off-peak production hours.

2.4 Long-Term Effectiveness and Permanence

Chemical oxidation provides permanent contaminant destruction. The chemical oxidation process creates only limited permanent Site constraints, as all processes are subsurface.

Sub-slab ventilation is a long-term mitigation system. Once in place, the system has a low maintenance and operation burden. The system, however, may be required to be utilized for the duration of operations at the Site. Limited contaminant reduction would be achieved through the use of the sub-slab ventilation system. The remaining contamination, however, is isolated and the contaminant pathway is limited to indoor volatilization. This pathway would be eliminated through the installation of the sub-slab ventilation system.

2.5 Reduction of Toxicity, Mobility, and Volume

Chemical oxidation would destroy residual soil contaminants. Low level contaminants remaining after the chemical oxidation process, if any, would be of limited mass and extent and would be isolated from public access. Sub-slab ventilation would not significantly reduce the volume of contamination below the slab. It would, however, eliminate the potential contaminant exposure pathway.

2.6 Feasibility

The effectiveness of chemical oxidation is highly dependant upon soil characteristics and chemistry. The feasibility of chemical oxidation would be evaluated as part of the pilot test study. The injection processes associated with chemical oxidation are common remediation practices.

Sub-slab ventilation system design and operation is a common mitigation practice. The feasibility for implementation of sub-slab ventilation is high.

2.7 Community Acceptance

Given the limited exposure scenarios that exist, it is anticipated that the community would accept chemical oxidation, sub-slab ventilation or a combination of the two practices. Disruption to the active business at the Site would be expected during operations. These disturbances would be of a temporary nature.

2.8 Cost-Benefit Analysis

The estimated cost for the ISCO pilot test is approximately $20,000 to $30,000. Full scale implementation of ISCO would be dependent upon the pilot test, but may range from an additional $25,000 to $50,000. A detailed cost estimate of the sub-slab ventilation system would be provided as part of the Plans and Specifications, but typical installations cost $10,000 to $30,000. Annual operation and maintenance of the sub-slab ventilation system may be in the range of $2,000 to $5,000. A preliminary cost estimate to conduct the pilot test is provided as Figure 3.

3.0 Project Plans and Specifications

The project includes two separate objectives:

1. The evaluation of chemical oxidation for contaminant mass reduction, and

2. The design of a sub-slab ventilation system to eliminate the indoor air volatilization pathway of chlorinated solvents (if necessary based upon chemical oxidation results).

A phased approach will be conducted. First, the chemical oxidation pilot test will be conducted to determine the feasibility of this remedial alternative. The pilot test will also be utilized to obtain pre-design data for the sub-slab ventilation system. If the pilot test is successful in decreasing the contaminant load to concentrations below the NYSDOH mitigation trigger values, sub-slab ventilation will not be implemented. The NYSDOH TCE and PCE Indoor Air Matrices from the October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York will be utilized as the evaluation criteria to determine the need for sub-slab vapor mitigation following completion of the chemical oxidant pilot test. The following sections describe the incremental approach to the pilot test study and sub-slab ventilation system design.

3.1 Chemical Oxidation Pilot Test

The ISCO process proposed to be evaluated during this pilot test is known commercially as RegenOx™. This process is a two-part system: a solid alkaline oxidant in powdered form that contains sodium percarbonate (also known as "dry peroxide" and the primary active ingredient in OxiClean) and a liquid catalyst that contains aqueous ferrous sulfate. The oxidizer and catalyst are mixed with water to form a slurry that is injected into the contaminated media. In the subsurface, the combined product produces a surface-mediated oxidation reaction comparable to that of Fenton's Reagent without a violent exothermic reaction. Moreover, the RegenOx™ process does not require the addition of acids. Accordingly, two of the most problematic aspects of the Fenton's Reaction, i.e., generation of excessive heat and mobilization of naturally-occurring metals, are of significantly less concern when using the RegenOx™ process.

Site conditions appear favorable for the application of this technology. These site conditions include:

- Chlorinated solvents (TCE and PCE) are amenable to chemical oxidation.
- The contaminants are located within a medium permeability (gravel and sand, with some silt and clay lenses) and have not penetrated into the underlying low permeability glacial till.
- The naturally-occurring organic and carbonate content of the soils is expected to be low.
- DNAPL has not been observed and the concentrations of the TCE/PCE that have been observed in groundwater do not suggest the presence of DNAPL.

Given these factors, the ISCO process is likely to be an effective remedy for the Site. A limitation to the ISCO process is the active laundry operations and the site constraints the equipment poses.

3.2 Pilot Test Scope

3.2.1 Task 1: Pre-Pilot Test Sampling and Monitoring Point Installation

The proposed pre-pilot test soil boring (PTSB) locations are shown on Figure 4. A total of four (4) borings will be installed. It is anticipated that the borings will be completed using direct-push drilling methods. Each drilling location will be sampled continuously throughout the depth of the boring. Samples will be examined by the on-site B&L representative and will be logged as described in the Sampling and Analysis Plan contained in the original VCP Site Investigation Work Plan. The samples will also be examined for moisture content to determine the depth at which saturated samples are obtained, indicating the vertical position of the water table. The borings will be terminated at the till layer (approximately 12 feet below grade). All analytical work conducted for environmental samples collected from the site will be performed by an ELAP-certified laboratory.

3.2.1.1 Soil Sample Organic Vapor Screening

Using a photo ionization detector (PID), each soil sample taken during the drilling program will be screened for total volatile organic vapors as outlined in the VCP Sampling and Analysis Plan. Soil samples will be collected for laboratory analysis from each boring and will be analyzed for VOCs using EPA SW-846 Methods. The samples will be placed in glass sample jars and stored on ice prior to transport to the analytical laboratory. Samples will be submitted from the "smear" zone, approximately 6-8 feet below grade. In addition, a single representative soil sample will be submitted to Regenesis for determination of Total Oxidant Demand and fractional organic content.

3.2.1.2 Monitoring Point Installation

Four (4) temporary monitoring wells consisting of one-and-one-half-inch diameter temporary wells installed with five-foot screens will be installed for the pilot test. The proposed monitoring locations are shown on Figure 4. Once the new monitoring points have been installed, an electronic water level meter will be used to obtain accurate water level measurements to the nearest 100th of a foot.

3.2.1.3 Groundwater Sample Collection and Analysis

A representative groundwater sample will be submitted to Regenesis for determination of Total Oxidant Demand.

3.2.1.4 Sub-slab Vapor Sample and Analysis

Baseline sub-slab vapor samples will be collected at existing vapor points VP-3 and 4 and new vapor points VP-11 and 12. VP-11 and 12 will be constructed in accordance with the VCP Site Investigation Work Plan. The samples will be analyzed for VOCs using TO-15 Methods in accordance with the VCP Site Investigation Work Plan.

3.2.1.5 Location and Elevation Survey of Investigation Points

The location and elevation of each new soil boring, temporary well, soil vapor monitoring location, and injection point will be determined by differential survey utilizing the datum of existing monitoring well MW-2.

3.2.2 Pilot Test Implementation

The actual quantity of material injected as part of the pilot test will be determined based upon the pre-pilot test sample results. The results will be submitted to Regenesis for recommended injection spacing and pounds/per foot application rate. For the purposes of this work plan, it is assumed that 20/lbs. of oxidant will be injected per foot from a depth of 5-12 feet below grade at seven locations (see Figure 4). A total of 980 pounds of oxidant is estimated to be injected (actual quantities are dependant upon pre-pilot test results). Procedures for oxidant injection are provided as Attachment A. If pre-pilot test results do not reveal elevated concentrations (ppm range) of PCE and TCE in the soil, the chemical oxidation injection may be replaced with hydrogen releasing compound (HRC) injection. HRC is better suited for contaminant reduction of lower level chlorinated solvent concentrations in anaerobic environments.

Dispersion of the oxidant through the saturated zone will be monitored in the four temporary groundwater monitoring points depicted on Figure 4. Groundwater indicator parameters measured during the test (using field instruments and/or test kits) will include temperature, pH, specific conductance, dissolved oxygen (DO), oxidation/reduction potential (ORP), alkalinity, water level, and hydrogen peroxide. Soil vapor monitoring will include carbon dioxide, oxygen, temperature, and total volatile organic constituents by photo ionization detector. Measurements will be taken on an at least an hourly basis during oxidant injection and through the first day of the pilot test and at least twice daily during the second day of the pilot test.

3.2.2.1 Post-Injection Monitoring

Groundwater indicator parameters (as defined above) will be measured bi-weekly for a period of four to six weeks following the pilot test injection. Monitoring will allow for an assessment of the dispersion (radius of influence) of the ISCO injection. It will determine the amount of time for the oxidant to be consumed, which would be used to evaluate the frequency of subsequent injections.

Post-injection soil samples will be collected from direct-push borings that will be completed in close proximity to the pre-injection soil borings. The analytical data from these borings will establish the post-injection mass of contaminants present in the pilot test area soils. The samples will be analyzed for VOCs using EPA SW-846 Methods.

Post-Injection sub-slab vapor samples will also be collected from VP-3, 4, 11 and 12 for analysis of VOCs via EPA Method TO-15.

The proposed work will require three mobilizations by a drilling subcontractor. The first mobilization will provide installation of pre-injection pilot test soil borings, temporary wells 1 through 4 and vapor monitoring points VP-11 and 12. The second mobilization will be for the injection of the ISCO. The third mobilization will be for the installation of post-injection pilot test soil borings 1 through 4.

3.2.3 *Pilot Test Data Evaluation*

The data obtained from the post-injection sub-slab vapor sampling from VP-3, 4, 11 and 12 will be evaluated against the NYSDOH Indoor Air Matrices to determine the need for sub-slab mitigation (i.e. installation of a sub-slab ventilation system). Vapor sampling data will be reported in micrograms/cubic meter (ug/m^3). The following criteria will be utilized to determine the subsequent phases following the chemical oxidant pilot test:

Compound	Sub-Slab Trigger Value Concentrations (mcg/m^3)		
	No Further Action Required	Monitoring Required	Mitigation Required
TCE	<50	50 to <250	250 and above
PCE	<100	100 to <1,000	1,000 and above

In order for no further action to be obtained, both compounds (TCE and PCE) will be required to be less than the indicated trigger values at all of the post-injection sub-slab monitoring locations. Under this scenario, no additional chemical oxidant injections would be conducted and all remaining monitoring points would be abandoned. Cracks and penetrations in the slab would be sealed.

If the TCE and PCE post-injection concentrations fall within the monitoring requirement range, additional vapor samples will be collected. The frequency and location of additional vapor sampling will be determined based upon the initial post-injection sampling results. Additional injections of chemical oxidant would also be evaluated to decrease contaminant concentrations towards the no further action trigger values.

Sub-slab ventilation will only be required if the TCE or PCE post injection concentrations exceed the monitoring trigger values. If chemical oxidation was successful in significantly reducing the contaminant mass, albeit not to levels below the mitigation trigger values, subsequent injections of the chemical oxidant would be evaluated to decrease contaminant concentrations towards the no further action or monitoring trigger values. If site conditions are not amenable to chemical oxidant contaminant reduction (concentrations cannot be reduced to below the trigger values), the design and installation of a sub-slab ventilation system as outlined in Section 3.3 will be conducted.

Soil samples collected as part of the ISCO pilot test will be evaluated against Part 375 soil cleanup objectives. Groundwater samples collected as part of the ISCO pilot test will be evaluated against New York State groundwater standards.

3.3 Sub-slab Ventilation System

The need for the sub-slab ventilation system will be based upon the pilot test study results as outlined above. Data obtained from the pilot test study will be utilized for the operating parameters of the sub-slab ventilation system design. Detailed Plans and Specifications would be submitted for review once the pilot test design data is acquired. Depending upon the size, the design will be in accordance with ASTM E-2121 (Standards Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings), or the EPA's

Radon Prevention in the Design and Construction of Schools and other Large Buildings (June 1994).

Given the site constraints posed by the existing building slab (3-4 feet thick in locations) and facility equipment, the ventilation system would likely need to be accomplished by individual sub-slab well points equipped with in-line exhaust fans. The location of the well points and fan sizing will be established as part of the Detailed Plans and Specifications to be submitted after the pilot test. The final design would also determine if a crawl space depressurization system is required near the former dry cleaning area (basement area indicated on site plan). The following general requirements will be incorporated into the sub-slab ventilation system design (if required):

1. *Sealing* – the slab above the area of impact will be inspected for cracks and penetrations. Elastomeric joint sealant, caulks, mortar, grouts, expandable foam, etc. will be utilized to seal identified penetrations.

2. *Depressurization Diagnostic Test* – once the limits of the sub-slab ventilation system are determined, a diagnostic test will be conducted to determine the ability of the sub-slab suction field. A hole will be drilled in the slab near the center of the area of interest and suction will be applied. Smaller holes will be inserted around the suction hole and a digital micromanometer, or other means, will be utilized to quantify sub-slab air flow.

3. *Well Point Installation* – well points will be installed in radon suction pits within the slab at a distance to ensure an overlap of the suction radius of influence. In-line active fans will be utilized for depressurization.

4. *Vent Pipe Exhaust* – to be located above the eave of the building roof at least 25-feet from any outdoor air intakes.

5. *Labeling* – all subsurface piping will be labeled as "SSD System" (Sub-slab Depressurization System).

6. *System Failure Warning* – The exhaust fans will be equipped with a warning device (e.g., light indicator, gauge, etc.) to indicate equipment failure.

4.0 Institutional Controls

An operation and maintenance plan would be submitted for the sub-slab ventilation system as part of final design (with the Plans and Specifications submittal). If a sub-slab ventilation system is required to be installed, a use restriction will be developed that mandates operation of the system until it is no longer needed. A mitigation monitoring plan would also be prepared that includes the following:

- Testing of combustion or vented appliances for back drafting.
- Calibration of the depressurization system.
- Testing of the warning device.
- Weekly checks of pressure gauges in the vent pipes.
- Annual system inspection:
  - Fan bearings
  - Exhaust pipe conditions
  - Check for cracks and penetrations in the slab
- Annual sub-slab air monitoring (frequency to be reduced based upon initial results).

5.0 Health and Safety Plans

The existing VCP Health and Safety Plan (January 2004) will be utilized for the investigation.

6.0 Quality Assurance/Quality Control

The methods outlined in the VCP Sampling and Analysis Plan for QA/QC will continue to be analyzed. These methods include decontamination procedures, use of field and trip blanks, proper documentation (including sampling data sheets and laboratory chain of custody), and data analysis including preparation of data summary tables. The summary tables will be prepared following thorough review of the data with the guidelines as outlined by the ASP protocol and the individual laboratory case narratives.

7.0 Schedule

The project schedule is depicted on Figure 5. The schedule is contingent upon NYSDEC review and may change depending on the results of the ISCO pilot test.

8.0 Reporting

A Pilot Test Summary Report will be prepared following the ISCO injection. The report will summarize the field methodologies and results and will provide recommendations for future actions (i.e. no further action, monitoring, or mitigation). If vapor mitigation is required, sub-slab ventilation Plans and Specifications will be submitted as a separate deliverable. An Operation and Maintenance Plan, including the necessary institutional controls, will be submitted with the Final Plans and Specifications. Monthly Reporting will continue in accordance with the VCP agreement.

9.0 Project Organization

The Wetlands Company is the prime engineering contractor for ARAMARK Uniform Services (Syracuse) LLC. B&L will report directly to the Wetlands Company for all services required on the project. With approval from the Wetlands Company, B&L will serve as direct liaison with the NYSDEC throughout the duration of the project.

The B&L Project Officer will be Scott D. Nostrand, P.E. Mr. Nostrand has the authority to commit resources and resolve potential project scheduling conflicts. Mr. Nostrand will have primary responsibility for oversight planning and implementation of the project.

The Project Manager will be David R. Hanny. The Project Manager will be in charge of all field activities related to the Pre-Design ISCO Pilot Test. The Project Manager will be responsible for scheduling and implementing the field activities, and will have primary contact with project subcontractors, The Wetlands Company, and NYSDEC. Mr. Hanny will also serve as the Quality Assurance Officer for this project. These responsibilities will include performing periodic field audits during the pilot test and sub-slab ventilation system installation and interfacing with the analytical laboratory to assure that the predetermined project objectives for data quality have been met.

Figure 1

Site Location Map

Project No. 909.001

Figure 1- Project Location Map
ARAMARK Uniform Services
Voluntary Cleanup Project

Village of Solvay | Onondaga Co., NY

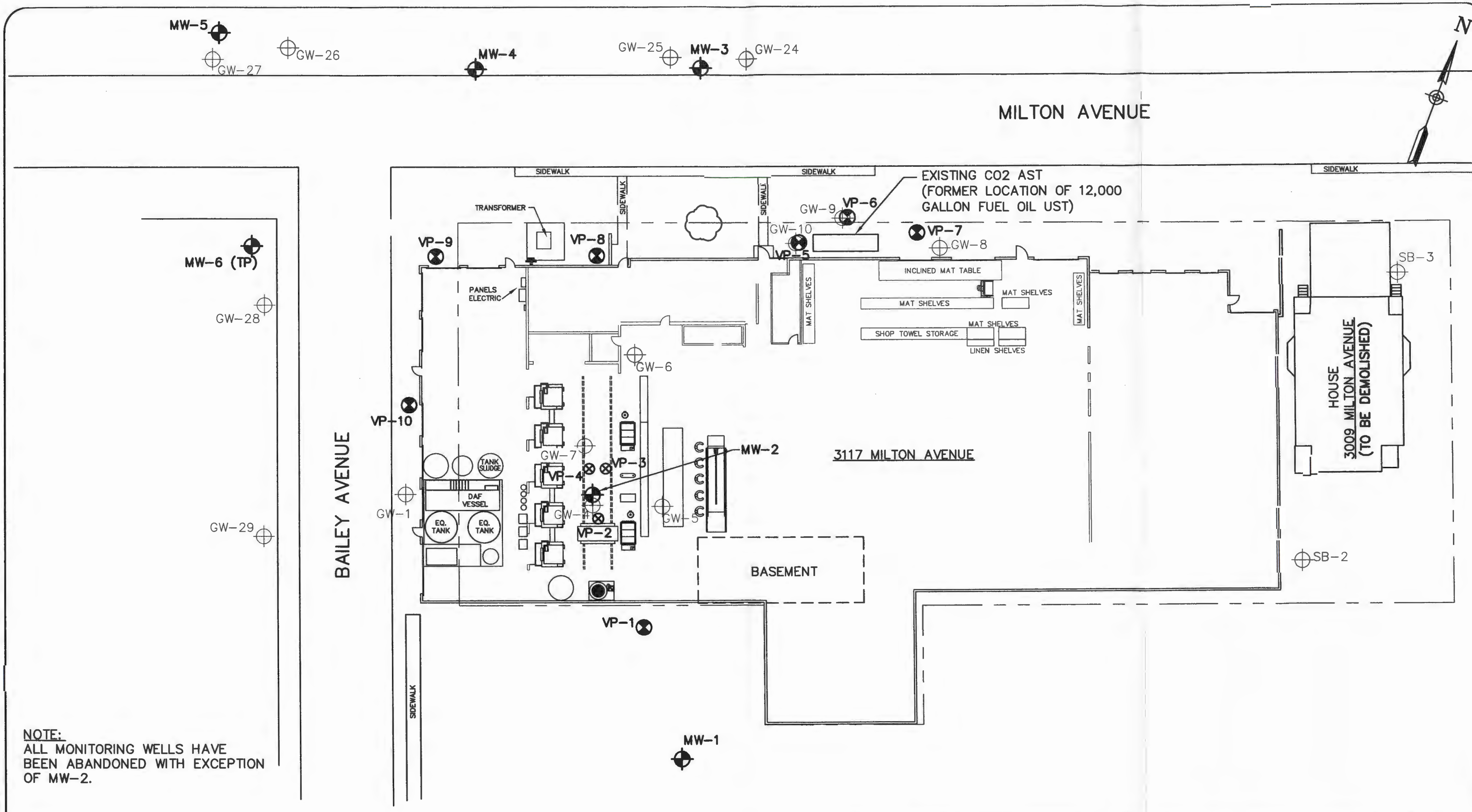
N

Barton & Loguidice, P.C.
Consulting Engineers

Base Map: USGS 7.5' Topographic Quadrangle Syracuse West, N.Y. (1978)

Figure 2

Historic Sample Locations



NOTE:
ALL MONITORING WELLS HAVE BEEN ABANDONED WITH EXCEPTION OF MW-2.

LEGEND:

- ⊗ SUB-SLAB VAPOR SURVEY POINT (EXISTING)
- SOIL GAS VAPOR SURVEY POINT (ABANDONED)
- ⊕ FORMER TEMPORARY SOIL AND/OR GROUNDWATER SAMPLE LOCATION
- MONITORING WELL LOCATION (MW-2 ONLY EXISTING LOCATION)

SCALE: 1"= 30'

Barton & Loguidice, P.C.
Engineers · Environmental Scientists · Planners · Landscape Architects

ARAMARK UNIFORM SERVICES

HISTORIC SAMPLE LOCATIONS

VILLAGE OF SOLVAY ONONDAGA COUNTY, N.Y.

Figure 2

Project No. 909.001

[redacted]
L: LS=,OR L:ON=;OFF=
P: STANDARD.PC3.CTB

11/7/05-SYR-MJ, JGS
900/SI_REPORT/909001_FIG02

Figure 3

Preliminary Pilot Test Cost Estimate

Figure 3
"ISCO Preliminary Cost Estimate"
ARAMARK Uniform Services (Syracuse) LLC
Remedial Action Work Plan

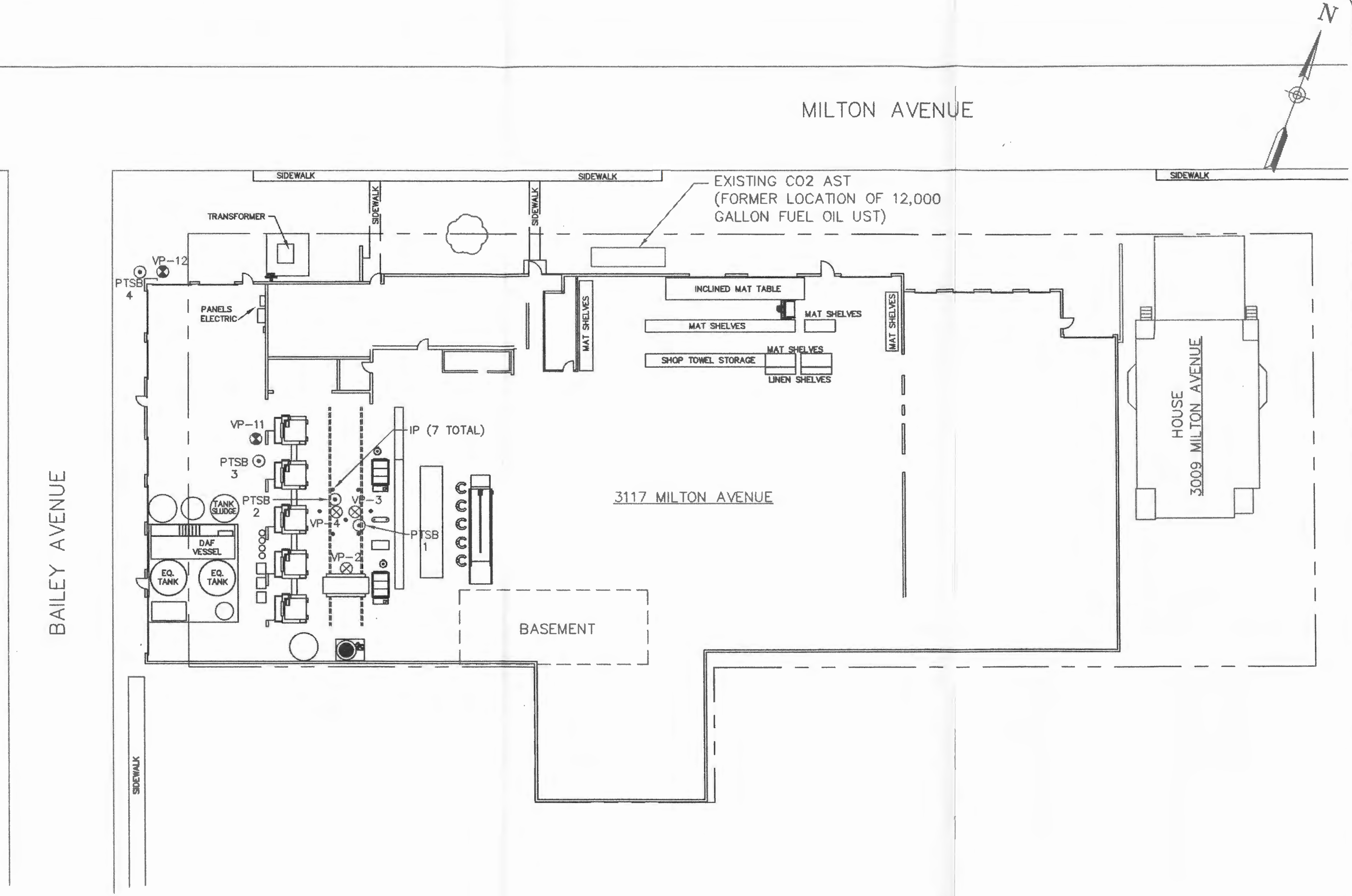
Item	Unit cost	Unit	Quantity	Cost
Pilot Test				
Pre-Injection Sampling (4 soil borings/4 vapor points)				
Direct Push Contractor	$2,200.00	day	1	$ 2,200.00
Sampling/Boring Installation Oversight	$1,200.00	round	1	$ 1,200.00
Laboratory				
Soil VOCs	$150.00	sample	4	$ 600.00
Vapor VOCs	$250.00	sample	4	$ 1,000.00
Oxidant Demand/Fractional Organic Content	$350.00	sample	2	$ 700.00
Injection of 980 lbs oxidant/activator (inc s/h)	$2.50	lb	980	$ 2,450.00
Direct Push Contractor	$2,200.00	day	1	$ 2,200.00
Biweekly Post-Injection Field Monitoring	$350.00	round	3	$ 1,050.00
Post-Injection Sampling				
Laboratory				
Soil VOCs	$150.00	sample	4	$ 600.00
Vapor VOCs	$250.00	sample	4	$ 1,000.00
Direct Push Contractor	$2,200.00	day	1	$ 2,200.00
Sampling and Boring Installation Oversight	$1,200.00	round	1	$ 1,200.00
Pilot Test Report (non-inclusive of Plans & Specs)	$3,800.00	ea	1	$ 3,800.00
Pilot Test Subtotal				*$ 20,200.00*
Oxidant and Activator Injection (Assume 3 Additional Rounds)				
Injection of 980 lbs oxidant	$2.50	lb	2940	$ 7,350.00
Direct Push Contractor	$2,200.00	day	3	$ 6,600.00
Field Oversight	$1,200.00	round	3	$ 3,600.00
Biweekly Post-Injection Field Monitoring	$350.00	round	9	$ 3,150.00
Post-Injection Vapor Sampling				
Laboratory				
Vapor VOCs	$250.00	sample	12	$ 3,000.00
Sampling	$800.00	round	3	$ 2,400.00
Injection Report	$2,900.00	ea	1	$ 2,900.00
Injection Subtotal				*$ 26,100.00*
Subtotal (pilot test and 3 additional injections)				$ 46,300.00
Engineering (20%)				$ 9,260.00
Contingency (15%)				$ 6,945.00
Total Estimated Costs				**$ 62,505.00**

Figure 4

Pilot Test Plan

NOTE:

1. PRE AND POST SOIL BORING SAMPLES TO BE COLLECTED FROM THE ONE-FOOT INERVAL ABOVE THE SATURATED ZONE (APPROX. 6-7 FBG @ LOCATIONS PTSB-1, 2 AND 3; AND 7-8 FBG @ LOCATION PTSB-4)
2. PTSB-PILOT TEST SOIL BORING
3. TEMPORARY WELLS TO BE SE AT THE TILL LAYER (APPROX. 12 FBG) AND SCREENED FROM 5 FBG TO WELL BOTTOM.
4. PTSB TO BE ANALYZED FOR VOCS VIA EPA METHOD 8260.
5. TEMPORARY WELLS TO BE TESTED FOR ISCO FIELD PARAMETERS.
6. PTSB-2 SOIL TO ALSO BE ANALYZED FOR TOTAL OXIDANT DEMAND AND FRACTIONAL ORGANIC CONTENT.
7. PTSB-2 GROUNDWATER TO ALSO BE ANALYZED FOR TOTAL OXIDANT DEMAND.
8. AN ADDITIONAL MOBILIZATION WILL BE REQUIRED BY THE DRILLING CONTRACTOR TO INSTALL THE POST-PILOT TEST SOIL BORINGS. THEY WILL BE INSTALLED IMMEDIATELY ADJACENT TO THE PRE-PILOT TEST SOIL BORINGS.



LEGEND:

- ⊗ EXISTING SUB-SLAB VAPOR SURVEY POINT
- SOIL GAS/ SUB-SLAB VAPOR SURVEY POINT (TO BE INSTALLED)
- • ISCO INJECTION POINT (IP)
- ⊙ PRE AND POST PILOT TEST SOIL BORING AND TEMPORARY WELL

SCALE: 1"= 30'

Barton & Loguidice, P.C.
Engineers·Environmental Scientists·Planners·Landscape Architects

ARAMARK UNIFORM SERVICES

ISCO PILOT TEST

VILLAGE OF SOLVAY ONONDAGA COUNTY, N.Y.

Figure 4

Project No. 909.001

X: XREF(S)_W/_(ROT/TWIST)
L: LS=;OR L:ON=;OFF=
P: STANDARD.PC3.CTB

11/7/05-SYR-MJ, SMT
900/SI_REPORT/909001_FIG04

Figure 5

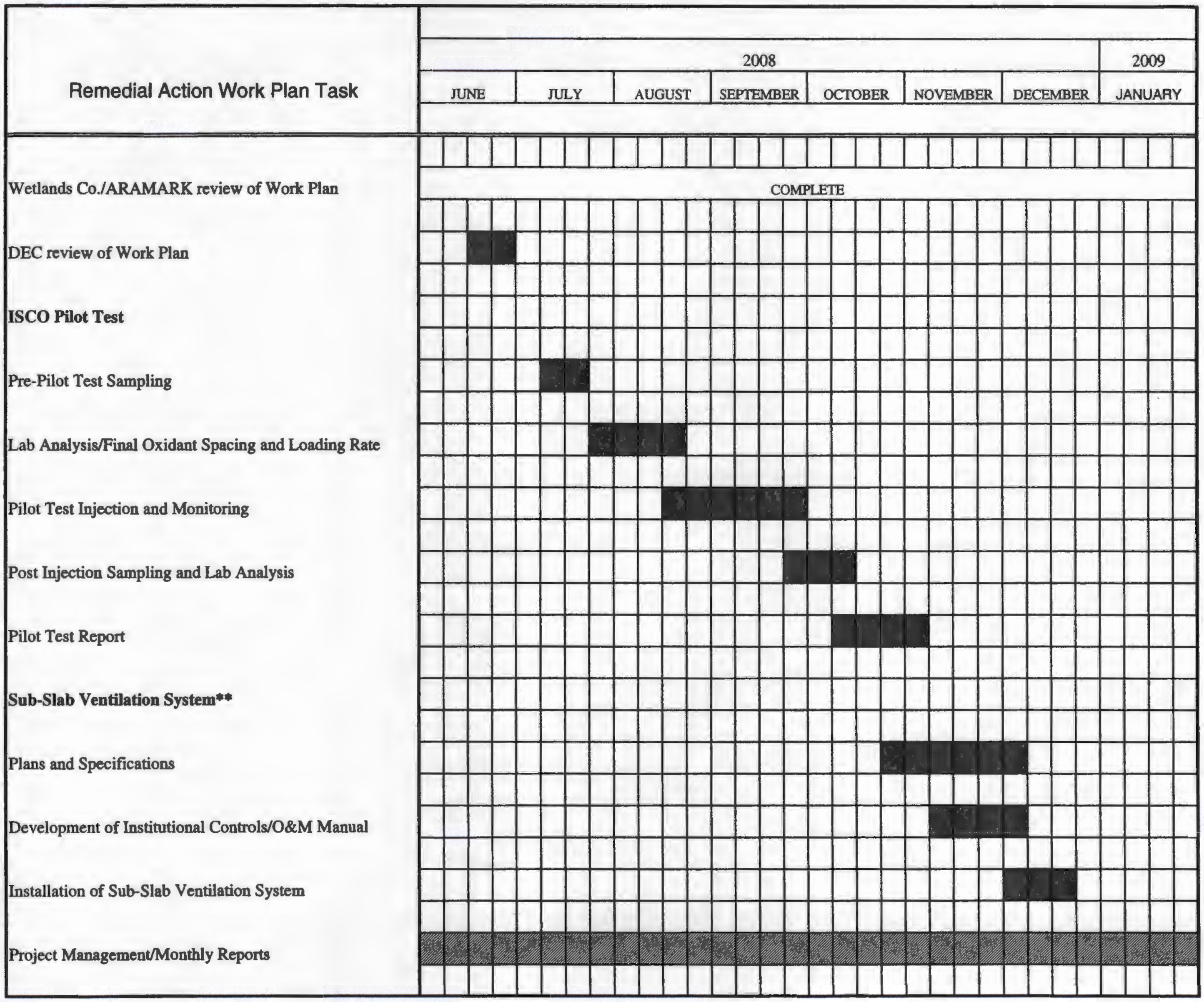
Project Schedule

FIGURE 5

PROJECT SCHEDULE

ARAMARK Uniform Services (Syracuse) LLC

Pre-Design ISCO Pilot Test



Note:

**Dependant upon results of ISCO Pilot Test. If ISCO is successful, subsequent injections may be conducted and sub-slab ventilation may not be required. Recommendations to be provided in the ISCO Pilot Test Summary Report.

Attachment A

Chemical Oxidation Installation Instructions

REGENESIS

RegenOx™

CHEMICAL OXIDATION REDEFINED...

INSTALLATION INSTRUCTIONS

Direct-Push Injection

GENERAL GUIDELINES

One of the best methods to deliver RegenOx™ into the subsurface is to inject the material through direct push rods using hydraulic equipment. This approach increases the spreading and mixing of RegenOx into the aquifer. This set of instructions is specific to direct push equipment. For advice on other injections methods such as soil mixing, hydraulic and pneumatic fracturing, and vertical injection, please contact Technical Services directly.

The installation of RegenOx should span the entire vertical contaminated saturated thickness, or in the case of vadose zone treatment the entire affected vadose zone targeted for treatment.

TYPICAL INSTALLATION EQUIPMENT

- Direct push rig
- Drive Rods (typically 1 ½-inch O.D.) & Injection Tooling with fluid deliver sub-assembly
- Injection Pump rated for 5 gpm @ 200 psi for sandy formations and 800 psi for silt and clay formations (Geoprobe DP-800, Yamada, Moyno, Rupe Models 9-1500 and 9-1600, Wilden, etc.)
- Injection hosing and a pressure relief valve with a bypass
- Clear hosing between mixing tank/drum and pump
- Pressure gauges
- Power drill paint stirrer (3-inch diameter or smaller propeller tip)
- Plastic bucket lid puller tool/opener tool
- 5-amp sump pump (such as Little Giant) and hose
- Three to four 55-gallon drums or similarly sized mixing tanks for RegenOx mixing
- Sand, bentonite chips, granular bentonite, cement, hydraulic cement, and quick-set concrete for closing and sealing temporary injection holes
- Wood plugs or similar for temporarily sealing injection holes prior to grout sealing
- Access to water
- Access to electricity

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personnel working with or in areas of potential contact with RegenOx should be required at a minimum to be fitted with modified Level D personal protective equipment:

- Eye protection – Wear well sealed goggles or a face shield (face shield recommended for full face protection)
- Head – Hard hat when required
- Respiratory – Use dust respirator approved by NIOSH/MSA
- Hands – Wear neoprene gloves
- Feet – Wear steel toe shoes with chemical resistant soles or neoprene boots
- Clothing – Wear long sleeve shirts and long pant legs. Consider using a Tyvek® body suit, Carhartt® coverall or splash gear

MATERIAL OVERVIEW, HANDLING, AND SAFETY

RegenOx is packaged in two parts. Part A is the RegenOx Oxidizer complex and Part B is the RegenOx Activator complex. Part A and Part B are shipped in separate 5-gallon buckets and each bucket has a gross weight of approximately 32 pounds (net weight of RegenOx material in each bucket is 30 pounds). The RegenOx Oxidizer complex is shipped as a fine white powder and the RegenOx Activator complex is shipped as a liquid gel. The Activator has a viscosity roughly equivalent to honey. It is common for stored RegenOx Activator to settle somewhat in a container, so it is imperative to adequately pre-mix the RegenOx Activator prior to mixing it with the RegenOx Oxidizer. Mixing the RegenOx Part B Activator with water at a ratio of roughly 1 gallon water per bucket of Activator makes the activator pourable and easier to work with. A Material Safety Data Sheet for Part A (RegenOx Oxidizer) and for Part B (RegenOx Activator) is provided with each shipment. Personnel who operate field equipment during the installation process should have appropriate training, supervision, and experience.

INSTALLATION PROCEDURES

1) Prior to the installation of RegenOx, any surface or overhead impediments should be identified as well as the location of all underground structures. Underground structures include but are not limited to: utility lines; tanks; distribution piping; sewers; drains; and landscape irrigation systems.

2) The planned installation locations should be adjusted to account for all impediments and obstacles.

3) Pre-mark the installation locations, noting any points that may have different vertical application requirements or total depth.

4) Set up the direct push unit over each specific point and follow the manufacturer standard operating procedures (SOP) for the direct push equipment. Care should be taken to assure that probe holes remain in the vertical.

5) For most applications, Regenesis suggests using 1.5-inch O.D./0.625-inch I.D drive rods. However, some applications may require the use of 2.125-inch O.D./1.5-inch I.D. or larger drive rods.

6) Advance drive rods through the surface pavement, as necessary, following SOP.

7) Push the drive rod assembly with an expendable tip to the desired maximum depth. Regenesis suggests pre-counting the number of drive rods needed to reach depth prior to starting injection activities.

8) After the drive rods have been pushed to the desired depth, the rod assembly should be withdrawn three to six inches. Then the expendable tip can be dropped from the drive rods, following SOP. If an injection tool was used instead of an expendable tip, the application of material can take place without any preliminary withdrawal of the rods.

9) In some cases, introduction of a large column of air prior to RegenOx application may be problematic. This is particularly the case in deep injections (>50 ft) with large diameter rods (>1.5-inch O.D.). To prevent the injection of air into the aquifer during RegenOx application, as well as to prevent problems associated with heaving sands, fill the drive rods with water, or the RegenOx mixture prior dropping the expendable tip or exposing the injection tool.

10) Open one of the buckets of RegenOx Part B Activator and pour/spoon the entire bucket of Activator into a small mixing bucket or tank, making sure that any Activator that settled in the bottom of the bucket was scraped out of the Activator bucket and into the mixing tank. Stir the Activator with the power drill mixer for roughly 2 to 3 minutes. Add roughly one gallon of water to the activator, and stir again for at least 2 to 3 minutes. The net weight of Activator in a bucket is 30 pounds. The pounds of Activator required for one vertical foot of injection can be divided by 30. Pour the stirred/mixed Activator into empty buckets based on that fraction. (For example, if 5 pounds of activator are required per foot, pour 5/30 or 1/6 of the contents into each of 6 empty buckets.)

11) Measure the appropriate quantity of RegenOx Oxidizer for each vertical foot of injection.

12) RegenOx % oxidizer in solution should typically range between 4% to 8%. Solutions up to 10% can be used, but flocculation of the solution prior to injection may result. Solutions with greater than 10% oxidizer in solution will result in excess reaction and flocculation prior to injection and are not normally recommended.

Into a 55-gallon drum or mixing tank, pour the required amount of water for one to four vertical feet of injection. The volume of water per injection location can be calculated from the following equation:

Volume of water (gallons/vertical foot of injection):

$$\frac{\text{RegenOx Oxidizer lbs/foot}}{(8.34\ \text{lbs/gal water})(\%\ \text{R}egenOx\_Oxidizer\ \text{solids})}\left[1-(\%\ \text{R}egenOx\_Oxidizer\ \text{solids})\right]$$

Tighter formations (clays and silts), and even some fine sand formations will likely require higher oxidant percentages since less volume can be injected per location. The following are guides to various RegenOx mixing ratios based on the above equation.

- to make a roughly 5% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx), use 22 gallons of water.

- to make a roughly 8% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx), use 13.5 gallons of water.

- to make a roughly 10% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx), use 11 gallons of water.

13) Pour the pre-measured quantity of RegenOx Oxidizer to make the desired target % oxidant in solution mixture into the mixing drum or tank. Mix the water and oxidant with a power drill paint stirrer to ensure that the Oxidizer has dissolved in the water.

14) Pour the applicable amount of the pre-mixed RegenOx Activator into the oxidant mixing tank or pump hopper. Mix the Oxidant and Activator using a power drill paint stirrer or hand paddle mixer for at least 5 minutes until a homogenous mixture is formed. After mixing the RegenOx mixture should be injected into the subsurface as soon as possible.

15) Do not mix more RegenOx material then will be used over roughly 1 to 4 feet of injection so as to minimize potential above ground reaction/flocculation prior to injection.

16) Transfer the contents of the mixing tank to the pump hopper using a gravity drain or a sump pump.

17) For some types of pumps, it may be desirable to perform a volume check prior to injecting RegenOx. Determining the volume displaced per pump stroke can be accomplished in two easy steps.

    a) Determine the number of pump strokes needed to deliver 3 gallons of RegenOx (use a graduated bucket for this)

    b) Divide 3 gallons by the results from the first step to determine the number of gallons of RegenOx delivered by each pump stroke.

18) Connect the delivery hose to the pump outlet and the delivery sub-assembly. Circulate RegenOx though the hose and the delivery sub-assembly to displace air in the hose.

19) Connect the sub-assembly to the drive rod. After confirming that all of the connections are secure, pump the RegenOx through the delivery system to displace the water/fluid in the rods.

20) Slowly withdraw the drive rods. Commonly, RegenOx injections progress at 1-foot intervals. However, continuous injection while slowly withdrawing single lengths of drive rod (3 or 4 feet) is an acceptable option. The pre-determined volume of RegenOx should be pumped into the aquifer across the desired treatment interval.

21) Remove one section of the drive rod. The drive rod may contain some residual RegenOx. Place the RegenOx-filled rod in a clean, empty bucket and allow the RegenOx to drain. Eventually, the RegenOx should be returned to the RegenOx pump hopper for reuse.

22) Observe any indications of aquifer refusal. This is typically indicated by a high-pitched squeal in the pump's hydraulic system or (in the case of shallow applications) RegenOx "surfacing" around the injection rods or previously installed injection points. At times backpressure caused by gassing will impede pump movement. This can be corrected by bleeding the pressure off using a pressure relief/bypass valve (placed inline between the pump discharge and the delivery sub-assembly) and then resume pumping. If aquifer acceptance appears to be low, allow enough time for the aquifer to equilibrate prior to removing the drive rod.

23) Repeat steps 13 through 23 until treatment of the entire contaminated vertical zone has been achieved. It is recommended that the procedure extend to the top of the capillary fringe/smear zone, or to the top of the targeted treatment interval.

24) Install an appropriate seal, such as bentonite, above the RegenOx material through the entire vadose zone. Prior to emplacing the borehole seal, we recommend placing clean sand in the hole to the top of the RegenOx treatment zone (especially important in holes that stay open). Bentonite chips or granular bentonite should be placed immediately above the treatment zone, followed by a cement/bentonite grout to roughly 0.5 feet below ground surface. Quick-set concrete should then be used as a surface seal.

25) Remove and clean the drive rods as necessary.

26) Finish the borehole at the surface as appropriate (concrete or asphalt cap, if necessary). We recommend a quick set concrete to provide a good surface seal with minimal set up time.

27) A proper borehole and surface seal assures that the RegenOx remains properly placed and prevents contaminant migration from the surface. Each borehole should be sealed immediately following RegenOx application to minimize RegenOx surfacing during the injection process. If RegenOx continues to "surface" up the direct push borehole, an appropriately sized (oversized) disposable drive tip or wood plug/stake can be used to plug the hole until the aquifer equilibrates and the RegenOx stops surfacing. If wells are used for RegenOx injection, the RegenOx injection wells and all nearby groundwater monitoring wells should be tightly capped to reduce potential for surfacing through nearby wells.

28) Periodically compare the pre- and post-injection volumes of RegenOx in the pump hopper using pre-marked volume levels. Volume level indicators are not on all pump hoppers. In this case, volume level markings can be temporarily added using known amounts of water and a carpenter's grease pencil (Kiel crayon). We suggest marking the water levels in 3-gallon increments.

29) Move to the next probe point, repeating steps 8 through 29. We recommend that the next RegenOx injection point be as far a distance as possible within the treatment zone from the previous RegenOx injection point. This will further minimize RegenOx surfacing and short circuiting up an adjacent borehole. When possible, due to the high volumes of liquid being injected, working from the outside of the injection area towards the center will limit expansion of the plume.

HELPFUL HINTS

1) *RegenOx Pump Information*

Regenesis has evaluated a number of pumps that are capable of delivering RegenOx to the subsurface at a sufficient pressure and volumetric rate. Although a number of pumps may be capable of delivering the RegenOx to the subsurface at adequate pressures and volume, each pump has a set of practical issues that make it difficult to manage in a field setting. In general, Regenesis strongly recommends using a pump with a minimum pressure rating of 200 pounds per square inch (psi) in sandy formations or 800 psi in silt, clay or weathered bedrock formations, and a minimum delivery rate of 5 gallons per minute (gpm). A lower gpm rated pump can be used; however, they are not recommended due to the amount of time required to inject the volume of liquids typically associated with a RegenOx injection (i.e. 1,000 lbs of RegenOx [500 lbs Oxidant/500 lbs Activator] require roughly 1,100 gallons of water to make a 5% Oxidant solution).

2) *Pump Cleaning*

For best results, use a hot water pressure washer (150 - 170 °F or 66 - 77 °C) to clean equipment and rods periodically throughout the day. Internal pump mechanisms and hoses can be easily cleaned by circulating hot water and a biodegradable cleaner such as Simple Green® through the pump and delivery hose. Further cleaning and decontamination (if necessary due to subsurface conditions) should be performed according to the equipment supplier's standard procedures and local regulatory requirements.

STATE OF NEW YORK
DEPARTMENT OF HEALTH
Flanigan Square 547 River Street Troy, New York 12180-2216

Richard F. Daines, M.D.
Commissioner

Wendy E. Saunders
Chief of Staff

April 21, 2008

Mr. Brian Davidson
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway - 12th Floor
Albany, New York 12233-7016

Re: **March 2008 Progress Report/Response to Comments**
Aramark Uniform Services
Site # V006657
Solvay, Onondaga County

Dear Mr. Davidson:

I have reviewed the *March 2008 Progress Report*, for the above referenced site, which included a response to the New York State Department of Environmental Conservation and Health's (the Agencies) comment letter dated November 19, 2007 on the Remedial Action Work Plan (September 2007). The proposed remedial alternative (in-situ chemical oxidation [ISCO]) has not been tested at the site yet. As such, the report title should be changed from a "Remedial Action Work Plan" to a "Pre-Design ISCO Pilot Test". However, I generally accept attempting to use ISCO to remediate soil, groundwater and soil vapor at the site.

Based upon my review of this progress report, the above mentioned modification (i.e., change to title and focus of document) as well as the following comments, should be incorporated into the revised work plan for Agency review.

3009 Milton Avenue vapor sampling

1. When available, please provide the Agencies with the validated data. Please ensure that the report for this sampling event should include the rationale for sampling the vacant structure and how sub-slab, indoor and outdoor air samples were collected.

Response to sampling indoor air at the site

1. Depending on the results of the bench scale and pilot scale tests and implementation of full scale ISCO treatment, and the proposed schedule for conducting the remedial work, a soil vapor intrusion (SVI) investigation may be necessary in the 2008/2009 heating season to assess the potential for exposure. If an SVI investigation is not planned, indoor air samples can be collected to assess current exposure. Please note that if the ISCO is not successful, the potential for exposures related to soil vapor intrusion will need to be re-evaluated and it may be necessary to collect indoor air samples while other remedial measures are being considered.

2. A revised schedule should be submitted prior to conducting the fieldwork.

1. Since monitoring of groundwater and soil vapor will be conducted inside the building, a fact sheet notifying the employees of the work being performed is recommended. This fact sheet should include, at a minimum, information about the known site contaminants, proposed activities, and contact information. Prior to conducting any work, please submit this draft fact sheet to the Agencies for review and approval.

Response to post injection monitoring

1. Once available, please provide the Agencies with Regenesis' evaluation of the loading rate and recommended injection spacing prior to the start of the pilot test.

2. Page 6 of the document states that if the pilot test is successful in significantly decreasing the contaminant load, the need for a sub-slab depressurization system will be evaluated. Please define the word "significantly". Please note that depending on the results of the ISCO injections, the need for a sub-slab depressurization system may not be necessary, other actions (e.g., monitoring) may be warranted.

3. Please explain how post injection soil samples will be collected since the locations of the soil borings will be converted to temporary monitoring wells (Figure 4).

Response to the Standards, Criteria and Guidance (SCG)

1. I agree that the use of chemical oxidation as a remedial option could reduce the contamination at the site. By using the sub slab concentrations beneath the on-site building to determine if soil vapors have decreased after ISCO injections is an acceptable screening tool for the pilot test. However, once the final remedy is determined, the target cleanup goal for soil and groundwater should be Part 375 soil cleanup objectives and New York State groundwater standards, respectively.

Thank you for the opportunity to review this letter. If you have any questions, please call me at (518) 402-7860.

Sincerely,

Julia M Kenney

Julia M. Kenney
Public Health Specialist II
Bureau of Environmental Exposure Investigation

cc: G. Litwin / M. VanValkenburg / file
G. Sauda / L. Letteney, Onondaga Co. DOH
G. Townsend – DEC Reg. 7
J. Aversa – DEC Central Office

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